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Advances in Information Technology and Its Application

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It is our pleasure to release this issue of RISTI - Revista Ibérica de Sistemas e Tecnologias de Informação. In this issue (Vol. 2015, No 16A) we selected 30 extended papers from the panel discussion on the Recent Development of Information Technology held in Guilin China in September 2014, which have gone through strict review and revision stages after extending the contents, and represent a cross-section of research in information technologies and artificial intelligence areas that touch both social sciences and engineering technologies.

This issue is mainly from research activities of scientific institutions in the People's Republic of China which reflects the particular scientific problems in the field of information technologies and artificial intelligence areas aiming to provide an advanced theory and application reference for relevant researchers and practitioners. The 30 extended papers cover information technologies and artificial intelligence in different research contexts, various approaches with research methods have been applied in order to reach the findings presented there. Moreover, they demonstrate the practical relevance of academic research in the information technologies and artificial intelligence areas.

We wish to thank all our reviewers and the editorial board members who have been contributing to the release of this issue by their devoted engagement. This good cooperation is expected to be continued in the future. We herewith also wish the readers of the journal can enjoy reading these papers as much as we enjoyed reviewing and editing this issue.

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Comprehensive Energy Saving Design of New Dwelling Construction in Hebei Rural Area

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Abstract: Rural residential energy saving and sustainable development have become a key and urgent problem thanks to the overall promotion of Chinese socialism new country side construction and deep-going implementation of energy saving as well as emission reduction. The simulation program based on TRNSYS transient system plays great role in designing comprehensive energy saving model of housing construction. Aimed at the geographical environment and climate characteristics of Hebei Province, this article carried out organic synthesis of TRNSYS system modeling key technology and housing comprehensive energy saving design, and designed a building comprehensive energy consumption calculating system that based on TRNBuild module. It established building model on the foundation of researching on Hebei rural residences; carried out load simulation computing hour by hour according to the three situations of architectural noumenon, attached insulation curtain as well as additional solar room; and analyzed energy-saving effect and economical efficiency. The actual measurement results indicated that this system could predict building comprehensive energy consumption accurately with obvious benefits in the comprehensive energy saving design of new dwelling construction in Hebei rural area.

Keywords: New dwelling construction; envelop enclosure; sunshine room; model; energy saving

1. Introduction

Heating air conditioning equipments will be more and more popular with the development of Hebei rural economy as well as peasants' improved requirements for living conditions. However, current rural residences in Hebei Province have not taken any energy saving measures with low thermal insulation property of envelop enclosure, which certainly will increase energy consumption sharply and is contrary to new rural construction, sustainable development and other national development strategies. Therefore, improve the thermal performance of envelop enclosure of rural residences in Hebei Province, lower residential energy consumption and promote residential thermal environmental comfort level are the primary tasks of current new rural construction in Hebei Province. Because building energy consumption occupies large proportion in various countries' energy consumption, people started to emphasize on it since the energy crisis in 1970s;

various countries (especially America, Germany, Britain and Japan) in the world invested large numbers of manpower, material and financial resources on building energy saving, carried out in-depth study of building energy saving and formulated a series of building energy-saving technical specification as well as policies and regulations by adjusting measures to local conditions. The upgrading of building energy-saving technology and implementation of energy-saving standards enabled building to achievement favorable effects in energy conservation. (Arunya R, Ranjith S, Umarani P, et al.,2015) Chinese work of building energy saving started later. With the implantation of Chinese socialism new countryside construction, relevant government departments and scientific research institutions started to pay attention to rural residential energy saving with carrying out many studies about it. Wang et al analyzed the technical economical efficiency of passive solar energy synthesis heating system in rural residences in cold areas(Seethal, K., Menon, D. M., & Radhika, N.,2015). Zhang surveyed and analyzed rural residential thermal insulation status in northern Shanxi, carried out one-dimensional steady-state heat transfer calculation on winter as well as summer thermal insulation of available walls in northern Shanxi by using finite element method, and designed a composite wall(Rghiou, A., Aziza, L., Elouaai, F., & Bouhorma, M.,2015). Xu analyzed rural residential roofs' cultural adaptability and climate suitability, and proposed appropriate roof sun-shade heat protection measures and two-layer composite insulation roof(Guo, H., Tang, J., Wang, D., Chen, F., & Lin, L.,2015). Zhu et al introduced optimal design strategy that combines new-type rural residential schemes with energy-saving technology.(Gundala, S., Ramanaiah, V. K., & Kesari, P., 2015) Since most rural residential energy-saving technologies remain at the stage of demonstration, how to popularize it and let peasant receive as well as use it is an issue that deserves research. Through taking Shijiazhuang as representative, this article carried out load simulation computing hour by hour on model application of TRNSYS according to the three situations of architectural noumenon, attached insulation curtain as well as additional solar room based on the survey of Hebei rural residences, and analyzed energy-saving effect as well as economical efficiency. It is conducive to driving the healthy development of Hebei rural residences, reducing environmental pollution, lowering rural residential demands of non-renewable resources (Runa, A. I. D. N. F., & Miranda, G. L., 2015), promoting rural residential comfort level and improving peasants' housing level.

2. Status of Hebei Rural Residential Energy-saving Measures

According to national standard "Civil Building Thermal Performance Design Specification", Chinese building thermal performance design can be divided into severe cold region, cold region, hot-summer and cold-winter region, hot-summer and warm-winter region as well as warm region. severe cold and cold regions all have demands of winter heating. With the improvement of people's living conditions, some hot-summer and warm-winter regions start to appear the demand of winter heating(Pratt, T. G., Chen, J., & Talebi, F., 2015). Among these areas with heating requirements, the solar energy resources in most regions are good; according to Chinese partition of solar energy resources, the solar energy resources in more than 2/3 heating areas belong to second class and above regions with all other heating areas, including northeast,

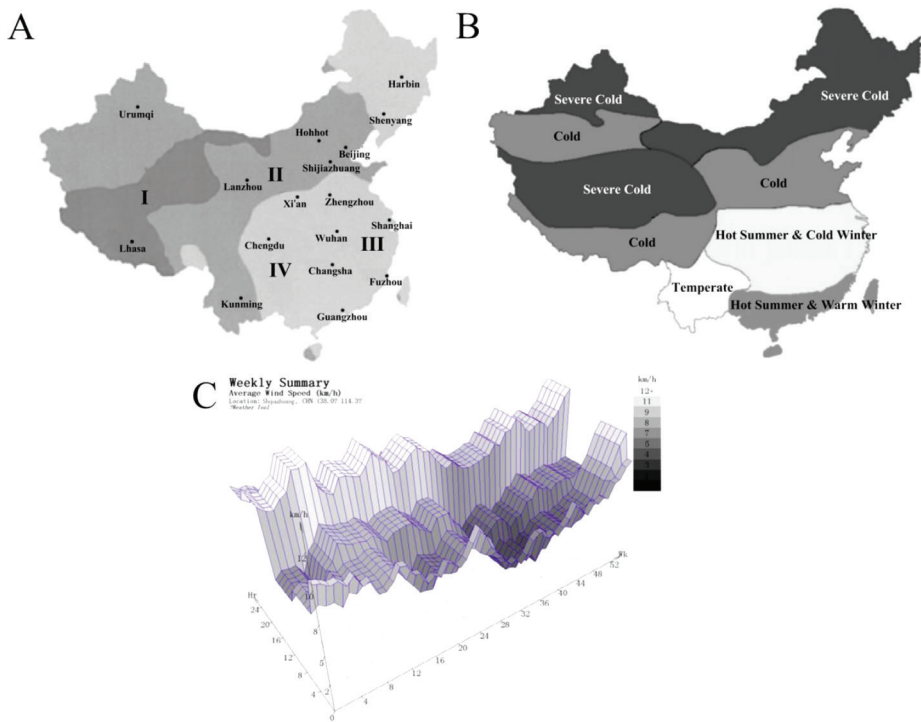


Figure 1 – Climate Survey in Hebei Province. A, China's Solar Energy Resources Zoning Map According to

Henan, great part of Jiangsu, Inner Mongolia, Hebei, Shandong, Shanxi, and Shanxi, belonging to third class regions (see Figure 1). Thus, the promotion of heating by solar energy resources and wind energy is one the good methods of energy saving as well as environmental protection.

meteorological data of 30 years from 1971-2000. B, China's building thermal partition map GB50176-93. C, average wind speed weekly of Hebei province.

Compared with cities, vast rural areas still adopt traditional heating installation or heatable brick bed to warm, which not only has low efficiency but also wastes more obvious application effect. Since most rural residences are one or two-layer independent architectural nomenclature with covered area not exceeding 200 m², the roof area is sufficient to install the solar thermal collector that satisfying design requirements. The application of solar heating can both improve indoor comfort level and reduce the usage amount of conventional energy resources. It would be a heating method that worth promoting if its economical efficiency was suitable (Sánchez, L., Ranilla, J., & Cocaña-Fernández, A., 2015). This article plans to carry out technical economical analysis on solar heating system in Hebei to find out a form of solar heating system that is suitable for rural areas.

3. Building Model

3.1. Introduction of TRNSYS

TRNSYS (Transient System Simulation) software is a transient system simulation program that firstly developed by Solar Energy laboratory (SEL) of American Wisconsin-Madison University and gradually perfected by joint study of some European institutions (CSTB, TRANSSOLAR). In addition, American Thermal Energy Systems Specialists (TESS) specially developed various modules that aimed at HVAC system.

TRNSYS consists of series of software, mainly including Trnsys Studio, TRNBuild, TRNEdit, TRNOPT, etc. TRNSYS software is a modularized dynamic simulation program. Modularization is considered to be composed by several small systems (modules) with each module realizing a certain function. Therefore, simulation analysis of system can be carried out only through calling the modules for realizing these specific functions and giving input condition. Since some modules will also use this when conducting simulation analysis on other systems, it does not need to realize these functions by programming procedures independently at this time for it can be achieved by calling these modules with giving specific input conditions(Holmes, D. S., Kadin, A. M., & Johnson, M. W., 2015).

TRNSYS software has following features: a) Module source code is opened; users can modify or write new modules and add to program data according to their demands; b) Flexible calculation and modularized open structure; users can establish any connection randomly according to their demands to form different systems of calculating programs; c) Form end user program to give convenience to TRNSYS users; d) The output results can output more than 100 systematic variations online and form EXCEL calculation file; e) Establish connection with EnergyPlus, MATLAB and other software.

3.2. Physical Model

Since China has not established the energy-saving design standard aimed at rural residences, and the requirements of “Building Energy-saving Design Standard in Severe Cold and Cold Regions”JGJ26- 2010 are too strict to rural residences with almost no building can meet them(Ganesh, N. S., & Srinivas, T.,2015), we established following physical model by using rural residential actual construction methods. For the screenshot of software model, please refer to Figure 2.

1. The building faces to the south with three rooms; the frontal width of each is 3.6 m; overall length is 10.8 m, spatial depth is 5.5 m, story height is 3m, south window-wall ratio is 0.3; other directions do not have window
2. The heat transfer coefficient of envelop enclosure as well as doors and windows, and specific procedures are shown in Figure 1.

Building envelope	Main materials	Heat transfer coefficient [W / (m ² ·K)]
Southwall	Cement mortar 20 mm Expansion of polystyrene 50 mm Porous brick 240mm	0.56
Northwall	Cement mortar 20mm Expansion of polystyrene 50mm Porous brick 370mm	0.50
Roof	Asphalt waterproof layer 5mm Cement mortar 20mm Expansion of polystyrene 80mm Reinforced concrete 100mm	0.46
Floor	Light color floor tile 5mm Cement mortar 20mm Fine stone concrete 40mm Expansion of polystyrene 20mm Moist insulation layer 5mm Fine stone concrete 30mm	1.30
Outside doors	/	2.0
Outside windows	/	2.8

Table 1 – Heat Transfer Coefficient of Building Envelope, Doors and Windows.

3.3.Simulated Situation and Condition

In order to analyze the effect of solar heating in different passive modes, this article selects TRNSYS software to carry out energy consumption simulation of the following three situations:

1. Architectural Noumenon
2. Architectural attached insulation curtain
3. Adding solar room to architectural south external wall

Basic Conditions:

1. 16 °C of Interior Design Temperature
2. The time of attaching insulation curtain is everyday from 18:00 to 8: 00 next day
3. Width of solar room is 1.2 m, the roof and wall are not transparent
4. Heating period is from November 15 to March 15 next year
5. Adopt the temperature and humidity as well as solar radiation in Beijing as meteorological parameters

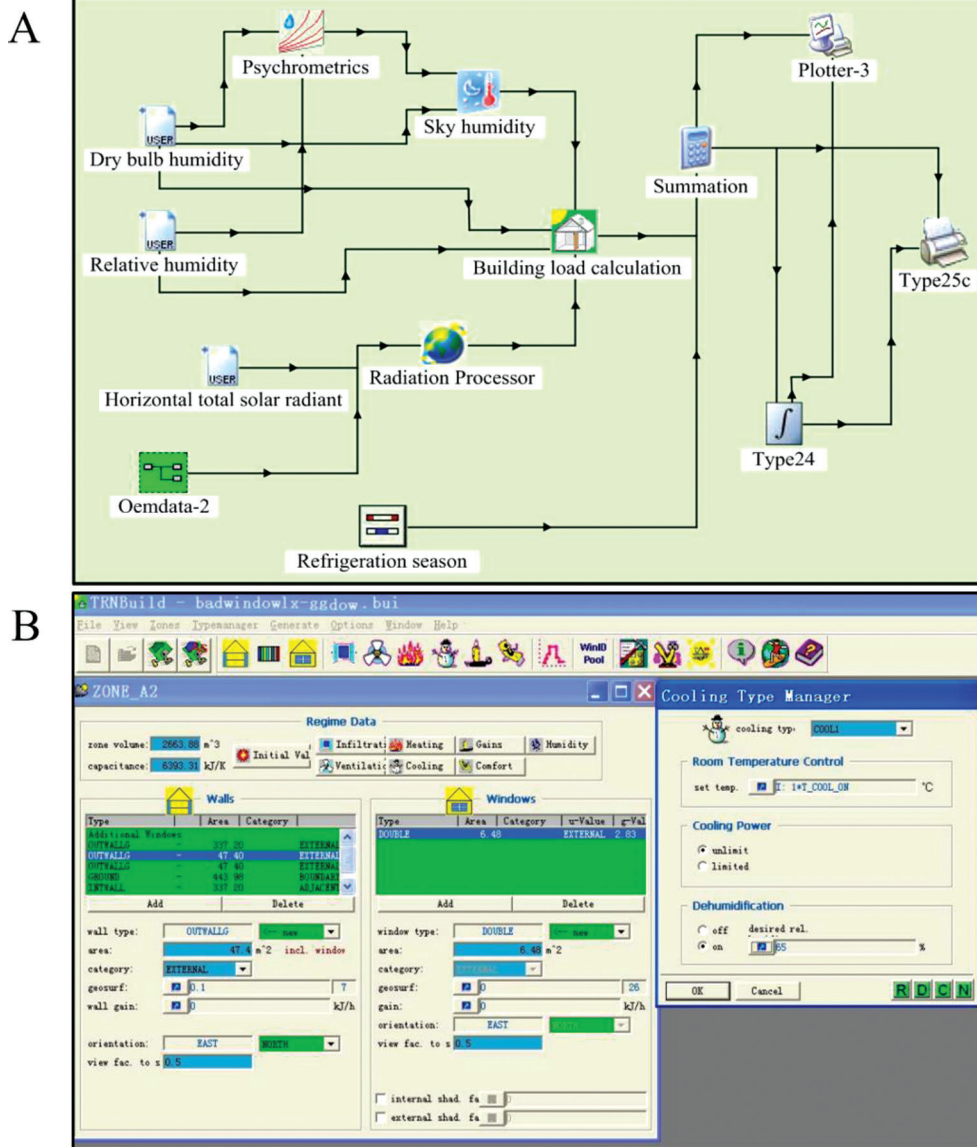


Figure 2 – Software Modeling Screenshots. A, Modular Dynamic Simulation Program. B, Parameter Setting of TRNBuild.

4. Simulation Calculation and Result Analysis

4.1. Direct Benefited Passive Solar Room

Because of the large external window of direct benefited passive solar room, it is suggested to add insulation curtains at night to reduce building energy consumption for the sake of saving energy and environmental protection. The resistance value of night thermal insulation recommended by “Chinese Passive Solar Heating Health Center” to Beijing and similar areas is $0.3 \text{ (m}^2 \text{ K) / W}$ (10. Hassan, P. F., Prakash, K. J., & Kirubakaran, V., 2015).

Since there is air layer existing between insulation curtain and window, the additional thermal resistance value at night shall be a comprehensive one after adding insulation curtains; according to heat transfer theory, it can be obtained:

$$R = \frac{1}{h_1} + \sum \frac{\delta}{\lambda} + \frac{1}{h_2} = \frac{1}{8.7} + \frac{1}{2.8} + \frac{0.15}{0.2} + 0.3 + \frac{1}{23} = 1.56 \text{ (m}^2 \text{ K) / W} \quad (1)$$

Thus, the entire thermal resistance value between insulation curtain and window is $1.56 \text{ (m}^2 \cdot \text{K) / W}$.

According to Table 2, it can be seen that building peak load and energy consumption reduced by 10% and 6% separately after adding insulation curtain.

	Window-wall ratio: 0.3	
	Ontological architecture	Adding insulation curtain
Peak load (W)	6170	5530
Energy consumption of heating period (kWh)	9230	8690

Table 2 – Simulation Results of Building Load and Heating Energy Consumption of Direct Benefit Type Solar House.

4.2. Additional Solar Room

The integral of hour-by-hour load during heating can acquire heating energy consumption within heating period; the building heating energy consumption of additional solar room is lower than that with setting insulation curtains. For detailed value, please refer to Figure 3 and Table 3

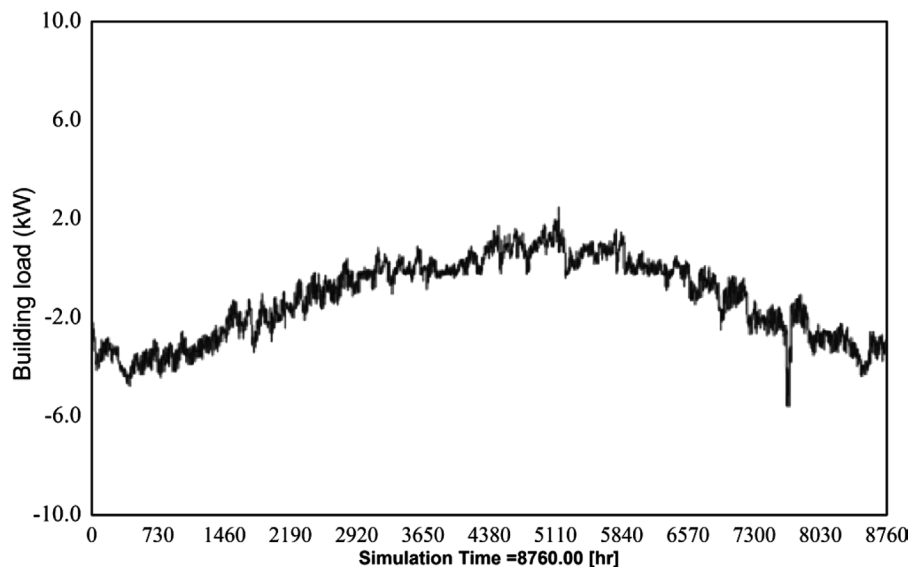


Figure 3 – All-year Hourly Load of Building After Adding Solar Room.

	Ontological architecture	Adding insulation curtain	Adding solar room
Peak load (W)	6170	5530	5120
Energy consumption of heating period (kWh)	9230	8690	8010
Load of unit building area (W / m ²)	104	93	86

Table 3 – Simulation results of building load and energy consumption throughout the year.

Based on the simulated data above, it can be known that compared with architectural noumenon, the method of adding solar room can reduce 17% of building peak load and 13% of building energy consumption in winter; its effect is more obvious than adding insulation curtains (Table 4).

	Ontological architecture	Adding insulation curtain	Adding solar room
Peak load	1	90%	83%
Energy consumption of heating period	1	94%	87%

Table 4 – Passive Solar Heating Effect on the Building Load and Energy Consumption.

5. Effect on Active Solar Heating System

5.1. Calculation of Solar Heating System

The design of building heating system shall calculate heating load and demand separately; as for the heating load, it shall in accordance with existing national standard of “Design Specification of Heating, Ventilation and Air Conditioning” GB50019; the heating demand shall calculate according to the provisions of “Design Specification of Building Water Supply and Drainage” GB50015. Take the larger result values as system design load. System design load is undertaken by solar heating system and other energy auxiliary heating/heat-exchange equipment together. Hereinto, the heating load undertaken by solar heating system is building heat consumption and the heating demand undertaken by solar heating system is the average heating consumption domestic hot water (Topalidou, M., Kase, D., Boraud, T., & Rougier, N. P., 2015; Levin, O., & Netz, Y., 2015; Valente, A. P., Pinho, P. D. C., & Lucato, L. T., 2015; Valente, A. P., Pinho, P. D. C., & Lucato, L. T., 2015). Since solar heating load is generally larger than that of domestic hot water, heating load is usually adopted as reference to determine system capacity.

5.2. Influence of Passive Solar Energy Technology on Solar Heating System

As mentioned above, the capacity of solar heating system is determined according to building heat consumption, whose steady station calculation, in the specification, is carried out based on the average outdoor temperature during heating period (Štilet, P., & Pavlović, M. D., 2015). Because this article adopted dynamic calculation, the model building’s average heat consumption can be obtained by the results through heating energy consumption diving heating duration. As for specific numerical value, please refer to Figure 4

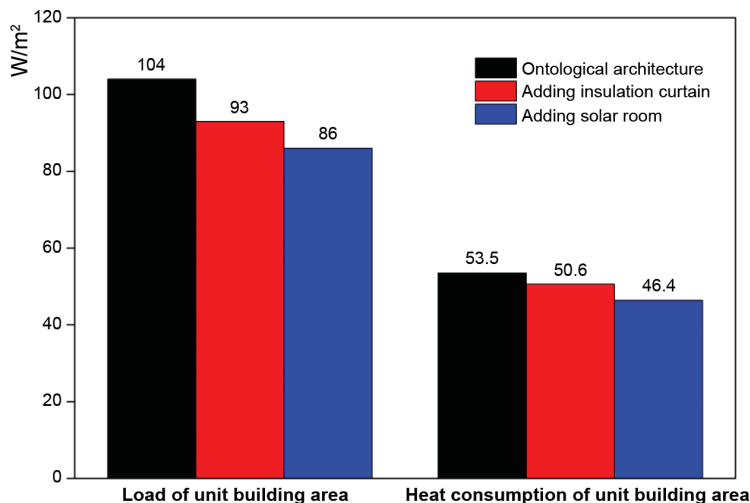


Figure 4 – Building heat consumptions under different scenarios.

It can be seen from Figure 4 that the reduction of peak load is larger than that of building heat consumption. The fractional energy savings of building energy consumption after adding insulation curtain and solar room are 6% and 13% separately. Therefore, 6% or 13% of solar heating system capacity will be reduced if building adopted the combination technology of active and passive solar energy with using passive solar energy heating.

6. Analysis of Economic Efficiency

6.1. Additional Thermal Insulation Cotton Curtain

Thermal insulation cotton curtain is a simple attenuator at night. According to the computed results, the insulation curtain can obtain favorable thermal insulation effect when the thermal resistance reached to $0.3 \text{ (m}^2 \text{ K) / W}$. Refer to the heat transfer coefficient and market price of Expansion of polystyrene, the price of insulation curtain is 60 yuan/m², which is 588 yuan in total for the model building in window-wall ratio of 0.3. If calculate the price of architectural noumenon in 1500 yuan /m², architectural total cost will be 89100 yuan. Thus, the increased investment of adding insulation curtain is 0.7% of total investment.

6.2. Add Solar Room

The energy saving effect of adding solar room is obvious because it can absorb lots of solar radiation, conduct it to indoor room and the air layer in the corridor can be applied as thermal resistance to weaken the heat exchange between air and indoor room. The building energy consumption during heating period of adding solar room is reduced by 13%, whose energy saving effect is more obvious than setting insulation curtain; however, its cost is also higher than insulation curtain. According to calculation, the cost of adding solar room in this context is 15000 yuan, which is 17/5 of building total price.

6.3. Comprehensive Analysis

The application of passive solar heating technology greatly reduced the capacity of solar collector system in solar heating system. According to the proportion that each 4 m² built-up area matches with 1 m² heat collector, the model building in this article requires 15 m² heat collector and the additional solar room reduced 13% of heat collector capacity and solar collecting system cost. This model saved 4875 yuan systematic initial investment if computed according to 2500 yuan of each square meter of heat collector. Remove the cost of solar heating room, the system shall increase 10125 yuan investment, which is equal to 10% of architectural construction cost. Since the energy-saving effect of adding solar heating room is obvious with reducing 13% of heating energy consumption, it is 6% of fractional energy savings superior to direct benefited passive solar room. The economic efficiency of additional insulation curtain is the best for it can save 6% of heating energy consumption without increasing construction cost. The construction cost of adding solar room is higher with occupying 17% of architectural cost, but its combination with active solar heating system can obtain 13% of energy saving effect through only increasing 10% of investment. As for the reconstruction project of existing building, the joint application of additional insulation curtain and solar room is recommended to acquire more obvious energy saving effect.

7. Conclusion

As an important component, the design of residential comprehensive energy-saving model shall be emphasized by computer technical development. Its characteristics of intuitional, safe and ecological has shown more perfectly due to the rapid development of TRNSYS transient simulation procedure features, including openness, flexibility, compatibility and non-professional operation. Aimed at the geographical environment and climate characteristics of Hebei Province, this article carried out organic synthesis of TRNSYS system modeling key technology and housing comprehensive energy saving design, and designed a building comprehensive energy consumption calculating system that based on TRNBuild module. It established building model on the foundation of researching on Hebei rural residences; carried out load simulation computing hour by hour according to the three situations of architectural noumenon, attached insulation curtain as well as additional solar room; and analyzed energy-saving effect and economical efficiency. The actual measurement results indicated that this system could predict building comprehensive energy consumption accurately with obvious benefits in the comprehensive energy saving design of new dwelling construction in Hebei rural area.

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Construction of E-commerce Business Platform for College Students

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Abstract: Since the arrival of a network economy era, a virtual market based on Internet has appeared and rapidly developed. This emerging market is global, virtual, and across time and space. After analyzing the present situation of campus electronic commerce, e-commerce hereinafter, and the development of entrepreneurial education of colleges at home and abroad, this paper designs an effective and practical e-commerce business platform for college students based on MVC design model. The platform applies knowledge of e-commerce, database application, Web service architecture in an integrated way. In order to make the platform more adaptable to college campus environment, and be able to cultivate more talents of specific fields, this paper uses genetic algorithm to upgrade the platform's Struts structure of, beatifies the view of page effect program (main.jsp), and simplifies the KeyAction module to improve the fluency and appearance of the platform. Empirical research proves that the e-commerce platform designed in this paper can facilitate university graduates entrepreneurship and employment.

Keywords: MVC; E-Commerce; Campus Environment; Entrepreneurship; Platform

1. Introduction

After China's higher education system reform, college graduates' difficulty in employment was rarely new to the public. But the economic turmoil triggered by the financial crisis in 2008 made it even harder for graduates to find a job. According to statistics, the employment situation in 2016 is not promising (Ydersbond, I. M., & Korsnes, M. S., 2016). Under the high employment pressure, the society must encourage college students to start their own business to create wealth and jobs, thereby offering them one of the important ways to face social challenges, decreasing the difficulty of university students' employment, and promoting the reform and development of higher education. College students' entrepreneurship must combine theory with practice, to truly realize their essential life value on campus. The construction of campus e-commerce platform can not only help students fully understand their challenges in aspects like information demand, competition, risk, but also cultivate their spirit of innovation and entrepreneurial ability, which is the necessary requirement on colleges and universities and the need of college students' individual development. Therefore, the present education community

is faced with challenges of great practical significance to build an entrepreneurship education system featuring integration of school, government, society, provide students an optimal environment, and train students according to requirements of the society, ensure students can find a proper job or seek better self-development opportunities by establishing their own business (Castela, N., Dias, P., Zacarias, M., & Tribolet, J., 2013). Experts at home and abroad put forward many proposals to upgrade website architecture. Some important studies are introduced as follows.

Nakayama, et al.(Hamad, M. N. F., & El-Moghazy, M. M. , 2015) suggested a method to optimize the site structure design by finding behavior differences between web designers and user. A graph demonstrating the relationship between website concept correlation and user access could reveal actual differences between designer's and user's behavior. For the sites which have high concept correlation is bigger but few visitors, adding links between web pages or set up index page can effectively improve link structure.

Yen and Fu (Jones L, Norton L, Austin Z, et al., 2016) put forward a structure adjustment method based on accessibility and popularity of website. It can be a reasonable adjustment on the topology of websites by making chart analysis on site accessibility and popularity to identify the site whose two parameters are inconsistent.

Garofalakis et al.(Tirol-Padre A, Rai M, Kumar V, et al., 2016) proposed a method based on web popularity dynamic adjustment web link structure. Its basic idea was: if the web page i has more relative visits than its direct upper site, exchange the link order of the two web pages link to order. A web page's direct upper site is identified according to the search tree of breadth-first algorithm. Repeat this operation until the relative visits of each web page are fewer than its direct upper page. This operation could damage the inherent logic relationship between web pages. However, the relationship can be maintained by keeping some web link relations unchanged.

Fuetal. (Gao L, Wang K, Xiao S, et al., 2016) put forward a method of restructuring the website. But this method only considered the local structure optimization of websites; it cannot achieve optimization of the whole structure of website.

Perkowitz and Etzioni (Kim S, Shi H, Lee J Y., 2016) defined the custom web site. Such a site can automatically adjust its structure by studying its visitors' access. But it may increase redundant index pages and lead to information overload for new users; while it may increase redundancy to access patterns for old users. In addition, as for technical implementation, it needs to continually acknowledge users' access patterns, which change dynamically. So it is difficult to accurately understand users' access behavior. What's worse, the great amount of calculation, the increase of pages, the server logs, and user browse history preservation are bound to increase the memory overhead.

Chang-chun Lin (Ma H., 2016) discussed the two aspects of web: page information overload and search depth: apply a planning refactoring website structure to establish optimization model and solve the model with mathematical method.

In this paper, the author puts forward a construction plan of campus e-commerce business platform system, and applies the MVC pattern to establish a platform suitable for students to start business in campus environment.

2. Campus E-Commerce Platform System

Campus e-commerce platform is a unique form of e-commerce platform. It mainly serves students, faculty and staff, and enterprises within campus. Since it is service-oriented and less commercial, it has its distinctive advantages. The overall framework of campus e-commerce platform system is shown in figure 1.

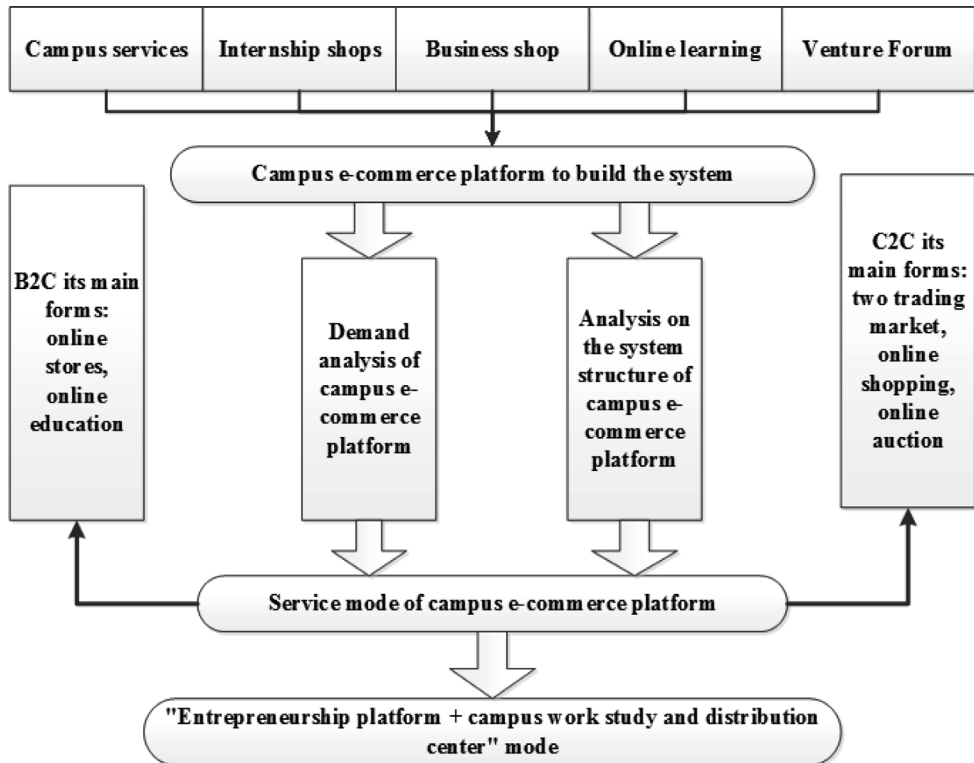


Figure 1 – Overall Framework of Campus E-commerce Platform System

As the platform is specially designed for campus environment, it depends on the campus network as its inherent hardware, with advanced technology and professional team consisting of students and teachers from computer major. It offers services to special community – college students. A survey was made on college students' cognition of e-commerce business. Among all students who were interviewed, 50.34% of them think that e-commerce entrepreneurship means e-commerce web sites and online store, 16.55% think it refers to Internet enterprise, and 25.52% think it is to develop cutting-edge multimedia project. Therefore, different respondents have different perception of e-commerce business. In a survey on college students' attitude towards starting up e-commerce, data reflects that only 6.9% respondents have no interest, and that a majority of students show entrepreneurial interests though they take no step because of

various reasons. It is logical to conclude that college students regard rationally. In table 1, 2, the differences between men and women are analyzed.

	Value	Df	Gradual Sig.(bilateral)	Accurate Sig.(bilateral)	Accurate Sig.(unilateral)
Pearson	4.886 ^a	1	0.027		
continuous correction ^b	3.986	1	0.046		
likelihood ratio	4.786	1	0.029		
Fisher exact test				0.033	0.024
Linear and linear combination	4.857	1	0.028		
Valid cases N	344				

Table 1 – Analysis of Gender Differences in Real Business

	Value	Df	Gradual Sig.(bilateral)	Accurate Sig.(bilateral)	Accurate Sig.(unilateral)
Pearson	5.166 ^a	1	0.023		
continuous correction ^b	4.411	1	0.036		
likelihood ratio	5.221	1	0.021		
Fisher exact test				0.026	0.018
Linear and linear combination	5.130	1	0.024		
Valid cases N	344				

Table 2 – Entrepreneurial Interest in Men and Women

In some aspects, the main participators are students who play the roles of entrepreneurial user but also administrative user. Teachers are also main users second to students. Then, the required function will be analyzed taking two groups of users into consideration. The main function of the system is as follows:

2.1. Campus Service

Campus service is a platform in which students and teachers can learn and communicate, or release news. It can also offer financial assistance to students from low-income families.

2.2. Intern Store

Intern store is a system platform designed for users to experience an array of functions, including registration, log in, view and purchase commodity, and confirm receipt ultimately.

2.3. Venture Store

Venture store is a platform system for real entrepreneurship. Figure 2 shows its logical model in detail.

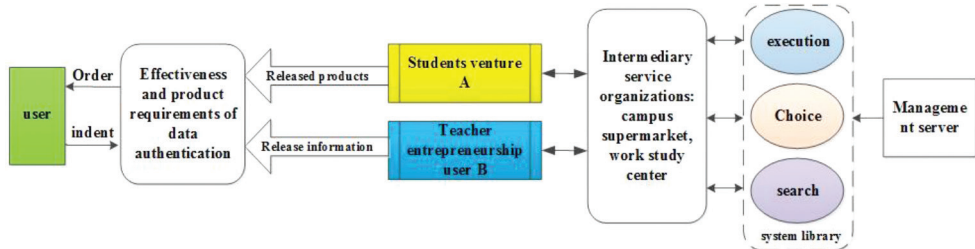


Figure 2 – The Logical Model of the Venture Store

2.4. Online Learning

This platform is designed for students to communicate with one another and learn courses like General e-commerce, website construction, website design and e-commerce security, thereby enhancing students' understandings on e-commerce environment, e-commerce entrepreneurship, and e-commerce security

2.5. Entrepreneurs' Forum

On entrepreneurs' forum, users can talk about their entrepreneurial goals and experience, or share their happiness after success.

3. Design and Construction of Entrepreneurship Platform Based on MVC

First, make sure that the system applies B/S model; then, based on MVC design model or Struts framework (Ankerson M S.,2016), and the principles of hierarchical design, confirm business logic layer, presentation layer and control layer. The following is detailed design.

3.1. View Design

System mainly includes login.jsp, Main.jsp, Practice.Jsp, Pioneer.jspetc. The program showing login page is the login.jsp. The names of form elements in this page correspond to the property names of the controller component UserForm. The program showing login success page is main.jsp. This program obtains the user name which is recorded in controller component UserForm after a successful login via the getAttribute ("formBean1") method of the "request" object, demonstrating the information of campus e-commerce platform page. If no value of the UserForm can be obtained, the user will be recognized as illegal.

3.2. Controller Design

This system involves two controllers. One serves as control center, LoginAction components conducting page orientation based on different results of authentication; the other one is KeyAction components responsible for receiving the data submitted in the data table of view component (Benslimane D, Sheng Q Z, Barhamgi M, et al., 2015). LoginAction is a subclass of Action. The execute() method is overridden in the LoginAction. Based on the setting in the configuration file, the object's main responsibility is to process requests sent from view, and conduct authentication by using the form data of Actionforms object.

3.3. Model Design

System defines two model components: UserLoginLog and DBUser. UserLoginLog is a JavaBean, which mainly completes the business logic for logging. Namely, it writes the login user name and password successfully down into specified log file. DBUser encapsulates the business logic related to database operations (Xiao B, Benbasat I., 2015).

3.4. Configuration Design

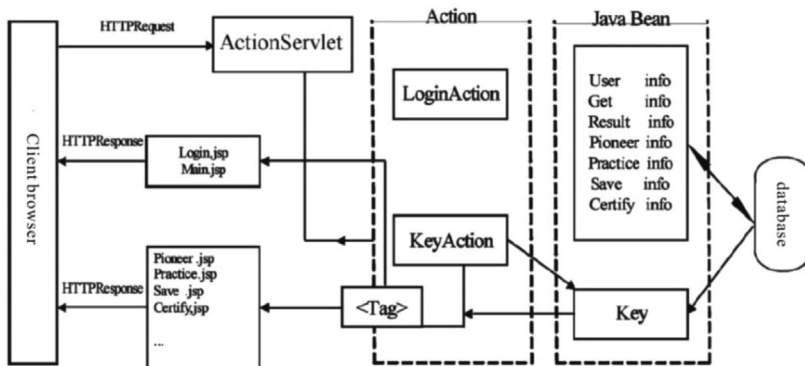


Figure 3 – Architecture Based on MVC

Two main files are included: Web.xml and Struts - config.xml. The web.xml is a general configuration file for Web applications. Its main function is to complete the configuration of ActionServlet and to set up default home page. Struts - config.xml is the core of the whole Struts framework. It is used by developers to assemble components and to establish the whole application context (Jiang X H., 2015). This document has equal function as a regulation and control center in the development process of a large project. The configuration file completed the configuration of ActionFormBean, ActionForward and Action Bean. The specific design architecture is shown in figure 3.

The detailed calling procedure is as follows. After a user enters business store module, LogonAction first verifies whether the user has logged in; if not, the user will be

redirected to the login page (Logon. JSP). After verification, request parameters will determine the next step. If the user has not chosen which startup store to register, he will be redirected to the Main interface (Main. JSP), and choose his own store requirements according to his need. After the information is submitted, GetInfo object will generate detailed information of the user through the ActionForward of struts config. Xml, save it to the FormBean, and call the JSP page to display the data in the Bean (Sasidharan S., 2015). At the same time, SaveInfo object will be called to save startup user information and store information into the database. After the user completes the whole procedure, system will view the correct answer by keyAction and provide feedback to the user, calling Resultinfo to produce store information and saving the SaveInfo objects into the database.

4. The optimization, Logistics and Payment Model of Campus E-commerce Business Platform

4.1. The Optimization Model of Campus E-commerce Business Platform

E-commerce site is designed in tree reticular structure by using hierarchical method; the logical level and sequence relationship between its node pages is clear. But it needs to deal with the scattered and complicated data and information between businesses and consumers, and has more pages and more complicated link structure compared with the ordinary web site. Therefore, it has more problems in practical application. Based on the above analysis, this paper established optimization model. By adjusting the logical structure position between pages, this paper wants to improve the efficiency of web links, further optimizing the site.

Suppose that the logical structure of an e-commerce platform is signified by digraph $G = (V, E)$, and that the quantity of diagraph's node is n . The set of node is $V = \{v_i, i = 1, \dots, n\}$, suggesting that the website has n pages; The set of edge is $E = \{< i, j > | v_i, v_j \in V\}$, representing the whole links between pages. $< v_i, v_j >$ is a link from v_i to v_j , $v_i \in V, v_j \in V$.

Suppose constant value $a_{ij} = \begin{cases} 1 \\ 0 \end{cases}$, $i, j = 1, 2, \dots$

n represents the basic link structure of e-commerce website.

Define decision $x_{ij} = \begin{cases} 1 \\ 0 \end{cases}$, $i, j = 1, 2, \dots, n$

To increase the access efficiency of e-commerce website, the optimization of this paper is aimed at maximizing access frequency, taking the following three constraint conditions into consideration:

- (1) The basic e-commerce site link must remain unchanged. Since it is designed according to the importance of commodity, the logic must not be damaged.
- (2) Avoiding the overload of user's information is to limit the number of links and the degree of node in the digraph. That's because a web page with too many links may cause information overload to users. Certainly, different pages can have different quantities of links.

(3) The depth of access path refers to the depth of the graph, namely to find the shortest path sub graph in the graph of website structure. The access path depth contains the shortest distance from the home page to each page. The purpose of shortening the depth of structure graph based on users' actual needs of access is to reduce the path length to visit a web page.

The detailed optimization model is as follows:

$$\text{Max} \quad \sum f_{ij} x_{ij} \quad \langle i, j \rangle \in E \quad (1)$$

$$\text{Subject to} \quad x_{ij} - a_{ij} \geq 0 \quad i, j = 1, 2, \dots, n \quad (2)$$

$$\sum x_{ij} \leq d_i \quad v_i \in A(v_i), i = 1, 2, \dots, n \quad (3)$$

$$y_{ij} \leq x_{ij} \quad \forall \langle i, j \rangle \in E \quad (4)$$

$$l_i + m(1 - y_{ij}) \geq l_j + 1 \quad \forall \langle i, j \rangle \in E \quad (5)$$

$$\sum y_{ij} \leq 1 \quad v_i \in B(v_j), j = 1, 2, \dots, n \quad (6)$$

$$l_j \leq l_i \quad \forall v_j \in V \quad (7)$$

$$x_{ij}, z_{ij}, a_{ij} = 0, 1 \quad l_i \geq 0 \quad (8)$$

d_i represents the maximum degree allowed by node v_i . $A(v_i)$ signifies the subsequent node set of node v_i . l_i suggests which layer node i lies in the diagram. The depth of digraph G is named L . From the chart, the shortest path spanning tree from the home page to other pages can be found. The tree is a sub graph of the structure diagram. To illustrate this question, another variable y_{ij} whose value is 0-1 is introduced to represent an edge of the shortest path from page v_i to v_j . If $y_{ij}=1$, the shortest path from page v_i to v_j is an edge of the shortest path spanning tree. Otherwise, it is not. $F = \{f_{ij} | i, j = 1, 2, \dots, n\}$ is the set of users' visit frequency. Equation (1) is optimized objective function. Constraint condition (2) means that basic links of the website cannot be deleted. Condition (3) shows that the degree of each node must be smaller than the biggest degree of this node. Condition (4) suggests that in the chart only the link between page v_i and v_j can be an edge of the shortest path spanning tree. Condition (5) indicates that the shortest path spanning tree includes all the nodes. Constraints condition (6) requests that $l_j \geq l_i$ is the premise of the existence of links from v_i to v_j and that m must be a positive number large enough. Constraints condition (7) requests that the layer number of all nodes must be fewer than the depth of predefined figure L .

E-commerce site optimization model takes into consideration the website's basic link, the number of links and the depth of access path depth. It can not only protect the basic link structure from being damaged but also reduce users' information overload and page search depth, thereby improving the efficiency of site visit.

In order to realize the optimization model of e-commerce sites, it is necessary to obtain the relevant data required by the model, including e-commerce site structure optimization model (Zhang S, Xiong W, Ni W, et al., 2015) and algorithm research station's existing logic structure and access frequency of links.

4.2. The Logistics and Payment Model of Campus E-commerce Business Platform

Considering the small distribution range, relatively concentrated business, and single shipping method in the campus, it is not suitable to apply logistics distribution. To reduce manpower cost, an independent campus distribution model is believed to be the best choice (Zhang S, Xiong W, Ni W, et al., 2015). In this model, several distribution locations in campus are set up and consumers' shopping information is obtained in advance. The distribution staff will deliver goods to distribution locations. All the staff is students from low-income families. This distribution model gives them an opportunity to earn money and practice their abilities. As for payment, since the living area of teachers and students are small, the platform must choose simple, safe and efficient payment methods, such as by cash or campus card. The participation of financial institutions is not needed.

5. Conclusion

As an important approach to encourage college students to start their own business and to enter the society, e-commerce platform should get much attention of computer technology development research. With the constant improvement, college students' e-commerce service will be increasingly simple, safe and efficient. This paper designs an effective and practical e-commerce business platform for college students based on MVC design model with integration the characteristics of the campus e-commerce operations and general method to build e-commerce platform. The platform's structure consists of four layers: Struts framework optimization via genetic algorithm, beautification of page effect program main.jsp, simplification of KeyAction components so as to improve the fluency and appearance of this platform for the sake of user's convenience. The e-commerce platform designed in this paper is equipped with perfect service module. It can not only meet the needs of consumers but also quickly find employment and appropriate jobs for college students. It provides a good sample for campus e-commerce business platform, offering practice environment for college students and important approaches to alleviate their employment pressure.

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Application of Cross Cultural Communication In English Teaching Based on the Combination of Cloud Technology

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Abstract: The application of cross cultural communication in English teaching with the combination of computer technology was carried out. Methods: theoretical study; the application of intercultural communication in College English teaching should follow four principles: the principle of relevance, the principle of order, the principle of contrast and the principle of culture teaching. In the application of intercultural communication in English teaching, four kinds of effective methods were put forward: the introduction of the classroom setting, the creation of context, the help of the multimedia and the homework. the application of cross cultural communication in English teaching with computer technology has potential problems, and it will be resolved. the application of the cross cultural communication in the English Teaching of computer technology can provide a reference for the reform of College English teaching and promote cross-cultural communication.

Keywords: Cloud technology; Cross cultural communication; English teaching

1. Introduction

Intercultural communication has potential long-term interests in international communication, as a part of College English teaching reform, cross cultural communication and its application in College English teaching and learning are concerned. It is necessary to study the application of intercultural communication in College English teaching and learning through effective use of cross - cultural communication means to improve students' ability to communicate effectively with their international communicative competence. Some linguists have carried out the research on the practice of intercultural communication in China and made some achievements, such as Jia Yuxin's "cross cultural communication", Guan Shijie's "Intercultural Communication" and Hu Wenzhong's "Introduction to intercultural communication", etc.(Abolfazli, S., Sanaei, Z., Tabassi, A., Rosen, S., Gani, A., & Khan, S. U., 2015). The study of these scholars is focused on the use of cross - cultural communication. After more than ten years' teaching practice, the theory of cross cultural communication has been developed, and has been widely used in college education. In recent years, with the

development of cloud technology, cloud technology and cross cultural communication. The application of cloud technology to Computer Assisted Instruction's teaching mode, which will be beneficial to the growth of students in English Teaching in cross cultural communication(Nookhong J, Wannapiroon P., 2015).



Figure 1-Cloud Computing

From the viewpoint of Krashen Stephen's "monitor mode", this paper discusses the importance, principles, methods and potential problems of cross cultural communication in College English teaching based on cloud technology(Mandhala V N, Gupta N Y., 2014).



Figure 2- Cross Cultural Communication between Students

2. College English Teaching

2.1. Intercultural Communication Problems in College English Teaching

Intercultural communication and foreign language teaching are inseparable. This is because foreign language teaching is not only to teach language knowledge, but also more important is to cultivate students' communicative competence, and cultivate their ability to cross cultural communication. From this point of view, the foreign language teaching is regarded as a part of the cross culture education. In the mid-1980s, China's College English education unified developed teaching outline, unified the sets with the syllabus textbook, 87 years began the implementation of CET 4 and CET 6(Merkin R, Taras V, Steel P., 2014). These are of large area of English teaching to a positive role in promoting. However, due to the deep development of reform and opening up, China is rapidly moving towards the world, and the society has put forward higher requirements on the English application ability of college graduates. According to the survey of Zhejiang University in 1993, the requirements of the society for undergraduate students to listen, speak and write are 67.25%, 71.11% and 61.48%, however, in these areas, our education is obviously lagging behind (Wolf, H. G., & Polzenhagen, F., 2006). On the one hand, the examination oriented education has brought about considerable negative influence, on the other hand, the traditional foreign language education idea also deeply bound our teacher's hands and feet. China's students, from primary school to university, and some of them are still in the doctoral level, a total of more than ten years of learning English, most of the time and energy spent in the dictionary, remember words, analysis of sentence structure (Karahasanoglu, S., & Skoog, G., 2009). For Chinese students, with vocabulary and grammar knowledge can be read, you can cope with the exam, but, in cross-cultural communication will often appear problems. These situations reflect the problems in foreign language teaching in a certain sense (Lee A L, Mader E M, Morley C P., 2015).

Question 1: the study of grammar and vocabulary as a foreign language learning. Such education out of the students not only sent out the ability to send information, even the ability to obtain information is also very poor, comprehensive communication ability (Jiménez, D. L., Redchuk, A., Dittmar, E. C., & Vargas, J. P., 2013).

Question 2: the learning method is old, I saw the forest. The influence of the traditional square Chinese characters learning, learning a foreign language is every rhythm, too observant of conventional standards. Attention tends to focus on the understanding of words and sentences, but less attention to the text; often the reception of information, ignoring the issue of information.

Question 3: comprehensive language ability, but the ability to cross cultural understanding, lack of social skills. When the language ability to improve to a considerable level, cultural barriers will be more prominent. Language mistakes are easy to get to the other side of the understanding, and pragmatic failure, cultural misunderstanding often lead to friction, and even lead to communication failure. A foreign language is very fluent, often hidden behind a cultural illusion, so that people mistakenly believe that he also has the cultural background and value of this language, his pragmatic failure, sometimes it is a deliberate act of speech, so the potential risk of conflict is also the largest.

2.2. Intercultural Communication in College English Teaching

With the development of globalization, the study of language and culture in China has been deeply studied, especially in the eighty's of the last century, the rise of "culture fever" and "reflective hot", which laid a good foundation for the study of cross culture. Professor Jin Huikang pointed out that the intercultural communication between Chinese and English will become the main trend of globalization." (Wolf, H. G., & Polzenhagen, F., 2006) At the same time, every country has its own unique language, culture and customs, each language is its culture of a mirror, reflecting the specific cultural characteristics. The specific cultural connotation of the social culture in the second foreign language learning to pay attention (Logan S, Hunt C., 2014).

The majority of foreign language teaching staff have a deep understanding of the close relationship between language and culture, in this understanding, based on the combination of language and culture teaching, put forward the concept of cultural teaching. However, a lot of foreign language teachers in the sense of cultural teaching is not very clear, so "teaching in the specific cultural information dissemination, but neglect the use of language and cultural information." Practice shows that this method has delayed the process of English learning, and is not conducive to the cultivation of intercultural communication competence (Nickerson, C., 2005).

In College English learning, with the increase of age, the students have more interest in the language behind the more information, at the same time, it will give the corresponding rational thinking and exploration. In English, a word, a phrase or even a sentence may load a large amount of cultural information in the English language. Connecting the words according to the meaning of the surface can not guarantee the full and accurate meaning of the word. The use of language, but also pay attention to decent, cultural rules for language appropriateness or not plays an important role. Do not understand these, it is possible to produce cross cultural misunderstanding, misunderstanding and conflict.

The two foundations of the modern western civilization are the Greek Rome culture and christianity. To learn English well, at the same time, pay attention to the important cultural pillar of the language. Among them, as the representative of culture, "ancient Greek Rome myth is the cradle of western humanistic spirit, is now one of the foundation of Western civilization, is the western literature, art and other subject matter, but also an important source of English idioms." Greek and Roman culture is the world cultural heritage, on the development of European literature and art play an important role, of Western civilization, the gorgeous and colorful, and has left behind the rich allusions and idioms in the English expression. Even more important, many of the words and the ancient Greek and Latin languages have a long history in English. For Christianity, regardless of whether the Chinese people believe in or not, as a part of the culture, students need to understand, teachers also have a responsibility to explain the introduction. Therefore, it can achieve good teaching effect in the process of Teaching College English.

3. Cross Cultural Communication in English Teaching

In practice, the application of scientific principles to cross cultural communication in College English teaching. High Dongjun and Hai Bo Shen believes that the

implementation application of intercultural communication in College English teaching should follow the four principles, that relativity principle, order principle, comparative principle and culture teaching supplemented by principle.

3.1. Relevance Principle

The principle of relevance is that the introduction of cultural factors is closely related to the text or daily life. Students can easily accept the knowledge of language and culture. In the classroom, teachers can choose different imported materials for different majors. In the new perspective of College English reading and Writing Tutorial (First Edition) third volume of the first unit of the “Lord Williams expensive fantasy”, for example, when the Scotland area, the teacher can import the Commonwealth Constitution of the relevant knowledge; the public management college students to the “Lord”, a brief review of the British feudal hierarchy, so that students understand their impact on the existing government. When the Law School of the students talked about Scotland, teachers can import and the British legal system of knowledge; the students of the College of the greed to explain the word “greed”, the origin of the Central Plains and the relevant content is a good choice. Through the introduction of relevant information, not only allows students to feel the charm of different cultures, but also to cultivate the habit of thinking of their association, so that students learn to read a comprehensive and comprehensive look at the problem. The introduction of related culture can also help to active classroom atmosphere, open up the students’ perspective, and cultivate students’ innovative thinking.

3.2. Order Principle

Two language acquisition related theory in the birth of a great influence. As one of the innate theory, the “natural order hypothesis” (“the model” of the part), in the scientific teaching order. He said, “as the first language learners, the second language learners acquire the characteristics of the target language seems to follow predictable order”. Cultural learning takes language learning as the carrier, and the learning of cultural knowledge and mastering the general follow from easy to difficult. For the students of grade one of College English teaching, teachers can choose general knowledge of British and American cultural presentation materials, strong interoperability, second grade and high grade students already have some British and American cultural background knowledge accumulation, choice of materials into the cultural content should be is not the same as in the initial stage, such as “newly compiled English Extensive Reading Course (3) teaching content is completely different to the first two volumes, once upon a time, two volumes are cultural environment introduction to discussion of the tiny things in daily life. Teachers should explain the cultural differences and provide clear information to the students. When it comes to body language, teachers can by way of non language communication, such as posture, gestures, facial expressions, or to explain under the cross culture background in the specific context of different meanings; mention of animal, teachers can list different cultural environment in the people of the same animals good evil, supplement of animal proverbs and idioms; referring to the history, teachers can introduce the history of British and American literature, listed some famous writers and their works, and stimulate students interest in learning. Through the gradual introduction of culture, students have accumulated a certain basic knowledge of intercultural communication, and their intercultural communicative

competence has been promoted. On this basis, the teacher can further guide them to explore more complex cultural phenomenon.

3.3. Contrast Principle

Comparison of two cultures to find their similarities and differences. From the perspective of cognitive psychology, learners are more receptive to the similarities between the two cultures, rather than the differences. In the teaching of teachers should take a variety of means to explain the differences between the two cultures, so that students understand and flexible use of cultural knowledge. Usually these differences are not in the Chinese language or not completely equivalent to the corresponding language, teachers should add some background information to further illustrate. For example, to talk about the word “Gospel”, only to explain it as “good news” for students, teachers can be added to the relevant knowledge of Christianity to explain; friendship in the eyes of westerners are more temporary, but in the eyes of Chinese people is lasting. In addition to the corresponding language should also discuss some of the conventions agreed. Customs as a potential cultural phenomenon, reflected in all aspects of life, in cross-cultural communication in violation of foreign customs will make each other unhappy, destroy the harmonious atmosphere of communication. A certain custom of the master of the Chinese students and Westerners to communicate and exchange. For example, “good morning!” this greeting in the west can be used in the twelve points before the meeting; formal occasions, regardless of the teacher more easy-going, students should be the title with the full name of the way, can not just use the name; meeting should be on time to attend, but if invited to someone’s home for dinner, it is best to 5 to 10 minutes; don’t want to increase intimacy by the topic, because it is not realistic. In many cases, the different understanding of the same expression is the cause of the failure of intercultural communication (Karahasanoglu, S., & Skoog, G., 2009).

3.4. Principles of Culture Teaching

Culture teaching in language teaching is a necessary component. It enriches the students’ language knowledge, and makes the learners have good communication ability. However, cultural education should be subordinated to the language teaching, and it is a useful supplement to it. Language if it is a tree, culture is a branch. Too many branches will affect the growth of trees. Language learning too many of the cultural introduction will interfere with the learning of students, the impact of the formation of their communication skills. Teachers should pay attention to the balance of language teaching and culture teaching in the course of teaching.

4. The Application of Cross Cultural Communication in English Teaching With the Combination of Cloud Technology

The “Affective Filter Hypothesis” (a part of the “monitoring model”) emphasizes the learning process in real life, and points out that teachers should reasonably grasp the classroom to increase the students’ learning motivation in order to achieve effective learning. In the face of comprehension input, the learner’s learning motivation is weakened or enhanced, which may lead to the failure or success of the two language

acquisition, which will in turn affect the learning motivation and continuous cycle. According to this theory, it is necessary for teachers to find an effective way to motivate students. The four kinds of effective methods, such as the introduction of the classroom setting, the creation of context, the help of the multimedia and the homework and so on, provide a clear idea for the teachers' classroom teaching.

4.1. Import Type Classroom Setting

Chinese students learn English in the classroom, the lack of language use of the big environment, encountered in the western culture of knowledge, they will feel at a loss, to a certain extent, affect the students learning process. Therefore, it is necessary for teachers to choose the appropriate teaching method in the classroom and to import the cultural knowledge active classroom atmosphere. In the listening class, too many of the listening materials and tasks will increase the students' learning pressure, teachers' culture is interesting, such as the material, teachers can give examples or by playing video clips to illustrate the similarities and differences between Chinese and Western culture time concept, but also by strengthening the time consciousness to enhance students' listening and speaking ability. In reading and writing, the learners will encounter all kinds of cultural elements of English, in this sense, reading and writing itself is a cross cultural exchange activities. Cultural factor is an effective way to help teachers achieve the teaching objectives. When the two cultural elements involved in the time and the friendship, the teacher can use different ways to deal with and import. Teachers can divide the students into groups, let them read the article about the concept of time, they have been asked to write a summary and a small speech; topic talked about friendship, teachers can allow students to write to my friend. In class, you can use the multimedia teaching as much as possible.

4.2. Creating Context

The effective way of language learning is to create a real context, which is related to culture, and it can make communication more smoothly. In the course of teaching, the teacher should not only clearly explain the relevant cultural factors, but also can improve the students' learning motivation and deepen the students' understanding and use of cultural phenomenon. Classroom observation found that students are more likely to be active in the classroom, especially the role played by the activities. Role play, students simulate real life, according to the task to create dialogue and use of non language communication. Teachers should be in a timely manner after the role play, to further emphasize the use of language in a specific cultural environment. Ellis (Ellis) proposed method of using teacher feedback in group activities. From the first team member, each team member has the opportunity to re integrate the given information, the group members repeatedly re - re - reshaping the given information content, clear or direct correction of the information after the re. The above method is only the last activity requires teachers to participate. Role play, students can help the team to correct the syntax errors and cultural ideas. After the role play, the teacher about the cultural idea of the two school is proportional to the previous correction of the panel members of the correction can give students a deep impression. This kind of group activities, the deviation of the students' context directly reflects their understanding of the culture and the role of the role of the target culture and the role of the distribution.

4.3. Multimedia Assistance



Figure 3 – Multimedia Teaching

In the context of the text of the text to improve the information of the input number and speed. The carrying capacity of the information in the multimedia courseware is incomparable to the paper plan. Introduction of background knowledge. The extension of the text content can be accomplished through multimedia courseware. The vast Internet provides a lot of knowledge about English learning (Zhu W, Deng X, Li J., 2014).

The teacher can add the content of the text to the multimedia courseware. The application of information technology to the expansion of knowledge, deepen the understanding of the knowledge has played an invaluable role. Through the network of teachers in the classroom can not digest and understand the problems left to students, students in the classroom to find the answer (Merino, J. A., & Lasagabaster, D., 2015). Multimedia technology has also increased the opportunity for students to study independently. Students can make full use of learning software in the autonomous learning part, so that students themselves to search for information, to solve the problem, complete information processing. In addition to encourage students to gather information on the processing and processing, hands-on production into the form of a slide in the classroom demonstration.

In multimedia cyber source can be used for teacher assignments, homework checking and correcting. The use of the network to carry out after-school work for teachers and students to save most of the time, the network resources are also creating the conditions for the communication between teachers and students. However, the use of multimedia technology in the classroom should also pay attention to some of the problems.

1. if the production of the multimedia courseware is too loud, it will affect the students' attention. As English teaching is often the pursuit of vivid and image. In order to design a variety of courseware, it is often needed to insert some

animation and the use of too fancy courseware background. These are contrary to the psychological characteristics of students and the law of perception, it is easy to disperse

Their attention. Students tend to focus on animation and background, while ignoring the teaching content, the impact of teaching quality. For this problem, the teacher should take the cognitive rules of students into consideration when designing the courseware, and try to avoid unnecessary fancy content. Courseware vivid is to students “learning” for the purpose, the plain place must be plain, properly inserted into the animation or video.

2. multimedia courseware if the player is not easy to understand the knowledge of students. Because the multimedia courseware can carry a lot of knowledge, and the content of the prior input. When using multimedia courseware, it is easy to speed up the playing speed easily. Students’ understanding of the knowledge of a certain process, the rapid view of the slide, so that students
The lack of opportunity to think, the whole class become tangguan. Teachers pay attention to the appropriate pause when using multimedia, leaving the students to think about the time. The use of multimedia courseware in the classroom teaching should pay attention to classroom teaching in the interaction between teachers and students. Classroom activities, teachers’ questions and proper explanation of the contents of the courseware are essential.

4.4.Extra Curricular Activities

Culture study is a comprehensive process, should follow a certain rule. In the course of university curriculum, it is necessary to understand the culture and to strengthen the study. For example, a teacher may be able to arrange a reading task, and a recommended reading material, including newspapers, magazines, novels, and reports. Some well-known English newspapers such as “China Daily”, “twenty-first Century”, “English weekly”, etc., rich cultural connotation, is a good reading material. The classic novel is a mirror of a specific culture, but also increase the volume of reading choice. By reading these materials, students can pay attention to the cultural factors, the society as a whole to study, stimulate their interest in learning. In addition to reading, the mother tongue is a shortcut to cultural acquisition. Teachers can promote the development of students’ intercultural communication competence through the recommended activities, such as the English corner, foreign language tour guide and attending lectures, these activities will further expand the scope of students’ knowledge, and encourage them to enrich their learning content.

5. Potential Problems

In the practical operation of cross cultural communication, teachers should pay special attention to two problems. One problem is how to guide students to understand the western culture. Teachers have a great influence on the formation of students’ world outlook. When the culture is introduced, the teacher should play a guiding role, and

inform the students that there is no good or bad, and the purpose of the study is to achieve mutual understanding in cross-cultural communication. Therefore, it is not advisable to accept western culture or to condemn another culture as a result of the national superiority. At the same time, culture is a heritage system, how to resolve the problem of another culture is a problem for teachers. Teachers should update their knowledge in cross-cultural teaching, study the new knowledge of religion, politics, literature, history and so on. Teacher's enthusiasm to participate is the key to the success of cultural introduction.

The fundamental purpose of English teaching is to achieve intercultural communication, which is to communicate with people from different cultures. The large area, the efficiency and the quality of the high foreign language teaching, greatly improve the students' ability of foreign language application, is not only the urgent need of the development of China's national economy, but also an urgent task of China's higher education in the 21st century. In order to achieve this goal, we need to recognize that foreign language education is a part of intercultural education. The language is regarded as a whole, which is closely related to culture and society. The report of the twenty-first Century Education Commission, published by UNESCO in 1996, is presented in which education must focus on four basic requirements: learning to learn, learning to do, learning to live, learning to be a man, and a new organization; the international community has been advocating "know to (learning), do and (to be)". Our foreign language teaching should be closely linked to the world education development direction, to train with the cross cultural communicative competence of personnel and continuous efforts.

The rapid development of the society needs to cultivate people's ability to interpret the multicultural elements through education, so as to achieve effective communication. College English must strengthen the cross cultural communication training and explore the feasible method to achieve maximum effectiveness. As a new trend in the practice of University, cross cultural communication has just started in practice, although there are potential difficulties, but its advantages are obvious. Under the background of the reform of university education, the application of the cross cultural communication in the university English teaching has a broad prospect.

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Research on the Application of BIM Technology in the Design of Prefabricated Concrete Structure

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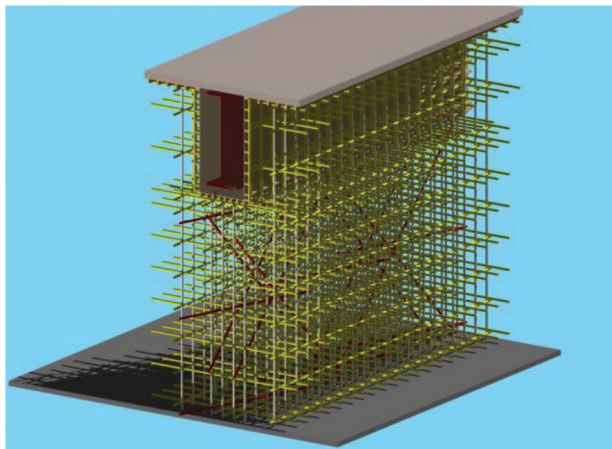
Abstract: Objective: To improve the structure design level of prefabricated concrete structure. Methods: Using BIM technology to analyze and design the structure of prefabricated concrete. Process: The article describes the development and the characteristics of BIM technology, expounds the method of PC structure design of housing industry based on BIM technology, and builds a general framework of the wisdom of the construction system. Result & Analysis: The structure of multi-level and high-rise residential buildings is mainly composed of masonry structure, reinforced concrete structure and steel structure, analyzes the construction data of different structural systems, and finds that BIM technology can improve the design of prefabricated concrete structure. Result: BIM technology is a scientific and reasonable construction design technology, it can be widely used in architectural design.

Keywords: BIM technology; Prefabricated concrete structure; PC structure design; Masonry structure

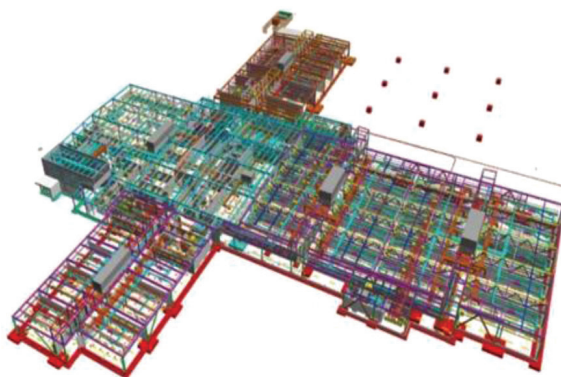
1. Introduction

With the development of information technology, BIM (information model building, building information model) technology has become a hot topic in the field of construction. The application value of BIM has been widely recognized by the industry. At this point in time, BIM is no longer the industry's cutting-edge technology, but the big trend of the industry, is construction enterprises to improve their core competitiveness of the necessary strategies. In the national "2011 to 2015 construction industry information development outline" in the clear that the BIM technology is the development direction and development goals of building information, the application of BIM technology in the development direction of building technology, also in line with national policy guidance (Lawrence J E.,2015). At present, more and more domestic construction projects are actively using BIM technology, especially in the super large complex engineering, three side projects, time limit and cost pressures are now pouring reinforced concrete structural engineering, the application of BIM technology is becoming more and more important, it can digest the design more quickly and quickly find the technical problems (Belo, A., Castela, G., & Fernandes, S., 2013), a faster engineering data, for production planning, preparation, schedule control etc.. But, the application of BIM technology in the precast concrete

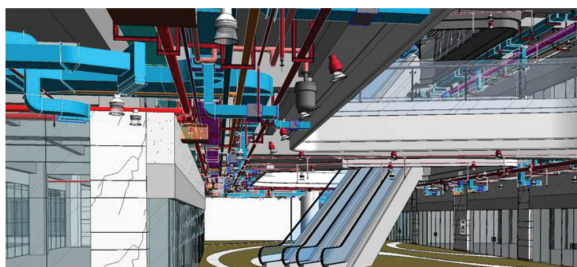
structure is still in the experimental stage, especially in the rapid heating of the housing industry, it is significant to study the application of BIM technology in precast concrete structures (Tarhini A, Arachchilage N A G, Abbasi M S., 2015). Figure 1 (a) - (c) shows the application of BIM technology in architectural design.



(a) Application of BIM Technology in 4D Project



(b) Application of BIM Technology in Architectural Design



(c) Application of BIM Technology in Decoration Engineering

Figure 1 – BIM Application of Technology

2. Materials and Methods

2.1. Bim Technology Features

BIM (Information Modeling Building, building information model) is based on three-dimensional digital technology, engineering data model of integrated construction project of various relevant information, is a detailed expression of the relevant information on the project. The establishment of three-dimensional digital BIM model is the carrier of the professional information storage, is the basis of BIM technology. BIM technology is the use of the establishment of three-dimensional digital model in the construction project design, construction, operation and management until the whole building life cycle of building for analysis, simulation, visualization, construction drawings, engineering quantity statistics (Chandrakanth M G., 2015). That is a process of creating, collecting, managing and applying information. BIM is the core of information. Revit Autodesk software is developed by the United States Autodesk company based on BIM technology, is currently the best software to build BIM platform compatibility. The biggest advantage of Revit software is: The information stored in the parametric design is stored in the database of the 3D model, plan, elevation, section, detail, three-dimensional map, schedule etc. at the same time produce design. This information is consistent, in a certain place, a modification can be reflected in all drawings and related data. This is very convenient for the management and coordination of technical personnel, reduce a lot of repetitive work. Revit Structure Autodesk is a powerful tool for structural engineers to provide structural design and drawing. The design of 3D rendering structure engineer is presented through the parameter driven model, to achieve more accurate visualization of the building structure before the construction (Stromquist N P., 2015). BIM technology will be the conventional two-dimensional expression to three-dimensional visual model, each professional staff can understand the intent of the design correctly and effectively, and assist the parties in a timely and efficient decision making use of BIM project, each professional, each member of the work in a three-dimensional collaborative environment to work together, deepen the design, modification can achieve linkage update, such an intermediary in a timely manner, to a great extent, avoid the design error caused by the lack of timely communication; BIM can simulate the real construction process and construction scene, and can be found through this process may exist problems, so as to determine the reasonable construction plan to guide the construction. BIM technology application content and technical route in the past, the reason why there are so many projects, is because the project information system, formed a information island, information cannot be integrated and shared, each professional lack of a common interaction platform, causing loss of information and transmission errors. BIM technology is expected to change this situation, the construction cost and social cost can be effectively improved by the BIM technology, which is common in the construction of the “fault” and “design change”. Sharing the same model information as the construction, structure, and installation, to check and solve the conflicts between the professional and the more intuitive and easy (Stromquist N P., 2015). In the aged 4-25 PC standard layer, through the integration of civil fire weak current professional model, standard level of initial impact of a total of 83.

Each point has three-dimensional graphics display, collision, collision and collision position of pipeline equipment name and the corresponding position of drawings, such

as the PC precast box beam and the collision of the fire spray pipe is shown in Figure 2. Through Figure 2 this activity collision information, in the deepening of the prefabricated frame beam YKL3 (1) -1, can be in the specific position (relative size and elevation) marked the precast beam reserved holes in the tube size, so to deepen after the production of precast concrete frame beam transported to the site can be hoisting molding, without the need to openings on the precast beam. Can imagine, if there are a large number of PC projects similar to the results of this collision, and simply rely on the technical personnel of the spatial imagination to find these results, is bound to cause the omission, if found in the construction, required: rework, modify, opening, delay, increase the cost for no reason, the loss is immeasurable. BIM technology can be integrated architecture, structure, and installation of professional information for testing, to help us to find out the problem, Nip in the bud. Fig. 2 the impact of PC prefabricated box beam and the fire spray pipe (Navabakhsh M, Azkiya M, Vosouqi M., 2015).

2.2. Plan Review Technology

PERT method is a program evaluation technology. PERT method to take three time estimation method: The most optimistic working hours, the most likely working hours and the most pessimistic working hours, the weighted average of the three is worth working:

$$MD = (OD + 4HD + PD) / 6 \quad (1)$$

PERT method is more close to engineering practice, this method is suitable for the use of this method when the workload of the project or the nature of the work is not determined, the duration is not determined and the other aspects are restricted. The principle of CPM and PERT is based on the project of network, to determine the critical path and work, known as network planning technique. Their main difference lies in: CPM method for the construction process of the duration of the estimate is determined, the PERT method is a probability model for the duration of the work (Pinder J., 2015). The following analysis of the PERT network planning in the working time probability distribution, the probability distribution of the duration and completion probability. working time probability distribution PERT model, the duration of a process (i) is considered to be a random variable that obeys the beta distribution, its mean $E(t_i)$ and variance σ_i^2 were estimated by using three time estimation method:

$$E(t_i) = \frac{a + 4m + b}{6} \quad (3)$$

$$\sigma_i^2 = \left(\frac{b_i - a_i}{6} \right)^2 \quad (4)$$

When the total number of key lines on a lot of work, while the working time variable is independent of the distribution, the total duration of the network plan is subject to normal distribution, which is $T \sim N(ET_n, \sigma)$.

Its probability density function is:

$$f(T) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(T-ET_n)^2}{2\sigma^2}} \quad (5)$$

Whats more, assume:

$$\lambda = \frac{T - ET_n}{\sigma} \quad (6)$$

check the standard normal distribution value:

$$\phi(\lambda) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\lambda} e^{-\frac{r^2}{2}} dt \quad (7)$$

The probability of completion of the project in the T time within the schedule is obtained.

2.2.Methods for the Design of Pc Structure of Housing Industry Based on BIM Technology

Revit Structure Autodesk based on BIM technology for example, a brief introduction to the PC structure design method of residential industrialization. In this paper, the application of BIM technology in the residential industrialization of PC structure design method is: according to the standard of residential products, modular design, building of a strong technical integration of residential industrial PC structure of the various components (such as precast facade, precast beams, prefabricated columns (Somers S O N, Stapleton L., 2015), prefabricated stairs, prefabricated floor slab, etc.), in the process of project structure design, directly from the design of the component library to select the required standard components to the project, so that a standard component of the assembly into three-dimensional visual model, thus greatly improving the working efficiency of the designer. The design features of the assembly style housing are the most, research, design and development of modular standard of the residential apartment, finally the formation of the assembly building model library. At present, from the author to learn Revit Structure Autodesk to understand, family is a powerful concept in the use of Revit, can be based on the design of family, define each type of different size, shape, material, or other parameters. Revit family can be loaded into the family, the system and the inner construction. Which can be loaded into the family also known as the component family, it includes a structural frame (beam), a structural column, a door, a window, etc. (Kealy A, Stapleton L.,2015). Component family file is independent of the file, can be independently edited and can be reused in different projects. After installing the REX extension plug on the computer, we can set up a modular, standardized PC component in the corresponding family template file.rft to form a PC component library, save the.rfa file can be used not only for detail design detail drawings for components factory production, can also be used in any one project needs to be loaded into the project design, which greatly improves the efficiency of the PC structure design of residential industrialization. System family is predefined in Revit and cannot be loaded from an external, can only be set and modified in the project, such as wall, roof, floor, stairs, etc. are the system family (Noga S R, Kolawole O D, Thakadu O.,2015). Residential industrial PC in the required prefabricated wall, stairs and other components cannot be directly created by the use of family template file, can only open a project file after.rvt, in the project in accordance with the modular, standardized design of prefabricated components and save it as a.rvt

project file, the formation of component system family member library, as shown in Figure 3. The design of prefabricated components in the project file can form a detailed component library, provides a detailed design for component factory production, but in the design of a project, it is not as ready to be loaded into the project as it is saved as a.rfa file. Based on the established system family member library can only be used as the .rvt to open but cannot be loaded into other project files, the author puts forward that software developers should seize the great opportunity to study the development of the two, such as wall, board, stairs, etc., according to the standardization, the creation of a file format can be loaded into the project file format, this greatly improves the efficiency of structure design (Frangakis-Syrett E., 2015).

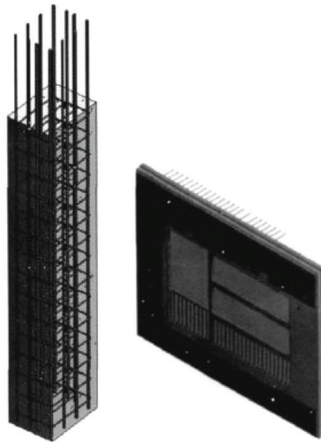


Figure 2 – A Three Dimensional Graphics Family Of Prefabricated Column Member And Precast Wall System

2.3. Overall Framework for the Construction of Wisdom

The system of intelligent building can be divided into eight systems, design and management system, construction quality management system, construction progress management system, construction cost management system, construction safety management system, the main body of the main management system, project procurement management system and project operation and maintenance information support system, the overall framework of the system is shown in Figure 4.

2.4. Characteristics of Prefabricated Concrete Structure

Construction of cast in place concrete structure, from the scaffolding, formwork, reinforced, concrete pouring, most of the work is done by hand. Construction of cast-in-place concrete structure in the presence of: The noise, dust pollution; Template turnover material consumption; construction personnel, more manual labor, labor intensity is big, and the level of proficiency required is higher; the construction speed is slow, the construction period is long, and the natural conditions are affected; Concrete appearance and inner quality control is difficult; The site of building material waste serious and

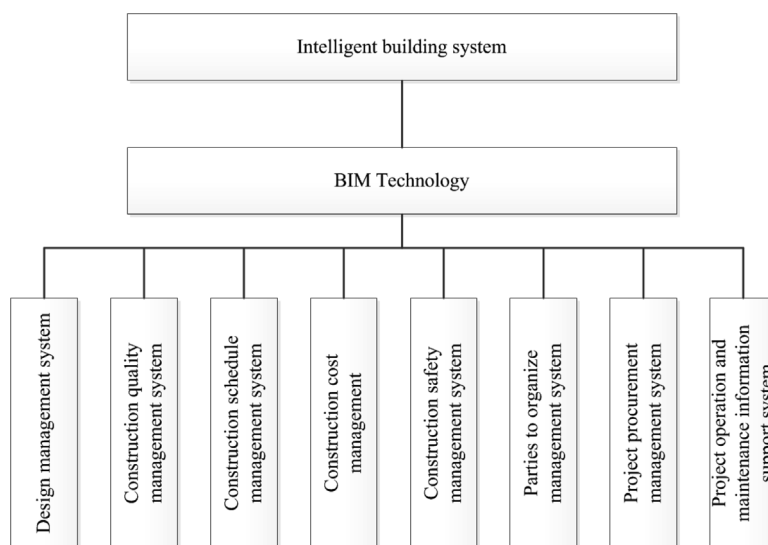


Figure 3 – The Structure of The Intelligent Building System

other defects. Prefabricated concrete structure technology and traditional construction method, has the following advantages: Can be used for a variety of light partition wall partition, room layout can be flexible and varied. Construction is convenient, the template and the cast in place concrete operation is little, the precast floor slab is not supported, and the laminated slab is seldom (Hammerer G.,2015). The wet operation of the site is greatly reduced by using the prefabricated and semi prefabricated form, conducive to environmental protection and reduce construction nuisance, more can reduce material and energy waste. Construction speed, little impact on the surrounding life. The size of the building is consistent with the modulus, the building component has a greater adaptability than the standard. Precast smooth surface, good appearance, accurate size and the thermal insulation, thermal insulation, water pipelines layout requirements of multiple functions such as combined, have good technical and economic benefits. This feature can be applied to the production of wall panels, also suitable for the production of structural components for easy installation. Precast structural period is short, investment recovery. Due to the reduction of the cast-in-place structure formwork, formwork and concrete curing time, accelerate the construction speed. So as to shorten the time of loan construction, shorten the payback period of investment, reduce the total cost of investment, with obvious economic benefits. The relevant components of the assembly building should be considered to give full play to the efficiency of the production equipment of the component factory, improve the generality and the exchange of components, and try to achieve a more use. Assembly building, which is a component of the production of component factory, through the special structure of the transport vehicle handling to the construction site with the installation of machinery (Whitbeck J V.,2015). In the design of the assembly, the shape, size and weight of the member, must be adapted to the lifting and transportation machinery, to give full play to the efficiency of the machine. Assembly building has its own unique construction

production rule, different from the traditional construction method, it is based on the mechanical lifting of the component, generally according to the construction site of the size of the area, the construction of roads, the arrangement of components, the supply of water power supply and the building of the relevant size, rational selection and arrangement of construction machinery. Assembly type architecture in the design and production can also make full use of industrial waste, in order to save the land waste, and other materials. In recent years the big building has been widely used in fly ash slag concrete wall, has been widely used in block building blocks, etc. (Lan W, Wang J, Li M., 2015). In the process of prefabricated building construction, can realize the full automation production and modern control, to a certain extent, it can promote the industrialization of construction industry. Industrial labor productivity is high, the production environment is stable, the design and standardization of components are beneficial to the mechanical production, and according to the strict inspection of the factory products, and thus the high quality assurance rate.

3. Results and Analysis

Multi-level and high-rise residential buildings are mainly of masonry structure, reinforced concrete structure and steel structure. Reinforced concrete structure has good seismic performance, material source, with the development of related technology, reinforced concrete structure is great, wood consumption, the construction speed is slow shortcomings overcome constantly. It is the most widely used structure in the multi-level and high-rise residential buildings (Nguyen V K, Hernandez-Vargas E A., 2015). The overall frame structure of the whole frame is a kind of reliable transmission mechanism which is formed by the frame beam, column or laminated beam, laminated plate, etc., frame structure to meet the requirements of deformation and bearing capacity. the overall structure of the assembly is characterized by a high degree of industrialization, pre fabricated ratio can reach 80%, the internal space is good, can provide flexible use of space for residential buildings; Frame beam and frame column component are easy to be standardized and stereotyped, facilitate large-scale industrial production; construction is relatively simple, construction efficiency is higher, the quality of the project can be very good to ensure that the material. According to domestic and foreign research results show that, assembly monolithic frame structure in seismic area, when the nodes

Structure system		Non seismic design	Seismic fortification intensity		
			6	7	8
Assemble monolithic frame structure		70m	60m	55m	45m
Shear wall structure		140m	110m	100m	80m
Assembled monolithic shear wall structure	Partially prefabricated shear wall structure	150m	120m	100m	80m
	Fully prefabricated shear wall structure	100m	100m	80m	60m
	Multi shear wall structure	20m	20m	20m	20m

Table 1 – The Maximum Applicable Height of Various Structural Systems

are connected and the reasonable construction measures are taken, the whole frame structure of the assembly can be equivalent to the cast in place concrete frame structure. Each kind of structure system also has its best suitable height (Navabakhsh M, Azkiya M, Vosouqi M., 2015), Table 1 gives the maximum applicable height of the whole assembly frame structure, the whole shear wall structure, and the overall structure of the whole frame shear wall structure.

For high-rise residential buildings, for the amount of materials per unit area of the floor structure is generally a fixed value, the material consumption of the vertical bearing members is closely related to the structure of the housing layer and the lateral force system, therefore, in order to meet the requirements of the same time, we should also carefully select the optimal structure system. In multi-storey and low-level housing, the design of building structure is controlled by the vertical load with gravity. And in high-rise residential, although the vertical load of gravity is still important to the design of residential structure, however, wind load and seismic load are important factors for the horizontal load, and the horizontal load is the main factor to be considered in the structural design. For the height of a certain residential building, the vertical load is a constant value, and the numerical value of horizontal load will vary according to the different structural dynamic characteristics. Under vertical load, the axial force and bending moment caused by the vertical members are linear with the height of the building; Under the action of horizontal load, the overturning moment is proportional to the height of the building (Whitbeck J V., 2015).

4. Conclusions

BIM is based on three-dimensional digital technology, building life cycle as the main line, the construction industry chain link and integrated project related information of the data model of the article describes the application of BIM technology. This paper describes the application of BIM technology in precast concrete structure, build a general framework for the construction of wisdom, and analysis that the BIM technology has advanced science and technology and broad prospects for development.

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Analysis on the Utilization Efficiency of Sports Venues in Hebei, China

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Abstract: With the rapid development of China's social economy, sports industry is gradually becoming a new potential social economic growth point. Most of the sports industry is closely related to the sports venues, sports venues are an important hardware for the development of sports industry. This paper is to improve the management level of the stadium, and provide the theoretical basis for the scientific and rational utilization of sports venues in Hebei province by the research of the actual situation, condition, development and utilization of sports venues in Hebei Province, and provide a theoretical basis for the development of sports industry in China. Based on the present situation of sports venues in Hebei Province, the article uses the method of literature, investigation, logical analysis and other research methods to investigate and study the development and utilization of sports venues in Hebei Province, including the resource allocation, social benefits and economic benefits.

Keywords: Stadium, Resources, Development and utilization, Influence factors

1. Introduction

1.1. The Status Quo of the Stadium

Along with the rapid development of China's socialist market economy, the combination of sports and economy is more and more closely. The term "sports industry" has become a hot topic. Sports venues and sports venues in the field of sports is an important part of the sports industry is an important material for the protection of people's attention, the reality of the problem, the development of a good or bad will directly affect the development of the sports industry reform and prospects. China according to the needs of the people, in June 1995 promulgated the "National Fitness Program", to mobilize the whole society to actively participate in sports have a great role in promoting. In order to thoroughly implement the State Council "public cultural and sports facilities regulations" and "National Fitness Program" second phase of the two phase of the project plan, to give full play to the school sports venues and public sports venues, the effectiveness of efforts to ease the growing demand for sports fitness equipment and fitness facilities.

The State Sports General Administration of sports and the Ministry of education in Shanghai City, August 6, 2006 to 7, held the national school sports venues and public venues to open the pilot area of social work conference, so that the development and utilization of sports venues resources is imperative to implement national fitness one of the key factors (Hirshon N.,2015).

1.2. Analysis the Necessity of Hebei Stadium

The rapid development of the society, the rapid economic growth, people's living standards are improving, and people's sports fitness consciousness gradually enhanced. More and more people are asked to take some of the professional sports places to relax and to exercise (Wang H, Zheng W T, He H F.,2015). And the current situation of our country's sports field is not optimistic. The fifth national sports venues survey shows that China's various types of sports venues 850080, the average per thousand people have 6.58 sports venues, and sports venues per capita area of only 1.03 square meters, to a large extent can't meet the needs of people's fitness activities. It's with the development of social economy, people's life rhythm, especially the life rhythm of urban residents (Hong S I L, Magnusen M, Mondello M., 2015). The fast pace of life and the reduction of manual labor, leading to a general decline in the health status of residents, many modern "civilization", such as obesity, cardiovascular disease, neurasthenia, and has reached a very high incidence of the residents of the physical quality of the impact can't be ignored. To reverse the adverse effects and improve the level of medical care while it is necessary, but after all, can only be a temporary solution; to want to fundamentally reverse the trend, the urgent task is to carry out a wide range of masses sports, as Comrade Mao Zedong early in 1952 proposed to "exhibition of sports, enhance the people's physique", to carry out a variety of mass sports activities is the fundamental way to improve the physical quality of the people. Especially at present, we have entered a well-off society, the demand for entertainment and fitness, entertainment, and the delay of aging have become increasingly important. Sports have become an important part of modern life. At present, there is a phenomenon that the shortage of venues and facilities in Hebei Province, and the phenomenon that the shortage of the problem can't be solved quickly. Because of the number of large public sports venues, the number of talents, technology, information, environment and other advantages, the sports resources and social sharing has important significance. But the lack of public stadiums in Hebei province seriously restricts the enthusiasm of the people of Hebei, and because of the imbalance of economic development, there is no denying the fact that the construction of public sports venues is not balanced (Gray A M, Buford W L., 2015).

1.3. Analysis of the Importance of Hebei Stadium

Sports venues are the material basis for the development of sports undertakings, but also an important part of the development of sports industry. Development and management of sports venues are in the socialist market economy conditions, to ensure the social benefits of the stadium, the full play of the function of the stadium, and make an inventory of sports resources, accelerate the development of sports industry. In recent years, with the development of social economy and the people's demand for sports, we have a big change in the backward situation of our province. There are 243 kinds of large sports venues in the province, including 49 stadium, and stadium 194. These stadiums in

adhere to open to the public to for serving the people at the same time, is adapting to the requirements of the socialist market economy, actively to reform the management system, conversion operation mechanism, efforts to expand their business, toward the “based, pluralistic development” direction, stadiums management more and more prosperous, and constantly develop to the depth and breadth of development; development projects from oneness to diversity, comprehensive benefit is more and more high; management by simple administrative management to enterprise management and development of market-oriented operation, the economic benefits from a loss to profit change new situation. However, these stadiums are still in the distribution, the function is not complete, the scale is small, the role play is not sufficient, and the opening is not enough, the development is weak, the project is single, the system is not smooth, the mechanism is not active. At present, in the face of our country has joined the WTO, the state actively develop the service industry, as a new economic growth point of the new situation, we should seize the opportunity to meet the challenges, to speed up the development of sports venues, and promote the development of sports industry (Clarke P W., 2015).

2. Analysis

2.1. Foreign Sports Venues Research Status

First, the construction of foreign sports venues: the number of sports venues in the stadium to be far superior to our country, such as Japan, the average per 400 people have a sports facilities, the United States per capita sports venues area of 14 square meters, and our country is only 1.03 square meters per capita. Investment in venues, the developed countries, the amount of investment is very large, can reach hundreds of millions or even billions of dollars, most of the sports investment has exceeded the gross domestic product (GDP) of more than 1%, and the most of which is the venue construction. In sports venues layout, since the 80's, Germany, Spain, Italy have varying degrees to adjust the layout of the sports venues to change the city as the center of the tendency to form a community oriented, in order to small and medium sized venues construction. The construction of sports venues is often combined with the development of urban parks and residential areas, forming a pattern of the integration of the field park. “This can meet the needs of the people engaged in different exercise, and can improve the comprehensive utilization of land and public facilities. This revolutionary construction idea has been accepted by more and more countries, including Japan, South Korea, Japan and South Korea also

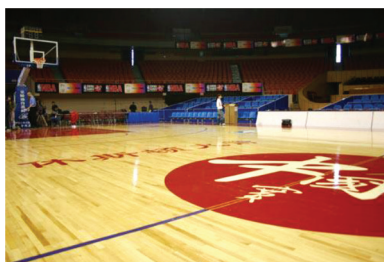


Figure 1 – Foreign Stadium

began to take the road of integration of the development of the field” (Kozma G, Bács Z, Perényi S., 2015).

Second, the development and utilization of sports facilities in Colleges and universities in foreign countries: to improve the utilization rate of the facilities, many countries put forward to open the school sports facilities, to solve the problem of the stadium, the “national and local public organizations, in order to prevent the school education work, should strive to make the school sports facilities for general sports activities” (Kasimati E., 2015). According to the data released by the Ministry of education in 1993: “99.2% of public schools in varying degrees in implementation responsibilities is open to local residents.” France in the “sports law” expressly provides: “all facilities, including school sports facilities, should make full use of all kinds of users, including the opening to the elderly and the disabled”. South Korea in the “National Sports Promotion Law” in the proposed: “schools and enterprises of sports facilities in the school education and business scope, and should be used for national sports revitalization”. South Korean National University scholar Bu Jiang Lin believes that in the promotion of the development of mass sports in South Korea 6 investment factors, sports facilities are the most important factors. And in sports facilities included in the six times, the second place is open school facilities, and this shows the importance of the school sports venues open. The primary goal of the British government in 1982 to develop the “community use program” is “to open up as much as possible to the educational institutions, the students must be open to the community, to maximize the use of these sports facilities resources” (Solberg H A, Preuss H., 2015). Japan, Germany, Russia, France, South Korea, etc., through laws and regulations of the development and utilization of sports venues, many countries clearly put forward to open school sports facilities, and in practice has achieved good results.

2.2. The Status of Domestic Sports Venues

First, the construction of foreign sports venues: the number of sports venues in the stadium to be far superior to our country, such as Japan, the average per 400 people have a sports facilities, the United States per capita sports venues area of 14 square meters, and our country is only 1.03 square meters per capita. Investment in venues, the developed countries, the amount of investment is very large, can reach hundreds of millions or even billions of dollars, most of the sports investment has exceeded the gross domestic product (GDP) of more than 1%, and the most of which is the venue construction. In sports venues layout, since the 80's, Germany, Spain, Italy have varying degrees to adjust the layout of the sports venues to change the city as the center of the tendency to form a community oriented, in order to small and medium sized venues construction (Freixo, J., & Rocha, Á., 2014). The construction of sports venues is often combined with the development of urban parks and residential areas, forming a pattern of the integration of the field park. “This can meet the needs of the people engaged in different exercise, and can improve the comprehensive utilization of land and public facilities. This revolutionary construction idea has been accepted by more and more countries, including Japan, South Korea, Japan and South Korea also began to take the road of integration of the development of the field”.

Second, the use of domestic sports venues resources: the implementation of the management of sports venues in China has just started, the operation is not high, and



Figure 2 – Domestic Stadium

there are still many problems. First, the stadium is mostly closed management, and most of the facilities for the Department of all, for internal use, most of the stadium are still stuck in the closed management state (Karimi-Osbouyi K, Esfandiari M, Alipour-Nakhi A., 2015). At the same time, the operation and management of the stadium is too narrow, the operation of sports venues and facilities in our country is mainly in sports competitions and sports training, and the proportion of the competition and training venues are 47.5% and 27.5%, respectively. Secondly, the use of the existing stadium is not high, the high threshold is too high, the idle serious, but also the existence of arbitrary appropriation and embezzlement phenomenon. Third, the management mode of the stadium is backward (Propheter G., 2015). Due to the lack of appropriate management personnel, the lack of advanced scientific management means, so that the management of the venue to stay in a more primitive state. It was pointed out that to change the concept, increase investment, protect the existing site, it improve the utilization rate.

3. Resource Utilization of Hebei Stadium

3.1. Hebei Sports Stadium Advantage

Hebei public venues demand big: “China mass sports status survey and research” pointed out: lack of sports venues (ground) facilities are the main factors that restrict the participation of residents in sports activities, and the shortage of venues (ground) is caused by two aspects, one is the number of venues (ground) facilities; the other is the existing facility () facilities utilization rate is low. Modern society, sports life is an irreversible trend, with the development of China’s comprehensive construction of a well-off society and social sports, Hebei Province, urban and rural residents to participate in physical training and fitness activities of the demand will increase, the venue (ground) facilities will be common in a certain period of time.

Leisure sports is to meet the people physical and mental health, entertainment and cultural activities, refers to the social development to a certain stage, arising in the corresponding cultural background, with sports as the main means, for people celebrating the spare time, enhance health to the positive role of a civilized, healthy and scientific way of life. At present, China has gradually entered the aging society, the leisure time gradually increased (114 days of the statutory holidays), the rapid increase

in living standards, these are for the sustained and stable growth of leisure sports has laid a good condition. In recent years, the rapid development of Hebei's economy, people's leisure time increased, the fitness consciousness, the mass sports activities increased significantly.

3.2. Hebei Stadium, the Disadvantage

Influence factors	Price	Facilities	Traffic	Guide	Facilities
Man	34	32	27	3	4
Woman	36	32	23	5	4

Table 1 – A survey on the factors affecting the consumption of health consumer in the gymnasium



Figure 3 – Hebei Stadium

First, the function is single, and the use rate is not high: the existing stadium, especially public sports venues, mainly from the host of international and domestic public competition for the design and construction of large scale, high standard, large ancillary building area, the use of public facilities, and the highest utilization efficiency (WeiMin L, JianWu F, Xin Y., 2015). However, public sports venues for the actual public international and domestic sports competitions are not many opportunities. With the multi closed management, more sports games and sports training, open to the public, the public is low, and higher charges. Part to the open society of commonality stadium and gymnasium get effective use of mostly only accounted for game hall, an area of 30% of the area while accounting for 70% of the game hall seating area mostly in the idle state, if the vertical space use efficiency, the use of lower rate. Single function of the venues, the use efficiency is not high. At present, Hebei province public sports venues and facilities utilization is not high, the phenomenon is very prominent, and the main reason is the following: first, the function of the venue is relatively single. Most of the public sports venues are built of international and domestic public sports competitions. In the design, the main function of the sports competition is to meet the needs of sports competition, so that many public sports venues are relatively simple. At present, the sports consumption demand of urban residents shows a variety of features, so the single

function of the stadium can't meet the diverse needs of people. Two is the public stadium operating costs high. Public stadium has the characteristics of large construction scale, high standard, high auxiliary building area, so it has higher operating costs. Three is some public sports venues geographical layout is unreasonable, also is not conducive to its opening and daily operation.

Second, the lack of funding for the renovation of: international and public stadium house, site, large equipment maintenance, renovation costs generally rely on state funding, the maintenance costs, general control in more than 20% of the total expenditure, such as France is 21.8%, Germany is 23.38%, and our country public stadium maintenance, transformation of funds in venues branch out of proportion is lower than the international average level and present downward trend. In recent years, due to the province of public sports venues, the allocation of funds has decreased year by year, some public sports venues and facilities, equipment aging phenomenon is more serious. Although many public sports venues to make up for the funding gap, it's not only expanded the degree of social openness, but also through market operations to increase revenue. But these poor operating incomes are not enough to assume the stadium's daily maintenance and equipment update (Giannoulakis C, Wang C H, Felver N., 2015). This is because: in recent years, the government of public sports venues are less and less, the normal operation of the public stadiums, difficult to open; the short-term behavior of the operators to make some of the stadium's loss, damage to the rapid increase, maintenance costs rose sharply; many of the public sports venues, the ordinary people can't afford to bear; in case of large-scale international domestic competition, the cost of maintenance and renewal of equipment more than doubled. Therefore, the lack of maintenance and transformation of funds, the lack of potential for the development of venues in the public stadium is more common. Due to the lack of follow-up funds, facilities, equipment aging, and unable to introduce and develop new sports fitness entertainment projects, so its development lack of stamina, which seriously hampered its business development and long-term development (Lin M C.,2015).

Third, its investment structure is single, and lack of social capital participation, the operating mechanism is not perfect: Hebei Province, most of the existing public sports venues are built by the national investment. This is mainly because of the public sports facilities, the investment scale is large, the capital recovery period is long, the capital income is low, social capital is generally reluctant to invest. At the same time, public sports venues are mainly to provide public goods or quasi-public goods, and to provide public goods is one of the basic functions of the state and the government, therefore, the central government and local government investment construction. According to "China mass sports situation investigation team" to the national sports venues of the survey, China has 75.4%, 12.4%, 4.7%, 5.1%, other accounted for 2.4%, which is a part of the collective. This shows that the construction of sports venues in Hebei province is lack of social capital, the investment structure is single and the social financing channels are not smooth. In recent years, the construction of public sports venues in some areas of our province has tried to attract the participation of social capital, but the effect is not ideal because of the policies and regulations, management system, property rights division, interest coordination and other reasons. Overall, the current

social capital in Hebei province to participate in the construction of public sports venues is not high, the construction of public sports venues in the social financing channels are not smooth. The absence of the operating mechanism of public stadiums in Hebei province is mainly manifested in two aspects: the operating mechanism is not perfect and the lack of incentive and restriction mechanism of the sports venues. On the one hand, public stadiums and Gymnasiums in the course of business due to the traditional planned economy era, the management idea of bound and ashamed to let go of the hands and feet to carry out business activities, widespread business, mismanagement and other issues; on the other hand, most of the public sports venues has not yet been built effective incentive mechanism failed to establish open competition and survival of the fittest mechanism, the backward thinking of the equalitarianism has not been eliminated and lack of restraint mechanism, rules and regulations incomplete. There is no denying the fact that the above two are largely restricted to the improvement of the management of public stadiums in our province.

3.3. Countermeasures

We must make clear the direction, determine the target, reform the system and innovation mechanism: in the current situation, the reform of the management system of public sports venues, the goal is to extricate from the shackles of the traditional planned economy system, beyond the shackles of the old management ideas, from the traditional administrative management to improve administrative management, from the micro management to macro management, from extensive development to intensive development, realize the scientific, healthy and sustainable development of public sports venues. According to China's current national conditions, the gradual implementation of the stage and stages, and the gradual development of the road, with the reform of our economic system and political system as a precondition and basis, can't exceed the economic system and political

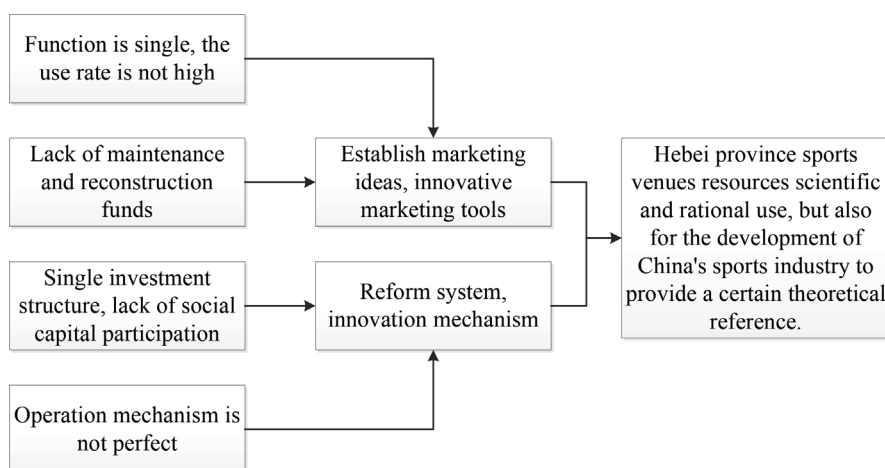


Figure 4 – Rational utilization of resources

system reform, and it can't lag behind the political, economic and cultural development requirements (Rauf R A, Darman S, Andriana A., 2015).

Strengthen public sports venues management system reform, and promote its operating mechanism innovation, and the establishment of the socialist market economic system to adapt, and our national conditions to meet the needs of the management system and operation mechanism, but also its self - development, self - renewal, can continue to develop the necessary (Xu J, Feng P, Yang P., 2016).

The reform of the public stadium should realize the separation between ownership and management, and constantly build up the asset management mechanism, management decision-making mechanism, interest incentive mechanism, budget constraint mechanism and internal and external coordination mechanism. According to the characteristics of economic development and the characteristics and the status quo of public sports facilities, we adopt flexible and efficient management mechanism, and promote a variety of management mode, operating mechanism. Under the premise of ensuring the athletic training and competition, the market can be gradually pushed to the market, the market operation mechanism, the operation of the modern enterprise system, improve the venues of the "self-hematopoietic" function.

4. Conclusion

Hebei public stadiums in the management process to rationalize the management system, the transformation of the operating mechanism, the formulation of preferential policies to attract social capital, reform personnel system, improve the use of human mechanism, strengthen internal management, improve the management system, innovation management mode, establish marketing ideas, innovative marketing tools, play sports intangible assets, expand business.

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Study on the Free Oscillation of the Earth Ball in Deep Source Earthquake Excitation

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Abstract: Objective: the free oscillation of the earth is one of the important subjects in the earth science, and it has a positive effect on the research and prediction of the earthquake. The purpose of this paper is to study the free oscillation of the earth's ball type. Model: the method of power spectrum density estimation is used to analyze the free vibration of a ball type. Process: Using the method of power spectrum density estimation, the Fourier transform of the autocorrelation function RN of the VH frequency Z waveform data is recorded, finally, according to the measured data of the 5 stations, the change value of the free oscillation curve is studied. Conclusion: In this paper, the method of power spectral density estimation is basically consistent with the experimental data. The accuracy of this method is proved, but the low frequency cannot be clearly distinguished from the earth free oscillation.

Keywords: Free oscillation; Power spectral density; Autocorrelation function; Free oscillating curve.

1. Introduction

Generally, the large earthquakes will cause global free oscillations (Dymnikova I, Khlopov M., 2015). Just like the Chile earthquake in 1960 and the Indonesian earthquake in 2004 etc. there are a global scale of the earth's free oscillations on the earth's reliable scientific instruments (Neyrinck M C. , 2015). In recent years, it has become more and more aware that the further study of the free oscillation of the earth, not only can be interpreted as a consequence of the earthquake and the effect of the earthquake, but can reflect some of the earth's interior structure and its dynamic processes, such as the lateral and radial inhomogeneity of the earth structure. At present studies on the internal structure of the earth is mainly using the seismological research by ray theory, such as tomographic imaging method etc. This method has some limitations. The wave theory is used in the earth's free oscillations, and the regional and global heterogeneity of the mechanical wave propagation in the process of mechanical wave propagation is a rich information reaction. At the same time, the free vibration mode of the earth can pass through the inner structure of the earth, and the sampling is relatively easy, but the accuracy is not

very high. In addition, there is a need to quantify the process, this point, the domestic and international studies are less (Prieto, Á. E., & Lozano-Tello, A., 2014).

The earliest accurate observation of the earth free oscillation (Sweet W V, Park J, Gill S., 2015; Tissier M, Bonneton P, Michallet H., 2015; Neale J, Harmon N, Srokosz M., 2015) is in 1954, the California Institute of Technology (Benioff Hugo) for the first time in his own design and production of strain gauge on the November 4, 1952 to increase the seismic cycle of about 57 minutes of long periodic vibration. It may be the free oscillation of the earth, although he has some imperfections in the interpretation of this explanation, but this has aroused people to study the theory of the earth free oscillation. Many people are encouraged by this result to develop a better seismic instrument for a long period of time, but also to carry out theoretical and numerical study of the free oscillation of the real earth model. He this on earth free oscillations are interpreted in subsequent May 22, 1960 earthquake in Chile was confirmed, the authenticity of the long period of free oscillation of the earth was finally confirmed that also makes people really Nobunaga period (Brodie K L, Raubenheimer B, Elgar S., 2015) of free oscillation of the earth's existence. In seismology created a new field. The study of the earth free oscillation is becoming one of the main methods to study the internal structure of the earth. It has been able to use the earth free oscillation observation data to obtain the internal structure of the earth and the distribution of the internal density of the law, but these need to do a further theoretical analysis of the earthquake wave propagation in the world.

2. The Present Situation and Research Situation of the Free Vibration of the Earth.

Since twenty-first Century, with the continuous development of computer system and the continuous development and updating of various seismic related measuring instruments (Bromirski P D, Diez A, Gerstoft P., 2015), the observation and experimental study on the free vibration of the earth has become more and more fast, common and effective.

2.1. Experimental Study

To some large earthquakes in global free oscillations, (such as the 1960 earthquake in Chile, Indonesia earthquake in 2004, Wenchuan earthquake in 2008). The earth free oscillation signal can be used superconducting gravimeter, drilling difference strain gauge and long period seismograph and artificial cave size very long baseline tilt meter (Quataert E, Storlazzi C, Rooijen A., 2015) (grotto gigantic long-base tilt meters) and so on record to, with the continuous improvement of the precision of modern instruments, the smaller earthquake excitation of earth free oscillation signal can also been recorded. Through the comparison between the instrument and the free vibration signal spectrum, it is clear that the phenomenon of the separation and coupling of the earth free oscillation spectrum is clearly detected. And the theoretical data and the actual observation results are verified, then the internal structure of the earth can be put forward to update the point of view, the source characteristics, etc. Since the earth ball type oscillation can trigger the vertical displacement of the earth's surface, and can be observed and studied by gravity, therefore, with the improvement of the accuracy of the gravity meter, especially the superconducting gravity meter, the research of the earth's spherical oscillation mode

has been greatly improved. Along with the improvement of the accuracy of the modern seismic survey instruments, the earthquake of magnitude is relatively small. The birth of the earth free oscillations can be detected.

2.2. Digital Simulation Study

The study of the free oscillation of the earth was initially focused on the theoretical aspects of the study, using the mathematical analysis method based on solving the relevant differential equations to obtain a variety of oscillation mode (Crawford W, Ballu V, Bertin X., 2015) of the intrinsic period or frequency. Since the 21 century, from the perspective of observation, the study of the earth free oscillation is based on the sensitive, and can be used to detect the long periodic vibration of the gravity, strain gauge and the long period seismic instrument, gauge and other high-precision instruments recorded data analysis. In the theoretical study, the influence of the inhomogeneity of the earth's structure on the free oscillation of the earth is very large. However, considering the complexity of the derivation and calculation of the theoretical cycle, it is difficult to take into account the effect of the earth's lateral heterogeneity on the earth free oscillations. In the case of large scale or large scale parallel computing simulation, we can study the relationship between the basic physical phenomena and the real situation.

Under the specific theory of the earth model, the theoretical research on spectrum of free oscillation of the earth can draw the ball type oscillation and toroidal oscillation of each mode of oscillation frequency and period. Through the comparison of the experimental results and the theoretical values of the observed oscillation results, it can be more close to the real structure of the earth. Whether the theory of free oscillation of the earth or the observation and experimental study, and the combination of the two aspects are the effective ways to study the earth free oscillation and reveal the internal structure of the earth. The numerical simulation study of the free oscillation of the earth is in fact the numerical simulation of the global seismic wave propagation. The numerical model can be used in combination with the common theory of the earth. Such as PREM model, IASPEI91 model and AK135 model, the wave equation numerical simulation method is essentially to solve the elastic seismic wave equation, the simulation of seismic wave field contains all the information of seismic wave generation and propagation process, so the numerical simulation method of wave equation has been an important position in seismic simulation. It includes boundary element method, finite difference method, spectral method, pseudo spectral method, finite element method, and recently developed spectral element method. These methods have their own advantages and disadvantages and have been applied in different fields. The finite element method is suitable for simulating arbitrary geological structures, and can be arbitrary triangle to approximate the formation interface, which can ensure the simulation of complex formation.

3. Study on the Free Oscillation of the Earth's Ball Type Excited By Earthquake

3.1. Background Data

The occurrence of the largest earthquake in Sumatra and Dammam in December 26, 2004 was the largest earthquake in the global network (Bertin X, Fortunato A B, Dodeta

G., 2015), which provided a new opportunity for the study of free vibration. Stein and Okla. (2005a, b), according to the global digital seismic data and their early studies of the mode split theory (Stein, Geller, 1977; Geller, Stein, 1977) and the observation results, the earthquake rupture center position and seismic moment, show that the fault of the north part of the slip. Park (2005) for further use of global digital seismograph network and some superconducting gravity meter record free oscillation data of earthquake rupture of, found under the Nicobar and Andaman island occurred in the slow movement of faults. Roast et al. (2005) analyzed the data of the superconducting gravity meter of 11 stations, and the and clearly divided into 5 and 7 single peak, and for the first time in the absence of data, the mode and the frequency spectrum of the earth's rotation are observed. In this study, we use the Chinese digital seismic network to extract the seismic waveform data to extract the free vibration information, and use the method to simulate the vibration mode splitting and amplitude of low frequency earth. It reveals the information of the seismic source which may contain the large earthquake excitation and the earthquake source, and hope to have some implications for the study of earthquake source.

At present, IRIS uses a new generation of intelligent /GSN CDSN station equipment (Youssef M, Hefny M., 2015), producing ultra-wide band and large dynamic (140 dB) recording data with international seismic data exchange standard format (SEED). The broadband data channel (5 of the original STS-1 seismic meter. 00-0.04Hz) to change the broadband data channel, Current data channel is 8.500-0.003 Hz. There are 10 units in the CDSN network, because of the lack of data in some stations, the study will not be considered. So we only analyze the data of the station where there are no missing records after 5 earthquakes. Table 5 shows the epicenter distance and azimuth of the 1 stations in the China Digital Seismic Network (CDSN).

Name of station	Code	$\phi N(^{\circ})$	$\lambda E / (^{\circ})$	Altitude	Epicenter distance	Epicenter distance
Baijiatong	BJT	40.0	116.2	198	85.4	32.0
Hailaer	HIA	49.2	119.7	610	94.4	28.8
Lasa	LSA	29.7	91.1	3789	67.4	17.3
Mudanjiang	MDJ	44.6	129.6	250	95.2	36.9
Qiongzong	QIZ	19	109.8	230	64.8	39.1

Table 1 – CDSN station location, the epicenter distance and azimuth angle

3.2. Research Theory and Simulation Method

In this study, the usual power spectral density estimation method is used to analyze the frequency of the free oscillating mode, it is defined as the Fourier transform (Horton B K, Anderson V J, Caballero V., 2015) of the autocorrelation function R_n of the VH frequency band Z to the waveform data, that is:

$$S_k = \sum_{n=0}^{N-1} R_n e^{-i \frac{2\pi nk}{N}}, k = 0, 1, 2, \dots, N-1 \quad (1)$$

Among them, the autocorrelation function R_n can be expressed as the following:

$$R_n = \frac{1}{N} \sum_{j=0}^{N-1} x_j x_{j+n} \quad (2)$$

Among them, N is the number of data used for the Chinese digital seismic network records of the VH frequency band Z . S_k is the power spectral density of discrete values, which corresponds to the frequency of the VH band of the sampling rate 0.1/s multiplied by the number of k . So the power spectral density of the VH spectrum of the Z spectrum is estimated.

In order to eliminate the influence of the data cannot be infinite and the impact of the power spectral density estimation, this study uses Henning window to suppress the side lobe, highlighting the theme (BouDagher-Fadel M K, Price G D, Hu X., 2015). In order to study the earth free oscillation mode in low frequency band division, we adopt Stein and Geller (1977) explanation of earth normal mode splitting theory to simulate the power spectral density of amplitude. The theory will source reference source under the framework of unfolding transitions to the geographic coordinate system, a clear given the double couple point source in a laterally homogeneous, excited rotational ellipsoid of the interior of the earth free oscillation amplitude of the expression. The expressions clearly show that normal mode splitting of single peak value and the fault geometry parameters, seismic moment, focal depth, the earth structure and the source and receive the geographic coordinates of the point about.

The frequency of the earth free oscillation mode split according to the results of Daylen and Sailor (1979) (Didenko A N., 2015) can be expressed as:

$$\omega_m = \omega_0 (1 + \alpha + mb + m^2 c) \quad (3)$$

In this study, the theoretical calculation values of specific modes of vibration mode (Dziewonski, Anderson, 1981) are given by ω_0 for the simple and intrinsic frequency of the earth free oscillation; ω_m is a free oscillating frequency of the split spectrum of the earth's rotation and the elliptical rate; m is a split mode number, and the free oscillation spectrum is divided into a , b , c , which is the central spectral line shift parameter. Daylen and Sailor (1979) are summarized in this paper, which mainly consists of the earth's elliptical ratio. This study uses the given parameters.

As a preliminary study, in the simulation oS2 mode at each station split peak amplitude, we will the Sumatra Andaman earthquake as a double couple point source. Since the northern part of the earthquake has a slow rupture, modeled on Stein and Okla (Pavlov V E, Shatsillo A V, Petrov P Y., 2015). (2005a) will focus on 7 degrees N, 91 degrees E. focal mechanism using the r Since the northern part of the earthquake has a slow rupture, modeled on Stein and Okla. (2005a) will focus on 7 degrees N, 91 degrees E. focal mechanism using the results of the Harvard University moment of the Harvard University moment tensor.

4. Analysis of the Measured Results of the Earth's Ball Type Free Oscillations Excited By Earthquake

In this paper, we use the VHZ data of 5 stations recorded by the China Digital Network (CDSN), the method of power spectral density estimation, the free oscillation of the fundamental frequency of $57^{\circ}S^4 - 60^{\circ}S^6$ with large earthquake excitation is obtained. There are 3 harmonic frequency free oscillations ($1^{\circ}S^4, 2^{\circ}S^4, 2^{\circ}S^5$), and compared with the free oscillation period of the PREM model (Figure 1- Figure 5).

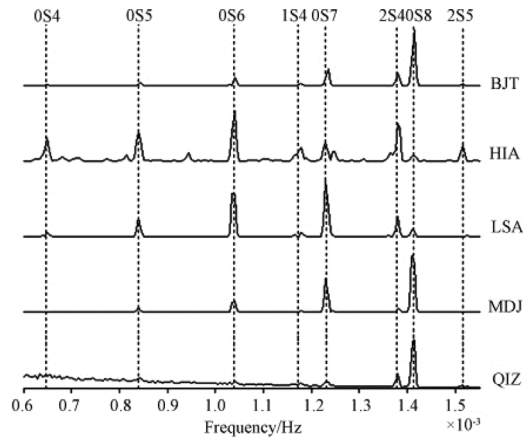


Figure 1 – Power spectral density of the VHZ channel in the 1.55-1.9 MHz channel

Figure 1 shows the corresponding situation of the frequency values of the VHZ in 0.6-1.55 MHz frequency band range from 5 to CDSN. In the frequency band, the base type oscillation $0^{\circ}S^0$, there is no display on the 5 stations; Baijiatuan station (BJT), Mudanjiang (MDJ) and Joan Taiwan (QIZ) at low frequency of free oscillation excited is not too good; It can be seen that the basic mode of vibration type $0^{\circ}S^4$ of Hailer station (HIA) and Lhasa LSA. The harmonic oscillation mode in Hailer (HIA) display is more prominent. Joan Taiwan (QIZ) with weak background noise.

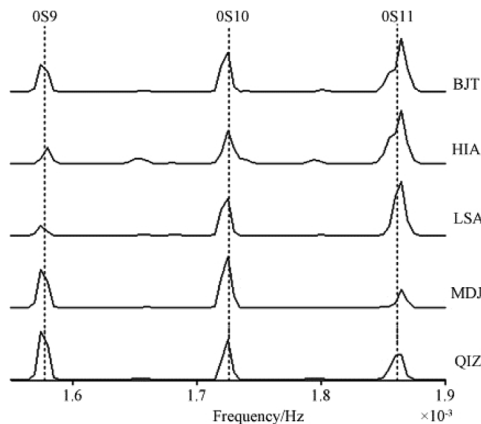


Figure 2 – Power Spectral Density Estimation of VHZ Channel in 1.55-1.9 MHz

Figure 2 shows the corresponding situation of the frequency value of the ball type with the VHZ model given by the power spectral density (relative value) and the PREM model given by the 1.55-1.9MHz frequency bands. From Figure 2 it can be seen that the base mode $^{\circ}S^9$, $^{\circ}S^{10}$, $^{\circ}S^{11}$, and the 5 stations in the CDSN can be shown very well, the frequency of the harmonic vibration mode in these 5 stations is not clear.

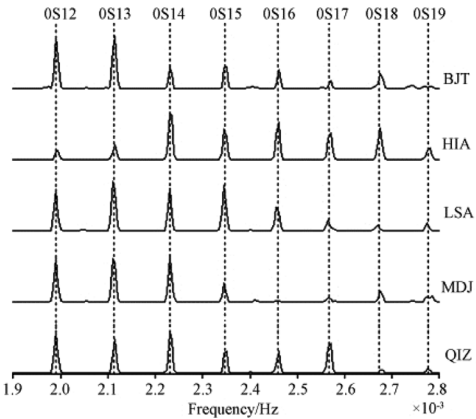


Figure 3 – Power spectral density estimation of VHZ channel in 1.9-2.8 MHz band

Figure 3 shows the corresponding situation of the frequency values of the 1.9-2.8 MHz s in the range of CDSN VHZ, the power spectral density (relative value) and the PREM model. From Figure 3 we can see that the band Carnegie shape $^{\circ}S^{12}$ to $^{\circ}S^{19}$ in the five stations display clear, agreement is also good, the base type vibration type $^{\circ}S^{19}$ in Baijiatuan station (BJT) display is less clear. In addition, it can be noted that there is no obvious display of the harmonic vibration mode in the 5 stations.

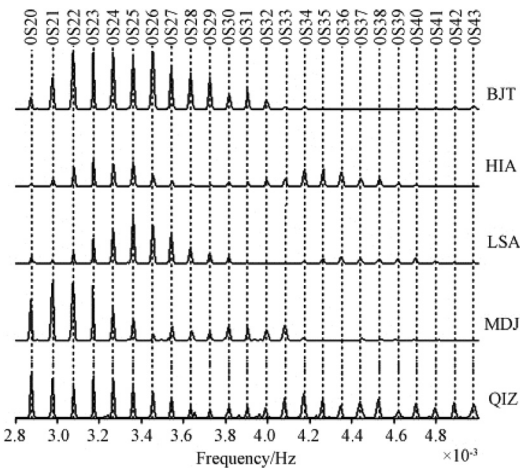


Figure 4 – Power Spectral Density Estimation of VHZ Channel in 2.8-5 MHz

Figure 4 shows the corresponding situation of the frequency value of the ball type with the VHZ model given by the power spectral density (relative value) and the PREM model given by the stations of 2.8 - 5 MHz frequency bands. From Figure 5 it can be seen that the base mode $^{\circ}S^{20} - ^{\circ}S^{43}$ shows a great difference between the 5 stations. The basic mode $^{\circ}S^{20} - ^{\circ}S^{29}$ in these 5 stations are more prominent. Hailer station (HIA) based on the vibration mode of the $^{\circ}S^{20} - ^{\circ}S^{40}$ is excited very well. Note that, Joan Taiwan (QIZ) in the band shape display are very prominent. Lhasa station (LSA) can clearly show the basic vibration mode in the frequency band. Tuan Taiwan (BJT) and Mudanjiang station (MDJ) high end free oscillation is excited by the bad.

By Figure 4, it can be seen that the most clear and consistent pattern of the basic type of the most of the 2.8 - 5 MHz frequency band is the most clear and consistent.

Figure 5 shows the corresponding situation of the frequency values of the 5-6.57 MHz of the 5 stations in the range of CDSN VHZ, the power spectral density (relative value) and the PREM model. In the frequency band, the frequency of the base type oscillation mode is not as good as the previous band (2.8 - 5 MHz). Among them, mode of $^{\circ}S^{44} - ^{\circ}S^{56}$ in Baijiatan station (BJT) on a clear display, and good agreement. Lhasa station (LSA) and Mudanjiang (MDJ) can be a good reflection of the frequency of all the basic mode of vibration type $^{\circ}S^{44} - ^{\circ}S^{60}$. Joan Taiwan (QIZ) can clearly see the base shape $^{\circ}S^{44} - ^{\circ}S^{47}$, $^{\circ}S^{50}$, $^{\circ}S^{59}$. The frequency values of the basic mode $^{\circ}S^{55} - ^{\circ}S^{60}$ in these 5 stations are deviated, which can be attributed to the lateral heterogeneity or anisotropy of the earth's media, resulting in the difference in the frequency of the oscillations in different directions of the seismic station.

By comparing the observed values of 5 stations in CDSN network with the theoretical values of PREM model, it is concluded that all the observation periods of the stations are in agreement with the theoretical cycle of PREM model.

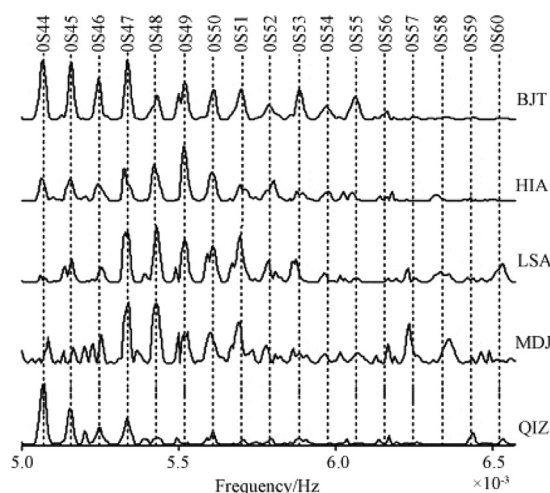


Figure 5 – Power Spectral Density Estimation of VHZ Channel in 5-6.57 MHz

5. Conclusion

In this paper, the VHZ data of 5 stations of China Digital Network (CDSN) are used to analyze the frequency values of the spherical oscillation frequency by the test results and the PREM model. It can accurately detect the fundamental frequency of ${}^0S^4$ - ${}^0S^{60}$, And ${}^1S^4$, ${}^2S^4$, and ${}^2S^5$ of the 3 harmonic frequency of the ball type oscillation. This not only reflects the operating state of the observation system of these stations, but also shows that the research is successful. In this study, most of the station for the low frequency vibration detection terminal type ${}^0S^4$ mode results is not obvious. This may be due to the multiple rupture of the earth's earthquake, and the 8.8 earthquake in Chile is not very ideal for the excitation of low frequency oscillation. Therefore, at the low frequency, the earth free oscillation cannot be clearly distinguished.

Free oscillation of the earth's normal modes for some discrete peaks in the spectrum, the position of the peaks in the spectrum can be used to determine the average mantle structure on the surface of a sphere. And spectral peak splitting is the evidence of large scale non-spherical and non-uniform earth. The use of the earth's free oscillations can provide some constraints on the mantle convection model. In addition, the seismic source rupture parameters can be used to search the seismic source rupture parameters by using the recorded data of the earth free oscillation waveform, which can be used to search for the geophysical problems such as slow earthquake, earthquake location and time.

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Application of BIM Technology in High Performance Steel Fiber Reinforced Concrete Interface

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Abstract: Objective: To study the high performance steel fiber reinforced concrete beams with BIM (Building Information Model) technology. Method: BIM technique was combined with IFC, and data was written by C++. Process: by studying the BIM file format IFC standard, the IFC neutral file to expand the geometric properties, the concrete material properties and the method of the material properties of the reinforced material parameters. And through the “data integration module” of C++ to access and analyze the relevant data in the processing of IFC file, generate the file form which is read by the nonlinear program of Fortran section. Result& Analysis: On the progress of BIM technology applied on high performance steel fiber reinforced concrete beam section nonlinear analysis process, the analysis results are in good agreement with the experimental results. Result: this method is reasonable and applicable.

Keywords: Bim; High Performance Steel Fiber Reinforced Concrete; Ifc

1. Introduction

Over the past decade, China's construction industry from the bidding to design, construction has been basically achieved the digital, computer widely used in various parts of the building. (Tserng, H. P., Yin, S. Y., Dzung, R. J., Wou, B., Tsai, M. D., & Chen, W. Y., 2009) However, due to historical reasons, China's construction industry organization structure is relatively loose, a large number of CAD computer aided design software are targeted at a certain stage of the design of the independent development, on the one hand, the existing CAD software can not contain the whole life information, on the other hand, different professional application software generated information can not be identified, generally artificial or drawings used as different systems between data exchange and sharing of media. Not only the design efficiency is low, but also caused the loss of data error and information. In view of the above two reasons, in recent years, based on the Building standard Information Model IFC building information model) technology came into being. BIM technology uses the IFC format to exchange data and share data, so as to realize the seamless exchange between different professional software. (Beach T, Rana O, Rezgui Y., 2015)

BIM will replace the traditional CAD 2D technology as the main technology of information integration and management in the future. Finland, Norway, Germany and

other European countries are based on BIM technology and the application software has reached 60% ~ 70%. (Haj-Ali R, Dasi L P, Kim H S., 2008) With the publication of IFC standard information model of IAI (International Alliance for Interoperability), the research and application of BIM technology has attracted wide attention, Vanlande and so on (Rezaei S, Wulfinghoff S, Kebriaei R., 2015); Wan created the information models for the expression of the prestressed load and load combination (Al Janabi M A M., 2015); FMC (Facilities Management Classes) information model for equipment management is established by Yu (Molinari G, Quack M, Arrieta A F., 2015); Schein built up a model of building automation system (DiGaudio R, Kreitinger K, Hickey C., 2015); However, BIM technology in China is still in the initial stage, the Tsinghua University, Zhang Jianping, Hu Zhenzhong and other 4D construction conflict and security analysis and management information model, developed based on the IFC standard 4D construction management system GCPSU - 4D (Chen K C, Loria A S., 2015); In Shanghai Jiao Tong University, Zhang Zhiyong, Deng Xueyuan, and other research of the IFC model of automatic generation of structural analysis model of the method, the automatic extraction of structural analysis information from the IFC file. (Huang Y, Ren H T, Wang Z B., 2014)

The main content of BIM technology is mainly reflected in the use of digital model for design, construction, management and other aspects. And the characteristics of BIM technology are mainly reflected in three aspects, namely: information integration, work process can be transmitted, collaborative design full support. From these three aspects of the characteristics of the BIM technology is briefly analyzed. (Baichoo S, Botha G, Jaufeerally-Fakim Y., 2015)

1.1. Information Integration of BIM Technology

The information integration of BIM technology features is mainly reflected in two aspects, one is the design process integration, the two is the design information integration. We know that the information model is the essence of information integration, because the building information model is a complete construction project digital and a single information model, the overall professional information needs to be implanted in a model. Therefore, in the collaborative design platform, the design of each process should be involved in, so that the integration of the design process can be achieved. The database is the core content of building information model, and the building information model generalizes many geometric information, such as the spatial relationship of the building structure, the size of the component (Vargas, A. V., & Osma, J. I. P., 2013). And its physical information is reflected in the building materials, building components and the number of properties and so on. BIM technology features in the design process integration and design information integration completely broke the traditional CAD method, in the design has a particularly significant effect. (Riviere G, Klopp C, Ibouniyamine N., 2015)

1.2. BIM Technical Characteristics of the Work Process Can be Transmitted

The work process of the transmission is one of the characteristics of the BIM technology. We know that the main work of the BIM technology application is the creation of a time and the unity between the engineering data. In this work, the design staff is not required to handle the drawings or update the link. After the application automatically modifies a

certain content, the BIM system will be modified in the way of feedback to be affected by the way back to the graphic elements. In addition, the same building model can be used in different purposes, such as BIM model can be used in the construction simulation, structural analysis, and so on. In this way, not only can reduce the work load, but also improve the working efficiency of the program design (Azizi F, Al Taweel A M., 2015).

1.3. Full Support for the Collaborative Design of BIM Technology

As a new design pattern, BIM system has built up a perfect communication bridge between design, construction and owner operators, and provides a large amount of data and information for the engineering project. Because the 3D model can be designed according to different professional work, so the BIM system can realize the mutual communication and influence of the construction object automatically by using 3D model. BIM technology reflects the full support of the “cooperative design”, which not only improves the ability of communication and communication between engineers, but also reduces the design cycle, improves the design quality and brings great economic benefits (Liu C, Liu R, Wang T., 2015).

1.4. BIM Technology for High Performance Steel Fiber Reinforced Concrete

At present, the research on BIM mainly focuses on the theoretical research and technology, such as Akinci Burcu and IFC product model, and proposes a new method to generate the required work space according to different construction procedures. Fu Xiao discusses some basic concepts of building information model design, combined with practice, analyzes how to design the use of Revit building information model in the design stage. And the combination of BIM and nonlinear analysis has not been involved. (Reichert R, Jusys Z, Behm R J., 2015)

For a long time, the stress and deformation of reinforced concrete structures are analyzed by using linear elastic theory, and the design method of ultimate state is not coordinated. With the development of economy, more and more large reinforced concrete structures need to be built, and higher requirements are put forward for design cycle and engineering quality. Therefore, the conventional design of the empirical formula has exposed many shortcomings, and the reinforced concrete nonlinear analysis method has been paid more and more attention because of its accurate simulation of the structure of the force state of the characteristics. At the same time, with the continuous development of computer level, the problem of nonlinear analysis is solved, which makes the method get a rapid development and plays a huge role (Chen K C, Loria A S., 2015).

Due to the nonlinear of concrete material, the nonlinear analysis of the cross section based on the constitutive relation is related to the large amount of information processing. At present, the nonlinear analysis is mainly used in the experiment, the load of the cross section, the environment and the internal information from the experimental conditions, and the number of the experimental components is not much, the results of the analysis are mainly used in the theoretical research. And the actual project need to extract the relevant information from the massive engineering data, and the analysis process using artificial management task is also very heavy, application of BIM technology to solve the cross section of information extraction, integration, transformation and exchange can be a good solution to the above problems.

In summary, this paper will combining FORTRAN written section nonlinear program with BIM Technology, proposed the related parameters of the application of IFC Standard is defined in terms of the BIM model storage nonlinear analysis, read and call BIM data, and for nonlinear sectional analysis theory and method of calculation, finally, through the analysis of examples, the feasibility and practicability of the calculation method is proposed in this paper.

2. IFC Standard Data Storage Method

BIM technology is aimed at solving the problem of information island in the construction field, and the core method to solve the problem of information island is to have a unified data storage standard, can regulate all walks of life and the construction of a large number of information, IFC standards appear to achieve this goal. IFC standard is an international standard for data representation and exchange of building products. BIM can be used as the standard for data exchange in IFC. It is the foundation of building engineering software to share information. This paper is based on IFC as the standard, and discusses the combination of BIM technology and the nonlinear analysis of concrete cross section. (Hao L, Liao K S, Chung T S., 2015)

The model defined in IFC standard is the object building data model, which is based on the information of the whole life cycle of building, and realizes the data exchange in different specialties and different stages of the project. Its architecture consists of four levels from bottom to top: Resource Layer, Core Layer, Interoperability Layer, Domain Layer. Each level contains a number of information description module, and compliance: "each level can only refer to the same level and the lower level of information resources, and can not refer to the upper resources" principle. In this way, the lower level resources are not affected and the stability of information is guaranteed. In this paper, the material information and geometric information of steel fiber reinforced concrete are in the resource layer, which is the most basic information, which can be used in all the upper fields (Huang Y, Ren H T, Wang Z B., 2014).

Resource layer is defined as the basic information, which describes the information of building products, through the object oriented modeling method, which will have similar attributes to a class, such as IfcWindow, IfcDoor, IfcColumn, IfcBeam and other entities, these entities defined in the definition of material information, geometric information, etc.. Such as "IfcDoor" in "Overall Height" is the proprietary property of this class, which represents the height of the space occupied by the "door" entity in the IFC description. In addition, IFC also includes a lot of abstract entity definitions (such as planning, space, organization, cost, etc.). The definition of these categories is composed of IFC Foundation Industrial Classes. (Chang C R, Long B, Yang X F., 2015)

IFC for the description of the information are used for object-oriented modeling language EXPRESS, through the string or the reference of other entities to describe the entity information. As shown in Figure 1, describe the content inside the parentheses following the entity name is the attribute of the entity, attribute value is by "," separated, by a "(" , "surrounded by symbols attributes together, expressed a set, where the individual elements are also" and "separated. The property is an IFC object said by # collar digital," # and digital common composition the identifier of the object; ordinary words represent

numbers or special identifiers; string general store user specific information. The “IfcDoor”, “IfcBeam” and other entities described above are carried out in accordance with the grammar. This paper is related to the following statements in the text details.

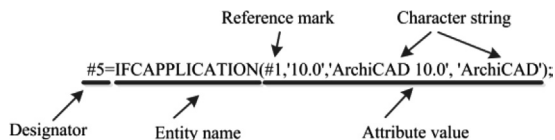


Figure 1 – IFC neutral file statement instance

3. Fortran Section Nonlinear Analysis Program

Fortran language in 1951, after 1966, 1977, 1990, 1995 and other versions of the past 60 years of history, although its history is long, but in the numerical calculation, Fortran language has obvious advantages of other programming languages. Fortran90 standard is introduced into the array calculation, which is very good for the function of matrix operation. In the array operation, Fortran can automatically carry out parallel operations, which is not available in many programming languages. In addition to the Fortran language has a lot of ready-made function software package, so it is very convenient. In this paper, the nonlinear analysis program is written in Fortran language, and the IFC platform for C++ programming, in view of our country a lot of engineering calculation procedures are Fortran program, so this paper needs to study the method of loading Fortran in C++ environment, at the same time with BIM, for the future similar needs to provide reference.

To be first, the input data necessary for the nonlinear program in this section are sorted. The nonlinear analysis program is used to analyze the relationship between the bending moment curvature of steel fiber reinforced concrete and steel fiber reinforced concrete and steel fiber reinforced concrete and steel fiber reinforced concrete and steel reinforced concrete and steel reinforced concrete and reinforced concrete and steel reinforced concrete and steel.

According to the Fortran section nonlinear program, all the input parameters of the program are summarized, as shown in Table 1.

Material Parameter	Concrete	steel bar
Bulk density(kg/m ³)	0025	00875
Cross section vertex coordinates	Rectangle (4 points X, Y coordinates)	
Radius of curvature of section contour	9.9E22(Greatly expressed as a straight line)	
Center of radius(mm)		12
Diameter		X ,Y coordinates
Constitutive model	Stress, strain, elastic model	Stress, strain, elastic model

Table 1 – Data read directly from the BIM

The parameters can be divided into two categories, one is the material related parameters, the other is the geometric parameters, and the cyclic control parameters can be classified as the relevant parameters of the material and the reinforced concrete materials. In the resource layer of the IFC file is the main basis for the definition of basic information. In this paper, according to the mapping relationship between IFC and C++ entity object, using object-oriented method to compile data integration module program, the bulk density, the constitutive model and the related parameters of the material are related to the reinforcement and concrete label. Concrete section of vertex coordinates, contour curvature radius and bar diameter, coordinate (BOLD mark), through the integration of the above modules in the IFC file entity parameters analyzed after reading.

4. Nonlinear Analysis Related Data Expansion and Access

4.1. Related to Data Expansion “Class”

By comparing the data and IFC neutral file stored in the nonlinear analysis program, we find that the data stored in IFC can't meet the requirement of the data in the nonlinear analysis. Therefore, we need to expand the relevant data in BIM.

As mentioned above, the expression of the IFC neutral file is EXPRESS language. If you want to add the data to the IFC file and free access, you must understand the syntax of the EXPRESS language.

IFC is used to store data of attributes, such as, IfcColumn, IfcBeam, and so on, which is used to express the characteristics of the entities, such as the entity's position (Object-Placement), the shape (Representation), which express the corresponding relationship between different entities and their attributes.

In the case of a beam structure, the entity definition of IfcBeam is described:

ENTITY IfcBeam

SUBTYPEOF(Ifc Building Element);

ENDENTITY;

IfcBeam entity is inherited from the IfcBuildingElement entity, which is inherited from the parent class directly. The 26 attribute is not defined, and the cross section dimension parameter of the beam is stored in the object of the IfcProduct entity class, and the Representation property of the IfcProduct contains the number of its geometric shapes.

The external entities referenced by the beam entity are as follows:

12=IFCOWNERHISTORY(#11,#4,\$,.NOCHANGE.,\$,\$,\$,1132354283);

#14698=IFCPRODUCTDEFINITIONSHAPE(\$,(#13781,#13793));

#14888=IFCLOCALPLACEMENT(#6235,#14795)

Entity IfcBeam in expression when references to other entities by the identifier “#” and the “#13 entity description of the entity's revision history information,” #14788 “entity description the name of the entity size,” #14798 “entity description of the position of

the entities in the local coordinate system and the local coordinate system the position relationship with the global coordinate system.

Thus, the IFC in the entity and attribute description is according to the fixed format item description, according to this order to get the information of the beam section is as follows:

```
#14533=IFCCARTESIANPOINT((-150.,0.,-400.));
```

```
#14523=IFCBOUNDINGBOX(13786,300.,2000.,400.);
```

These two statements describe the coordinates of a vertex in a local coordinate system, and a rectangle that can be completely enclosed by the beam. The size can be retrieved information according to this method, and will not go. According to the geometric information, the above mentioned above can be calculated by the data integration module.

Secondly, there is no definition of reinforced concrete in BIM, and only the concrete material is defined, and the specific property of concrete is not defined in the current version of IFC. So in this example the required data of the reinforcement and the material properties of steel and concrete need to be expanded.

4.2. Data Expansion Method

According to the need of nonlinear analysis, the data of concrete label, bar code, diameter and thickness of protective layer are extended to IFC file. The data of the IFC file is accessed by the independent development of data integration module.

```
#199=IFCPROPERTYSET('1TWEtweer',#13,'Graphi soft AC89 COLUMN ',' Graphi soft AC90',(#193)
```

The last one of the attributes contained in the statement is `IfcProperty`, the class through the `IfcProperty Single Value` `IfcProperty Table Value` entity to achieve data storage, such as the case of the diameter of the steel bar diameter information on the use of this storage method, the specific code is as follows:

```
#78=IFCPROPERTYSINGLEVALUE('Steel Bulk density',$,12,$);
```

```
#74=IFCCOMPLEXPROPERTY('Steel',$,'Nonlinear',(#74));
```

```
#81=IFCPROPERTYSET('3REEBfrfsetb',#9,'Steel', " ",(#70));
```

In summary, the section is required for the nonlinear analysis of data through the expansion of IFC files are stored in a building information model (BIM), and read calls and analysis by the data integration module, then the final nonlinear analysis program the desired data output with FORTRAN program to read the file format, you can load FORTRAN nonlinear analysis program for analysis and calculation.

4.3. Data Integration Module

According to the above data, the bridge and the link between the BIM and the nonlinear analysis program are established by the data integration module. According to the above problems, the method of judging the module is designed as follows:

The bulk density: the bar code and the concrete label in IFC are read from the database in the data integration module, and the data are stored in the target variable.

II constitutive relation: due to the stress strain relationship of concrete should be more complex, is affected by many factors, various theoretical curve more, so stored in the module too in different alternate uses for Zhenhai et al the variety curve equation. Using the distributing analysis of input data required for the constitutive relation curve of point, so module also provides manual input points of stress, strain and tangent modulus of choice.

The position coordinates of the steel bar: because there is no reinforced concrete in IFC, the size information can be obtained directly from the concrete. In the same way, only the basic information of the IFC file is expanded.

The loop control parameters: this part of the data according to the data read by the number of procedures to determine module.

In summary, the data integration module can be of IFC neutral file in the nonlinear analysis of relevant information accurately read, to integrate, to judge, by preliminary data processing can get fee linear analysis to program data.

5. Nonlinear Analysis of High Performance Steel Fiber Reinforced Concrete Beams

The following formula is used in the constitutive relation of steel fiber reinforced concrete,

$$\frac{\sigma}{f_c} = \frac{\beta \eta}{(\beta - 1) + (\eta)^\beta} \quad (1)$$

Wherein, $\beta = 1.093 + 0.236RI^{-0.926}$

$$\eta = \frac{1000\varepsilon}{0.7f_c^{0.30}} \quad (2)$$

RI was based on the test of the beam specimen material properties. By the test data directly from the test data.

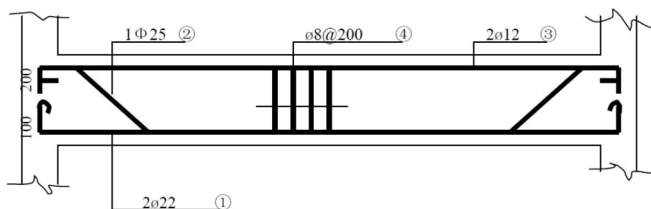


Figure 2 – Reinforced steel fiber reinforced concrete size and distribution

The beam geometry size and reinforcement are shown in Figure 2.

Based on the method of data integration, the geometrical properties and material properties of high performance fiber reinforced concrete beams are written to IFC file, and the load deflection curves of different fiber volume ratio are obtained by using C++ program to call the nonlinear analysis with Fortran software.

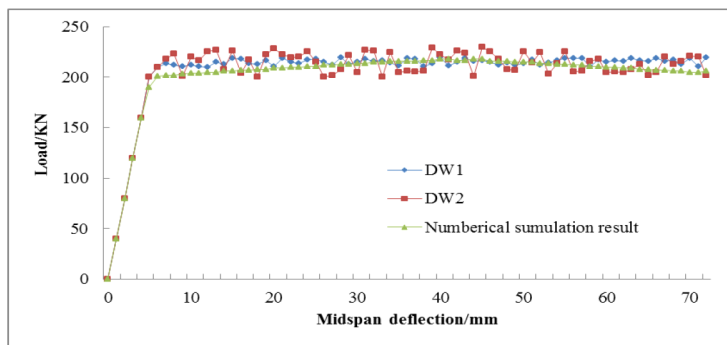


Figure 3 – Steel fiber volume ratio 2.5% load deflection curve

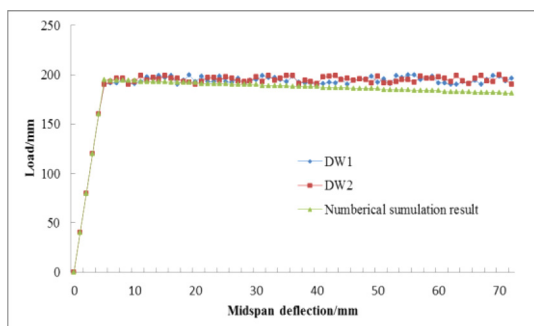


Figure 4 – Steel fiber volume ratio 0.5% load deflection curve

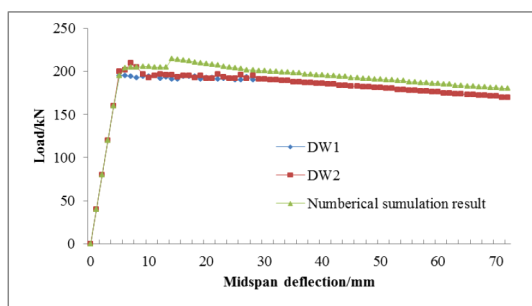


Figure 5 – Steel fiber volume ratio 2.0% load deflection curve

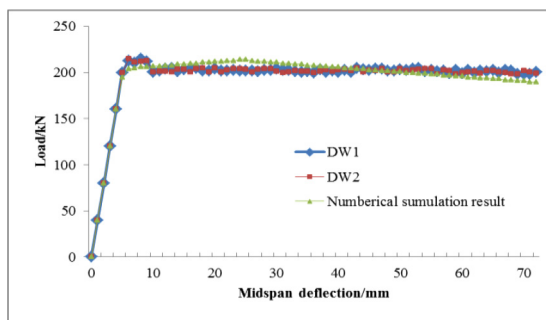


Figure 6 – Steel fiber volume ratio 1.0% load deflection curve

The asterisk (*) of the curve for the Fortran nonlinear analysis software. Figure 3-6 showed that the data integration method proposed in this paper is more accurate in data collection and transmission, and the nonlinear analysis method is in good agreement with the experimental results.

6. Conclusions

1. object-oriented analysis and design software is used for the future construction industry information development direction, this paper on the steel fiber reinforced concrete beam nonlinear analysis software for the object processing, refining the nonlinear calculation of the required data, such as the material class, geometric size class IfcBeam, for the latter part of the structural nonlinear analysis and the safety level of the data base.
2. for the high performance fiber reinforced concrete beam section nonlinear analysis, the analysis results and the experimental data are in good agreement, the data integration method proposed in this paper is more accurate in data acquisition and transmission.
3. BIM as the construction industry information development trend, which follows the IFC standard has a wide range of applicability and practicality. In this paper, the application software based on IFC can be called and added to the data in order to provide a reference for the development of the professional software based on BIM.

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Research on the Winning Laws of Wrestling Based on Logical Reasoning and Mathematical Statistics Method

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Abstract: Objective: In order to improve the performance of the wrestling athletes in our country. Method: Establishing a research method of the wrestling winning laws based on logical reasoning and data statistics. Process: The article introduced the development of wrestling and related concepts, established the fuzzy logic reasoning model, and analyzed the technical and tactical characteristics of the classical style wrestling. Result & Analysis: This paper studies the various skills in wrestling, carries on statistics and analysis of a large number of wrestling sports records data, and finds that the establishment of the research method can get the general rule of wrestling. Result: the research method based on logical reasoning and data statistics is effective and feasible.

Keywords: Wrestling sports; Winning laws; Logical reasoning; Data statistics.

1. Introduction

Wrestling is one of the oldest Olympic Games with a long history of several thousand years. As early as the first session of the Athens Olympic Games in 1896, men's free style wrestling became a formal event. A total of 71 pieces of gold medals, the current world wrestling all the rules of the world, project setting, technology level and sports performance and other aspects of the development of a rapid development, Olympic Games, the key projects, many countries will be wrestling as the key project of the Olympic games, wrestling has become one of the most watched events in the world. Throughout the history of wrestling show, the sports power of all sports are attached great importance to the development of wrestling, my country has made a good record in wrestling (Lorenz S L., 2015). The Athens Olympic Games in 2004 and the Beijing Olympics in 2008 have a gold medal. Figure out the success of the wrestling program can make our gold medal has been won, become the overlord of the wrestling world. Classical style wrestling, free as a competitive sport with a long history in the world, respectively in the first and the fourth Olympic Games to become a formal event. With the continuous development of wrestling, the project has become one of the basic categories of modern sports, is an important part of the Olympic movement. In the modern Olympic games, set up small Greco levels, men's freestyle level, women's wrestling level. Throughout the

previous Olympic Games, the sports power of all competitive sports in the development of wrestling projects are showing a good trend. With Russia and the United States as an example, the United States and Russia and the United States wrestling is the traditional advantages of the project, the key is the two items in the Olympic Games gold medal. This fully shows that the wrestling event in the Olympic Games in a pivotal position (Javadimehr S, Fatemi A H, Ghonsooly B., 2015). Figure 1 (a) - (b) shows different forms of wrestling matches.



(a) Classical Wrestling Match



(b) Freestyle Wrestling Tournament

Figure 1 – Different Forms of Wrestling Match

Research on the domestic and foreign advantages of sports items found, to develop a sports program into an advantage project, it is necessary to grasp the winning laws of the project, only to grasp the law can be the rule of law, targeted training, to defeat the opponent, you can achieve excellent results. So, through discussion and Research on the winning rule of the wrestling program is to keep the wrestling movement in high efficiency, an important link in sustainable development. Master the winning rule of wrestling found a key to success, can successfully open the door to the Olympic victory. The research methods of the winning factors of wrestling items are usually literature data method, questionnaire survey method, expert interview method, logical analysis method and mathematical statistics method (Lorenz S L., 2015).

2. The Interpretation of the Basic Competitive Features of Wrestling

Feature is a special feature of a thing that is different from other things. Three competitive characteristics is to study the most regular objective reflection of the success factors of the project related indicators. It is true that in order to pursue the ultimate competitive ability as the basic characteristics of the competitive sports, the winning factor is to study the fundamental problem (Abreu, A., Rocha, Á., Cota, M. P., & Carvalho, J. V., 2015). The research on the development of competitive level is the starting point for the study of the winning factor. In the world of wrestling, it is a good thing that a good athlete must have the speed, endurance and flexibility of a marathon runner, the lifter's strength and intelligence and mental chess player (McClellan K., 2015). From

the perspective of sports training, this sentence is not scientific scrutiny, but then you can see that wrestling, the two players do not use any instrument to display, hold, roll, etc. Action will fall and winning the game, the athletes' competitive ability to ask such a high. Thinking from the perspective of the theory of the group, the international style of wrestling is based on the ability to classify. The action structure classification of the anti - fighting program belongs to the category of multi-action structure variation. It is obvious that three different classification criteria are analyzed from the theory, it can be seen that the wrestling project is based on the special quality, in the form of technology, the use of tactical combination to score winning hand combat project, progressively, wrestling special competitive characteristics must deal with the relationship between good special qualities, technical and tactical, and high level athletes winning must consider the psychological factors (Edlow B L, Hinson H E., 2015).

3. Wrestling Competition Form

Contemporary international wrestling is refers to players of both sides in the square mat indoor a 12*12m with radius as the effective area of 4.5m, under the condition of fixed rules, athletes in accordance with their respective weight classes, physical contact, fitness, technique and tactics, psychology of a battle of wits, a sports game to score or absolute advantage of winning victory judgment, have the characteristics of absolute victory and score victory. The competition between the two sides is reflected in five aspects, physical, skills, tactics, psychology, intelligence and so on. The comprehensive ability of the five aspects is the athlete's competitive ability. The performance of the wrestling event is mainly determined by its own competitive ability, the competitive ability of the opponent and the decision of the three aspects. The athlete's competitive ability is the internal cause, which is the controllable factor, is the most fundamental reason for the decision to play. But the athlete's own competitive ability is also controlled by the opponent's competitive ability, sometimes even the decisive influence. Ring (Henricks T S., 2015), as shown in Figure 2.

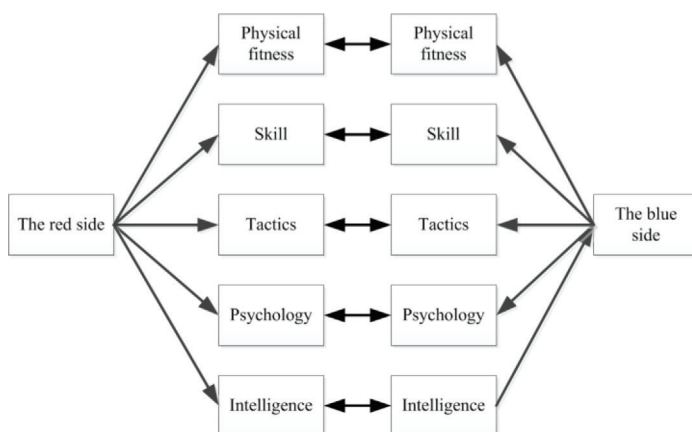


Figure 2 – Wrestling Competition Form

4. Logical Analysis

According to the philosophy of dialectical materialism, the principle and method of using logic, in this study, the observed phenomena and the obtained data were demonstrated, summarized and integrated, then, from the shallower to the deeper interpretation of reasoning, summarize the law of winning Chinese wrestling. In this paper, a fuzzy logic inference neural network (FLINN) is proposed, the number of neurons in the rule layer is determined by the sample (Laine E., 2015), and the structure is shown in Figure 3.

Input for $n: x_1, x_2, \dots, x_n$; Output is y . every output has m pieces of language for each input, the number of rule layer nodes is L .

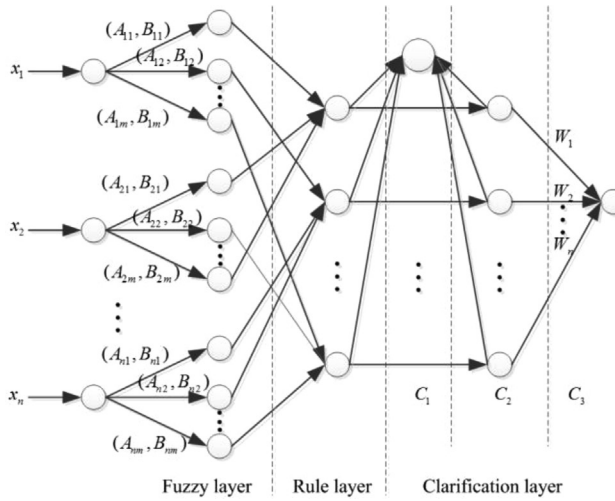


Figure 3 – FLINN Structure

Fuzzy layer: The sampling input is generally accurate, and the fuzzy logic reasoning method is used, the accuracy of the input is to be fuzzy, the function to be accomplished is to replace the exact value with the language of a fuzzy tone. The linguistic values of variables can be divided into 3: small, medium, large, or very poor, poor, medium, good, very good. There are many ways to make a fuzzy method, the golden section is a kind of the most widely used method to reflect the natural beauty of harmonious beauty of the optimal segmentation model, in the case of unknown membership with this model can get better results (Reams L, Kang K.J., 2014). The distribution of membership functions of linguistic values should be in accordance with the golden section rate. If the bell type membership function is used, the more close to the center of the domain, the smaller the coverage is, the entropy of the center is 0.618 times more than that of the center. If $x_{\max}$ and $x_{\min}$ are the minimum and maximum of the universe, the variables have 3 linguistic values:

$$G_o(\mu_o, \sigma_o) = \exp(-(x - \mu_o)^2 / \sigma_o^2) \quad (1)$$

The left and right membership functions are $G_{-1}(\mu_{-1}, \sigma_{-1})$, $G_{+1}(\mu_{+1}, \sigma_{+1})$, and (μ_0, σ_0) , respectively.

Among them: (μ_{-1}, σ_{-1}) , (μ_0, σ_0) , (μ_{+1}, σ_{+1}) , respectively, the mean and variance of the 3 membership functions, use general method to determine:

$$\begin{aligned}\mu_{-1} &= x_{\min}, \\ \mu_0 &= (x_{\min} + x_{\max}) / 2, \\ \mu_{+1} &= x_{\max}, \\ \sigma_{-1} = \sigma_0 = \sigma_{+1} &= (x_{\max} - x_{\min}) / 2\end{aligned}\quad (2)$$

The mean value and the general method of the golden section method are the same, but they are different, as follows:

$$\begin{aligned}\sigma_{-1} &= (x_{\max} - x_{\min}) / 4, \\ \sigma_0 &= \sigma_{-1} \times 0.618, \\ \sigma_{+1} &= \sigma_{-1}\end{aligned}\quad (3)$$

The distribution law of the linguistic value coverage based on the golden section model is more in line with the distribution law of the domain, so this paper uses the method to determine the weights of the fuzzy A_{ij} and B_{ij} , then the output of the fuzzy layer:

$$\begin{aligned}\text{Out}A_{ij} &= \exp(-(x_i - A_{ij})^2 / B_{ij}^2), \\ i &= 1, 2, \dots, n, j = 1, 2, \dots, m\end{aligned}\quad (4)$$

Rule layer: All the possible rules are m^n , but not all of the rules are meaningful, so the initial set of rules is determined by the sample, and the sample set of P samples is $\{S_1, S_2, \dots, S_p\}$, the fuzzy layer of the membership degree is determined by the input of the training sample, take the maximum value of the input variables as input variables, assuming that the input values are divided into 3, representing “small”, 2 “small”, 3 “middle”, 1 “big”, and easy to program, and for the contradiction of the rules, to be retained, so that in the future of network training to choose. Each neuron in the rule layer represents a rule, can determine the connection between the rule layer and the fuzzy layer:

$$\begin{aligned}\text{If } x_1 \text{ is Small and } x_2 \text{ is Big,} \\ \text{Then } y \text{ is Small.}\end{aligned}\quad (5)$$

The x_1 is “small” neurons and x_2 represents the “big” neurons that are connected to the neurons of the rule:

$$\text{Out}B_i = \text{Out}A_{1,j_1} \text{Out}A_{2,j_2} \dots \text{Out}A_{n,j_n}\quad (6)$$

Among them, $i = 1, 2, \dots, l$ and $j_1, j_2, \dots, j_n$ are the number between 1 - m , which is determined by the first i rule.

Clear layers: Using the method of gravity center method, the output of the network is:

$$y = \text{Out}C_3 = \frac{\text{Out}B_i W_i}{\sum_{i=1}^l \text{out}B_i} \quad (7)$$

Which W_i is the weight of the C_3 layer (Li G., 2015).

5. Analysis on the Technical and Tactical Characteristics of the Classical-Style Wrestling

5.1. Offensive Techniques and Tactics

In the classical style wrestling attack technique and tactics, one is the use of different types of technical action when standing up, such as arms and waist abdomen, shoulder neck and waist abdomen, waist abdomen and chest, throw the other party to the dangerous state or transfer to each other behind to force each other into a kneeling state, or the direct oppression of their shoulders; the second is in ground wrestling at the side of the body center of gravity along the longitudinal axis and the transversal axis rotation a week or force each other's shoulders and ground angle was less than 90 degrees (Li G., 2015). Through the comparison between the 2004 and the major countries of the 2008 Olympic games, Russia and Azerbaijan before the Beijing Olympics eight teams per minute scoring more than 1 points per minute, and the 2004 Athens Olympic Games, the offensive index at 0.8 points / minute, have significant differences ($P < 0.05$). At present, with the change of classical rules, in the competition, the opportunity to carry out the effective attack is the most, the time of the match is shortened, the way to score is increased, that is out of bounds score; In addition, in the stage of both players can get a hug, a direct favorable opportunity to attack, make the game more casual, encourage athletes to take offensive tactics (Cline F K R., 2015).

5.2. Defensive Techniques and Tactics

For the current 2 minutes a game of wrestling, defensive ability is essential, as in the stand in points, ground wrestling must score, standing and kneeling down link both fell, and the short game time, the change of tactics is less than the old rules, at the time also reduced athletes, so whether it is standing or kneeling on the defensive strength of the players put forward higher requirements. Through the comparison of the major countries of the Olympic Games in 2004 and 2008, compared with the 2004 Athens Olympics, show every minute points of Olympic Games in 2008 the rising trend of major countries, are in the 0.7 points / minute, in addition to Russia to maintain a relatively stable, but also increased. The main reason is that the rules make the game more exciting, the game more opportunities to score, the number of attack and defense conversion is increasing, which indicates that the integration of attack and defense is the main technical and tactical characteristics of modern wrestling (Schroeder S., 2015).

6. Wrestling Winning Sum Rate

Sum Law refers to the ability of competitive sports is a kind of comprehensive performance, it is determined by the level of individual development and the level of its comprehensive development. Wrestling competitive ability is by fast, hidden, vast, even, stable, variable, congruent several factors and the formation of comprehensive development. Various factors of different development level and composition of the different characteristics of the athletes in the various techniques. In today's competitive sports, If you know and have a certain winning factor, you may get a good result, so today if the lack of a winning factor or a factor in winning is not up to the standards are higher, then he will defeat in the fierce competition. System theory of the famous barrel principle points out a bucket of capacity is not determined by the longest of the block, but by the shortest piece of decision. To improve the competitive ability of wrestling athletes, must be the comprehensive promotion of all winning factors. Just like the Japanese women wrestling world wrestling has been a powerful country, they are the ability to get on the knees roll bridge, we do not fight with them, to avoid the edge, we pay attention to the Japanese team with strong winning factors, such as strengthening the strength of the quality of the training, we develop fast, the vast, hidden, and other factors. Can also be successful, the Athens Olympic Games in China will beat Japan's Hamaguchi Ryoko is an example.

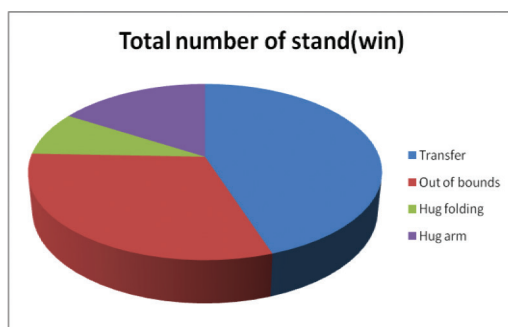
7. Data Statistics and Analysis of Wrestling Techniques and Tactics

7.1. Wrestling Skills and Tactics Score Data Statistics

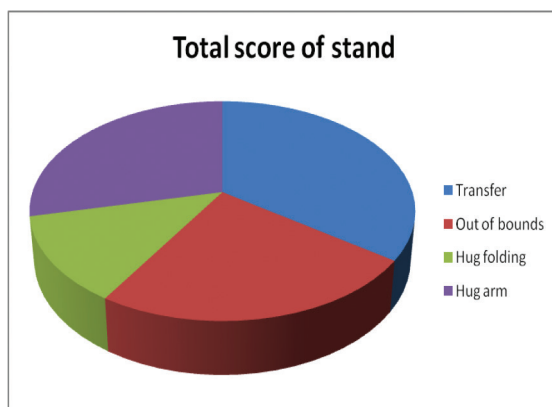
Application of classical style wrestling tactics statistics system software for the three Olympic athletes preparing for the 2012 London Olympics will national team of Greco Roman wrestlers. According to the match hierarchies 55kg class Li Shujin, 60kg class Chengjiang, 120kg Liu Deli opponents in the game a total of 210 game tactics do storage and analysis. The integration of the 210 game statistics, as shown in Table 1, the statistics of the score of all players are shown, in the standing stage focused on the transfer and scoring tactics in forcing the opponent out of bounds, in the stage of the kneeling stage is basically the three part of the rolling bridge category, to mention the defensive tactics (Budd M A, Kuemmel A., 2015).

Stand	Total number of stand(win)	Ratio (%)	Total score of stand	Ratio (%)	Ground holds	Total number of ground holds (win)	Ratio (%)	Total score of ground holds	Ratio (%)
Transfer	77	45	77	35	Defensive success	98	29	98	17
Out of bounds	53	31	53	24	Rolling bridge	145	43	252	45
Hug folding	14	8	28	13	Lifting	85	25	204	36
Hug arm	28	16	63	29	Neck and shoulder	6	2	11	2
In total	172	100	221	100	In total	334	100	565	100

Table 1 – The Data of Total Score Of 210 Games



(a) The Proportion of The Total Number of Times in The Standing Score



(b) The Proportion of The Total score in The Standing Score

Figure 4 – The Percentage of The Data in The Standing Score

It is not difficult to score in the data table that the total score is the core standing transfer and forcing the opponent out of bounds technical score, at the same time, the main technical movements of the athletes' scores are also the holding fold and the class, from Figure 4 it can be seen clearly that the number of standing and the fraction of the score, from the use of the frequency can be clearly seen in the transfer of the total proportion of 45%, out of the total proportion of 31%, accounting for 8% of the proportion of the total arms folded arms, accounted for 16% of the proportion of the total; From the score, transfer accounted for 35% of the proportion of the total score is 24%, out of bounds, holding a total of 13% of the total proportion of the total proportion of arms, holding 29% of the total, that in every game in the main points of tactics is transfer and persecute opponents out of bounds and the holding arm, want in stance phase scores mainly improve athletes transfer of various technical movement. And the tactics mainly to let the opponent out of bounds, the strength and agility of the players are the basic conditions to improve the score, with the increase of strength and agility, technical action training should focus on the training of transfer of technical movements, skilled in the easy to score the technical action, to do a good job of offensive and defensive defense (Javadimehr S, Fatemi A H, Ghonsooly B.,2015).

7.2. Points Wrestling Technical and Tactical Statistics

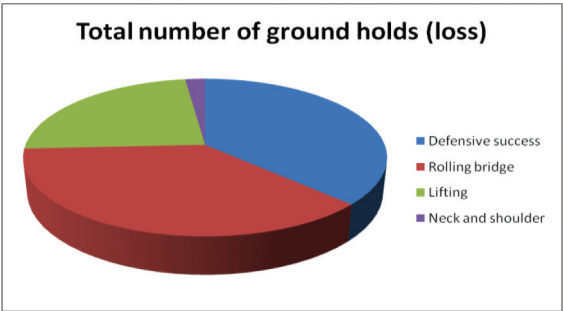
Defense has always been an important victory for the classical style wrestling, one of the key points of the discussion so tactics are also investigated, don't lose points is an important ideological victory in the competition, in order to reduce the losing rate, in the game to determine which action is easy to lose points. As shown in Table 2 and are forced to transfer the opponent out of bounds is easy to lose points area, a kneeling opponent's defensive success stage that we lost points is the main factor, kneeling and embrace such points also accounted for a large proportion, things are, easy to score points is also easy to lose points. To improve the attack but also to defensive tactics for points, try to increase the score, reduce the loss of points, not only to attack can easily score, also to attack the other people at the same time to know the defense, a good game before the training program, play the best competitive state in the game.

Stand	Total number of stand(loss)	Ratio (%)	Total lost score of stand	Ratio (%)	Ground holds	Total number of ground holds (loss)	Ratio (%)	Total lost score of ground holds	Ratio (%)
Transfer	45	46	45	40	Defensive success	72	37	72	23
Out of bounds	34	35	34	30	Rolling bridge	72	37	131	42
Hug folding	7	7	11	10	Lifting	46	24	103	33
Hug arm	12	12	23	20	Neck and shoulder	4	2	7	2
In total	98	100	113	100	In total	194	100	313	100

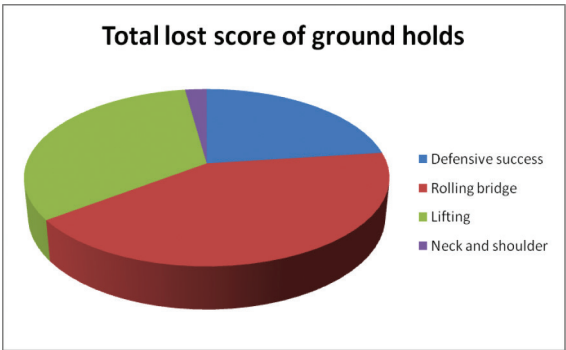
Table 2 – The Total Loss of Data In 210 Games

Kneeling phase points is an important part of the game, but also are the main points of the, most of the game in the standing stage is in a stalemate, keep yourself not score also don't lose points, so the defense on the stage of the kneeling stage is the key to determine the outcome of the game, the main core is losing, kneeling in action is the main rolling Bridge and embrace, tactics are mainly defensive tactics, from Figure 4 of the pie chart can be seen kneeling the number and percentage of score points, from the use of the frequency can be clearly seen in the rolling bridge category accounted for 37% of the total, defensive success accounted for 37% of the total, carrying a total of 24% of the total proportion of the total proportion of 2%; Winning is kneeling lose from the score, the rolling bridge category accounted for the proportion of total 42%, defensive success losing is 23%, lifting the total proportion of 33%, shoulder and neck accounted for the total proportion of 2%, if you want to hold stage occupies the dominant position, then the rolling bridge and embrace the technology action of defense against certain is the main training project, do well defended, not losing a victory in two athletes several attacks are not scoring, kneeling defense is a victory, especially in kg class competition,

ensure the defensive not lost is the key. Is different with other game concept, score is very important, Greco Roman wrestling not losing a lot more important, often the neglected direction of thinking is indeed the key to victory, to strengthen defense training, improve the athletes' defensive consciousness, improve the defensive ability of athletes and provide some help to prepare for the training of the Olympic Games.



(a) The Proportion of The Total Number of Ground Holds



(b) The Proportion of The Total Lost Score of Ground Holds

Figure 5 – The Proportion of Data in Ground Holds

8. Conclusion

Wrestling has now become an important Olympic sport, the effective way to improve the whole level of wrestling is to find a good way to win the wrestling. This paper introduces the concept and theory of the related concepts and theories, analysis of logical reasoning model and data statistics, a research method based on logical reasoning and data statistics is established, and reached a good wrestling winning law.

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A Mode Construction of Public Welfare Organizations Based on Digital Technology

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Abstract: Objective: This paper constructs a public welfare organization model based on the digital age, in order to improve the survival and development of the public welfare organizations in the new era, and create the value of social public benefit. Process: This paper first introduces the digital era has changed the channels and means for the spread of China's public welfare organizations, networks have been able to become a kind of consensus and trend, for on the basis of the public awareness of the public organizations. Is proposed according to the specific condition of China at the present stage, the application model based on the digital age. In this paper, from the public welfare orientation, management team construction, the building of public platform and the operation of the public platform system four aspects in detail, this paper built a based on the application platform of the digital age, public welfare organizations. Through this platform, the establishment of a more perfect method of establishing the application mode of public organizations.

Keywords: Commonweal organization; Public welfare model; Digital technology; Mode construction

1. Introduction

In China's public welfare undertakings in the past is entirely borne by the government, invested by the government and official background of public organizations (hereinafter referred to as the official public dominated, more representative of the China Charity Federation, China Federation of the Red Cross, the China Youth Development Foundation gold, China children and teenagers' fund and so on. Also some official background of public organization, including Beijing friends of nature, green homes. These public welfare organizations in the social public sphere plays a major role, with a broad and profound social influence and appeal. However, the growing demand of the society has become more and more effective (Jin C., 2013; Parsons L M., 2007; Keefer P., 2007).

Folk public welfare organizations, also known as "civil enterprise" or "social enterprise", are the people who are spontaneously founded and carried out not to take the benefit as the goal. NGO, compared with the official charity organization, flexible, diverse, low operation cost, social mobilization, characteristics, occupies a more and more proportion in all kinds of public organizations.

From 2005 to now, the domestic gradually emerged and formed a number of non-governmental organizations based on the network, such as a multi back one kilogram organization, the catcher in the rye, “Ge Sanghua”, “”, “Lighthouse”, “Katie” and so on. These new organizations are based on the WEB2.0 micro public organization. They take the new era of “micro public” concept as a guide, with a new generation of Internet software and hardware as the core, to the network of individual users as the core, the integration of public service resources and information, to meet the needs of the traditional public interest organizations cannot meet the needs (Martins, J., Gonçalves, R., Santos, V., Cota, M. P., Oliveira, T., & Branco, F., 2015).

Under the Internet environment, the public welfare organization of the network information platform is not only the basis of external communication platform, but also the outside world to understand the public welfare organization of the window. Taking NGO2.0 map as an example, this paper introduces STSF model to discuss how to make government, enterprise and foundation better understand Chinese public welfare organizations, and provide effective material, human and financial support to establish trust and interactive relationship between public organizations, foundation, network information platform (Wang J., 2015; Oreglia E, Qiu J, Bu W, et al., 2015; Rindermann H., 2008).

Then build a new model of civil service based on WEB2.0, study the integration of supply and demand information, promote citizen communication and share information and form the complete operating mechanism, in order to avoid the obstacles encountered in the development of civil society organizations.

2. New Model of Public Welfare Organization Network

2.1. Demand Customer Caused Network Communication Mode Change

Taking into account the public welfare organizations of the network using the conditions generally not high, the staff technology, management capabilities, the researchers first consider is the study of CMS, the social network service platform based on SNS. Although the SNS community for people who have common interests together, but the grassroots public welfare organizations themselves are weak, coupled with the lack of public interest in the SNS community, it is difficult to attract more users to use (Jenks J, Hamid R, Shah J, et al., 2013).

Subsequently, with the Chinese public welfare project 2.0 group and public organization's contact and communication, more and more, part of public organization in the network technique obtained after upgrading is urgent to realize the importance of the public network platform to build, project group based on their needs, for public welfare organization planning “official website” or marketing platform, financial network system platform, such as saving of Minqin desert tree planting project combines a lot of Web2.0 consciousness and technology, will be an organic combination of virtual tree planting and the actual planting, with a strong practical significance. But this kind of planning is subject to the development of technical capabilities and huge differences, it is difficult to implement for the project (Polinsky A M, Shavell S.,2007; Kistler R, Collins W, Saha S, et al. 2001).

Finally, the Chinese public welfare 2 project repeatedly research needs, the public organization to raise funds, organization and promotion, recruitment and other business modules of the needs of the same. This provides a new way of thinking for the research direction, namely through the way of thinking and practice of 2, so that the public welfare organizations and social mainstream resources for docking, in particular CSR (corporate social responsibility) resources. In the course of the study, the research team found the Web2.0 application, and then the prototype of the Ngo2.0 map.

Ngo2.0 map to build a bridge between public welfare organizations and enterprise CSR, and promote public welfare organizations and enterprises CSR mutual understanding and exchange, increasing the possibility of docking between the two, and thus promote the NGO to get the project cooperation opportunities, funds or materials donated, volunteer service and other enterprises to provide resources. From November 2010 launch date, there are public welfare organizations and enterprises published reports of 1064, the average daily number of reported 4.77, in these reports are NGO needs of 170, CSR 793.

The continuous development of NGO2.0 map need to rely on the continuous expansion of the visibility, attract new users, while maintaining the relationship with the old users, improve customer trust and loyalty, and thus form the brand effect. STSF model introduced in the NGO2.0 map operation, not only can solve the platform to attract new users, maintain the old user's goal, but also through four stages of marketing strategy can get low-cost, rapid feedback, and then evaluate the effectiveness of the website's communication. At the same time in the process of marketing, the collection and the NGO2.0 map of the relevant views and information, in order to improve the ability to integrate information, design better communication strategy.

2.2. Application of STSF Model in NGO2.0 Map Operation

2.2.1. Summery of the running of STSF model

STSF model is a model of enterprise Internet business application. NGO2.0 map using the model, refers to the Web2.0 environment, first let users find us (search), into our website, the site has a full understanding and experience; second, we need to get the user's trust (trust), so that users can choose us (select), and complete; the last is the most important is to maintain good customer relationship, so that users can be loyal to us (follow).

As a non - profit organization, the public welfare organizations in China need a lot of manpower, material resources and financial resources. Therefore, the shortage of funds is a difficult problem. Some public organizations began to pay attention to the Internet and other new media, trying to raise resources through the Internet is not ideal. NGO2.0 map is based on the actual needs to build the Web2.0 platform, the end of the public service organization, and the other end to provide resources for enterprise CSR, to achieve the needs of both sides on the platform, and these are often used to operate, so the introduction of STSF model, according to users on the Internet to find NGO2.0 map, NGO2.0 map, select NGO2.0 map and NGO2.0 map of the process to implement the network communication strategy.

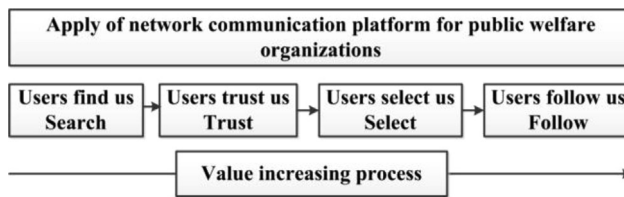


Figure 1 - STSF Model of Public Welfare Organization

2.2.2. Search stage

In vast amounts of information and numerous network space, user search information is mainly dependent on search engines, how to make users quickly and effectively find their relevant information depends on the NGO2.0 map in search engine marketing strategy as well as the attractiveness of web page design. With “Chinese public welfare 2”, “NGO”, “enterprise CSR” and so on as the keyword is convenient for the user to find the target website. In the design of the site is to strengthen the CIS NGO2.0 image, content organization and logo showing a unified, to ensure the consistency of the network communication. NGO2.0 map can also use Tencent microblogging, Sina Weibo, Sina Weibo, Tencent, Youku video network and other public network platform, in the above published a detailed plan and implementation of activities, not only to improve the website, public service organizations and corporate reputation, but also increased the channel to communicate with users, increase the opportunity to find users.

In order to search for the audience, while NGO2.0 map operators can start the anti-search operation, that is, through the search engine, blog search tools, SNS social networking sites and other related information search NGO2.0 map, listen to the outside world to discuss and comment on the site, including what organizations and web users in the discussion of what content. Through this stage of the search, NGO2.0 map can not only be included in a number of useful search engines and search tools, found in their own areas of the most influential promotional tools, and can follow up the latest developments in the industry, to grasp the latest information and discourse power, for the next step of the network station to lay the foundation.

2.2.3. Trust stage

The decisive factor that drives user trust in the network communication is the equivalence of information transmission, which is mainly to protect the credit problem, to help the resource provider to obtain the real situation of the activities and resources utilization, thus to establish the network brand image and user trust system. NGO2.0 map of the existing information release, that is, the Ngo2.0 map publishing information required to submit the Chinese public 2 audit, the audit will be issued after the audit, to ensure the authenticity of the project information. And the enterprise CSR resource publishing will not need to go through the audit, the operation is also very simple, just follow the prompts to enter the appropriate information. Through the audit of public information needs of the organization to increase the credibility of the site, which is conducive to attract business users to log on to provide resources to achieve docking with the NGO’s

needs, but also to facilitate the enterprise to find appropriate public organizations based on their own requirements.

Internet word of mouth effect is very important for any website in Web2.0, “site check” and “word of mouth” constitute the brand image evaluation and user trust system. For NGO2.0 map of word of mouth effect, you can use blog, forums and microblogging and other tools to enhance the popularity, and select the relevant degree of evaluation and other organizations to participate in the evaluation and dissemination of the site, and guide users to effectively spread, improve the site’s exposure rate in potential users, of course, the user’s choice of reputation effect, the target user’s determination can refer to the first phase of the anti-search results. This way is not only low cost, high credibility, but also with the group and affinity, is conducive to the conclusion of the site brand loyalty.

2.2.4. Select stage

When the user of the site and the dissemination of information generated by the trust, often based on their needs to communicate, until the choice to participate. In this process, the use of convenient, timely tracking and effective online communication is the key to attract users. Take the NGO2.0 map as an example, it takes Ushahidi as the prototype, the platform is simple, the whole installation and setup process is only a few steps, basically do not need professional knowledge, only need to follow the instructions of the installation can be completed within a few minutes. The use of the process of hardware equipment requirements is very low, so the user can immediately publish information, use it becomes simple, users need to achieve any function can be completed in a moment. Ngo2.0 map provides a wide variety of information dissemination and reception, users can use mobile applications, SMS, instant messaging applications, e-mail, and access to the site and other ways to complete information dissemination and reception. At the same time with a unique way of information subscription, the user can select a region on the map, and then through the phone or e-mail to receive all the information within the region.

In addition, tracking techniques and communication skills are involved in the process of tracking users and encouraging them to choose their own web sites. Currently China’s most popular instant messaging tool is mainly QQ, MSN, popo, Fetion, Ali Wangwang, combining in anti-search stage accumulation of user information, according to the needs of different users communicate in a timely manner, drew potential users, the firm’s core user, make it become the site’s loyal supporters.

2.2.5. Loyalty stage

The sustainable development of the network platform is not only to face the daily new users, but also to maintain the interaction with the old users, improve customer loyalty, and timely and detailed information and feedback to provide the results become the important guarantee.

This stage is a very important module in the NGO2.0 map, which is the latest tracking report. This way through the map to see this way is more intuitive, click on the map of a region marked by the area, you can see all the information reported in the

region, to further click on a report can read more information; the page view through the information is more comprehensive, information reported on the platform all the information reported. In addition to the information subscription, users can choose to focus on the activities of the Ngo2.0 map will automatically set the user to set the information to the user, E-mail and microblogging and other instant messaging tools to ensure that the site and user, user and user interaction, thereby improving the user's identity and loyalty.

However, only the release of content and the feedback of the user's feedback is not enough, according to the results of feedback analysis and promotion strategy is to improve the promotion strategy. Which network communication tools are strong, which platform information and modules are more popular with users, so as to effectively select the most appropriate network communication channels.

3. Construction of Public Welfare Organizations Based on the Mode of Public Service Application in the Digital Era

3.1. The Construction of Public Welfare Organization Communication Mode Based on WEB2.0

Construction based on the WEB2.0 of the public welfare model including public service orientation, team building, network platform to build and run several modules. Organization through the STP positioning process, to determine the difference between the service and service objects, forming a 5W1H positioning statement (Fu F, Liu L, Wang L., 2008; Stefanone M A, Lackaff D, Rosen D. ,2010; Xin D U., 2013). Focusing focus on the positioning plays a supporting role, it will organize the concept, service content into a well-designed slogan, image or slogan, and integrated into the organizational culture. On the basis of the accurate organization and location, it is necessary to construct the entity part of the public organization, that is, the formation of the management team and the construction of public service network platform. The management team includes two parts of the board of directors and full-time working team. The construction of the public service network platform includes four parts, including the design idea, the access path, the function module design and the hardware construction. The last of the establishment of the public welfare model is the process of the trial operation, the operation process of the user, information and operation in the process.

The idea of the public interest model based on WEB2.0 is shown in Fig.2.

3.2. Construction of Public Organization Management Team

Nonprofit organizations should have the board of directors and full-time working team, the same is true of public organizations. The board of directors of the public organization is the highest decision maker, usually including the investor, the interest related person, the creation person; the full-time working group is responsible for the daily operation of the public welfare organizations, usually according to the work function is divided into several specific departments.

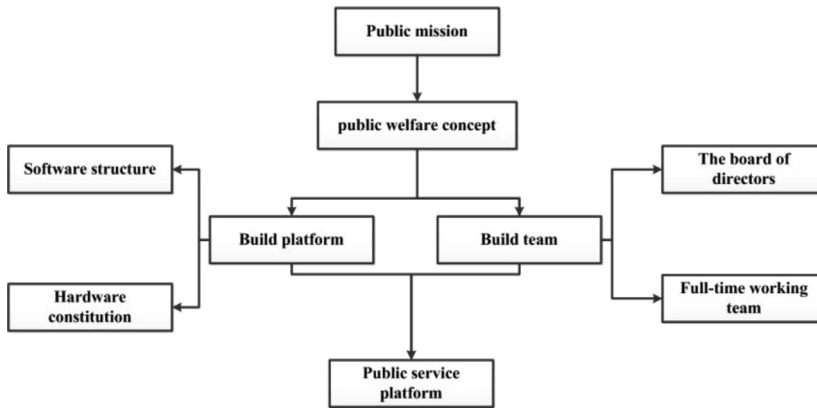


Figure 2 – The Idea of the Public Interest Model Based on WEB2.0

Based on Web2.0, public interest organizations lies in to engage in support of public welfare undertakings, of its management team decision mode is no longer traditional pyramid, is no longer the, but from the bottom up. The management team's role is no longer but the service issue orders left and right, supporters.

3.2.1. Construction of the board of directors

The board of directors includes the board of directors and the board of supervisors, and the Council's responsibilities include the formulation of the articles of association of the organization, design of internal and external systems, and strategic planning for the organization. The duties of the board of supervisors shall include the supervision and examination of the organization's management team members and staff, and to observe the process of the organization of the project, review the organization's financial budget and decision making.

Since the board of directors is the top management representative in most of the nonprofit organizations, the board member's choice should be chosen as possible, except for the founder, employee representatives, representatives of staff, staff representatives and investors. Although these members personal affairs busy, but the social impact and over a wide range of social contacts can widely for the organization to seek resources, can effectively reduce the external resistance of organization, and help improve the awareness of the organization, for example in terms of money raising, so some board members can do for the organization as an ambassador, access to the outside world attention. So the members of the board of directors according to the nature of their work can be divided into full-time, part-time and attachment three.

Board members should not only have a relatively rich social activities experience, with a strong abstract thinking ability, but also to deal with the public concept has a more profound understanding. In addition to the enthusiasm of the public welfare undertakings, with a certain spirit of dedication and social responsibility, the board members are the highest decision-makers, should have a high personal ability and comprehensive quality, and especially should have a strong sense of service and

learning ability. Therefore, caution should be maintained when choosing a board member. In addition, in some special cases, the board members can also coincide with the management team members, which is more common in the public organization based on WEB2.0. Because of its relatively flat organization. The author tries to have the quality and skills of the members of the Table.1.

Category	The Specific Capacity and Description
Technical skills	1. Basic knowledge of computer software and hardware system and common software 2. Understand the basic skills of Internet software and hardware. 3. the website design, development and promotion of basic skills to understand 4. Understand the design and application of WEB2.0. 5. Good at learning new technology, to grasp the use of new products
Conceptual skills	1. has a good overall view, can be in accordance with the organization's mission, according to the changes in the external environment to make a timely adjustment - Whole, formulate and update the organization's development strategy. 2. have a deeper understanding of the public interest, can grasp the new public welfare concept in time 3. With the media, the foundation, the enterprise, the government's relationship management skills
Interpersonal skills	1. to the enterprise, government, media and related organizations to lobby 2. with the management team, the ability to communicate with the team 3. to deal with the coordination of the incident handling capacity 4. in the face of public speaking ability and social mobilization ability 5. a wider range of social contacts and a wealth of human resources 6. strong personal charm and influence

Table 1 - Skill types of board members

3.2.2. Construction of full-time working team

Full-time working group is the core of public welfare organizations. Although many public welfare organizations are fully formed by amateur Internet users, but the success of the case analysis, the author believes that in the conditions of the permit, the public organization should be as far as possible to create conditions for their own full-time work team, which is the guarantee of organization and service capabilities. However, the public welfare organizations and the traditional model of public welfare organizations to be different, it depends on the distribution of individual collective action on the network to achieve the value of public interest, rather than by direct participation of organizations. As a result, the staff of the full-time team can be more dispersed SOHO in the area of home office, that part time staff, the use of information technology to complete the work. Should avoid the use of ordinary users or volunteers to complete the work, a large number of free volunteers can reduce the human costs in the short term, but its work stability and poor professional, leading to the organization's service level is not stable or even interrupted, long-term past will reduce the organization's reputation.

The number of micro organization management team based on WEB2.0 is generally small, but the workload of a single individual is relatively large, the team's size should

be determined according to the organization's mission, scale and resource capacity and other factors. The number of people should be maintained at 7 to 20, of which the number of 5-15 people are the most common, it is best for the odd number, you can prevent the vote when a draw.

According to the division of responsibilities, the working team should have a total head, finance department, network department, operating department, and human resources department, etc., the structure is shown in Figure 3.

The organizational structure of the public welfare organization is different from the traditional public service organization. Charity is the traditional pyramid management, top-down decision-making chain transfer. Public service organizations to provide support services, is the decision-making process from bottom to top.

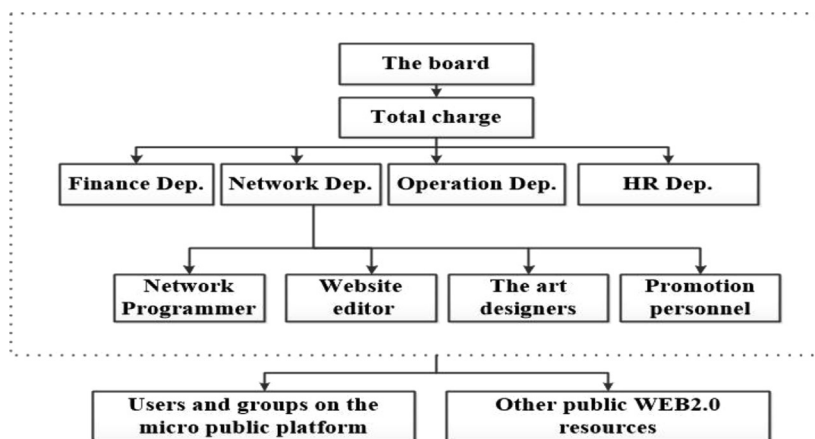


Figure 3 – Public Welfare Organization Chart

The responsibility of each department in the organization is stated as follows.

1. The general manager's responsibility is similar to the general manager of a general profit organization, and is responsible for the management of the organization.
2. The financial sector as a whole to organize the daily income, expenses, management organization of the collection and use of resources, but also to disclose financial information to the outside world, for all parties to monitor.
3. The network department should have a website programmer, website editor, art staff and promotion staff. Among them, the site programmer, editors and artists can also choose to work outside the solution. But in the ability of the case, the organization should be as far as possible to have their own network personnel.

According to the standards of the current mainstream WEB2.0 web site, network programmers should have the following requirements:

1. Familiar with Linux system configuration and maintenance.
2. Master server configuration and optimization (SQL).

3. To manage and develop the database effectively, and be familiar with the database (MySQL) optimization, can carry on the deep excavation of the existing data.
4. Love to write open source software and share it with others.
5. The development of a sensitive, sensitive, and can correspond to the needs of the development of the organization to make rapid changes, rapid delivery.
6. With the new module and the site of the independent design and development capabilities, it is best to master the on Rails Ruby and related plug-ins.
7. Knowledge of HTML, CSS, JavaScript and browser compatibility.
8. Code management and deployment, master asp.net language.
9. Be familiar with network security, be able to resist the hacker attack, maintain the normal work of the website firewall.

Web site editor's main responsibility is to maintain public information platform, the quality of its work on the site of the good or bad.

The monument has a direct impact, specific duties include:

1. The release of official information, the creation of a copy of the site to enrich the content, shooting video and pictures and editing.
2. Review, screen, or delete information on the platform.
3. Pay close attention to the operation of the platform, and timely resolution of the conflict on the platform, collect user feedback.
4. Make a summary of the work done on a regular basis and make recommendations for improvement.

The main responsibility of the artists is in accordance with the requirements of the organization and the production of initial web pages, web page design, including the design of the home page, LOGO, column page, content pages, features, etc., in particular, to be good at developing web site interface style, will use HTML+CSS code.

1. Promotion staff's responsibility is that, according to the organization of the deployment, selectively in other network organizations to promote, for public service platform to get more hits, improve the number of users, the accumulation of popularity. Promotion personnel should master the skills as follows.
2. Will be landing on the network to search engines, such as Baidu's ranking, etc.. Make the website keyword of landing and update, can make the traffic forecast.
3. The establishment of an external link, such as the link.
4. With an external web site to create interactive content, this site can be submitted to the external web site for more access to a greater amount of access and influence.
5. The use of common network marketing, event marketing and word of mouth marketing methods to increase the amount of access and visibility of the network platform.
6. The operation of the management of the organization's daily operations, including the management of public service platform online activities, and offline activities, monitoring and recording activities under the line, with various media, business, foundation, government departments and other agencies to obtain external support, and even participate in commercial projects to obtain

funding; regular work summary, the platform is responsible for the daily, peripheral work.

7. The human resources department is responsible for the organization's human resources development and training, including the related training and management of personnel involved in the activities. It is consistent with the human resources department of the traditional public welfare organizations.

3.2.3. Construction of public welfare network platform based on WEB2.0

Public organization should first decide whether to have the independent website or domain name of the organization. If you do not have the conditions to set up the network platform independently, you can use the existing WEB2.0 network resources, the organization's platform distributed in public WEB2.0 sites, including the use of public blog, microblogging, WIKI, SNS and free mailing list. And other benefits are the lowest cost, the shortcomings are obvious, the stability and reliability of the organization's services, as well as the degree of trust will be limited, the organization's lack of independent public service platform for users to do the function set will also be limited by the public WEB2.0 service provider (Pang J, Jie L, Xu F., 2014; Doyle A., 2011).

Under the conditions of the situation, it is best to have an independent public service platform. The construction of the public service network platform is the construction of the website, the staff's equipped with the division of labor. The founder of the charity organization can be set up according to the idea of the design of the organization, in accordance with the need to set up a website.

No matter what kind of field service, support the core theory of the public welfare network platform is the six degree theory, the most important in the support of the six degrees of space is still the most recent first degree, that is, the user's first social network relationship. To this end, the public platform should maintain and maintain the relationship between the user, the first time to update the user's first social relations network contact information, public information and action, and be able to understand the relevant belonging, such as location, job information, interest, the recent involvement of the activities. On this basis, expand the user's second tier, third tier social network relationship. It can be said that the key to the design of public service platform is two points, one is to ensure the authenticity of the user resources, and the two is to maintain the complex social network relationship between users.

Based on the WEB2.0 platform by WAP, WEB, and SyncML data station search and synchronization of four parts. Function modules are configured as shown in Fig.4.

1. The article / photo module is the main source of public service platform. Users publish public information to the log, to text, pictures and video and other multimedia content. The new content will focus on the user's friends and users outside the station by using the WEB2.0 tool.
2. A friend / concern and activity / group module is a manifestation of the SNS function of the public service platform. Users through these two modules to build a network society, the relationship between social expansion, increase user six degree space in a certain time, according to a topic to establish groups, organizations online or offline activities.

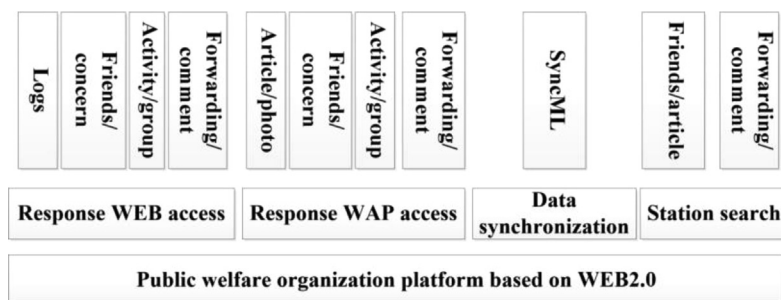


Figure 4 - Functional Module Design of Public Service Platform

3. Forward / comment module will be the platform and the network on the WEB2.0 resources for docking. Users can participate in a certain activity or group theme through a comment or response; the user can transmit the information through WEB2.0's standard data interface through the standard data interface. Therefore, the core of this module is that it can integrate the platform of the organization with the WEB2.0 resources on the whole Internet, and further expand the breadth and speed of information dissemination.
4. The SyncML module serves as the data synchronization of the mobile phone user.
5. In the station search module allows the user to quickly locate the contents of its concern.

Site work includes the following steps:

1. Site selection (asp.net, ASP, PHP, JSP, script Java, etc.), Download Web sites, or make their own web sites.
2. Domain name registration should be carefully considered, positioning and organization linked, concise, easy to remember.
3. The purchase of a site space (i.e., the purchase of a virtual host service, should take into account the target population commonly used Internet access service provider for reference).
4. The domain name binding and analysis (public website belongs to the non-operating site, the Ministry of information industry, the Ministry of information industry, ICP/IP <http://www.miibeian.gov.cn> for the record).
5. Website program upload and install.
6. Debugging and error correction, if not in conformity with the requirements, return to step 1; if it meets the requirements.
7. add the content of the site, the construction is completed.

In addition to the addition of the site content of the other work, can choose to complete, and can also be part of the network, even all outsourced to the network company. But to pay for this and increase the cost of.

From (1) to (7) the logical relationship as shown in Fig.5.

So far, the public welfare organization of the network platform for the establishment of the hardware has been completed.

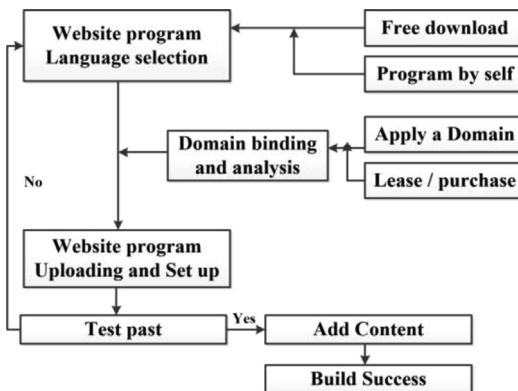


Figure 5 – Construction Process of Public Network Platform



Figure 6 -Public Welfare Organization Prediction Model of Media Development Seminar

4. Conclusions

The activities of public welfare organizations in China have covered almost all aspects of social life, culture, education, health care, environment, charity and so on. They have a positive and far-reaching impact on the construction of the whole society. The main goal of network communication model based on STSF model is to promote the organization, organization and society to strengthen contact, exchange information, and help to optimize the allocation of resources, promote public welfare, solve common problems, provide useful suggestions for government decision-making, and play a positive role in building a harmonious society.

This paper puts forward the construction method of the public welfare organization mode based on WEB2.0. This paper puts forward the idea of constructing the public welfare model based on WEB2.0, including: the construction of the micro management

team; analyzes the running mechanism of the micro public welfare organization based on WEB2.0, and proves its validity.

In this paper, according to the specific condition of China at the present stage, from the public welfare orientation, management team building, the building of public platform and the operation of the public platform system four aspects in detail, this paper set up a public welfare organization application platform based on the digital age. Through this platform, based on web is put forward of new folk public welfare model, the paper studies the integration of the supply and demand information in civil public welfare, promote the citizen communication and sharing information and form a complete mechanism of action, in order to help organizations around the obstacles in the development, improve the ability of survival and development of Chinese folk public welfare organization, create social value.

Acknowledgements

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Research on a New Model of Computer Network Aided English Instruction

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Abstract: Objective: It researches on a new model of computer network aided English instruction. Method: Model design and experimental effect evaluation for the new model of computer network aided English instruction. Process: Firstly, we introduced the advantages and disadvantages of CAI, the traditional teaching mode and the traditional computer aided English instruction. Secondly, According to the above two kinds of teaching problems, this paper designs a new teaching mode based on these two methods. Finally, the experiment teaching evaluation of new teaching mode is carried out. Result& Analysis: After the experiment, the improvement of English reading level in experimental group was significantly higher than the control group. And $P < 0.01$. This result is statistically significant. Result: We should integrate resources and make full use of the advantages of computer networks and traditional teaching, so as to better realize English teaching.

Keywords: English teaching; Computer assisted instruction; Traditional teaching

1. Introduction

In recent years, people gradually aware that the autonomy of the learners is the ultimate goal of the education. With the continuous development of social economy, cultural exchanges become more frequent, and college students' English learning model is also experiencing a reform and innovation (Webb S, Malik M, Wilson M., 2015). College English teaching in the classroom gradually transformed into a modern Internet assisted instruction by the original single teaching of "blackboard + textbook", the teaching of the first auxiliary teaching recorder and the simple projector. But, at the same time, a variety of fresh information and teaching mode of constantly updated impact on the traditional teaching on the Internet, and rich teaching resources also let students and teachers be overwhelmed. It makes the students eager to learn, improve the learning efficiency, and reduce the cost of learning (Lunde K R., 2013). At the same time, the development of computer network technology provides more possibilities and more broad prospects for developing students' autonomous learning ability.

How to make use of computer technology to explore new mode of College English Teaching in the network environment (Nagata N., 2013), and to improve students' ability of using computer technology in the network environment is an urgent problem to be solved.

2. What is CAI?

Computer Assisted Instruction (CAI) is carried out in the computer aided to discuss the teaching content, teaching process and teaching method and technology with a variety of teaching activities (Aqda M F, Hamidi F, Rahimi M., 2011). CAI provides students with a good learning environment. Comprehensive application of computer technology, such as multimedia, hypertext, artificial intelligence and knowledge base, overcome the disadvantages of traditional teaching methods (WANG Z, LI J., 2010). Its use can effectively shorten the learning time, and improve the quality of teaching and teaching efficiency, which achieves the optimization of teaching objectives (Leizhao C J L., 2010). The main research content of CAI includes the Computer Assisted Instruction mode, the production of Computer Assisted Instruction courseware, the writing tools and environment of Computer Assisted Instruction (Franco H, Bratt H, Rossier R, et al., 2010). CAI system can be divided into three parts: computer hardware, system software and software program. And its basic mechanism model is shown in Fig. 1.

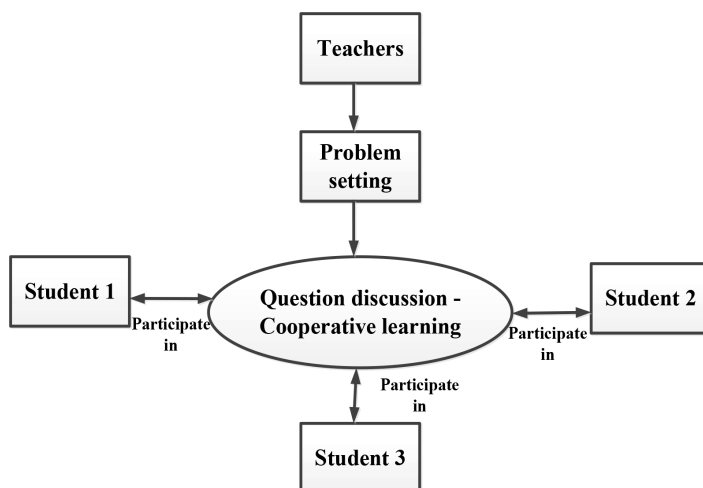


Figure 1 - The Basic Mechanism Model of CAI

2.1. Effect of CAI

CAI is helpful to the cultivation of the ability of observation. Computer Assisted Instruction can accord to the need to observe the students in the need, which turn things into action, change things into reality and put things into simplicity (Beechler S, Williams S., 2012). Things difficult to observe can be clearly presented in front of the students, so that students can be careful, comprehensive observation, inspire positive thinking (Gasca-Hurtado, G. P., Peña, A., Gómez-Álvarez, M. C., Plascencia-Osuna, Ó. A., & Calvo-Manzano, J. A., 2015).

CAI is helpful to the cultivation of generalization ability. The computer can provide a vivid and clear appearance (Han L., 2010), which is helpful to guide students to sum up the common features of the same thing.

CAI is helpful to the cultivation of logical thinking ability. In the course of teaching practice, the students' cognitive structure is also set up, and the ability of logical reasoning is developed at the same time.

2.2. Application of CAI

CAI is applied in general technology. General technology course is a new course, which is full of vigor and vitality (Johnson E P, Perry J, Shamir H., 2010). It is a course which is based on the practice, pay attention to create, and pay attention to the integration of science and humanities integration of curriculum. The use of multimedia computer technology in general technology teaching can play its advantages (Wang P., 2011), so that the general technology classroom teaching can be more colorful, but also can temporarily alleviate the contradiction of the shortage of the general technology laboratory.

CAI is used in low level language teaching. CAI enables students to realize the organic combination of various senses, so that the knowledge can be displayed in front of the students in a multi-level, multi angle and visual image, so as to mobilize the enthusiasm of students, active classroom atmosphere, improve the classroom teaching efficiency.

CAI is applied in art teaching. Using Computer Assisted Instruction can better highlight the teaching key and breakthrough teaching difficulty. Especially in the breakthrough of the traditional teaching of many difficulties, the computer can play an unparalleled superiority.

3. The Advantages and Disadvantages of the Traditional Teaching Mode

The traditional mode of college English teaching in our country can be expressed by the form of teachers + students + the textbook and chalk. It is a kind of teaching mode which takes the teacher as the center to teach the language knowledge and skills (Jia J, Chen Y, Ding Z, et al., 2012). This model has the following advantages. First, teachers can teach students in accordance with their aptitude in the classroom, and flexible change the teaching progress and teaching content according to the actual English level of the students, but not to stick to the lesson plan. Second, teachers can adjust classroom atmosphere and teaching methods at any time according to the students in the class of the expressions and reactions, and can also adjust the practice time to help students to consolidate the knowledge. Third, teachers can communicate with students at any time, and teacher-student relationship is harmonious; Fourth, teachers can often form a variety of classroom activities, and thereby create a group learning atmosphere.

However, there are also many problems in the traditional teaching. First, it cannot provide students with a wealth of visual and auditory stimuli, over emphasis on grammar and reading, information input limited. So it is difficult to fully mobilize all the senses of the learners to participate in learning, and achieve the maximum learning effect. Second,

this teaching mode emphasizes the input of language knowledge (input), while ignoring the use of language (output), it is not conducive to mobilize and play the enthusiasm and creativity of students' autonomous learning, and not conducive to the cultivation and improvement of students' English comprehensive ability. Third, the traditional English teaching mode is use the old program of "reviewing the old lesson - importing new lesson - explaining new class assignments", which is not conducive to stimulate the students' interest in learning, and makes the classroom teaching of apathy. Fourth, teachers pay too much attention to English grammar, vocabulary, sentence patterns, and explaining, but ignore the practical use of the language.

In short, the traditional teaching mode has its success, but its limitations lead it to adapt to the current rapid development of the situation, with the need of the times.

4. The Advantages and Disadvantages of the Traditional Computer Aided English Teaching Mode

The traditional computer aided English teaching mode has the following advantages. First, College English teaching with multimedia network technology helps to stimulate students' interest in learning, which can improve learning efficiency, can make full use of resources, and enrich English classroom teaching (Shafaei A., 2012). Second, there are a lot of authentic English materials on the network. They relate to politics, economy, society, culture, science and technology, etc., and can create a real language learning environment for students. Third, multimedia English teaching can go out of the classroom, and students can learn, practice, counseling and testing in the home, which is conducive to stimulate students' learning initiative.

But at the same time, there are some new problems we found. First, many English teachers rely entirely on computer assisted language teaching, a courseware player, multimedia courseware teaching ideas by the impact. Second, computer assisted language teaching completely replace the traditional way of teaching (Price L H, Hendricks S, Cook C., 2010), influences students' understanding to some specific problems, and weaken the teaching and learning interaction; Fourth, multimedia teaching is transformed into the cramming teaching model and the blind pursuit of information but ignore the students' abilities.

Therefore, the new model of computer aided English teaching based on the network is very important.

5. The Design of a New Model of Computer Aided English Instruction

5.1. Design Principles

According to the definition and characteristics of network assisted instruction, and the specific characteristics of college English, this paper argues that the following principles should be followed in the construction of college English network assisted teaching mode.

In College English teaching, the emphasis is on the students as the center, taking the teacher as the leading.

In English teaching classroom, teachers should pay attention to the teaching of English vocabulary, grammar, sentence patterns, and the skills of the answer to the problem (Gilakjani A P., 2012). In the teaching of the network environment, taking the students as the center and taking the teacher as the leading provides students with the meaning and situation of learning English knowledge, which pays attention to the development of students in all aspects of the ability.

In learning time, both asynchronous learning and synchronous learning are the main learning style. In the learning style (Jin S A A., 2010), the classroom teaching is the main teaching method, supplemented by autonomous learning and collaborative learning. In learning content, it combines the key and difficult with a large number of relevant learning resources.

5.2. Theoretical Basis

This paper mainly uses E. Bialystok mode (Al-Jewair T S, Qutub A F, Malkhassian G, et al., 2010). It mainly describes the formation of foreign language ability in the process of the three levels of the relevant factors and the composition of the way, and the three levels are input levels, knowledge acquisition process and the output of the three levels. The basic process of the model is shown in Fig. 2.

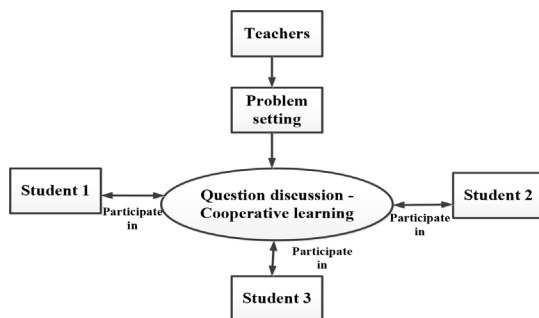


Figure 2 – The Basic Process of E . Bialystok Model

This model focuses on the comprehensive grasp of foreign language knowledge in foreign language teaching, but not only limits to explicit foreign language knowledge. Because the acquisition of language is based on the existing knowledge structure, it is the comprehensive effect of the dominant and recessive knowledge.

The merit of this model is an important part of the process of foreign language acquisition (Li J I N., 2011). However, this model makes it difficult to operate, because it requires that teachers should not only fully understand the students' knowledge base, but also have a good knowledge of students in the teaching environment. The ideal model is

difficult to be realized in the limited time and space of the classroom teaching. It is a large part of the students' acquisition and the need to study the environment.

5.3. Model Construction

Network teaching and classroom teaching each have a very strong advantage, but there are also shortcomings in their own. The current English classroom teaching is still the main channel of education in China, the network teaching lack of emotional communication between teachers and students, cultural and other aspects, and the network teaching needs to be equipped with higher conditions of teaching environment. Therefore, at this stage, it is not feasible to completely replace the traditional English classroom teaching. Therefore, this paper constructs the following models, which can both play the advantages and make up for the shortcomings of network teaching, and also help to reform the existing classroom teaching, and ultimately make the school in teaching efficiency and quality improvement.

1. Model 1 - Task-based feedback teaching model

Flow chart based on the task of autonomous feedback teaching mode is shown in Fig. 3, which can clearly reflect in the teachers' post task, the students' learning process of the network and the feedback of the students in the process of classroom teaching.

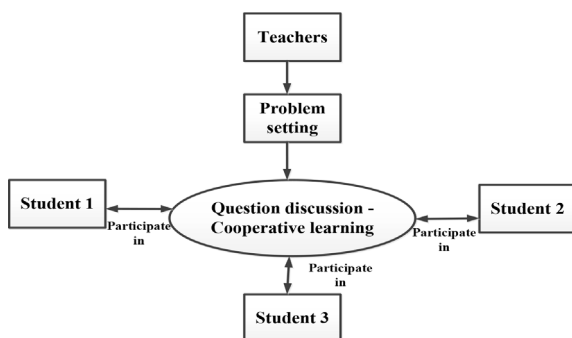


Figure 3 – Task-based Feedback Teaching Model

Self-learning process is that teachers make full use of the network, and the contents of teaching and material are classified into several tasks on the WEB server, so that students can learn from the content of the subjects through information collection, comprehensive analysis, abstraction, reflection, and so on. In this process, the network provides a wealth of human and material resources to facilitate the timely exchange of students, timely feedback. In the process of network aided teaching, English teachers have completely changed the passive acceptance of the learners in the traditional teaching, and make the learners become active and cultivate the ability of students to explore and study the network. This kind of self - learning method is beneficial to cultivate students' ability to analyze and solve problems, and to achieve a comprehensive understanding and absorption of knowledge.

2. Mode 2 - Collaborative teaching model based on the discussion of the problem

Flow chart based on the problem of collaborative teaching mode is shown in Fig. 4, which reflects that the students can discuss, share the ideas of each student, and achieve collaborative learning process according to the problem of the form and the content of the problem after the problem is raised by teachers. This kind of teaching method is generally monitored by the English teacher, and the teacher is the curriculum to set different questions. Students can speak according to their own interest. They can make comments on the opinions of others. Everyone's comments or comments can be seen by all the students who are involved in the discussion. Teachers guide and supervise the student discussion and speech to conform to the requirements of the teaching goal, avoiding discussing to stray from the point in the discussion of the process. The discussion questions are generally made by the teacher, and also by the students. The method can not only be discussed in real time, but also in non-real time. Teachers can actively organize and participate in the discussion with students, and encourage students to form discussion groups. In this group, the leader is the moderator of the forum, who analyzes, summarizes and sums up the problems discussion. If the problems raised in the online discussion are universal, the teacher can guide the students in the classroom teaching and help the students to learn. In the course of discussing the nature of the formation of collaborative learning process, teachers can also create collaborative learning environment.

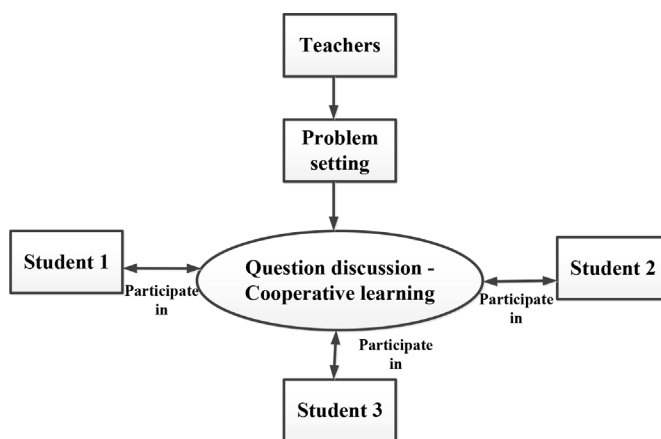


Figure 4 – Collaborative Teaching Model Based on the Discussion of the Problem

6. The Effect Evaluation of the New Model of Computer Aided English Instruction

In view of the new model mentioned above, we have done the teaching design of the students' English reading course in order to evaluate the effect.

6.1. Experimental Object

In this paper, class 1 of 2014 grade of Business Administration in Chengdu University of Technology was selected as the experimental class, which contains 35 persons. Class 2 of 2014 grade of Business Administration was selected as the control class, which contains 33 persons (Fig. 5).

6.2. Experimental Period

2015.03-2015.06, it has a total of four months, sixteen weeks.



Figure 5 – Multimedia Scene Teaching

6.3. Experimental Method

This teaching experiment uses the quantitative research method, and combines the contrast method. The control class uses the traditional multimedia teaching mode. Experimental class uses new model. Before the experiment, two classes were conducted in June 2001 in the National English four level test reading comprehension questions. After the experiment, the two classes were carried out in the National English four levels in December 2001. Record the results of two times and compare the results of the experiment.

6.4. Research Tools

SPSS 18.0

6.5. Data Processing

According to the results, the average and standard deviation are calculated. The calculation formula is as follows.

$$X = \frac{a_1 + a_2 + a_3 + \dots + a_n}{n} \quad (1)$$

Among them, $a_1, a_2 \dots a_n$ is the result of reading, and n is the number of student.

$$S = \sqrt{\frac{1}{n} \sum_{i=1}^n (x_i - x)^2} \quad (2)$$

Among them, n is the sample number, X_i is the sample value, and $\bar{x}$ is the sample mean. In order to find the accuracy of the experimental results, the experimental data were tested.

1). Z test -- the significance test of the difference of average number of large sample

Z test method is suitable for the difference between the two mean numbers of large sample (sample size is greater than 30). It is calculated by calculating the difference between the average number of Z comparing with the provisions of the theoretical Z value, which can see if it is greater than the provisions of the Z value, so as to determine whether the difference between the average number of two significant difference. The number of samples in this paper is more than 30, so the method of "Z test" is adopted. The calculation formula is as follows.

$$Z = \frac{x_1 - x_2}{\sqrt{\frac{s_1}{n_1} + \frac{s_2}{n_2}}} \quad (3)$$

Among them, x_1, x_2 is reading result of the experimental group and control group. S_1, S_2 is standard deviation of the experimental group and control group. n_1, n_2 is the number of experimental group and control group.

Compare the calculated Z value and theoretical Z value, infer the probability of occurrence and make a judgment based on the Z value and the difference between the significant relationships (Table 1).

P Value The Degree of Significant Differences		
$ Z \geq 2.58$	$P \leq 0.01$	Highly significant
$ Z \geq 1.95$	$P \leq 0.05$	Significant
$ Z < 1.95$	$P > 0.05$	Non-significant

Table 1 – Relationships Between P Value and $|Z|$

6.6.Experimental Results and Analysis

Experimental results are shown in table 2.

Project		Before the Experiment	After the Experiment
Experience group	X1	14.32	26.75
	S1	6.432	5.997
Control group	X2	14.79	23.57
	S2	6.880	6.765
Z value		1.784	3.188
P value		$P > 0.05$	$p < 0.01$

Table 2 – Experimental Results

From table 2, we can see the experimental group and the control group were not significantly different ($P>0.05$) in the initial test, which shows that the students in the experimental group and the control group are quite. After the experiment, the experimental group and the control group was significant difference ($P<0.01$, $z = 2.58$), and the average score of the experimental group was 3.18 points higher than the control group, which shows that the experimental group's English reading level was significantly higher than the control group after the new model of teaching experiment. The new mode of computer aided English teaching has promoted the students' English learning and has a positive effect on the improvement of students' English level.

7. Conclusion

With the development of globalization and the rapid development of computer network technology, many aspects of people's lives are being strongly impacted by the network era. The traditional foreign language teaching in the computer network environment is facing the new opportunity, but also faces challenges. How to guide the two to carry out the efficient integration of resources is to give full play to the advantages of the information age, so that the computer network meets the needs of modern education development and real integration into the organic part of the curriculum, which promotes the transformation of the traditional Chinese college English teaching important issues.

With the rapid development of modern information technology, computer network is gradually applied to the large, middle and primary schools in our country, and the computer is not attached importance to the development of the past. Although there are still some problems in the process of implementing the new model of College English teaching, but as long as the majority of teachers fundamentally change the concept of teaching, setting up the integration of computer and foreign language curriculum awareness. Foreign language teaching will be truly personalized, independent learning direction.

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Research On The Teaching Mode Of Instrumental Music Based On Computer Platform

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Abstract: Objective: To improve the quality and efficiency of instrumental music teaching in China. Methods: Establishing an instrumental music teaching system based on the computer platform. Process: The paper describes the development situation of computer music and its related concepts, studies the mathematical model of the pitch melody line, and establishes the teaching system of instrumental music based on the computer platform. Result & Analysis: This paper studies the construction of computer music system, analyzes its relevant data of production and teaching laboratory, and finds that the application of the teaching model based on the computer platform is suitable for the teaching in the domestic music college. Result: The teaching system based on the computer platform in this paper can promote the teaching quality of the instrumental music in China.

Keywords: instrumental music; computer platform; pitch melody line; teaching system

1. Introduction

In the second half of twentieth Century, with the wide application of computer technology, Profound changes have taken place in all kinds of traditional art, including music. And computer music as “music produced by the electronic computer”, is the latest development of electronic music in the digital era. In a broad sense, the content of computer music can be understood from two aspects, the computer music is the use of computer technology and software, hardware and software design, in order to express the music art form which belongs to the value of the digital age, computer music is a traditional form of music works in a digital way or tools, so that traditional music in the new technology interface, multi dimension of the integration and the creation of process reengineering, so as a new form of music. From a functional point of view, many applications of computer in the field of music can be incorporated into the category of computer music, such as the computer’s digital synthesis of audio features, analysis of the style of music works, automatic spectrum music function, music teaching function, etc. (Allsup R E., 2003). In the digital era, in addition to computer music, we are not unfamiliar with other nouns, such as electronic music, music, digital music, computer music, etc., these concepts are very easy to confuse, clarify their meaning and the relationship with the computer music, help to clarify the meaning of computer music. In twenty-first

Century, with the rapid development of computer technology and network technology, relying on the network and computer network teaching platform development and prosperity, in assisting students to better complete the learning task and other aspects of the role has been no doubt. However, in a large number of network teaching platform, but rare university music professional courses. In the field of music, is the art and technology of the art and technology more effective in the implementation of teaching? Every technological leap has opened up a new space for art, “Instrumental music” is a compulsory course for the students majoring in music. The study of computer music in China started a little late. In 1990s, China Conservatory of Music, Central Conservatory of Music and other colleges and universities have set up a computer music lab, the theory research and practice application of computer music (Law W W, Ho W C., 2009). Such as the Chinese modern electronic music center of Central Conservatory of Music is the first to take the core of electronic music teaching, Research, creation, performance and international cooperation and academic exchange of electronic music. Its regularly organized “Beijing international electronic music festival”, the performance content covers all kinds of electronic music computer music, become the highest international electronic music festival in Asia. In theoretical research, the general consensus of the academic community for the computer music is that computer music is just a tool for the use of, rather than a style of music, and related research focus on the computer in the field of music application problems, especially the historical development of computer music, creative thinking, specific appreciation of the work and technology application (Lindo-Salado-Echeverría, C., Sanz-Angulo, P., De-Benito-Martín, J. J., & Galindo-Melero, J., 2015). Such as Zhang Xiaofu’s thesis “the concept of electronic music” to the electronic music in a few more easily confused concept definition, which is conducive to people from the concept of computer music. Feng Yi’s “revolution in music from the electronic music to digital music” in the history of the development of electronic music to comb, certainly the history of computer music. Tao Xin’s “computer music thinking research” from the perspective of instrumental technology, music ontology form of thinking and other aspects of the problem of thinking of computer music. Song Jin’s “what is the post modernist of music”, which is the basic characteristic of the post modernist music, is very important to understand the philosophy development context of computer music (Nielsen S G., 1999). Figure 1 shows the instrumental music teaching.

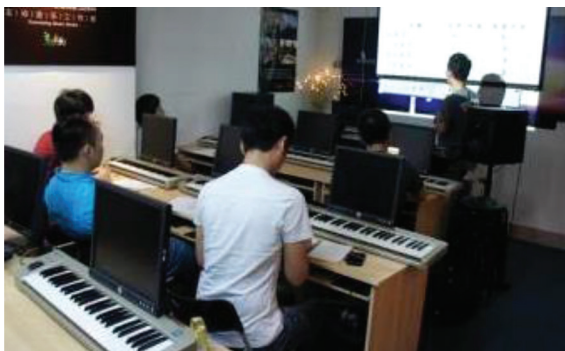


Figure 1 – Multimedia Instrumental Music Teaching

2. Materials and Methods

2.1. The Model Establishment of the Melody Line of the Music

The melody is full of rhythms, such as rhythm like a streamline, so you can use a melody line to express the melody of the music. We use a matrix to record the melody curve, that is, $P_{i,j} = (0 < i < w, 0 < j < 1)$. The initial value of the matrix is 0, where the curve passes, we set the value to 1 (Schmidt C P., 2005). That is:

$$M_{i,j} = \begin{cases} 1 & (i,j) \in Line \\ 0 & (i,j) \notin Line \end{cases} \quad (1)$$

In this article the use of matrix to record the melody line, the important information of the melody line is the height of its extreme points. We will use MP to express the extreme points of the melody line. MPH represents the height of the extreme points corresponding to the value of the. At the beginning of the creation of music, we first draw a random line of music. This curve is a random picture. We will extract node information from, this information is random. We will be the evidence of musical reasoning. The more evidence to extract, the more it will be able to make music with a specific style, as shown in Figure 2.

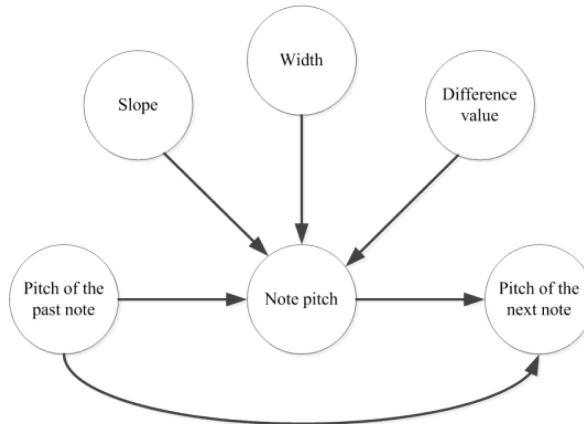


Figure 2 – Pitch Reasoning Model

In this melody line, we find the height of each extreme point MPH, Y axis in the matrix coordinate. All of these records were highly expressed in B (Zdzinski S F., 1996).

$$B_i = MPH_i \quad (2)$$

Maxima will directly reflect the level of sound with the time rhythm of the line point and minimum value, in order to guide the algorithm to design and build a model of pitch rhythm rules, as shown below:

$$\Delta h_i = MPH(i) - MPH(i-1) \quad (3)$$

$$y = MPH(i-1) + \frac{\Delta h}{2} \quad (4)$$

$$S^2 = \sum_{k \in [i-1, i]} MPH_k^2 - y^2 \quad (5)$$

Through the analysis of the S^2 value, the system will launch the music chorus, great turning point usually appears in the chorus music. In melody line, S^2 one of the largest section for chorus, division method of the golden ratio can be applied to the main chorus and brother, will determine the main melody and chorus and the length of the dividing line (Tillmann B, Koelsch S, Escoffier N, et al., 2006).

2.2. Pro Tools

Pro Tools system is a professional audio and video recording, editing and mixing of industrial standards, as shown in Figure 3.



Figure 3 – Pro Tools System

According to different market positioning and price division, and derived from the Pro Tools HD, ProTools24MIX, Digi001, Digi002, Mbox and other hardware configuration levels of different, a slight difference in the number of software functions. Tools Pro system is the computer as the control center, Nonlinear recording system with hard disk as data carrier. digital audio workstation based on computer, not only redefine the means and ways of making music, and completely replace the traditional audio tape multi track recording and mixing mixer. Innovative software and high performance hardware are integrated, the overall performance is quite good. Features include all the functions required for professional sound processing, MIDI, recording, editing, processing, mixing, audio format conversion, nondestructive editing, video synchronous post professional recording work, include pro tools without exception (Azzara C D., 1993). In addition to, more than a number of manufacturers to develop more than a hundred sets of plug-in unit, not only meet the needs of all kinds of professional work

on the sound, more music workers in the creation of unlimited space. Different types of equipment, can meet the professional recording studio, film and television centers and other business needs. As a part of Avid Technology, Pro Tools family in the Digital Design product line has become a professional music, film and television audio post production of the main products, standard for digital audio production in music, radio, film and television, and in most of the Grammy winning music and Oscar winning movie digital audio production occupies an important position. According to the official statement, Pro Tools basic performance has the following aspects: The Pro Tools system can be in the top 48 K Hz sampling rate is up to 64 simultaneous recording and playback of audio tracks (Fitzpatrick K R., 2006). The audio signal is transmitted and processed into the Pro Tools with 24 bits, until it is sent out through the audio interface. Session in the high quality sound and the industry's best signal converter (A/D and D/A conversion) is closely related to. In Pro Tools, we can use the ears, eyes, hands and do mix, make this process quite easy. Pro Tools software interface allows all aspects of mixing processing, shared information between the software and the console, every operation you do is a map of the two. A computer system for processing a mix of data, and you can go to the operation steps of using Pro Tools mix visual user interface. Pro Tools software provides various methods of flexible control and making automatic mixing. All treatments are non - destructive and complete in a friendly environment. Features and features similar to the audio, Pro Tools integrated MIDI environment so that you can make a full range of MIDI related parts of the control operation. MIDI and MIDI as convenient as the audio sequencer to do various processing, thus eliminating the trouble of learning additional MIDI operations (Zdzinski S F., 1992). Pro Tools software supports MIDI data extraction, creation, and output, regardless of the number of MIDI in your production process, regardless of the number of MIDI, you will be amazed by the Pro Tools friendly, perfect and comprehensive MIDI environment. Pro Tools's ability to edit so comprehensive, as a standard to determine the ability of editing. There are two factors to achieve this phenomenon: the use of convenient, full-featured. Same as Pro Tools TDM software, Pro Tools LE a screen editing window under the interface allows you to edit the data in all aspects of the audio and MIDI data. Finishing, audio region, pitch correction, percussion sound reset, part of the selection of the reorganization of the music Pro Tools to the non-linear approach to edit, let you in accordance with the idea of their own immediate operation, and like Replacer Sound, such as processing plug-ins, can also be used in the Pro Tools LE, you can always use this tool to make some of the sound material. Plug, as an add-on tool based on software pattern, can be used to work with Pro Tools LE, which is mainly aimed at the effect of the system. By means of plug-in, the system can be embedded in a variety of dynamic processing to audio design (Creech A, Hallam S., 2003). The processing process is usually simulated with some hardware, its function is similar to the function of hardware implementation, to use the plug-in, it is only required to activate it at the Pro Tools interface. In this way, you can choose to use the default values of the processing plug-in or its own set of parameters, and all kinds of activities in the state of automatic mixing plug mix. And the external effect of different processing equipment, you can plug in a variety of settings applied to multiple tracks. Pro Tools LE is compatible with two types of models: RTAS and Audio Suite. RTAS (Real-Time Audio Suite) the plug-in gives you all the benefits of real-time processing, and within the limits of the system, assigned to use multiple tracks. Audio Suite plug-in is non real time processing, this process, once used in the audio, generates

a new audio file in the raw material. Of course, you can also choose to store the original file. Two forms of processing plug-ins each have their own strengths, and the details of the plug-in, please refer to all of the products (Seddon F A, O'Neill S A., 2003).

2.3. Teaching System Based on Computer Platform

Consider the impact of a large number of users accessing the server system, so it uses multi server distributed structure model. Take the Web file server and data server and multimedia server distributed in the network of multiple servers to achieve a lower impact on a single server. The specific hardware structure diagram is shown in figure 4.

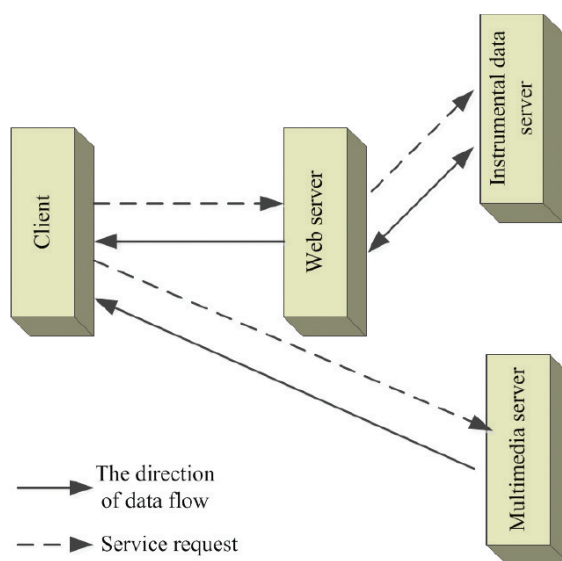


Figure 4 – The Teaching System of Instrumental Music Network Based on Computer Platform

Which the Web server is responsible for sending the Web page to the user's Web browser and the link to the related multimedia information. The data server is responsible for providing the Web with the operating data (including various resource links), as well as the relevant documents and resources for the storage of auxiliary teaching. The multimedia server sends the corresponding multimedia data stream to the students after the client sends out the multimedia request (Paul S J, Teachout D J, Sullivan J M, et al., 2001).

2.4. Construction of Computer Music System

The purpose, meaning and advantage of the computer music teaching based on the preceding. We can set up a set of computer music system according to our needs. The computer music production system is a typical hardware with the computer as the core of the core of the t. The function can be related to the composer, arranger, orchestrator, recording, mixing, music and music publishing and commercial printing.

The peripherals usually include audio, keyboard, synthesizer, M101 sampler, analog or digital recording equipment, monitoring equipment and so on. According to the use of occasions and professional and technical aspects of the factors, computer music system can be divided into the following three types (Cavitt M E., 2003). Universal: mainly for entry-level computer music lovers, for non-commercial use. System for the computer is not high, in which the CPU frequency of 800MHz above, memory 128M, this entry level for the beginner MIDI production of learning, appreciation is enough. Sound source part can use computer sound card on the curing of G M basic tone in with a MIDI interface electronic organ the MIDI cable connected to the computer. In this way, you can use the keyboard on the keyboard to make a simple MIDI music on the computer. Of course, due to the sound quality of the computer's sound card and keyboard physical characteristics of the keyboard to determine the "workshop" produced by the music from the professional music is far from. But with a multimedia computer also has a set of computer music system. This is only for the MIDI music appreciation, learning and teaching of beginners is enough. Personal studio type: This is currently China's most popular, the most practical one in the model, it includes computer, synthesizer, sound source, mixer, monitoring equipment, digital recording equipment in hardware and so on. In this set of modes, the recording and editing of the sound signal is due to be carried out (Ryynänen M P, Klapuri A P., 2008). So the computer hardware configuration is required to have a relatively high CPU for more than 2.6 G. memory to 512M as the lower limit, in addition, it is also required to allow large, good performance of the hard disk to store the audio frequency of the T professional audio card as a computer, external audio data exchange interface (D/A, A/D conversion) is also essential. As for the source, can be purchased according to the funds and use. But there are at least one or two sets of professional audio source or synthesizer. They are connected to a computer via a dedicated MIDI cable. The external mixer should choose a higher quality mixer. Listening and sound recording equipment (tape recorder, CD recorder, DAT, etc.) should also choose at least the quasi professional class. Using this system to make a more professional MIDI music production and vocal music, musical instruments mixed recording, editing and production. Professional production type: this configuration is essentially the entire traditional recording studio functions as a microcosm of the production system for the center of the computer as the center (Goto M., 2004). The hardware is equipped with the exception of the individual making type, include professional audio, sound sampler, workstations, digital recording equipment etc. The sampler is used to obtain more types of timbre, more really sound effects and broader tone control ability of a digital device. In this system, the selection of the hardware system is more important than the MIDI system. Because it directly affects the final sound effect of finished music. Although these systems do not directly deal with MIDI information but have a MIDI interface for the MIDI control function. It can also be used for the simultaneous recording of other MIDI devices with high performance sound analysis and processing capability. Its periphery is usually a sound workstation or an external digital storage device used to store the sound data file, which also reduces the workload of the computer in the whole system. Therefore, the computer in the system to only play a unified management, coordination of the role of peripheral equipment and therefore not high standards of its hardware. This system is compared with the traditional recording studio, many advantages: less investment, flexible form, performance stability,

The most important is that it can be in the audio processing ability to completely and the traditional recording mode (Nimmons G L, Kang R S, Drennan W R, et al., 2008).

3. Results and Analysis

Since 2000, because of the promotion of the concept of digital music education, and government and schools to increase the input of music education, make many colleges and universities to purchase advanced music teaching equipment become possible. Most colleges and universities have established a teaching laboratory for computer music production, already have a relatively complete teaching system, some colleges and universities have set up a recording studio, music studio. A group of computer music teaching system was established in China in 2002, at the time of the computer and related hardware has been eliminated, can not meet the requirements of the modern computer music production. Good conditions of the school such as Central Conservatory of Music have been carried out on the hardware device for many times, always use the most advanced hardware equipment. This is unimaginable in local colleges and universities. But the basic teaching conditions are constantly improving, more and more colleges and universities are also more and more emphasis on the development of this profession. The author through the research of nearly 50 universities, the results are as follows.

University types	Academy of music	Art Institute	Comprehensive class	Normal College
Absolute quantity	8	4	3	19
Number of schools	9	5	6	30
Percent	89%	80%	50%	63%

Table 1 – Course Offering Situation

As can be seen in the professional music academy and art academy, the highest proportion of the computer music course is the highest, because the number of the teachers is the most, there are a considerable part of the school is currently not open such courses (Akeroyd M A, Moore B C J, Moore G A., 2001).

4. Results

With the wide application of computer technology and the instrumental music teaching based on computer music system development, the teaching of instrumental music has become an important developing direction of modern music teaching, which can greatly improve the level of music production. In this paper, the teaching system of instrumental music network based on computer platform is described in this paper, and the model of music pitch melody line is studied, what's more, the construction of the Teaching Laboratory of computer music production is analyzed, so it's found that our country's investment in the education needs to increase to improve the level of the national music education.

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Research on Language Learning with Multimedia Electronic Reading Room

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Abstract: Objective: with the development of digital electronic age, the English teaching mode with multimedia electronic reading room should be developed. Methods: we have made a survey of the status quo and data of many schools at home and abroad, in order to obtain the current status of the school multimedia electronic reading room description. This paper analyzes the basic functions of multimedia electronic reading room and makes some related discussion, analyzes the advantages of multimedia foreign language learning, and expounds the management method of multimedia electronic reading room in the school library. Results and analysis: the construction of multimedia electronic reading room will improve the level of foreign language teaching in schools, but also can improve the students' vision and quality. In addition, this paper introduces the structure and the advantages of the multimedia electronic reading room, and puts forward the corresponding management suggestions.

Keywords: Foreign language study; Multimedia; Electronic Reading Room

1. Introduction

Electronic Reading Room refers to computer technology, network communications technology, set E-literature (such as disks, CD-ROM, network services, etc.) reading, consulting, training and services as one of the modern multi-purpose library. To provide students with access to the Internet where there are some databases that provide a place for students to find information to find information! There are some foreign databases (Kornum L., 2013).

Electronic Reading Room of the hardware system mainly consists of server, high-capacity storage devices, network transmission and switching systems, user terminals (Jin L, Cortazzi M., 2002). General should be configured multimedia computer, internet information server, disk arrays, switches, network cards, UTP twisted pair, print scanning projection and other equipment (Turner S V, Dipinto V M., 1997). For critical apparatus main server storage systems, switches and other best selected more mature, advanced, easy to expand and the higher cost of brand.

Electronic Reading Room software system includes a server operating system, client operating software firewall. Platform network servers should choose openness, compatibility, security, simple and flexible management of the operating system, now generally use a lot of electronic reading room Netware and Windows NT. Client operating system is now more, Windows98, Windows2000, Windows XP has adopted (Uren V, Cimiano P, Iria J., 2006; Kulik J A, Kulik C L C, Cohen P A., 1980).

In the process of establishing an electronic reading room, all the hardware, software and network products should try to follow the principles in line with the mainstream of development and international standardization, so that the system has high portability, scalability, and flexible connectivity for leaving room for future upgrades (Bai J., 2003). Stability and security policy Electronic Reading Room System. Electronic Reading Room inside information not only for indoor users to view, but also for campus network users to use the Internet, in order to ensure quality of service, it is necessary to ensure the system is stable. In order to make the data transmission security, electronic reading system should also has high security (Pun M., 2014). Electronic Reading Room in principle scalable storage medium. With the increasing number of various types of electronic resources, electronic documentation Electronic Reading Room will collect more and more, therefore, storage media system required sufficient room (Yu H J, Michaels G., 1998).

With the process of digitizing libraries faster and faster, the development of computer technology and Internet technology, multimedia electronic reading room as a library of digital information sources and service center, specific gravity and importance of the share of the foreign service in a growing library more significantly, a great tendency to replace the traditional reading of. In the network environment, multimedia electronic reading room has the following features: Network Information Retrieval; publishing and access to network resources; online reading; video on demand; online news (Mira-Giménez, M. J., 2015); online video; the latest economic information reports; popular Express; online dating and so on. Many in life can be obtained through other channels, is now on the computer's multimedia electronic reading room by simply moving the mouse and keystrokes can be easily completed (Neo M, Neo K T K., 2001).



Figure 1 – Multimedia English Teaching

Multimedia Electronic Reading Room is recently with the development of computer technology and Internet technology and access to the library of new things, with so many features listed above and the use of space, the library will become the next major sector and external window, so its management especially important (Fenglong X., 2005). Moreover, unlike traditional electronic reading room reading room with books and journals provide readers read as the information source, it provides a digital network information resources. Electronic Reading Room of its high input costs, high-tech, maintenance and management are quite different with the traditional reading of the quality requirements of the staff but also with the traditional view of different jobs, while the Electronic Reading Room in University libraries have also taken a fee the way to make up for the high cost of inputs. This is in the management and control of proposed new issues, how to scientifically manage and maintain the electronic reading room. In this regard, the library has some experience and lessons.

In the beginning of the establishment of a multimedia reading room, because it is something new, reflecting the good readers, coupled with the ability to bring some economic benefits, no experience in the management and control can learn, so it is simultaneous practice summary. Use personal responsibility, but driven by economic interests, managers and maintenance of equipment on board the reader management and lax oversight, brought some adverse effects, and between workers and therefore had some differences; use department of collective responsibility, but in charge of the reader and on board aircraft management fees on resulted in some unnecessary differences, but also quality requirements of multimedia reading room staff is not enough attention.

To develop a scientific management methods and to determine the possible measures, we should first multimedia electronic reading room itself features and functions have a full understanding. Unlike traditional electronic reading room reading room, it is configured with high-tech precision equipment, we need new modern management in order to ensure their normal operation, give full play to its role. To ensure the electronic reading room of the entire computer network system is always in the normal and orderly operation of the state, it requires electronic reading room staff must be strengthened to readers using the computer's behavior standardized management, at the same time to prevent the virus do indeed work to ensure system security, but also constantly updated collection of digital information in a timely manner, the museum purchased digital resources for processing, storage and web publishing.

2. Multimedia Electronic Reading Room Features

Electronic Reading Room will be used for multimedia networking assisted foreign language learning, the main purpose is to improve foreign language teaching and strengthening the quality of teaching, to develop students' horizons and improve the quality of foreign language students (Figure 2).

2.1. Retrieval Services Collapsed CD Database

In the electronic reading room, CD retrieves its informative, convenient retrieval and win readers of all ages, is the most important functions of the electronic reading room services. The use of CD-ROM, can be a variety of field title, keyword, author, institutions retrieval. Such as Tsinghua University, "Chinese Academic Journal (full text) database"

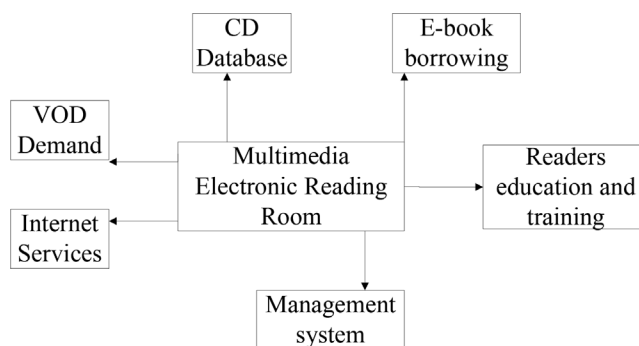


Figure 2 – Multimedia Electronic Reading Room Features

Articles Dissertation databases (online version) and the Chinese periodical databases. In short, CD-ROM databases become the backbone of almost all countries of library information database to obtain the latest academic university teachers and students is an important source of information.

2.2. E-book borrowing

Today, e-book is its spread fast, spread the cost of the economy, and give full play to the computer as a communications tool of great advantage, as the current information society dissemination of information a powerful backbone. Now there have been electronic reading room open to the Founder Apabi e-book lending business, it appears that the readers can be more convenient, safer and more efficient from the electronic reading room “borrow” to the required information.

2.3. VOD Demand

Electronic Reading Room computers are multimedia machines, equipped with a sound card, headphones, speakers and other equipment and video playback software, readers can according to their preferences stored in the reading room on-demand movies, TV, music and animation and other rich audiovisual products.

2.4. Internet Services

With the increasing development of communication technology, network technology, library information services will exceed a single collection restrictions, development and utilization of library collections and online resources through integrated land, to provide readers with information services, networked library services. Multimedia Electronic Reading Room of the online services is the use of multi-media reading device, the library gradually provide bibliographic page provided to the reader inquiries, personal loan inquiries, briefing books, reference and consulting services. Readers can also be chosen at random in the terminal, read e-books online, browse a variety of information on the Internet. Meanwhile, readers can also use the computer terminal for reading the information required to download, print, file transfer, and send E-mail, so that the effective sharing of information resources for the theoretical study and research services.

2.5. Library management system inspection services

Electronic Reading Room and Library Management system networking, the reader can complete book information and individuals to borrow books status inquiries, and renewals by WEB way. In addition, the book can also be queries, query union catalog, interlibrary loan inquiry and book appointments, renew, master of business.

2.6. Readers education and training

The rapid popularization of computer technology and network technology, on the one hand to provide readers with a quick and accurate access to information condition, on the other hand, modern readers searching skills challenges. Because of the level of knowledge of different audiences, they will have different difficulties in computer operations, database retrieval, WEB browsing and so on. In addition, both the information retrieval and data reading, readers need a familiar and master the process, which requires the reader to train retrieval methods. Furthermore, although many network resources, but there is no specific mechanism to regulate and organize, so that readers like a needle in a haystack to retrieve information. Therefore, the reader for user education and training, is particularly important. The Electronic Reading Room powerful computer equipment and network environment, is suitable for readers to education and training.

3. Foreign Language Learning with Multimedia Electronic Reading Room

Multimedia Electronic Reading Room assisted foreign language learning has become the current trend. More and more schools have been completed at the beginning of the deployment or the relevant multimedia assisted foreign language learning program.

3.1. Traditional Foreign Language Teaching Problems

Natural language of traditional foreign language teaching between teachers and students is the most direct, most natural, the most intimate, the most flexible language, interactive communication between teachers and students in the classroom, it should be the most effective way of teaching and learning. In the traditional classroom language teaching, teachers can maximize initiative, with experience, love, personal charisma and so on to infect students awaken their curiosity and help them establish the correct motivation. By the classroom teacher, the students in contact with the lower class, the students keep abreast of the problems to be targeted guidance.

But with the modern educational technology and the rise of multimedia technology.

As well as social, political, economic and cultural evolving, language learners for language proficiency requirements have been strengthened, the traditional foreign language teaching gradually revealed many problems. Concrete can be summarized as follows: First, the traditional foreign language teaching, because the amount of information the classroom, the teacher writing on the blackboard in the classroom and often take a lot of time, students take notes consuming, laborious, often to keep up with the idea of teacher phenomenon, reducing the sensitivity of students, so that students lose the necessary notes thinking training process; and second, the traditional foreign

language teaching mainly based on textbooks, teaching materials often lag behind update knowledge, we have been unable to meet the needs of students. This requires learners not only depend on the materials, and the need to acquire knowledge through other means; third, traditional foreign language teaching is the main means to rely on more single “textbooks, blackboards, chalk,” the media, teaching media single, boring, hard to arouse students’ interest; fourth, the traditional foreign language teaching more classes the number of students, the students and their different levels of students sitting in the classroom listening to the teacher talk about the same content, the teacher is difficult to be individualized, thereby increasing the burden on teachers.

3.2. Computer Assisted Language Learning advantages exist

Students in the college library resources currently available on the main picture and a small amount of network resource text, images, audio-visual resources and a small amount of foreign language resources (library auditorium), etc., it is not enough. In order to better improve our hospital foreign language teaching and strengthening the quality of teaching, to develop students’ horizons and improve the quality of foreign language students, proposed the establishment of multimedia electronic reading room, students can independently use multimedia Computer Assisted Language Learning. As an adjunct to the following advantages.

3.2.1. Local conditions and individualized

Multimedia Electronic Reading Room to provide a large number of different levels of multimedia educational software and resources to students according to their language skills, comprehension, interest in learning to choose their own software and resource library, interactive learning through a computer or online exams, effective realization of students’ individual learning, which make up the traditional teaching difficult to achieve individualized.

3.2.2. Virtual real context, improve language proficiency

Learning a foreign language is to learn and master in real situations, the use of foreign language’s the ability to exchange information and thoughts and feelings. American psychologist Bruner said: “The success of the foreign language classroom teaching should create more scenarios in the classroom, so that students have the opportunity to use their own language to learn the material.” Multimedia computer system can imagine abstract knowledge, specific of the teaching content and student organically combine to achieve sound, painting blend, for students to create and use real situations to create an atmosphere of communication, so that students feel, strengthen language information stimulus, triggering the desire of students thinking, learning too relaxed, easy student to master, thereby improving their ability to use foreign languages.

3.2.3. Stimulate multiple senses, enhance understanding and memory

The multimedia computer by means of different forms of static and dynamic different images, different colors, text, graphics, images, animations, video, music, and sound effects. FIG parallel by sound, video, and Mao, to enable students to simultaneously

receive audio information and image information, so that they have a sense of immersive audio-visual integration of this graphic stimulate the students a variety of senses to promote their language surface meticulous and profound meaning of the experience, sensory stimulation is conducive to better remember and learners master the language skills and knowledge presented, and ultimately to deepen understanding and memory enhancement purposes.

3.2.4. Demo analog classroom teaching

Students can take advantage of video-on-demand system, choose courses of interest, maximizes the sharing of teaching resources. There are four courses demand forms: one is the name of the class teacher to record a video file, with the content of the slides, and then placed in the video-on-demand system; one is the teachers to use Word, PowerPoint or FrontPage to write simple teaching presentations and use them in the office software feature to insert a hyperlink sound, graphics, clip art, or other relevant documents or links inserted into the presentation; one is foreign language learning multimedia courseware, including FLASH courseware, AUTHORWARE courseware and courseware other formats ; another is a class designed for foreign language learners developed software, such as “an easy back the word,” “crazy English” and so on.

3.2.5. Resource-rich utility for easy retrieval fast

Content-rich multimedia resources, information resources multimedia database systems based on computer graphics, animation, audio, video, courseware and other forms of existence, it has a large capacity of information resources for teachers and students, teachers and students can be retrieved according to their needs, spend very little time, you can find the information they need to improve learning efficiency. Full use of text, sound, images and other media technologies, showing an overview of a foreign language from all angles vividly system, thus making teaching content more vivid, powerfully stimulate learners' curiosity, improve the learning of consciousness .

3.2.6. Resource updated quickly, broaden their knowledge

Traditional materials often lag behind update knowledge, it has been unable to meet the needs of students. This requires learners not only depend on the materials, and the need to acquire knowledge through other channels. Modern multimedia technology provide the conditions to this end, multimedia database which can multi-level latitude to show foreign language learning content, and can frequently updated content, meet our students' needs. Multimedia Network Foreign Language Education will be extended to all aspects of the content of the books and the reality of social networks, which not only broadens the book knowledge, but also provides a valuable opportunity for students to apply what they have learned a lot of practical knowledge.

3.2.7. Interactive Learning

We open forum for the exchange of knowledge in the system area, the area for students to comment on some of the hot spots of the discipline, difficult issues provides a platform for academic exchange of teachers and teachers, teachers and students, and between students

convenient. The forum will be active in the discipline of academic atmosphere and improve the academic standards of teachers, to stimulate student interest in learning helpful.

4. Multimedia Electronic Reading Room Management

Electronic reading room to do work, the quality of staff is crucial. Electronic Reading Room is a highly integrated sector, from the allocation of resources to the management service includes almost all of the mining library, editing, Tibetan, reading, consulting, computer and other business, so the high staff requirements, engaged in this work should be understood both library services, and understand computer technology and network technology, and a high level of foreign language reading comprehensive talent. Library staff members not only have the traditional business management skills, but also with modern equipment to computer-based software and hardware application management and maintenance skills. With modern management skills, we should also have a strong sense of professionalism, responsibility, both of which must also have to adapt to electronic reading room of work, to provide readers with quality services.

How to multimedia electronic reading room for scientific management, to facilitate the management of readers on board and staff. At present the domestic university libraries are at the stage of exploration and accumulation of experience, the paper might propose two methods for peer discussion.

4.1. Multimedia Electronic Reading Room of the University Library open Status

As information technology, especially multimedia and computer network technology rapid development in recent years, in the original auditorium of the University Library, on the basis of the electronic reading room open, have built a multimedia reading room, but the university Library Multimedia Reading Room the operating mode is different, the practice also for their own array, individual actions, this phenomenon is not conducive to unity construction and development of Multimedia reading Room. It is necessary to understand the University Library auditorium, electronic reading room, multimedia reading room open to the status quo, and on this basis, on the University Library auditorium, electronic reading room, multimedia reading of concept, services and resources category were compared.

Auditorium, electronic reading and multimedia reading room is open and set up various colleges and universities have different library, which opened three forms of Tsinghua University Library reading room, reading room and services are open to the work of the very place, is our model of learning, such as its multimedia reading resources, both rich campus resources, and recommended the school multimedia sites, and multimedia home design aesthetic and practical. In addition, Yangzhou University Library, Qufu Normal University Library, Wuhan University Library also set up an electronic reading room, multimedia reading room and auditorium, and all aspects of work well done. The rest of the university library and some only established electronic reading room, some only set up a multimedia reading room or auditorium.

University library electronic reading room, multimedia reading room and auditorium Sector division is also different, there are vested in Reference Department, also attributable to electronic access, technical department, multimedia information unit, audiovisual unit, among them the home “reference Department” to be a little more; service content of each reading more consistent, mostly to provide audio-visual materials, multimedia services and network resource information retrieval service. Thus, the establishment of a unified university library electronic reading room, multimedia reading room and auditorium open mode and Sector imperative.

4.2. Multimedia Electronic Reading Room Management Control

Use management software and use two charging methods: a membership card machine and the duty officer and the agency charged with both methods. This management method required equipment is simple, you only need to download and register management software or purchase fee management software, and then installed on each client system client program, using a working machine to run the server installation program management side, as a management server, it costs about 2,000 yuan.

Readers with a certain amount of documentary evidence on the prepaid machine costs in the office, when the machine with the user name and password given freedom, servers, automatic timing deductions, contact the duty officer does not happen with their cash, prepaid readers insufficient cost server It will automatically prompt them to pay fees or to take on board to stop the use of computers.

Duty personnel agency fees, no card machine to the person on the machine’s temporary duty personnel to management proxy reader application boot time (Readers should be pre-payments, agreed-on time), the delivery cost conversion machine, the time to when the server automatically sends a message to the client to use: time to stop using or pay the cost of delay. This management model is the human-computer management, cash management does not, readers have contact, does not occur in cooperation with the attendant cash. Fees on board turned over duty collection office, the office can be checked from the management staff of the liquidation (server-side data), so the presence of the tripartite mutual supervision. Duty personnel and management personnel division responsible for the management of electronic reading room, officers on duty to assist staff to maintain the normal operation of the machine, they are responsible for their own accounts to the office. Work flow chart is as follows (Figure 3).

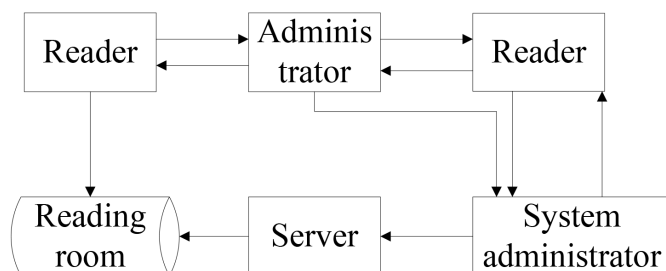


Figure 3 – Management flowchart of Reading Room

Multimedia Electronic Reading Room will gradually become the main library and a collection medium. It means the full development and utilization of electronic reading room, the use of modern teaching and scientific research to provide services, the Internet age is the new task assigned to the library, new topics.

5. Conclusion

With the advent and development of digital electronic age, modern university education has developed rapidly in the direction of digitization, networking and multimedia. With the construction of broadband campus network, making full use of campus network, improving the network multimedia teaching system is not only an important channel to expand the campus network application, but also the inevitable trend of modern educational technology development. Based on the composition of multimedia electronic reading room and its role in education, this paper analyzes the structure of the university education system based on the electronic reading room through the analysis of hardware, software, information flow channels, network information port and other components. The system was greatly welcomed by the students, the increasing number of visitors and the number of users showed that the combination of electronic reading room of the university education model is effective.

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Research On The Construction Of Green Buildings' Integrated Assessment System Based On BIM Technology

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Abstract: Objective: To improve the effect of green design in modern architecture. Methods: Establishing the integrated assessment system of green building based on BIM technology. Process: The article describes the characteristics and advantages of BIM technology, expounds the application of BIM in construction industry, and establishes the green building integrated evaluation system based on BIM technology. Result & Analysis: This paper studies the advantages of BIM technology in green building, analyses the public buildings in the design stage of the green level, and finds that the BIM information model is more scientific and more innovative than the traditional construction technology. Result: The green building evaluation system based on BIM technology can evaluate the whole building system and improve the level of green design.

Keywords: green design; BIM technology; construction technology; evaluation system

1. Introduction

Since the reform and opening up, the construction industry after nearly 40 years of rapid development, has achieved remarkable results, whether it is the total construction, or construction technology has been greatly developed. In particular, public buildings, as people's important work and activities, in recent years is gradually increasing. These public buildings provide a great convenience for the production and life of the city residents, but also greatly promote the development of our society and economy. But behind the economic boom, public buildings have many problems such as huge energy consumption, poor functional and so on. Large public buildings such as large shopping malls, office buildings, hotels, stadiums, etc., although the total construction area is less than 5% of civil buildings, but this part of the energy consumption accounted for more than 10% of the total energy consumption of civil buildings, the annual electricity consumption per square meter of up to 300 - 100 KWh. Although the construction industry, especially the development of public buildings are facing many challenges, but because of new technology and new concept of continuous development, the construction industry also has a lot of development opportunities. A great opportunity is the state to solve the problem of high

energy consumption in the construction industry, is strongly support the development of green building (Gasca-Hurtado, G. P., Peña, A., Gómez-Álvarez, M. C., Plascencia-Osuna, Ó. A., & Calvo-Manzano, J. A., 2015). The emphasis of the green building is on the whole life cycle of the building, maximum energy saving, section land, water saving, section material, protect the environment and reduce pollution, provide people with health and efficient use of space, and the natural harmonious coexistence (Laureano, R., Caetano, N., & Cortez, P., 2014). From the construction requirements and the design concept can be seen, green building design process of building information processing requirements continue to increase, traditional design methods and processes, has been very difficult to meet the needs of green building (Wang W, Zmeureanu R, Rivard H., 2005). However, the rapid development of information technology is just to meet the needs of green building design. Figure 1 (a)-(b) shows the green design of modern architecture.



(a) Beijing Green Building Assembly



(b) Solar Green Office Building

Figure 1 – The Green Design of Modern Architecture

At present, information has been the three main elements of social development with material and energy, and the model is one of the ways in which we understand, analyze and transform the information. Building information model (BIM) technology, it is in such a big data era, the background of the information age, the core idea is to integrate all kinds of information into the model, and use the model to express the construction of the information. BIM technology makes the information of buildings and their components in a central database, and all kinds of attributes of the building and its components are fully digitized, this ensures the inherent unity and the calculation of the construction information, avoid the “information island” phenomenon caused by the existing two-dimensional chart. In addition, BIM technology is used in parametric modeling, the construction information that makes the BIM model, with coordination and can be carried out. This information will make the design of green building design process energy saving analysis, environmental analysis, and so it becomes very convenient. BIM brings not only a technological change, to the entire construction industry is more of a change in the design process. BIM provides a very good platform for different construction work, and the platform is also an integral part of the green building integrated design (Wang W, Rivard H, Zmeureanu R., 2006). So the application of BIM technology in green building design is studied, and how to use the good information technology especially BIM and other key technologies, to break through the existing public building design of various information barriers, to improve the performance of the building is very realistic and very important in front of us, at the same time, it is also a very urgent problem.

2. Materials and Methods

2.1. The Application of BIM in Construction Industry

In 2005 by the University of Florida, the first to carry out the research of BIM-FOR-LEED, the experience of the purpose is to analyze the depth of the BIM and the application of the subsidiary technology in the LEED assessment standards, as well as meet the standard design points, and want to solve these key points is how to play the advantages of BIM technology in the implementation of the play. Participants include: University of Pennsylvania, University of Southern Calif, and many other colleges and universities. Research to solve the problem of the integration of BIM and green building design. The process of its work is: the use of Revit to solve the problem of cross professional issues, the establishment of BIM information model. Through the integration phase information, project planning and scheduling, create a four dimensional model of BIM based on life cycle (Pan Y, Yin R, Huang Z., 2008). Quantitative estimation and prediction based on BIM model, project cost analysis. Information based on the BIM model in Revit, for energy simulation, lighting design, water analysis, etc., LEED strategy and consistency analysis of the project, and the essential factors of LEED authentication are obtained by the optimization scheme. Mr. He Guanpei as the founder of the development of BIM technology in china, write “BIM” and other books based general BIM application, to the domestic industry to explain the principle of BIM, application areas and application methods, combined with the advantages and disadvantages of BIM application case analysis. Yue Sun, the scholar of our country, expounds the

information and characteristics of the construction project in the whole life cycle, and the current construction project information management in the main problems of the reasons are summarized, the existing problems and the problems that arise, and analysis of the construction project information management on the basis of BIM is a certain value, through the above research, and thus put forward to build the BIM based on the construction of the entire life cycle information management framework. Shi Ying is a summary of how to use and integrated design methods in solar building design, at the same time, the combination of BIM concept and technology, the process and method of BIM technology in solar building design are analyzed, and the framework of solar building design is summarized according to the above analysis, at the same time to explore the use of BIM technology in solar building design of the various stages of the use of methods. At present, our country is still in the initial stage of BIM application, only less than 10% of the construction units in the use of BIM. In addition, the Chinese government departments have also put forward the importance of BIM technology as the representative of the information technology supporting construction technology. Some famous Design Institute of China also began to launch BIM technology promotion and application, China Architectural Design Research Institute, Beijing Architectural Design Institute, CCDI and other line design institute established their respective BIM technology platform and enterprise BIM application standards, provide support to the small and medium sized design industry units. In addition, some of our colleges and universities have been set up BIM (building life cycle management) laboratory, such as Harbin Institute of Technology, Tsinghua University, Tongji University, South China University of Technology, it is a branch of BIM technology. And domestic present also has many based on BIM Technology in architectural design success stories, such as the Olympic venues “Water Cube”, the Expo venue, etc.. To sum up, our country has entered a rapid development stage in the BIM application (Gowri K., 2004). Figure 2 shows the application of BIM technology in the construction of Green House.

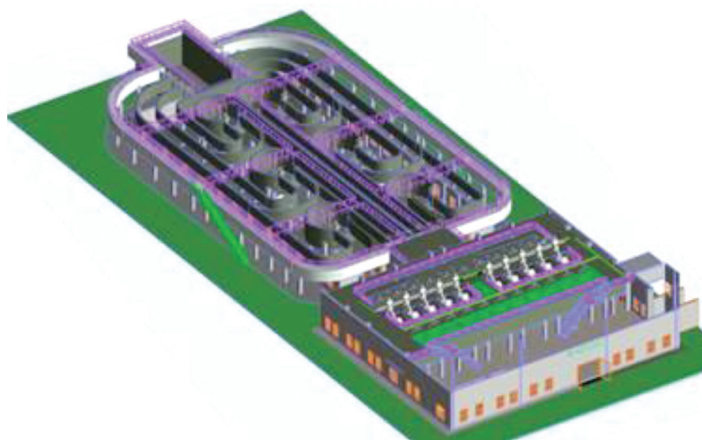


Figure 2 – BIM Technology and Green House

2.2. Numerical Analysis of Random Variables

Average (mathematical expectation): the average value can be referred to as the mathematical expectation or mean. Probability density function of continuous random variable $f(x)$, if the $\int_{-\infty}^{\infty} xf(x)dx$ has an absolute convergence, the mean value of X is:

$$EX = \int_{-\infty}^{\infty} xf(x)dx \quad (1)$$

Function $Y = g(X)$'s expectations for:

$$E(Y) = E[g(X)] = \int_{-\infty}^{\infty} g(x)p(x)dx \quad (2)$$

If (X, Y) for a two dimensional continuous random variable, the function $Z = g(X, Y)$ is expected to:

$$E(Z) = E[g(X, Y)] = \int_{-\infty}^{+\infty} \int_{-\infty}^{+\infty} g(x, y)p(x, y)dxdy \quad (3)$$

Variance and standard deviation: let X be a random variable, if there is $E[X - E(X)]^2$, then there is:

$$D(X) = E[X - E(X)]^2 \quad (3)$$

Is the variance of the X , then $\sigma(X) = \sqrt{D(X)}$ the standard deviation of X (i.e., the mean variance). The mean of the function of the random variable is $D(X)$, when X is a discrete random variable, there is:

$$D(X) = \sum_{i=1}^{\infty} [x_i - E(X)]^2 p\{X = x_i\} \quad (4)$$

When the X is connected to a continuous variable, there is a:

$$D(X) = \int_{-\infty}^{\infty} [x_i - E(X)]^2 dx \quad (5)$$

The formula for calculating the variance is:

$$D(X) = E(X^2) - [E(X)]^2 \quad (6)$$

In probability theory, normal distribution is very important, in a primary position. In solving practical problems, many random variables obey or follow normal distribution. In this paper, the research progress of complex factors random variable is subject to normal distribution (Green S D., 1994).

2.3. Advantages of Bim Technology in Green Building

For the whole life cycle of the building, it is an important content of BIM and green building. Because of the wide range of BIM, so in this part of the building life cycle, only the construction of the link did not cover it. But it seems that the development of the building, BIM will gradually be incorporated into the life cycle of its research, thus consistent with the green building. Due to the combination of green building and BIM technology, so it can be realized in the BIM model, which can be carried out in a single data platform for different professional design and data integration, and to ensure the accuracy of the data in different stages of the life cycle. Usually the BIM model can be used to the construction stage from the design stage, therefore, it can be more directly to calculate the amount of the project, at the same time, some simulation of the construction process, the construction organization scheme (Wang W, Rivard H, Zmeureanu R., 2005). BIM model can be applied to the operation management of building, this allows the management to have a more comprehensive understanding of the maintenance of the building, and in the process of the transfer of information will not be lost. In addition, because the BIM covers the construction of the full information, support multi professional party based on BIM to carry out performance simulation, green analysis, spatial reasoning, and more in-depth study. Green construction project is gradually developing and improving with the planning, design, construction and operation stages, from the point of view of information accumulation, it can be carried out by macro to micro, from the macro to the micro, from the similar to the accurate, from the rough to the detailed establishment, collection and development of this process, to carry out the construction of the project. Even though the information of building related elements can be displayed in the BIM model more accurately, but it is not necessarily consistent with the true information obtained by the designers at different time points in the project (Gustafsson S I., 2000), the performance simulation and analysis of the green building, etc., have also increased the uncertainty. The expression of the BIM application is the level of BIM, the accuracy classification of different building elements in the BIM model, detailed level is divided into 5 levels, from 100 to 500, to delineate the scope of the use of different BIM models. The practice of green building based on BIM technology, the advantage of BIM technology is mainly used, for different technical difficulties in different stages of green building, a solution method based on BIM is proposed, green building life cycle is divided into the following 4 stages: The first is the decision-making stage, and then the design stage, construction stage, and the final stage of operation management, upward can be extended to the production of green materials (Rajendran S, Gambatese J A, Behm M G., 2009), down to the construction of the demolition and reuse, the rest of the BIM functions are integrated as shown in Figure 3.

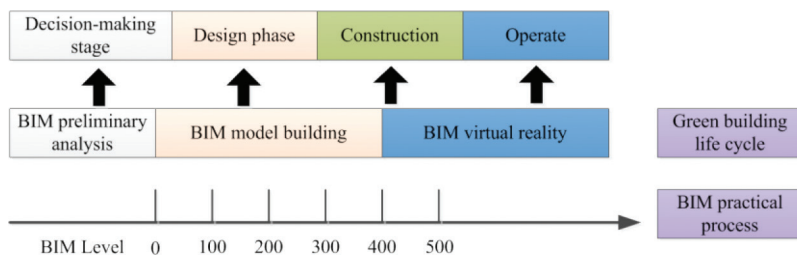


Figure 3 – BIM Integration of the Whole Life Cycle of Green Building

Integration of green building project process with the practice of BIM technology, is the function of BIM in different stages of the project classification, the main functions include auxiliary design and auxiliary management, and the main content of the project including BIM pre analysis, model generation and virtual reality. Is through the application of life cycle. The core chapters of this paper are divided into the function of the BIM technology, which is different from the nature of the strategy. On the other hand, the key of green building evaluation for the construction plan after the end of the design evaluation and completion of the year after the completion of the use of the operational identification evaluation of the year, has focused on the two stages of green construction work (Castro-Lacouture D, Sefair J A, Flórez L., 2009). Decision-making and design stage, is the process of the program from scratch, relying on BIM technology to assist architects to design. Construction and operation stage, is a green building from the idea to the practice of the entity, green building project participants include professionals and non professionals, the professional cooperation and management to complete the construction of practical process, can rely on BIM technology to carry out management and development plan. BIM in the operational phase of the total application can be summarized as shown in Figure 4, based on BIM information model, the different project participation with project process and need to simulate the collision model, 4D construction, equipment operation in the operation simulation and record operation information, compared with traditional construction technology more science more innovative (Kohler N., 1999).

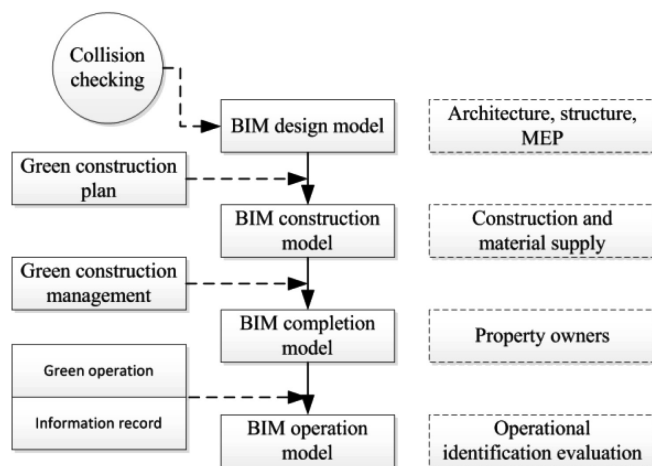


Figure 4 – Application Framework for the BIM Application Framework

2.4. The Establishment of Green Building Assessment System

The current application of the evaluation system, the majority of future assessment based, generally used in the construction of a year later. But the key elements of the green building is the key to the planning, design and construction stage, the design of the planning and selection, building selection, material selection, equipment selection,

technology application and so on green building's final results are playing an important role, and then evaluate the design results only for qualitative and quantitative assessment, can not make up for the defects of the previous design (Frank M G, Gilovich T., 1989). Establishment of the pre assessment system, on the one hand, it can be considered in the future to consider the impact factors of the design stage, avoid design problems caused by defects, on the other hand, it can also be used as an effective technology promotion platform, the green building design concept, technology, design methods, new materials and equipment used in the application, so that the design of the design of the green design method to the impact of the green design. Pre evaluation system is mainly aimed at the design stage, the evaluation is based on quantitative data in the design process. Due to the various stages involved in the relevant professional, external conditions, design ideas, working methods and other factors, each link has a specific effect on the green building. All kinds of green building related standards related to many professional design process, the lack of planning and control methods and specific implementation methods of integrated data system, it is very difficult to quantify and evaluate the impact of building related data in the whole design process (Ding G K C., 2008), it is a BIM integrated data system which covers all stages of architectural design, including architectural components, building materials, etc. The system includes: building design 3D information BIM model. The design concept of green building, BIM building information model as data carrier, storage, extraction, management and analysis of data in the design, materials, and energy consumption of the building. According to the results of calculation analysis, optimize and guide the construction plan, design and construction plan, in order to achieve efficient use of energy and resources (energy saving, land saving, water saving, section material), and the minimum impact on the environment. BIM building information model. In the process of green building design, the data integration and integrated management of the construction space geometry information, building space function, building materials and equipment, etc., basic basis for the analysis of various indicators of green building (Bribián I Z, Usón A A, Scarpellini S., 2009). Analysis and processing of building data. Based on 3D graphics platform, the data from the aspects of design, structure, materials, and energy consumption are extracted, calculated and analyzed. Based on the establishment of three-dimensional building information model, and integrated professional related data, research data interaction, processing and analysis method; research on the building overall layout, planning, design, structure system, building materials, heating cooling, greenhouse effect, artificial lighting, indoor ventilation, building sound environment and sunshine quality and other factors for data statistics and analysis. Quantitative analysis of green building design scheme based on the analysis results, and according to the green building design requirements for the corresponding professional design optimization and adjustment (Lee G, Sacks R, Eastman C M., 2006).

3. Results and Analysis

Public buildings should meet all the requirements of the standard in the design phase, and to meet the general terms and the degree of preferred items, divided into three grades of green is as follows.

Level	General terms (Total 36)						
	Saving land and outdoor environment	Energy conservation and utilization	Saving water and water resource utilization	Saving material and material resources	Indoor environmental quality	Operation management	Optimization options
	6 items	10 items	6 items	5 items	6 items	3 items	12 items
Level1	3	4	3	3	3	1	0
Level2	4	6	4	3	4	2	5
Level3	5	8	5	4	5	2	8

Table 1 – The Number Requirements of Green Building Design

In the evaluation process, the key points are the general term and the preferred term, and need to submit the relevant proof material. For example, the festival and the outdoor environment in terms of the surrounding buildings, not to bring light pollution, sunshine requirements of the surrounding residential buildings” (Zeng X D, Zhao A., 2006). First of all, we should see whether the design of the design of the use of mirror-type aluminum alloy reflection of higher external wall or glass curtain wall; Outdoor landscape lighting whether there is direct light into the air, etc.. And the need to submit proof material contains the design unit to provide the drawings, design, sunshine analysis report, etc.. In addition to prove that the material also has the relevant requirements, such as the requirements of the general plan can be seen, the space relationship between the surrounding residential buildings and the new project; Requirements if the use of glass curtain wall design, the design documents must provide a curtain wall to the surrounding buildings caused by light pollution analysis report and so on. Evaluation of key points and the requirements of proof materials (Xuebin Z., 2010), it can be said that the provisions of the green building evaluation criteria for each of the provisions are clear.

4. Conclusions

With the extensive application of green ecological building and the development of the modern technology of BIM, the integrated assessment system of green building based on the BIM technology has been established and developed. This paper describes the development and application of BIM technology, analyzes it in the advantages of green building, establishes a pre evaluation system of green building, and evaluates the application problems in the design stage of the public buildings with the evaluation system. What's more, it researches the feasibility of the application of BIM technology in green building, and through experimental analysis, it's found that integrated evaluation system of green building based on the BIM Technology can carry on scientific and reasonable evaluation to the building's indicators.

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Research on the Implementation of Analysis System of Computer-Network User's Behavior Based on System Log

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Abstract: Objective: In order to provide strong scientific evidences to the computer crime cases. Method: Establishing forensic analysis system of network users' behaviors based on system log. Process: This paper introduced the development of computer technology and the present situation of network crime, and gave out the definition of computer forensics technology and the characteristics of computer system log, and established the model of the corresponding forensic analysis system. Result & Analysis: This paper studied the theoretical model of log analysis, analyzed the experimental results of the system, and found that the system can query and analyze the criminal invasion log effectively. Result: The forensic analysis system researched in this paper can analyze the behaviors of the network users, and provide strong scientific evidence for the network crime cases.

Keywords: Network crime; System log; Forensic analysis system; Strong scientific

1. Introduction

With the development of science and technology, computer and computer network in the fields of politics, economy, culture, military and so on. The wide range of applications, the computer has become an indispensable part of people's daily life, the computer network to the user with great convenience, people are increasingly dependent on computers and their networks. But because of computer technology, the popularity of the Internet and the virtual nature of the Internet, as well as the use of computer and Internet related legislation of the lag, the use of computer and Internet as a tool or a computer, Internet applications for the object of criminal activities. Computer crime is a kind of crime which is influenced by computer technology (Ayers D., 2009). Figure 1 (a) - (b) shows the characteristics and behavior of the computer network crime.

In the case of computer crime means constantly upgrading, it has become a new direction of criminal cases, but at present the relevant laws and regulations are not perfect, in order to ensure that the computer data can become a legitimate criminal evidence, it must meet become a necessary condition for legal evidence, because the computer data itself has diversity, potential, dissemination and vulnerability. So the key issue is to get a timely, full, reliable and strong evidence. At present, the study of computer crime mainly



(a) The Wide Range of Computer Internet Provides a Space For Cyber Crime



(b) Attacks by Hackers on the Internet

Figure 1 – Part Features and Behavior of Network Crime

focuses on the characteristics of crime, the prevention measures and the influence on the human beings. Data form is the document, the program source code and other information that can be obtained without special tools, which is far from meeting the collection of criminal evidence, but also can not effectively combat computer crime, so computer forensics as a new type of school department came into being, at the same time it marks a new stage of network security defense theory (Cadavid, J. M., & Gómez, L. F. M., 2015). Computer forensics, also known as computer forensic science, it refers to the computer as a crime scene, the use of advanced differentiation and analysis techniques, the computer crime forensic autopsy, search and confirm the evidence and criminal evidence, and accordingly (Carrier B D., 2006).

2. Definition and Development Situation of Computer Forensics

2.1. Definition of Computer Forensics

The term “IACS International” is in the Association of Computer (Specialist). 1991 annual meeting of the United States formally proposed. This is a new subject, which is the science of computer science and law science. Since the term was put forward, many experts and scholars and research institutions to try to give a definition of computer forensics. Robbin Judd (1998) is defined as the Kemmish (1999) definition of computer forensics as a legal recognition, preservation, analysis, and TCT Mc (). Farmer Venema FBI is also presented in this paper. It also gives the definition of Computer Forensics: to avoid distortion, deviate from the way of data to reconstruct the data in order to reconstruct data or reconstruct the system in the past. The computer forensics is defined as “a collection of data stored in the computer’s media.” New Technologies, a well-known computer emergency response and computer forensics, which further extends the definition: Computer Forensics includes the protection, recognition, extraction and filing of computer evidence stored in magnetic media encoding information. In spite of all kinds of definitions and different emphases, the essence is the same. In summary, computer forensics is the process of obtaining, preserving, identifying, analyzing and submitting electronic evidence in the computer and related equipment. This process should be recognized by law (Carrier B., 2003).

2.2. Current Situation of the Development of Computer Forensics Technology

In foreign countries, especially the United States and other network technology developed countries, the fight against computer crime has a history of twenty or thirty years, accumulate some experience in computer forensics, there have been many specialized computer forensics departments, laboratories and Consultation Service Co. In 1984, the U.S. FBI laboratory and other legal enforcement departments began to establish a laboratory test of computer evidence. The United States also set up a computer emergency response team CERT”, “High tech crime investigation organization”, “national basic construction protection center”, “digital front” and other organizations, purpose is to study and deal with computer crime related events. In 2001, the U.S. Air Force Research Laboratory and the Ministry of information Defense Information Division launched the first Digital Forensics Research Workshop (DFRWS), Its goal is to create a dynamic expert community, which is composed of academic institutions and applications, definition of core technology, the establishment of general forensic terms, to participate in the general evidence collection (Bienvenue J M, Duncalf N, Marchiarullo D, et al., 2006). International Organization on Computer Evidence (IOCE) has been established, its purpose is to take the first step in the exchange and discussion of computer crime information for the international justice community. The organization in the United States of America is the Scientific Working Group on Digital Evidence (SWGDE), it is responsible for the study of digital evidence inspection guide and standards. In addition, there are SANS company’s system forensics, investigation and response to the annual meeting and FIRST Technology Forum, etc.. Focus Security, a famous international network security site, also opens up a mailing list for computer forensics

columns to discuss the exchange of research personnel engaged in computer forensics. In China, the computer forensics technology is still in the initial stage of development. Although the public security organs in our country have established a special police force to combat computer crime, the technology is still relatively lack of effective tools, only the use of a number of common foreign evidence or use their own experience, program is still lack of a set of standard computer forensics process, evidence available to the court is very easy to be questioned (Gill P, Brenner C, Brinkmann B, et al., 2001). In our country, the research and practice of computer network forensics is in the initial stage, in the research of the project: the Chinese Academy of Sciences Institute of High Energy Physics Research Institute of Computer Center hosted the national network security issues, and that is the network security intrusion forensic system, and in December 2002 held in Shanghai on the network security forum to launch a "forensic" simulation machine, known as the network Intrusion Forensics system. Jilin University in network reverse tracing, University of Electronic Science and technology in the network trap, Beijing University of Aeronautics and Astronautics in intrusion deception model, China University of science and technology of electronic data identification technology, Northern Jiaotong University in the security log system and dynamic code identification technology have carried out the research work. Peking University, Fudan University, Tongji University and other institutions of higher learning in the study of computer crime investigation technology, and the development of a variety of network monitoring system and audit system. On the domestic market has introduced several computer forensics system: Network Intrusion Forensics System in Shenzhen branch of the new, Computer forensics Shanghai Jinnuo network security investigation box, the software company of network information monitoring analysis and forensics system etc. (Andréasson H, Gyllensten U, Allen M., 2002).

3. Log Analysis Based On Hierarchical Clustering

3.1. Hierarchical Clustering

The hierarchical clustering algorithm is based on the distance between the clusters to obtain a certain end condition of the cluster. The hierarchical clustering algorithm (AGNES) is based on the bottom-up order of the hierarchical decomposition, and the hierarchical clustering algorithm (DIANA) is the hierarchical decomposition order is top-down. Aggregation level clustering algorithm: each cluster is considered as a single object, and then the two closest clusters are merged, and then the distance between the clusters and the clusters is updated. Repeat the above steps until all objects are stopped when a cluster or a user specified condition is met. Split level clustering algorithm: first, all the objects are considered as a single cluster, and gradually formed a small cluster, until each object from a cluster, or meet the user specified conditions (Petroni N L, Walters A, Fraser T, et al., 2006). Figure 2 describes the processing procedure of the hierarchical clustering algorithm and a split level clustering algorithm on a data collection $\{a, b, c, d, e\}$, which contains five objects.

Despite a bottom-up, top-down, and especially from the view of the clustering algorithm and the clustering algorithm, a top-down, especially from the graph, it is not a reversible process, but we cannot separate the two aggregation and the previous state by splitting the two.

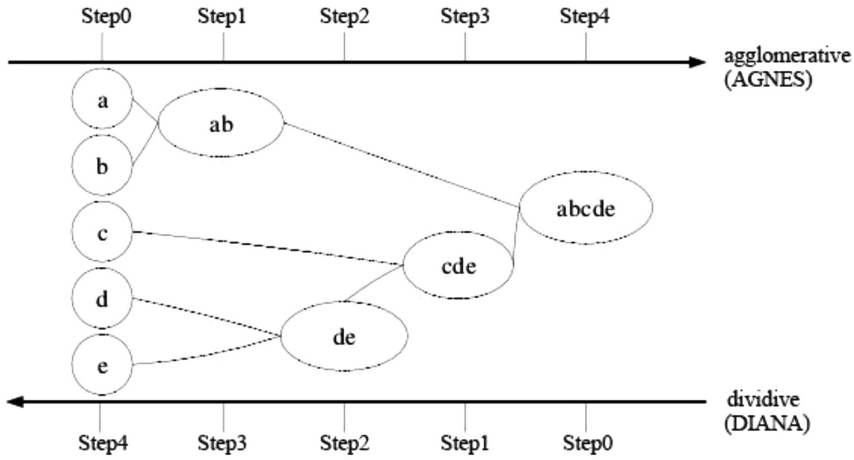


Figure 2 – Agglomerative and Divisive Hierarchical Clustering Algorithm

3.2. Cluster Distance Measurement Method

In the hierarchical clustering, there are four methods to measure the distance between any two clusters: Single linkage, also known as the nearest neighbor method or the minimum distance, that the minimum distance between any two points in different clusters. The distance between two points is the difference between two points, that is, the longer the distance, the greater the dissimilarity. This method can be applied to the data of non elliptical structures, but it is susceptible to noise and outliers. The formula is.

$$d_{\min}(C_i, C_j) = \min_{p \in C_i, p' \in C_j} |p - p'| \quad (1)$$

Complete linkage (complete linkage) also known as the nearest neighbor when neighbor) method or the maximum distance, representing two different clusters of arbitrary two points between the distance of the maximum. This method is easy to ignore the noise and outliers, to find a relatively dense cluster, but it may cause large clusters rupture. The formula is:

$$d_{\max}(C_i, C_j) = \max_{p \in C_i, p' \in C_j} |p - p'| \quad (2)$$

Mean value method is also known as the center of mass distance, first calculated the average value of the two clusters is the distance of two clusters. Formula is as follows:

$$d_{\text{mean}}(C_i, C_j) = |m_i - m_j| \quad (3)$$

The group-mean method is used to mean the distance between two different data sets, and the combination of the two classes is easy to merge (Jobling M A, Gill P., 2004). The merged clusters have better robustness.

3.3. Sub Cluster Analysis of Chameleon Algorithm

There are two basis for measuring the combined effect in Chameleon. One is the threshold method, but not easy to determine the two parameters, the selection is not good, so that the clustering effect is too large, the two is the use of function $MAX[RI(C_i, C_j) * RC(C_i, C_j)]$, where $RC(C_i, C_j)$ is the relative degree between the two clusters, $RI(C_i, C_j)$ is the relative interconnection between the two clusters, but need to specify the number of cycles or the end of the total number of clusters to control the completion of clustering (Divne A M, Allen M., 2005). The threshold value of the people is difficult to specify the actual application, but not the specified threshold and can not find the end of the algorithm, the other can not undo the merged has been completed. In order to solve the above problems, we introduce the structural similarity to define the close degree between the two clusters, and use the cohesion metric function to guide the clustering. Results are made without the need to manually specify the threshold, and can be the last of the combined results of the decomposition. The two nodes of the adjacent nodes are equivalent (Chen Z, Han F, Cao J, et al., 2013), and the formula for calculating the structural equivalence similarity is:

$$S_{i,j} = \sqrt{\sum_{k \neq i,j} (W_{ik} - W_{jk})^2} \quad (4)$$

Where $W_{i,j}$ is the weight between two points (v_i, v_j) . If the value of a function can reflect the degree of similarity within a cluster of data points or within the convergence of the algorithm, and the algorithm of the iterative process of the change, the guidance of a certain time to reach the end of the algorithm, we call this the nature of the function is the cohesion metric function. We use the following functions:

$$E(C) = \sum_{r=1}^k \frac{\sum_{P_i, P_j \in C_r} sim(P_i, P_j)}{n_r} \quad (5)$$

Where $sim(P_i, P_j)$ is the similarity between the P_i and P_j two data points, the penalty factor n_r is the publish to big k , because we believe that the results of the clustering should be less, so we have to punish the big k , so that it is beneficial to small direction, that is:

$$E'(C) = \left| 1 - \frac{2k}{n} \right| E(C) \quad (6)$$

The iterative process continues until the sudden decrease of $E'(C)$, then restores the merged state, and terminates the clustering (Budowle B, Giusti A M, Wayne J S, et al., 1991).

4. Log Forensics Implementation Model

4.1. Characteristics of Computer System Log

System log is one of the most important tools for the maintenance of computer system security and to assist in the management of computer systems. System log has the following main features:

1. Diversity: different operating systems, application software, network equipment and services generate different log files, there is no uniform standards and format of the computer system log.
2. It is not easy to read: most computer system log is stored in binary form. It needs special software and tools to display the text. Because of the diversity of log, the log file records are not the same.
3. Data is large: the computer system log records the information of the computer system log. According to the configuration of computer system log, the amount of information is different. Some server logs, such as Web log, firewall log, intrusion detection system log and log data, log file, a log file is very large, and a log file is generated.
4. It is not easy to obtain the mechanism of different operating systems, application software and network equipment, and the format of the storage log is different, each system developers and network equipment manufacturers often according to their own need to develop their own log format, the log interface is not the same, part of the system log is real-time reflect the system state, which makes it difficult to obtain different log files generated by various systems (Howard C, Gilmore S, Robertson J, et al., 2008).
5. The computer log system is designed for the computer system management. It can change the generation and storage of the computer system by modifying the related configuration file and system. It can be used to prevent the security incidents in the system. The system log files are stored in the system without the protection of the system. Therefore, the log file is not necessarily reliable, and thus cannot be considered as valid evidence.
6. System log records the information of the running status of the computer system according to the time sequence. The system may record the same system events in multiple system logs. For example, the Linux operating system will be recorded in "Wtmp", "Lastlog", secure and "Utmp" files. A host of system logs only reflects the user behavior in the computer system, and a user in the network activities in the process of different computer systems in the network to leave traces, such as firewall log, IDS log, operating system, and so on, there is a certain relationship between these different activities to reflect the user's activities (Hedman J, Albinsson L, Ansell C, et al., 2008).

4.2. The Realization of Computer Network Forensics Based on System Log

In this system, a computer network user behavior analysis system model is proposed. The system is a proxy based distributed forensic analysis system. The main idea of the system design is to collect the key server's system log in the local area network. The theoretical model of the system is shown in Figure 3. The system is made up of two parts: log collection agent and forensic server. The system uses client/server structure, log collection Agent is the Client, deployed in the local area network of each protected server, responsible for the target machine on the system log information integrity verification, collection and transmission, configuration file defines a collection of various parameters, such as the collection object, collection time interval, the server's address and port, PKI certificate and key file name and path, etc. (Hopwood A J, Hurth C, Yang J, et al., 2010). Forensic server is the server side of the system, the data received

by Agent is the most important function of the server, and the database is responsible for the analysis of the data from the database. Finally, it is responsible for the analysis of the results. The information transmission between client and server uses a secure transmission way, such as SSL protocol, which can realize the mutual authentication between client and server. Method to guarantee the integrity of log information.

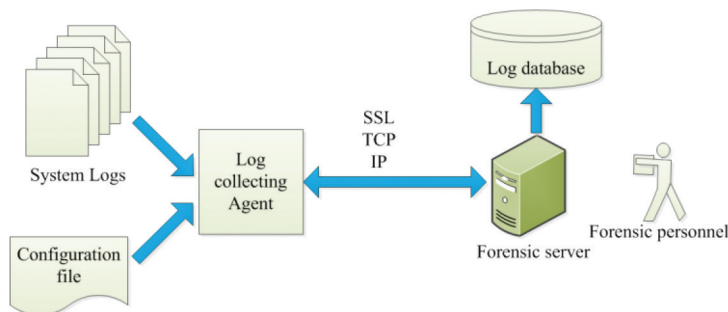


Figure 3 – Analysis System Model of Computer Network User Behavior Analysis System Based on System Log

This system model has the following advantages:

1. The security of log keeping. The log collection agent periodically transfers the log to a secure high strength forensic server, which can avoid the log in the target machine being destroyed.
2. Log analysis is more convenient and quick. You can analyze and process all the server's system logs without landing on each server.
3. It facilitates the analysis of the relevance of the log. Through the analysis of the log of different servers or different system logs, all the log records related to the security incident are analyzed, and the intrusion process is reconstructed in time sequence. The evidence obtained is more comprehensive and the analysis result is more accurate.
4. It can cross platform analysis log. Through the log of the centralized processing, only need to write a program on a system to achieve a unified analysis of the system of different systems.
5. System maintenance and response is simple (Bem D, Huebner E., 2007).

5. Experimental Program

In order to clearly see the results of the analysis, the log data used in the test should include normal log and suspicious days. So we use a number of computers as a result of the computer forensics, on the basis of normal work, some of the more artificial the right to operate and the invasion of suspicious commands, including the illegal access from the host named Hacke and the host named Makal. When the system is running, the user can query the log, including the normal log query and suspicious log query (Cooper A J., 2007). Figure 4 is a common log query page:

seq	date	time	host	program	memo
1005	2009-11-3	20:35:11	localhost	hernel	BIOS-E820:0000...
1006	2009-11-3	20:35:35	localhost	hernel	BIOS-E820:0000...
1007	2009-11-3	20:36:06	localhost	hernel	BIOS-E820:0000...
1008	2009-11-3	20:36:17	localhost	hernel	BIOS-E820:0000...
1009	2009-11-3	20:36:19	localhost	hernel	BIOS-E820:0000...
1010	2009-11-3	20:36:23	localhost	hernel	BIOS-E820:0000...
1011	2009-11-3	20:36:26	localhost	hernel	BIOS-E820:0000...
1012	2009-11-3	20:36:35	localhost	hernel	BIOS-E820:0000...
1013	2009-11-3	20:36:39	localhost	hernel	BIOS-E820:0000...
1014	2009-11-3	20:36:43	localhost	hernel	BIOS-E820:0000...
1015	2009-11-3	20:36:47	localhost	hernel	BIOS-E820:0000...
1016	2009-11-3	20:36:49	localhost	hernel	BIOS-E820:0000...
1017	2009-11-3	20:36:53	localhost	hernel	BIOS-E820:0000...
1018	2009-11-3	20:36:55	localhost	portmap	OMB HI GHMEN:...
1019	2009-11-3	20:36:59	localhost	portmap	OMB HI GHMEN:...
1020	2009-11-3	20:37:03	localhost	portmap	OMB HI GHMEN:...

Figure 4 – Common Log Query

As can be seen from the above, the common log in a large extent is similar. At the time of experimental design in order to clear the intrusion log, artificially to machine the Unauthorized Intrusion Forensics and the intrusion suspicious command, which includes the illegal access from the host named Hacker and Makal(Petroni N L, Walters

seq	date	time	host	program	memo
2001	2009-11-4	16:35:11	hacker	login[1450]	FAILED LOGIN F...
2002	2009-11-4	16:35:35	hacker	login[1451]	FAILED LOGIN F...
2003	2009-11-4	16:36:06	hacker	login[1452]	FAILED LOGIN F...
2004	2009-11-4	16:36:17	hacker	login[1453]	FAILED LOGIN F...
2005	2009-11-4	16:36:19	hacker	login[1454]	FAILED LOGIN F...
2006	2009-11-4	16:36:23	hacker	login[1455]	FAILED LOGIN F...
2007	2009-11-4	16:36:26	hacker	login[1456]	FAILED LOGIN F...
2008	2009-11-4	16:36:35	hacker	login[1457]	FAILED LOGIN F...
2009	2009-11-4	16:36:39	hacker	login[1458]	FAILED LOGIN F...
3722	2009-11-4	20:43:21	makal	xneted[892]	REFUSED CONN...
3723	2009-11-4	20:43:22	makal	xneted[893]	REFUSED CONN...
3724	2009-11-4	20:43:28	makal	xneted[894]	REFUSED CONN...
3725	2009-11-4	20:43:29	makal	xneted[895]	REFUSED CONN...
3726	2009-11-4	20:43:30	makal	xneted[896]	REFUSED CONN...
3727	2009-11-4	20:43:36	makal	xneted[897]	REFUSED CONN...
3728	2009-11-4	20:43:43	makal	xneted[898]	REFUSED CONN...

Figure 5 – Intrusion Log Query

A, Fraser T, et al., 2006), as we can see from Figure 5, these two logs have been shown to be an intrusion suspicious log. As shown in the following diagram:

6. Conclusion

With the explosive growth of Internet, there are more and more attacks on the network, and the attacking means are also changing with the strengthening of security and defense measures, so it's very important to study the technology of computer forensics, actively access to the illegal hacker's attack behavior and complete reconstruction through electronic forensics technology, which can accurately and effectively combat illegal hackers. In this paper, the definition of computer forensics technology is defined, the characteristics of the computer system log are analyzed, a log analysis method based on hierarchical clustering is introduced, and the network user behavior analysis system model based on the system log is established. This paper also analyzed the log data used in the test, including normal log and suspicious log. Through the analysis, it is found that the model of forensic analysis system in this paper can effectively and accurately analyze the behavior of the computer log.

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Research on the Method of Color-Gamut Training of Tennis Based on Computer Platform

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Abstract: Objective: To improve the efficiency of tennis training. Method: Establishing a network course of tennis teaching combining the computer platform and color-gamut training theory. Process: This paper introduced the development of computer technology, presented the necessity of establishing multimedia teaching system of tennis, analyzed the theory of color-gamut training, and established corresponding model of tennis teaching-training system. Results & Analysis: the paper studied the practical model of tennis teaching and training on the computer platform, analyzed the corresponding experimental data, and found that the model of the teaching system in this paper was more advanced than the traditional one. Result: The network teaching system combining the computing platform and the color-gamut training theory can improve the tennis training effect.

Keywords: computer platform; color-gamut training theory; tennis training

1. Introduction

Under the influence of network technology and the rapid development of computer technology, our country, each industry has carried out the computer information revolution. In the frenzy of our education, science and technology under medical treatment, government departments and other industries to establish their own information network platform. China started the construction of the China Education and research network in 1993, in 1999, the China Education and research network and the network construction and transformation of the high - speed network, and now the Chinese education and research network has become China's second largest Internet network. And, on the basis of the Chinese educational television satellite multimedia transmission platform, China Education and research network to achieve a high speed connection, gradually formed the modern distance education and education information network platform, this platform has powerful interactive features (Kikot, T., Fernandes, S., & Costa, G., 2015). At the same time, in this platform to promote many teaching subjects gradually implemented Computer Assisted Instruction, accelerate the close combination of the various subjects with computer technology, fully utilize the advantages of network development, to improve the teaching quality (Steinbeck C., 2001). Figure 1 (a) - (b) shows the development of computer technology and the application in the network teaching.



(a) Globalization Development of Computer Technology



(b) Multimedia Teaching in the Field

Figure 1 – Application of Computer Technology

Although the network multimedia teaching system has the incomparable superiority, but in our country sports educational circles, the network multimedia system of tennis teaching is not much. How to make these advantages fully in tennis teaching has been demonstrated, become the urgent need to solve the problem. Media integration and collaborative learning environment created by the Internet courseware, be able to combine the theory teaching and the technical practice of tennis, so as to improve the students' enthusiasm and interest, and to promote the learners to study and study efficiently. The theory and application of network teaching of Public Physical Education in normal colleges and universities, Liu Dianguo, points out that the use of computer networks to carry out the teaching of the computer network, realization of the modernization of Public Physical Education in Colleges and universities, improve the quality of teaching, so that the development of Public Physical Education in colleges and universities to keep pace

with the times, this is an important issue that all teachers of higher education in the new century must be studied (Sharkey P M, Murray D W, Vandavelde S., 1993).

2. Overview of Secure Computer Platform

With the rapid development of computer system and widely used in military, aviation, rail transportation, medical, nuclear power plants and other areas of high security requirements, the security and reliability of computer system have been attached great importance to it, then the formation of the security system, which is an independent research branch. "The security system refers to, the failure of the system will result in significant casualties, property damage and environmental damage. It's safe as the core of computer system (Appavoo J, Uhlig V, Waterland A., 2008), It is often called a secure computer platform. Safety computer platform means that the performance of the computer is closely related to life, Its safety is crucial. So the security of computer platform is usually required to achieve the function of a security failure, when the system fails, its output is still in a state of security. The most common use of this feature is fault tolerance technology. Fault tolerance technique is when a computer is in error, the use of redundancy in the way of maintaining the normal work of the system, in order to improve the reliability of the system. The first fault-tolerant computer in the world was built in Czechoslovakia in 1950s. In the 60's, the American Space Agency (NASA) has been developed to support the fault tolerant computer for the satellite of the earth observation satellite. Subsequently, it uses the structure of the three mode redundancy (TMR), successfully developed the guidance computer of the Apollo moon landing craft, it lays the foundation for the development of fault-tolerant computer system (Xiaoyan X U, Wensai C., 2009). At the end of the 70's, began to be used for a system development for commercial purposes, and in the 80's got a wide range of applications, mainly for online transactions, this makes fault tolerant computer from a specific application domain to a general wider application field, is a leap in the development of fault-tolerant computer. Into the 80's, along with the development of ultra large scale integrated circuit technology, greatly reduce the cost of computer hardware, the computer has entered every field of the society, in some areas, the failure of the computer will cause great damage, so the fault tolerant computer from military aviation and other departments to expand to industrial control, transportation sector and other fields. In the rail transit operation control system, safe computer platform generally uses the structure and principle of the fault tolerant computer to realize the system's fault. In 1965, Japan's first and the safety computer platform of electronic interlocking device parameters fail safe logic components. Although it is not practical, it establishes the foundation for the development of the electronic interlocking device. In 1978, Sweden will be the first to use the computer's electronic interlocking device practical. Its use of the security of the computer platform is a general control computer, two sets of different procedures are installed, output only two located at the site of the fail safe concentrator is consistent with the results of time, to control signal machine and other equipment. Subsequently, Japan has been inspired by Sweden, The method of BUS signal is adopted, development of the security of the BUS synchronization platform. Later, a secure computer platform, which is based on the task synchronization, is used, and its comparison circuit constitutes only one security of the fault, this makes the security hardware platform has a greater development space (Tetko I V, Gasteiger J, Todeschini R., 2005).

3. Domestic Computer Platform Based on Uefi

3.1. Introduction of Domestic Computer Platform

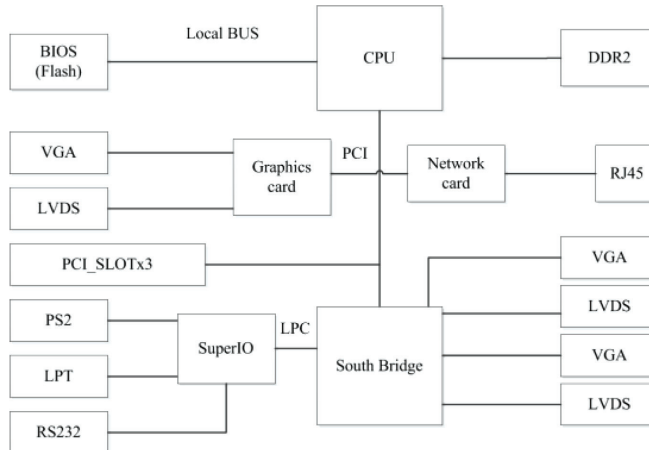


Figure 2 – The Logic Diagram of The Domestic Computing Platform

The hardware platform of this paper is a research and development of the core 2F processor computer platform, its logical structure is shown in Figure 2. Dragon core processor comes with its own memory controller, supports up to DDR2 of 2 GB memory, the processor is connected through the PCI bus and Ethernet controller, video card, South bridge, provide up to 3 PCI device extensions. Provides 2 RS232 interface outwards through the bridge, 4 USB interfaces, 1 digital audio interface, 1 IDE interface and 1 LPC interface; Provide two-way Gigabit Ethernet port through the Ethernet controller; Provide LVDS and VGA 2 kinds of display interface through the graphics card. Flash is connected with CPU through Local-BUS. The platform was originally used as BIOS PMON. PMON is the most commonly used MIPS BIOS processor, the latest version is PMON2000, Supports MIPS, ARM, PPC and X86 architecture, you can start the operating system from IDE, Flash, network, and USB, including debug system, supports multiple debug commands, use the serial port as the output (Sawhney M S., 1998).

3.2. Advantage of Uefi Bios

Extensible firmware interface (EFI) is first proposed by Intel to remove the limit of the performance of an BIOS processor architecture, which is then submitted to the international standard organization UEFI management, renamed the unified extensible firmware interface (UEFI). UEFI-BIOS implementation process is shown in Figure 3, it generally includes SEC (Security), PEI (pre-EFI Initialization), DXE (Driver Execution Environment), BDS (Boot Device Select) 4 stages, SEC implementation of the basic system of the system, to prepare the C language implementation environment; PEI phase into the C code environment, describes the system resources and initialization information, after the end of the transfer to

the DXE phase; DXE phase of the computer system for the initialization and configuration of equipment, build system tables, to provide access to the resources of the interface; BDS stage for the BIOS boot of the final stage, to complete the preparatory work before entering the operating system boot, and eventually load OS Loader, system control power to the OS-Loader, only to retain the runtime service can be used for the system. At this point, UEFI

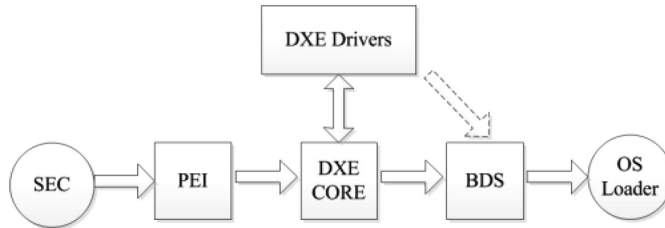


Figure 3 – Code Execution Process of UEFI BIOS

BIOS control over the system (England P, Lampson B, Manferdelli J., 2003).

UEFI has the advantages of modular structure, C language style, EFI driver model, hardware operation mode, etc., respectively from the transplant and boot speed, four aspects: extension, operation interface of PMON and Loongson domestic computer platform UEFI firmware both are compared below.

1. starting speed: PMON will drive the device to be loaded and executed on all of the devices that are found on the motherboard, so how to mount the device directly affects the system boot speed; UEFI device drivers follow the UEFI driver model, the DXE phase does not work more for the drive of this type, until the start in the Bds Call `Efi_Driver_Binding_Protocol` to connect the device to the device controller and initialize the device, in the BDS phase, the device can be selected and the boot sequence is adjusted, devices that do not need to start at the start of a startup can be delayed until the later stages are initialized and configured, so as to improve the system boot speed (Tiwana A, Ramesh B., 2001).
2. portability: PMON and UEFI BIOS are written in C language, and the device driver is found by polling mode. PMON and the hardware related part of the distribution is not the rule, the larger the workload of the transplant, and requires the developer to understand the code structure; The modular structure of UEFI and the standard operating interface of hardware make the coupling between the driver and the core control code is low, the implementation of the standard interface is only needed for the transplant, and not affect its upper or other parallel modules, so, UEFI can be far better than PMON. UEFI standard hardware operation interface is a group of DXE Architectural Protocols, they shield the underlying hardware details, making the UEFI BIOS with high portability.
3. scalability: PMON to add a driver or function in the process of adding to the appropriate device or function of the call, the programmer needs to be very familiar with the structure of the entire code and call location; UEFI BIOS device drivers in EFI Driver Model, BIOS core code will be found and load driven, do not need to focus on the core code programming. And the support of PCI bus architecture is also reflected by the UEFI bus architecture. UEFI PCI

bus driver uses hierarchical structure, from the bottom up including PCI Root Bridge, PCI BUS and PCI device drivers three layer, most of the initialization and configuration of the bus is implemented in the hardware related Host Bridge driver, the realization of PCI device driver has nothing to do with the architecture of the platform PCI, when the bus structure is changed, it is necessary to change the PCI Host Bridge (Appavoo J, Uhlig V, Waterland A., 2008).

4. Color-Gamut Training Theory

4.1. Basic Concepts

The color gamut is the color range of a given color pattern. It is important to understand the size of the color gamut, and the color gamut is a complete subset of the colors, for example, a given color space or the color range of an output device, such as the screen display, printer output and print copy of the performance of the color range. In nature, the spectrum of the color composition of the largest color gamut, the color gamut contains all the colors that the human eye can see. Color gamut mapping technology is divided into two categories, the color gamut and color gamut expansion (Usui S, Arai Y, Nakauchi S., 2000). Color gamut compression technique cutting has been widely used, was first used in the printing industry, because the color gamut of the display is wider than that of the printing equipment, therefore, it is necessary to use the color gamut mapping technology to map the color picture on the color gamut of the printing machine, otherwise it will color distortion, this technique is also used in the display device of the printer and the different color gamut. And the color gamut expansion technology, since the past can be used for color gamut extension of the general approach to maintain the source color gamut. So there is no more scholars in this direction. In some references, the color gamut expansion scheme for high definition TV is proposed, the expansion of the scheme is to expand the transmission range of RGB three component signals to negative values, and these negative signals can be easily obtained from the camera, the thing to do is to try to keep these negative signals and transmit them, so that high definition TV can receive a wider color gamut of TV signal, thus, the color gamut extension scheme is to try to obtain high resolution image source, it is not a good solution, it does not necessarily apply to a wider color gamut. To obtain a general solution is needed to use color gamut extension techniques, in the literature, the paper introduces how to use the color gamut expansion technology to carry out the gamut expansion, using color gamut extension techniques do not have to require the color gamut of the image source to match the color gamut of the device, the small color gamut of the image source after the expansion of the color gamut can also be displayed on the wide color gamut display effect (Vrhel M J, Trussell H J., 1992).

4.2. CIE1976LAB System

In order to overcome the heterogeneity of 1931CIE-XYZ system, and to further improve and unify the color evaluation method, the new color space and the related color difference formula are recommended in CIE1976LAB system. The conversion formula between CIELAB and CIEXYZ is:

$$\begin{aligned}
 L^* &= 116(Y/Y_0)^{1/3} - 16 \\
 a^* &= 500[(X/X_0)^{1/3} - (Y/Y_0)^{1/3}] \\
 b^* &= 200[(Y/Y_0)^{1/3} - (Z/Z_0)^{1/3}] \\
 Y/Y_0 &> 0.01
 \end{aligned} \tag{1}$$

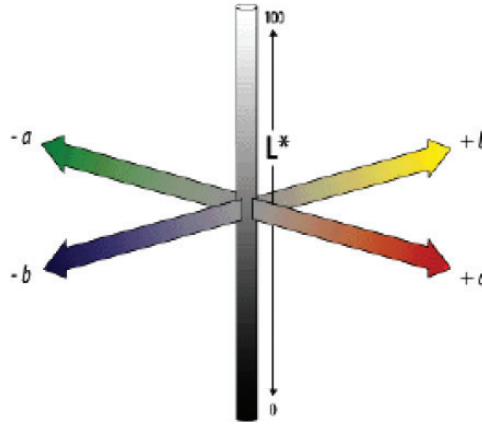


Figure 4 – CIE LAB Color Space

The X_0 , Y_0 , Z_0 for the three stimulus white value, three white stimulation of D65 are $X_0 = 95.047$, $Y_0 = 100.000$, and $Z_0 = 108.883$. Figure 4 is a schematic diagram of the CIELAB space, CIELAB space is the most wide range of color space, the value of L in the range of 0 to 100, A and B are in the range of -120 to +120, can cover the entire horseshoe shaped area in the CIE1931xy, all the colors that the human eye can perceive.

3.2. Color Evaluation

Color evaluation is divided into subjective and objective evaluation, subjective evaluation is more important than objective evaluation. Subjective evaluation is the evaluation of the original image or their own psychological feeling. The evaluation results will be influenced by the characteristics, psychology and environment of different people, so as to produce a big difference. It is the objective evaluation of various quality features using appropriate tools, instruments of proofs for quantitative detection, will get the data to calculate, statistics, comparison. In the field of color management, color difference is the most important parameter of objective evaluation, the smaller the difference between the two colors, the more close to the two color, for the two images, the average color difference of all the color points is generally compared, the smaller the color difference value, the more close to the two images. There are only a few of the commonly used color difference formulas, and here are the CIE color difference formula (Rasche K, Geist R, Westall J., 2005). In an CIELAB color space and color value and color difference between (L_1^*, a_1^*, b_1^*) and (L_2^*, a_2^*, b_2^*) can be expressed as:

$$\Delta E_{ab}^* = [(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2]^{1/2} \quad (2)$$

Where $\Delta L^* = L_1^* - L_2^*$, $\Delta a^* = a_1^* - a_2^*$, $\Delta b^* = b_1^* - b_2^*$. However, the Lab color space recommended by CIE in 1976 has been considered as a perfect place for many years. Representation of perceived chromatic aberration, so CIE in 1994 proposed the use of CIE94 color difference formula to amend the Lab space color difference formula CIE94 color difference formula is defined as the formula:

$$\Delta E_{94} = \sqrt{\left(\frac{\Delta L}{k_L \cdot S_L}\right)^2 + \left(\frac{\Delta C_{ab}}{k_C \cdot S_C}\right)^2 + \left(\frac{\Delta H_{ab}}{k_H \cdot S_H}\right)^2} \quad (3)$$

Here

$$\Delta L = L_1 - L_2 \quad (4)$$

$$\Delta C = C_1 - C_2 \quad (5)$$

$$\Delta H = \sqrt{(a_1 - a_2)^2 + (b_1 - b_2)^2 - \Delta C^2} \quad (6)$$

SL, SC, SH as weight function,

$$S_L = 1$$

$$S_C = 1 + 0.045 \times \sqrt{C_1 \cdot C_2} \quad (7)$$

$$S_H = 1 + 0.015 \times \sqrt{C_1 \cdot C_2} \quad (8)$$

KL, KC, and KH are all parameters, compared to the CIE76 color difference formula, the CIE94 color difference formula can better respond to the differences in color, the color difference formula is also used in this paper (Scott D, Scott L M, Howe B L., 1998).

4. Tennis Teaching and Training System Design

4.1. The Need for the Design

The client to class information, plan summary, teaching video and teaching pictures, etc., as well as the online message and question answering and so on the server side of the end of the teaching resources of the teaching resources, teaching pictures, planning to sum up the update, upload, message management.

4.2. Running Environment

The operating environment of the system: the hardware platform is shown in Figure 2; Software requirements for 2003/Windows XP Windows; Memory requirements: 256M and above; Hard disk do not has any requirement.

4.3. Basic Design Concepts and Processes

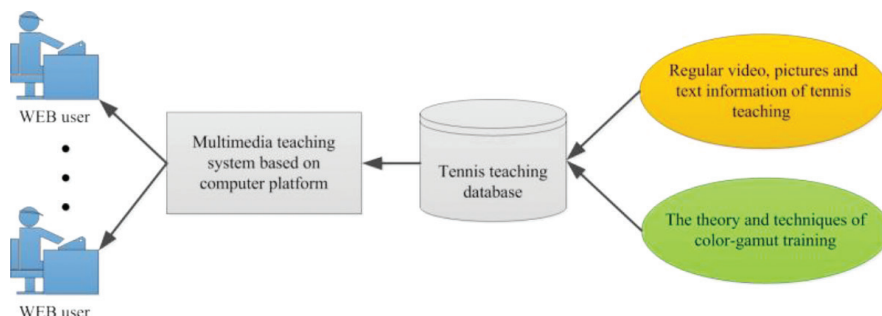


Figure 5 – Tennis Teaching and Training System Based on Computer Platform

4.4. System Error Handling Design

1. Error message: When browsing the information, the system prompts the access failure; For online message, the system prompts the message failed; When you do online Q & A, the system prompts the connection failure.
2. Remedy: It is recommended that the user to re issue a request for access or re - access to the system (Ferrauti A, Weber K, Strüder H K., 1997).

5. Experimental Results

The experimental system of two classes of tennis learning situation to do a comparison, the experimental class is based on the computer platform of network tennis teaching mode, control class using traditional teaching mode. Through the test and evaluation of the results obtained by the theoretical results, technical performance, the ball stability results, we make mathematical statistics. Where theory 20 points, technical action and the stability of the ball are 40 points (Maffioletti N A, Bramanti J, Jubeau M., 2009), the results are shown in Table 1.

In the experimental class and the control class, the theoretical results, technical performance, the stability of the ball after the mathematical statistics, the results showed that the experimental class of these three results were higher than the control class, and the difference was significant ($P < 0.05$).

6. Conclusion

With the development of computer technology, network teaching has become one of the main teaching methods. In tennis training, the teaching system of multimedia network

Category		Test item 1	Test item 2	Test item 3
		Theory	Technical action	Hitting stability
Experience group	Average	15.43	33.06	33.60
	Standard deviation	2.0792	3.4833	3.1797
Contrast group	Average	13.83	30.70	31.20
	Standard deviation	1.9134	4.3955	4.0206
deviation between average values		1.60	2.36	2.40
P value		<0.05	<0.05	<0.05

Table 1 – Comparison of the results of the experimental class and the control class

can obtain good training effect through the platform of computer technology combining with the relevant color-gamut training theory. This paper introduces the application of computer technology, introduces the color-gamut training theory on the basis of the concept of security computer platform, and establishes a multimedia teaching and training system. And finally, this paper uses actual training results of the two classes for comparing, through analyzing the experimental data, and it's found that the color-gamut training method based on the computer platform can effectively improve the training effect.

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Study on the Transmission of Weak Photoelectric Signal in Low Dimensional Nanostructures

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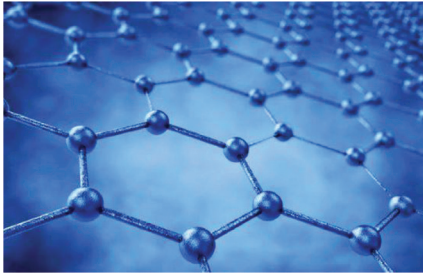
Abstract: Objective: To study the transmission situation of weak photoelectric signal in low-dimensional nano structures. Methods: Researching the characteristics of the low-dimensional nanostructures and the weak photoelectric signal. Process: This paper introduces the classification of low-dimensional nanostructure, describes the transmission situation of the electron in a single-library mesoscopic ring under the driving of periodic magnetic field based on one-dimensional electron quantum waveguide theory, and establishes a weak photoelectric signal detection system. Results and analysis: The nano-junction model of asymmetric three-port graphene is established based on the theoretical formula, analyzed the data result of the model, and finds that the nano junction of graphene can provide more options to control the thermal rectification. Conclusion: The low-dimensional nanostructure can effectively transfer the weak photoelectric signal.

Keywords: nanostructure; mesoscopic ring; grapheme; weak photoelectric signal

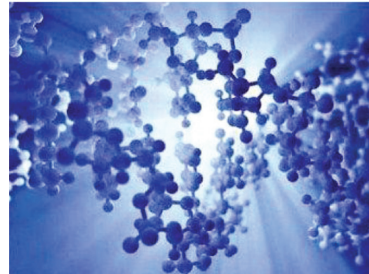
1. Introduction

With the rapid development and progress of material production technology, such as molecular beam epitaxy, vapor deposition of metal oxide, etc., as well as the rapid development of fine processing technology such as micro engraving of ray and ion beam, people have been able to fabricate super-fine low dimensional nanostructures, and realize the control of physical properties of materials on the nanometer scale. In nanostructures, the way people deal with information is governed by the principle of quantum mechanics, that is to control a single electron or a small amount of electrons in the structure of an artificial-atom molecule, then we can achieve the storage and delivery of information (Lingling, HE, Zhong ZHANG, and Lifeng GE., 2010). This makes low dimensional nanostructures become the focus of the research object present of modern condensed state physics, materials physics, and information science. At the same time, with the rapid development of science and technology in the field of information, optical devices based on traditional optical technology have not been able to meet the requirements of information science technology developing toward the direction of further miniaturization and large capacity, which requires the development of a new generation of micro or nano photonic devices on the optical mesoscopic scale (Yuchi, LIN, Xin HONG, and Meirong ZHAO., 2002). Because the photons have the

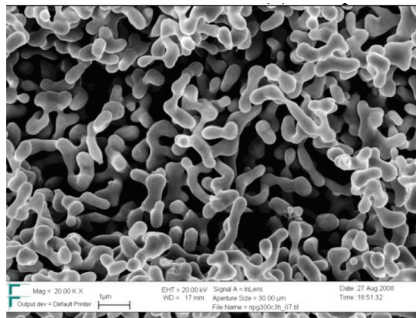
characteristics of high frequency, high transmission speed, short wavelength, easy to penetrate into the optical medium, and can interact with the media, ect., it's considered to be the main medium of the next generation of quantum devices. Figure 1 (a) - (c) shows several major kinds of nano materials.



(a) Graphene material



(b) Composite nano material



(c) New nano material cooperatively developed by China and German

Figure 1 – Several Kinds of Nano Materials

2. Several Kinds of Typical Low Dimensional Nano Structures

2.1. Mesoscopic Ring

Advances in optical and micro engraving technology of electron beam help us to make out devices of sub-micron dimensions in the experimental condition. When the temperature is very low, the phase coherence length of the electron can reach to the micron level, and when the electrons move in such a distance, they can keep the phase memory. So the transport process of electrons in such a system is dominated by its phase coherence, and this opens up a new area of physics, which is mesoscopic physics. In many research objects of mesoscopic physics, the system that can mostly reflect the electronic phase coherent is the mesoscopic ring (Li, Jing, Weimin LI, and Xiaodong CHEN., 1999).

Landauer et al. pointed out that the elastic scattering between electrons and impurities does not cause the loss of phase in the electron wave function, and only add a certain phase in the wave function. However, if a non elastic collision is made, electronic phase information will be completely lost (Mira-Giménez, M. J., 2015). Therefore, in the transport process of the electron in the mesoscopic system, the characteristic length of the decisive role is the phase coherence length. When the wave function of the electron is separated at a certain point, propagates along two different paths, and joins together at another time, the total wave function of the electron will appear phase coherent fluctuations (Guoxin, MA., 2003).

2.2. Graphene

Carbon is one of the most widely distributed elements in nature, it is different form the crystallographic structure, which makes the carbon has a pivotal position in the basic research and application research. In 2004, K.S. Novoselov and A.K. Geim, physicists of the University of Manchester in England, were the first time to use a mechanical stripping method to obtain a two-dimensional structure of carbon, which is graphene (Xianjun, WANG., 2011). Why graphene has become the most popular material in condensed state physics, one of the important reasons is that it provides an achievable platform in experiment for the solution of many fundamental problems in modern high energy physics and quantum field theory. In many special properties of graphene the most interesting is that in the low energy excitation, the operation of the electron can be regarded as Dirac fermions with no quality and chiral properties. This is because graphite is a kind of semi metallic material, the band structure on the boundary of the Brillouin zone is overlapped, which makes the electrons can move between the layers of graphene (XIONG, Wenzhuo, Zhiyong KONG, and Wei ZHANG., 2007).

2.3. Nano Optical Waveguide

Photon transport is a rapidly developing subject that has a lot of work to do in the basic theory and application research. In free space, because the interaction of low dimensional nano structure and space electromagnetic wave is three-dimensional, and the joint strength of them is weak, the phenomenon of quantum optics in nano structure is not significant. Now, the nano optical waveguides typically represented by photonic crystal waveguide, nano metal plasma waveguide, ect. have potential application value in physical realization of microwave transmission line, optoelectronic device, ultra-high density storage, quantum computer, etc., so it's one of the most active and most dynamic frontier areas of current physics research (Yaguang, ZENG, Junjie LIANG, and Dingan HAN., 2009).

Nano photonic wire is a kind of one-dimensional waveguide structure with high refractive index and minimum cross section area, with dimensions in hundreds of nanometers. Intense optical confinement makes the device compact, and be able to realize large angle bending or form a ring resonator. Scientists at the University of California use the nano belt composed by SnO₂ crystal as the device information channel. The nano belt is proved to be a very low loss optical waveguide material, which not only can be used as a low loss waveguide for visible and ultraviolet light, but also has excellent toughness, and can be bent into different shapes (Chang K, Chen R, Wang S, et al., 2015).

Photonic crystals are artificial materials with periodic adjustment on the distribution of the material's permittivity. Understanding of photonic crystals can be compared with the conventional crystal. In the theory of solid physics, the atoms with periodic arrangement in the crystal forms a specific periodic potential field, so that the electrons in the middle movement will be affected by the Prague scattering of the periodic potential field, and ultimately form the band structure (Gu W, Huang J, Tan W., 2015).

3. One-Dimensional Electron-Quantum Waveguide Theory

One-dimensional electron-quantum waveguide theory was proposed by Jianbai Xia, an academician of semiconductor physics institute of Chinese Academy of Sciences, in 1992. The theory assumes that the width of the microstructure is much smaller than the length, so the quantum level of the horizontal transmission mode is far greater than the longitudinal transmission. Thus, the three-dimensional Schrodinger equation is reduced to one dimension (XI, Caiping, and Qinfen YAO., 2008). And it defines two boundary conditions, which is that the wave function is continuous at the node:

$$\psi_1 = \psi_2 = \psi_3 = \dots = \psi_n \quad (1)$$

And by the current density conservation, get:

$$\sum_n \frac{\partial \psi_n}{\partial x_n} = 0 \quad (2)$$

where x_n is the distance of pointing to the node or departing from the node. In this way, the wave function of one-dimensional system can be written as a superposition of two wave functions with opposed wave vectors:

$$\psi_n(x) = c_n e^{ikx} + d_n e^{-ikx} \quad (3)$$

The coefficients c_n , d_n , etc. in the formula can be obtained through the boundary conditions (1) and (2). One-dimensional electron-quantum waveguide theory neglects the width of the system, but the given results and the experimental measurements of it are consistent with other theories, and it has been widely used to study the electron coherent transport in mesoscopic systems, one of the most typical example is to study the electron transport problems of mesoscopic ring (Zheng, Qian, Shen Zhu, and Luo Chengmu., 2002).

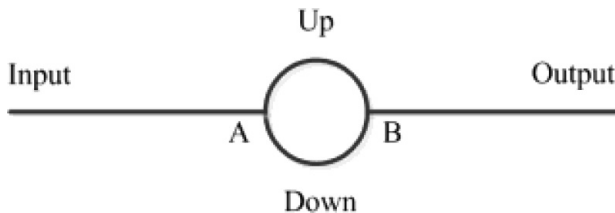


Figure 2 – Transmission of Electrons In Mesoscopic Metal Rings

Electronic enter the system from the left side of electrode, and can get through the ring region along two different paths: the upper one and the lower one. The corresponding wave function is:

$$\begin{aligned}\psi_i &= e^{ikx} + re^{-ikx} \\ \psi_u &= u_1 e^{ikx} + u_2 e^{-ikx} \\ \psi_d &= d_1 e^{ikx} + d_2 e^{-ikx} \\ \psi_t &= te^{ikx}\end{aligned}\tag{4}$$

where r and t are respectively the reflection and transmission amplitude of single electron. According to the boundary conditions of nodes A and B, the linear equations can be obtained:

$$\begin{aligned}1 + r &= u_1 + u_2 \\ 1 + r &= d_1 + d_2\end{aligned}\tag{5}$$

$$\begin{aligned}1 - r &= u_1 - u_2 + d_1 - d_2 \\ t &= u_1 e^{ikL_1} + u_2 e^{-ikL_1} \\ t &= d_1 e^{ikL_2} + d_2 e^{-ikL_2} \\ t &= u_1 e^{ikL_1} - u_2 e^{-ikL_1} + d_1 e^{ikL_2} - d_2 e^{-ikL_2}\end{aligned}\tag{6}$$

Solving equations (5) and (6), the electron transmittance of X is:

$$T = \frac{64[1 - \cos(kL)][1 + \cos(k\Delta L)]}{4\{[4 - 5\cos(kL) + \cos(k\Delta L)]^2 + [4\sin(kL)]^2\}}\tag{7}$$

where $L = L_1 + L_2$, $\Delta L = L_2 - L_1$. Starting from the fomula above, the transmission probability of different energy electrons entering the mesoscopic ring can be obtained.

4. Design of Weak Photoelectric Signal Detection System

4.1. Basic Composition of the Detection System

Complete photoelectric detection system should include the following basic components: the light source, the detection of objects and the generation of optical signal, photoelectric conversion, the amplification and filtering processing after the conversion of electrical signal and the final data display. In any weak photoelectric detection system, the light source is essential, different detection system can choose different light signal as the light source according to the actual needs, which mainly are the distribution of space, radiation power and spectral range of the light source. The light source of general photoelectric sensor can be incandescent lamp, gas discharge lamp, semiconductor light emitting device, etc.. The objects are different in different photoelectric detection systems, it's just a physical quantity to be measured, when it's shone by the beam of a light source, we can use the photoelectric detecting device to detect it according to various optical effects, for example, the interference, reflection, absorption and so on change the light beam into the optical signal which carries the characteristic information of the the object (Shujie, Zhao Changhai Wan Qiuhua Wang, and Lu Xinran., 2010).

Photoelectric conversion is the key part of the photoelectric detection system, this part will determine the accuracy and sensitivity of the whole detection system. And the photoelectric conversion changes optical signal carrying the characteristics of the measured signal into electrical signal, in order to use the very sophisticated modern electronic technology to amplify and process the signal. The conversion is usually accomplished by photoelectric detector, and the commonly used photoelectric detectors are photosensitive resistor, silicon photocell, photosensitive diode and the photoelectric multiplier which detects the extremely weak light signal. The amplification and filtering of the electrical signal after photoelectric conversion is accomplished by the use of integrated electronic circuits. Because the photoelectric-converted signal is generally quite weak, which must be enlarged, filtered and done with other processing to meet the needs of the display and calculation. This part also can be achieved by using different methods according to different functions, in order to achieve the best performance of the system requirements. In the system, the photoelectric signal is very weak, so the signal is processed by a differential amplifier and two stage of amplifiers. The results of many photoelectric detection systems are required to give a specific value, that is to display the results of the measured electrical signal, which have been handled well in the past several parts, directly through the display device or system. In this system, the result of the final photoelectric detection is displayed by the upper monitor (Xianjun, WANG., 2012).

4.2. Design of the Detection System

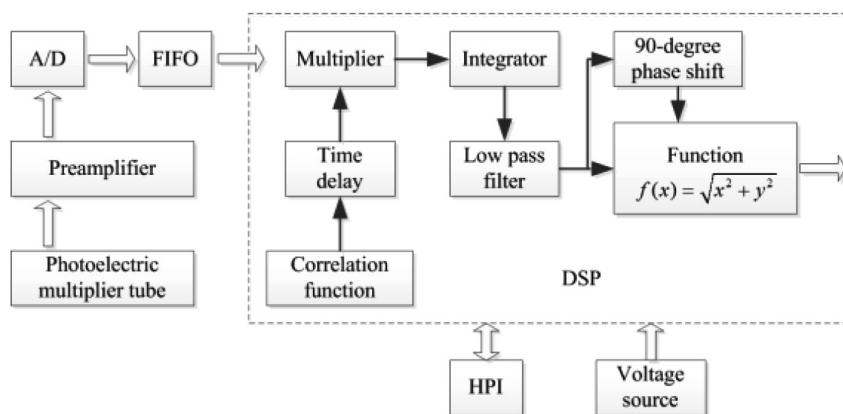


Figure 3 – Detecting System of Weak Photoelectric Signal

The detection system is composed of the photoelectric multiplier tube , A/D converter, data buffer unit FIFO (First In First Out), DSP interface circuit and the corresponding power conversion circuit, flash program saving unit and other components, as shown in Figure 3.

Based on the requirement of sampling time of actual signal, in order to meet the needs of the data-processing time and system data transmission, and taking into account of the chip price, supply cycle, application and other factors, the photoelectric multiplier

tube, DSP, FIFO in the system respectively were respectively selected as side-window type photo multiplier tube 1P28 of HAMAMATSU company, AD7870 of ANALOG DEVICE company, TMS320VC5402 of TI company, and IDT70V024 of IDT company. TMS320VC5402 is a high performance 16-bit fixed-point DSP with the operating rate of up to 100MIPS (Million Instruction Per Second). The improved Harvard architecture solved the bottleneck of the transmission channel in the high-speed data transmission in the Von-Neumann structure; The internal multi bus structure guarantees that the program space and data space can be accessed multiple times during a machine cycle; The multiple pipeline architecture of the instruction execution reduces the instruction cycle to the minimum; Multiple processing units can be performed simultaneously in one instruction cycle, this structure can satisfy some special requirements of digital signal processing, such as FIR, IIR, FFT and so on. The input signal is sampled by A/D, and the collected data is stored in FIFO, after data acquisition, the DSP reads data from the FIFO and starts the signal processing. Signal processing algorithms have been programmed to save on the external flash chip, for powering on DSP to read program to its internal RAM unit. The signal processing data is transmitted to the host by HPI interface, in order to carry out the numerical analysis (AnanthaLakshmi A V, Harish G, Kumar B B., 2015).

5. Electron Transfer of A Single-Library Mesoscopic Ring In A Periodic Magnetic Field

In the last few years, researches on time-correlation transport properties of electrons in different nano structures have attracted wide attention of researchers. The study of the correlation of electronic time is helpful to design the next generation of nano electronic devices. In the time-correlation driving process, the external oscillating driving field can affect the phases of the electron wave functions of different intervals, and generate photon assisted tunneling. Photon assisted tunneling is that the oscillatory potential ridge makes energy exchange between the energy of transmission electron and external oscillating field, and occurs the phenomenon that the electron pass through the whole potential area (Yingjuan, YAN Jun CHEN., 2004). In experiment, photon assisted tunneling phenomenon has been observed in the quantum dot, diode and semiconductor superlattice. Moreover, the photon assisted tunneling is considered to be used to design a variety of ultrafast switching devices, high-frequency radio source and high-frequency detector. Recent theoretical studies show that photon assisted tunneling can be observed in the low dimensional nano structures such as mesoscopic hybrid system, carbon nanotube and graphene. The single electron transport properties of the double ring in the magnetic flux driven are studied by Shin et al, it was found that the effect of the electron is related to the photon assisted tunneling. In this chapter, We study the transport behavior of a single-library mesoscopic metal ring driven by periodic magnetic flux, it is hoped that the new physical effect can be appeared in this special quantum topological structure. When the single ring structure is driven by the constant flux, it's found that the reflectivity of the electrode is 1 in the research, that's to say there is no current through the electrode, which shows that the magnetic flux has no effect on the electron transfer in the electrode. We consider a new situation, when driving a mesoscopic ring with periodic magnetic flux, periodic oscillating current is found on the electrode connecting base and ring. This not-zero current will also appear when the metal ring is driven by a linear time correlation flux. Buttiker et al, also studied

the quantum behavior of the ring driven by periodic magnetic flux, but they did not study the current density on the metal ring (Wang, Ligang, and Dianyuan Zhang., 2007).

6. Model and Theoretical Formula of Three-Port Graphene Nano Junction

The model structure of asymmetric three-port graphene nano junction is presented in Figure 4 (a)-(c). the central portion is attached to three and a half infinitely long ends ,which are the left end, the right port and the middle end, and the corresponding widths were expressed by N_L , N_R , and N_C , while the corresponding temperature of the three ports are T_L , T_R , and T_C . In order to build the dynamic matrix of phonons, we use a force constant model including four neighboring relationships to describe the phonon transport. In the figure, part (a) is the structure of the model, part (b) and part (c) are respectively used to illustrate the heat flow directions under the conditons of $T_L > T_R$ and $T_L < T_R$. Note that the middle port here is a temperature probe, its temperature TC is adjustable. In the region, here we use the nonequilibrium Green function to process the phonon transport. According to the non balanced Green function method, transport coefficient between every two ports can be expressed as:

$$\Lambda_{ij}(\omega) = \text{Trace}(G^r \Gamma_i G^a \Gamma_j) \quad (8)$$

where $G^{r(a)}$ is the central area of the delay Green function, $\Gamma_{i(j)}$ is the contact widening function of port i (j). According to Laudauer transport theory, the heat flow from port I to port J can be expressed as:

$$J_{ij} = \frac{1}{2\pi} \int_0^\infty \hbar \omega \Lambda_{ij} [\eta(T_i, \omega) - \eta(T_j, \omega)] d\omega \quad (9)$$

where the Einstein distribution function of the port $i(i = L, R, C)$ is:

$$\eta(T_i, \omega) = [\exp(\hbar \omega / k_B T_i) - 1]^{-1} \quad (10)$$

For convenience, we specify $T_L = T_0(1 + \Delta)$, $T_R = T_0(1 - \Delta)$, where the T_0 and Δ respectively represent the average temperature and temperature deviation. When $\Delta > 0 (T_L > T_R)$, the flow into the middle port and forward flow can be respectively expressed as $J_C = J_{LC} + J_{RC}$ and $J_+ = J_{LR} + J_{CR}$. Similarly when $\Delta < 0 (T_L < T_R)$, we can get $J_C = J_{RC} + J_{LC}$ and $J_- = J_{RL} + J_{CL}$. As the middle port is playing a temperature probe, the temperature TC can be adjusted to meet the purpose of controlling the heat flow J_+ and J_- (SHANG, Qiufeng., 2005).

7. Numerical Results and Analysis of the Model

Figure 5 reflects the influence of geometrical structure on the rectification efficiency χ . In the figure, we show the function χ and non symmetry λ . When λ increases, all the χ value increased quickly. The rectification efficiency χ is very sensitive to the structure adjustment of the middle probe, which shows an increasing relationship. In order

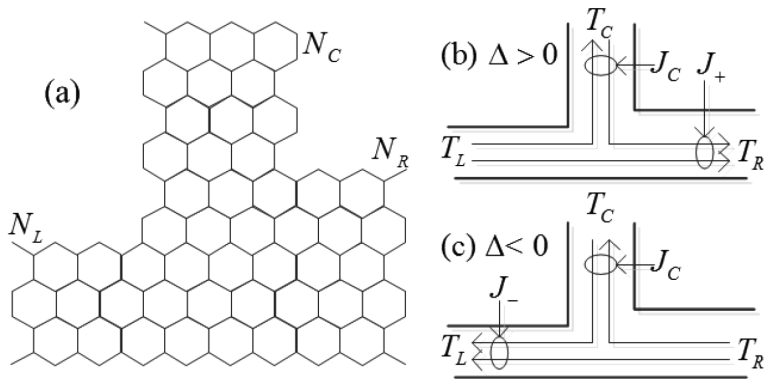


Figure 4 – Model Structure of Asymmetric Three-Port Graphene Nano Junction

to present this relationship more clearly, in the illustration of Figure 5, we show the relationship between λ and N_C . You can see when the left and right ports are fixed, the rectification efficiency χ monotonously increases from 4% to 20%. According to these results, we know that the asymmetry of the left end and the right end can improved the rectification efficiency obviously. In addition, the intermediate end not only acts as a temperature probe, but also can effectively adjust the thermal rectification behavior. These results indicate that the asymmetric three-port graphene nano junction can provide more choices for the way to control the thermal rectification (He, ZhengYou, YuMei Cai, and QingQuan Qian., 2005).

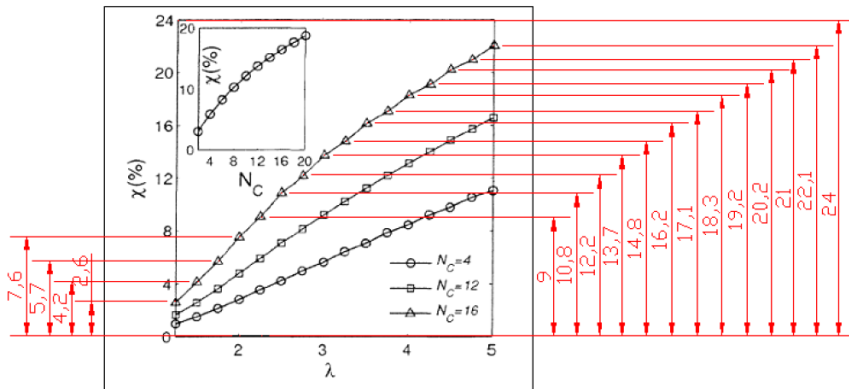


Figure 5 – The Relationship Between the Rectification Efficiency χ and asymmetry λ

8. Conclusion

This paper introduced several typical low-dimensional nano structures, including mesoscopic ring, graphene and nano optical waveguide. It studied the transmission behavior of electrons in single-loop and single-library structure, based on the theory

of one-dimensional quantum waveguide. And it's found that when the mesoscopic ring is driven by a periodic magnetic flux, there is only one current on the electrode. In this paper, a model of three-port graphene nano junction is established, and the numerical results are analyzed. The results show that the asymmetric three-port graphene nano junction can provide more options to control the thermal rectification.

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Research on E-commerce Model Based on Intelligent System Transaction

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Abstract: Objective: To establish an intelligent electronic commerce model, improve the efficiency of electronic commerce, reduce transaction costs, and realize the intelligent business process. Methods: combination with Agent technology and genetic algorithm. Process: a bilateral multi project negotiation model based on genetic algorithm is proposed, which carries out the requirement analysis and the overall design, determines the system's each module and the function to realize, and encoding realizes the whole system model based on Agent. Result& Analysis: through the combination of Agent and the specific electronic commerce system, the characteristics of Agent can be fully played, and the task of product selection and negotiation can be finished. Results: the application of Agent technology in electronic commerce has put forward the innovative research, provided more scientific basis, and has practical application value.

Keywords: Agent; Intelligent electronic commerce model

1. Introduction

In the late twentieth Century, the Internet boom and the growth of interest in E-commerce are hand in hand. In “eleven-Five” period, China's e-commerce maintained a sustained and rapid development of good posture, the total volume of transactions increased by nearly 2.5 times, in 2010 reached about 4.5 yuan. The endogenous power and innovation ability of the development of electronic commerce is becoming more and more. At present, the rapid development of global information technology, and further improve the development of e-commerce environment, with the continuous innovation of e-commerce business model, e-commerce services are gradually moving towards intelligent (Morisetti A, Tirone P, Luzzani F., 1994).

1.1. Problems of Traditional Electronic Commerce

The rapid development of electronic commerce has promoted the integration and development of the economy, and has brought more opportunities and challenges to the development of the economy. E-commerce is a kind of business model which is developing rapidly in recent years (Bloomgarden Z T, Dodis R, Viscoli C M., 2006). It takes the advantage of computer and Internet as its basic tools, and the advantages of higher

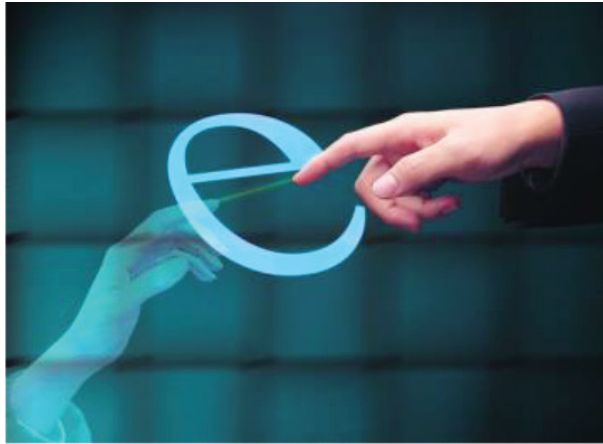


Figure 1 – Electronic Commerce

efficiency and lower cost. However, most of the current market solution for e-commerce has some limitations, which limits its further development (Broome D R, Girguis M S, Baron P W., 2007). At present, the electronic commerce solution and the application system platform are mostly based on the Web technology of the browser / Server three layer network computing model. B/S three layer structure, including the presentation layer, business logic layer and data service layer. Presentation layer contains a browser, data service layer is provided by the database service, and the business logic layer is the key to the entire e-commerce software system, as shown in figure.2 (Kluger A N, DeNisi A., 1996).

In the traditional electronic commerce mode, the background database is maintained by the commercial organization. It provides the related service for the information management in the library, and establishes its own home page through the Web server to the public (Mahmud H, Quaisar M M, Sabur A, et al., 2008). Customers first log in through the browser to find their own products, and then to provide the business of the goods, the request is received and processed by the Web server, and then transmitted

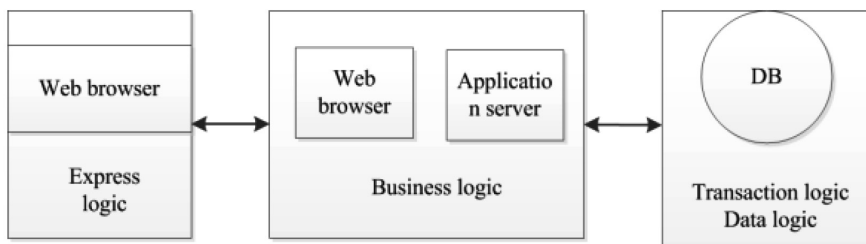


Figure 2 – Three Layer Structure of Traditional Electronic Commerce

to the background data server, which provides the user with a specific service to complete the request. Web technology as the main technology of the current e-commerce architecture, and promote the development of e-commerce. However, the technology is not perfect, whose biggest problem (Clancy R L, Tomkins W A, Muckle T J., 1975):

Firstly, the customer is interested in a wide variety of commodity information from the Internet, and then to compare, order, these operations are required to operate online, both the time and energy, but also increase the customer's time and energy, but also increase the customer's time and energy, but also to provide static services, this transaction model can only provide static services, this transaction model can only provide static services (Gasca-Hurtado, G. P., Peña, A., Gómez-Álvarez, M. C., Plascencia-Osuna, Ó. A., & Calvo-Manzano, J. A., 2015), this transaction model can only provide static services, this transaction model can only provide static services, the business model can only provide static services, such as: secondly, this transaction mode can only provide static services, this transaction mode can only provide static services, the business model can only provide static services, the business model can only provide static services, such as: Thirdly, this transaction mode can only provide services. Unable to express their views, only unconditional acceptance or rejection of the proposal of the other party is completely in a passive position, which has a great deal of difference between the actual transaction activities, traditional business activities in the wisdom of business negotiation is ignored (Cheng L, Liu J, Gu X, et al., 2014).

1.2. Introduce New Technology to Electronic Commerce

From the last century 50 's, the intelligent Agent system architecture is used as a method for the implementation of task automation in the computer. For the purpose of communicating information and coordinating production process quality and other tasks are very suitable for the use of intelligent Agent method. Because of the traditional B/S based electronic commerce technology and can not meet the needs of users, so in recent years, there has been a new e-commerce model - smart Agent (Hartono E, Holsapple C W, Kim K Y., 2014).

Intelligent Agent solves many problems in electronic commerce, one of which is automatic negotiation. Users expect e-commerce to reduce costs, but also hope to be able to get better products and the right price, and Agent technology can be a good solution to these problems, as the traditional trade. The use of Agent to replace the customer and business to carry out automatic negotiation will be the next generation of e-commerce development direction (Hsu C L, Westland J C, Chiang C H., 2015).

2. Negotiation Model

Consultation has been widely discussed by scholars in many fields, including machine learning, blog, social sciences, economics, negotiation support systems, psychology, and other fields. In many different fields, people need to be consulted, such as international disputes, meeting arrangement, legal issues, purchasing products, product planning, family affairs and so on (Xu L, Peng J., 2015).

Consultation is a general term for the problem of common concern among multiple Agent. The negotiation of the two parties is a complex process, which involves many subjects such as psychology, sociology, economics, applied mathematics, computer science and so on. In this chapter, we focus on the negotiation problem in the electronic commerce environment, and design a bilateral multi issue negotiation model based on genetic algorithm (M. Yasin M, Alavi J, Czuchry A., 2014).

2.1. Negotiation Model Based on Genetic Algorithm

Whether the negotiation of electronic commerce can reach agreement, determines the success or failure of the whole business activities. A good negotiation model should meet the following requirements:

1. the issue of negotiation can be effectively and comprehensively described;
2. the human factor in negotiation can be described;
3. the calculation resource required by the negotiation process is limited.

Based on the above requirements, this paper designs a bilateral multi issue negotiation model based on genetic algorithm.

Since Agent can sense the surrounding specific environment, and thus represents the user to complete a series of goals, this paper makes the following basic assumptions in the negotiation model:

1. Agent is selfish, that is, it only seeks the best interests of the party;
2. the Agent has an incomplete, that is, it does not know the other side's preferences and other information;
3. Agent only has limited rationality, and the strategy adopted is to be beneficial to the optimal strategy of the party;
4. there is no deceit in the negotiation, that is, both parties have a good agreement;
5. time is valuable for both parties to negotiate;
6. negotiation failure is the worst result for both parties.

The negotiation model in this paper is defined as follows formula (1) (Overby E, Forman C., 2014).

$$Model = \langle Ag, Q, X, W, U, T, A \rangle \quad (1)$$

Ag: Agent collection for participation in the negotiation, $Ag_i \in Ag$, Here we assume Where Agb said the customer consultation Ags, Agent said the business negotiation Agent.

Q: the negotiation project set $Q = [Q_1, ..., Q_j, ..., Q_J]$, which is the first j consultation project (the NO.J gene), the number of projects $J > 2$. In this article, the project set is the commodity price, delivery time and quality assurance time.

X: the value of the negotiated project, $X = [x_1, ..., x_j, ..., x_J]$, where X_j is expressed in the Agent of the proposed attribute Qj, in which each proposal must be within a given range $x_j \in [x_j^{\min}, x_j^{\max}]$, which is the expected range of the negotiated agent.

W: the weight of the project, $W = [W_1, \dots, W_j, \dots, W_J]$, which means that the weight of the Q_j to Ag_j , this value and the user specified.

V: evaluation function, the evaluation of a value of the Agent to a certain value of the consultation project. The evaluation function can be either linear or nonlinear. For simplicity, the monotone linear function is selected as the evaluation function. The trial to function as shown in a formula 2 (Wang L, Yang J, Yin S., 2015).

$$V(x_j) = \frac{x_j^{\max} - x_j}{x_j^{\max} - x_j^{\min}} \quad (2)$$

Monotone increasing function, as shown in formula (3).

$$V(x_j) = \frac{x_j - x_j^{\min}}{x_j^{\max} - x_j^{\min}} \quad (3)$$

In the course of negotiation, the business and customer Agent according to their own interests of different projects tend to select the appropriate evaluation function for each project, according to the same topic, the evaluation function of the two sides chose the opposite.

U: utility function, which means that the user Agent to a consultation project set value evaluation, the calculation method of the formula (4) is shown.

$$U(x_j) = \sum_{j=1}^J W_j V(x_j) \quad (4)$$

T: time period for consultation.

The action set A; $A = \{\text{call, request, propose, agree, reject}\}$. In which, call said the issue of the request for consultations; request said the response to the request of the agreement; propose said the issue of the proposal; agree said the agreement is proposed; reject said it refused to propose (Itti L, Koch C, Niebur E., 1998).

2.2. Negotiation Process Description

In the negotiation model, Agent plays two roles: customers and merchants. After the merchant receives the customer's proposal, according to the commodity information which they defined, check the attribute and the attribute restraint, the formation of the proposal, feedback to the user. The process of customer consultation is similar (Posada D, Buckley T R., 2004). In view of the above proposed negotiation model, the negotiation process of multi Agent is summarized, and the negotiation process is shown in Figure 3.

In the consultation, there are two kinds of Agent: negotiation Agent and negotiation to accept Agent, T is the negotiation period, the negotiation process is as follows:

1. the Agent of the parties to the negotiation;
2. Agent Agent to the other party to issue a CFP message, that is, at this time to set up the negotiation time t_0 ;
3. if the Agent receives a rejection message or exceeds the time limit for the negotiation, the negotiation shall be turned (8); otherwise, the request shall be

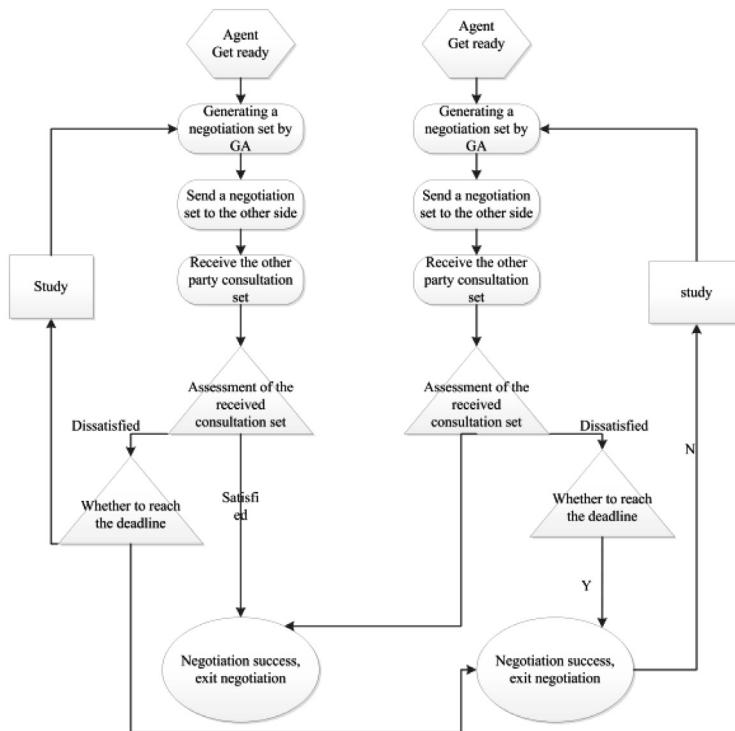


Figure 3 – Negotiation Flow Chart

negotiated.

4. the two sides generate the initial consultation population and send them to each other, ready to negotiate;
5. if one party agrees with the other party in the I round of negotiations, the agree message is sent to the other party. If the agreement is reached, the reject message is transmitted (8). If the agreement is not agreed, the propose message is transmitted (6).
6. the Agent receives the propose message to make a decision on whether to make a decision on the next round of negotiations, if at this time $t < T$, reduce the minimum utility value, turn (5), otherwise (8);
7. the success of the negotiation, the agreement, the end of the consultation;
8. negotiation fails, the algorithm ends.

3. Electronic Commerce System Based on Agent

3.1. Intelligent Electronic Commerce Process

In the electronic commerce activities of enterprises, a large number of business operations are performed by two or more than two employees. The related activities and

activities of the enterprises constitute the electronic commerce business process according to certain rules.

3.1.1. Customer Purchasing Business Process

According to the research, the customer purchase process can generally be divided into 8 steps: step 1, customer demand definition; step 2, commodity search; step 3, suppliers and customers to choose from each other; step 4, business negotiation; step 5, the signing of the contract; step 6, payment; step 7, delivery; step 8, the transaction evaluation. Customer purchasing business process is shown in fig.4:

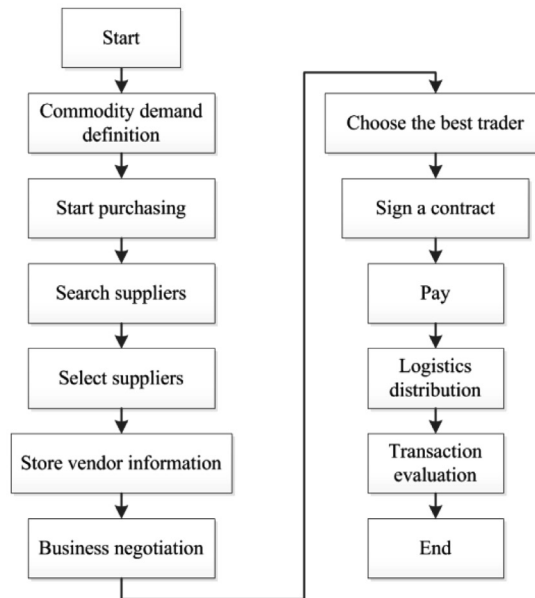


Figure 4 – Customer Purchasing Business Process

The whole business process is divided into the following five main stages:

1. commodity search stage. Customer defined commodity demand, search Agent derived a number of search sub Agent autonomous Search related commodity information on the network, the information service provider in the system Agent to provide product information for the search Agent, search the sub Agent to return the information to the search Agent, search Agent through information filtering, re organize feedback to customers.
2. The procurement phase. The purchase of Agent based on the search Agent to send back the message, one by one to visit the supplier website

The information service Agent, and issue the purchase request “the supplier according to the purchase request and own inventory situation, production

capacity to decide whether to accept the purchase Agent of the request task or accept the task which part. Purchasing Agent will accept the supplier list of the purchase request to the customer information service Agent, in the customer and supplier for mutual authentication, customer negotiation Agent derived a number of sub Agent and supplier negotiation Agent.

3. negotiation stage. The customer Agent is able to negotiate and eventually agree on the properties of the product. In the electronic market based on Agent, the



Figure 5 – Electronic Commerce Purchase

dynamic pricing of commodity trading and the automatic bid of intelligent. In this way, the negotiation ability of Agent is very important. In the actual process of artificial negotiation, the parties or multi parties for a certain commodity to negotiate and eventually determine the price and other attributes; and in the electronic market automation negotiations, Agent also completed in general similar work and try to get the best interests. In the process of the negotiation, the negotiation sub Agent, according to the respective negotiation strategy and other private information, in accordance with the agreement of a certain bargaining agreement, until a consensus or consultation. Within the specified time, the Agent will return to the Agent to negotiate the outcome of the Agent, and then the Agent will choose the best trader, and then sign the contract by the two parties;

4. payment and delivery. Customers pay Agent to carry the digital signature of customer information, order information and payment information and suppliers to pay Agent, third party payment Agent interaction, follow the security transaction protocol, complete the identity confirmation and ordering information confirmation, customer electronic bank payment Agent and third party payment Agent interaction, transfer funds to third parties. Businesses receive delivery information from the third party after the notification, the logistics company, the logistics company products to customers. Upon receipt of the product, the customer pays Agent and the third party to pay Agent to confirm receipt of the product, the third party payment Agent and the supplier of electronic banking payment Agent interaction, the transfer of funds to the supplier.

5. evaluation stage. Customer evaluation of Agent for supplier information storage and evaluation, as the basis for the future transaction knowledge. Vendor Agent stores the knowledge acquired in the transaction as a basis for providing personalized service, after sales service and advertising services. Third party Agent system to save the customer and supplier of the transaction results, and evaluate the two sides of the credit, as the evidence of future disputes.

3.1.2. Supplier sales process

In addition to providing products to customers outside the site, it should also take the initiative to publish product information and customer demand for products, the product sold out. Supplier sales process and customer purchase business process is generally similar, but the first few steps are different, the customer is the definition of commodity demand and commodity search, and the supplier is the product information release and seek customers. The entire sales process including product marketing, negotiation, payment, delivery and evaluation of five stages. Supplier sales business process(Fig.6).

In the product marketing stage, the supplier organization product information, in the vendor website, and send ad Agent on the web, search Agent, advertising Agent will find the customer ordering information feedback to the supplier system, after confirmation to enter the next phase. Active marketing process was shown in fig.7.

3.2. Business Process Automation Technology

According to the introduction of e-commerce transaction process, it is not difficult to see a successful business process including the search, negotiation, contract signing, payment and delivery, after-sales service and evaluation of a series of processes, such as customers, suppliers, banks, third party logistics and other trade entities to complete their transactions and common cooperation. Intelligent electronic commerce is the use of distributed computing technology and modern artificial intelligence methods to achieve business information processing automation and intelligence, which is how to achieve business process automation, is a big problem of intelligent electronic commerce. And workflow technology is the best solution to solve this problem. Workflow technology is one of the core technologies for realizing enterprise business process modeling, business process management and integration. It is one of the most rapidly developing new technologies in the field of computer application.

In Fig.8, the process definition tool provides a means for the user to analyze and model the actual business process, and generates a formal description of the business process that can be processed by the computer. Workflow execution service is composed of one or more workflow engines, which is the core of the workflow, and is responsible for creating, managing and executing workflow instances. Access to a variety of workflow application programming interface (WAPI). The workflow engine provides the runtime environment for the workflow instance, explains the process definition, controls the running of the workflow instance, dispatch the role, and maintains the workflow control data. The application of the call is a collection of functions, each application may be responsible for the execution of a certain sub process of the workflow or the completion of a certain task. Workflow client applications access to the job list

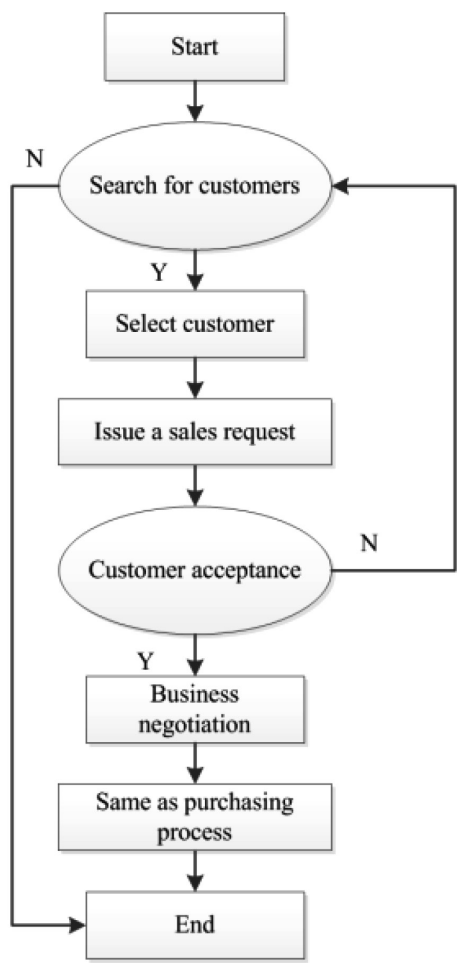


Figure 6 – Supplier Sales Process

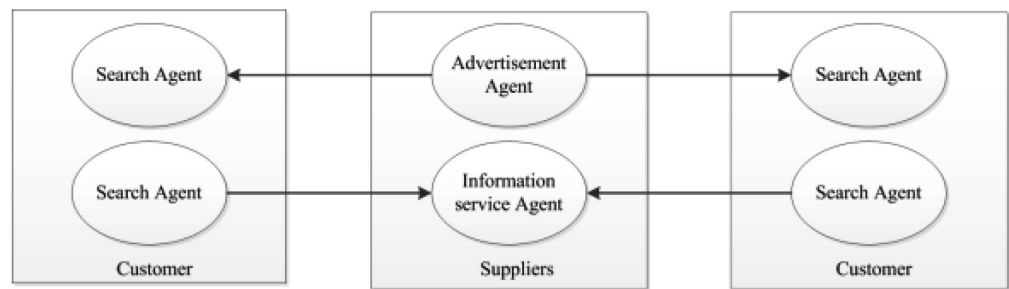


Figure 7 – Supplier Active Marketing

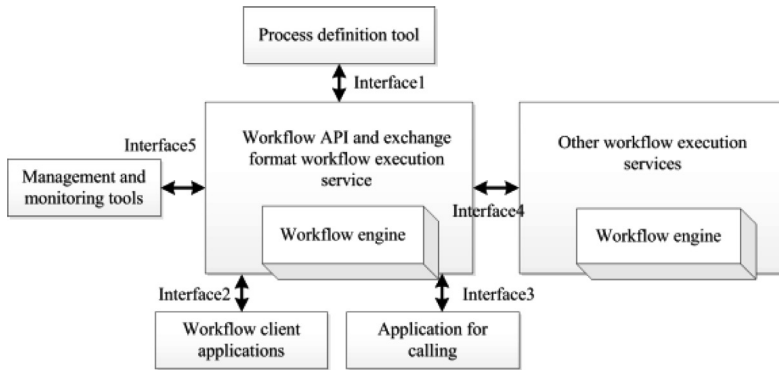


Figure 8 – Workflow Reference Model

library through job listings. Workflow engine can assign tasks to job listings, which are accessed by the user, and can be assigned directly to the user through the access interface. Management and monitoring tools, its function is to monitor and manage the status of WfMS process instance, such as user management, role management, audit management, etc., from the workflow execution process to capture and record a variety of information, such as workflow instance information, event information, job information and remote information.

In E-commerce activities, workflow system exists in every stage, and the whole process of the transaction (from customers' search for goods, buyers and sellers, payment and delivery, evaluation, etc.) is a large working process. All of these processes can be realized by workflow technology.

In the intelligent electronic commerce system, the customer requests to the customer Multi-Agent system. After the task decomposition, the workflow management Agent generates a number of sub workflows, the customer and the supplier system's Agent to complete the sub workflow task. Agent complete control and implementation of the workflow tasks to achieve business goals.

Intelligent electronic commerce system has the characteristics of standard business process, flexible user defined process, enterprise dynamic cooperation and the interface mode of Web/Brower. The intelligence of the intelligent electronic commerce system not only shows the intelligent features of human intelligence, autonomy and learning ability of Agent itself, but also the application of artificial intelligence method in the process of business processing, such as the use of artificial neural network to predict, data mining and search Agent and negotiation Agent. The intelligent electronic commerce system is developing towards the user's autonomy, dynamic collaboration and automation direction.

4. System Structure Model Design

According to the concept of electronic commerce, this paper applies Agent technology to the field of electronic commerce, and puts forward a FI based intelligent electronic commerce model which follows Agent to regulate the open and interoperable. Intelligent

electronic commerce system is a complex system, it is not only a technical problem, but also related to people. All business of intelligent electronic commerce by Agent agent, Agent use of network resources to complete the assigned task. Business entities use the technology means to carry out business, trade and other business activities, and realize the business process intelligence.

In the model, the customers for the multi-agent system CMAS and supplier multi agent system Pian atherosclerosis to participate in business activities of the customers and suppliers to provide intelligent agent service, complete the commodity search! Consultation and payment transactions, so as to alleviate and even solve at present the explosive growth of the Internet business information and network environment of increasingly complex caused by contradictions. Fig.9 shows the structure model of the five layer of the intelligent electronic commerce system.

In Fig.9, the bottom layer is the technical basis and social environment, such as hardware and software basis, law, electronic banking, logistics, etc.. The second layer is the database layer, the user information database for user authentication, a record of the user's real information; the product supply database to save the product information and the Agent according to the product information, and according to certain classification principle to save the product information, and according to certain classification principle were stored, to consult the historical database used to record the information of the Agent for the transaction Agent. The contents of the product supply database and the product demand database are determined by the concept and the instance of the knowledge base. The third layer is the Agent platform, which provides control functions such as, Aglet, JADE, Agent, etc., such as Java, Voyager, Agent and so on. The fourth layer

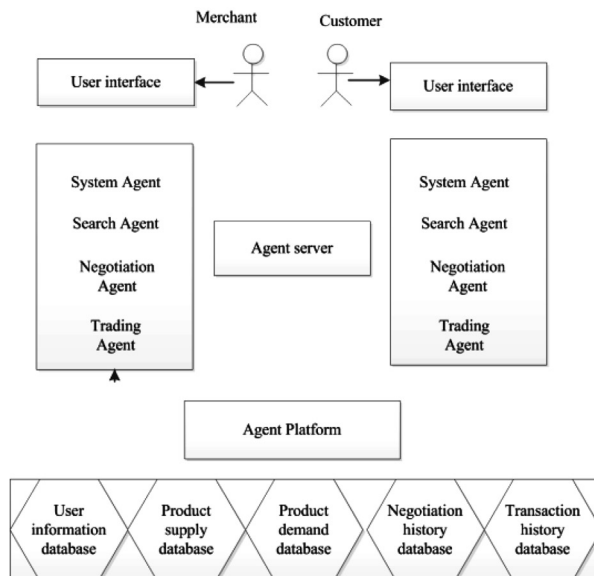


Figure 9 – System Architecture Model of Intelligent Electronic Commerce

is the Agent entity layer, including customer, supplier and third party Agent system as well as knowledge ontology library, MMAS and CMAS to provide management services and resource services, customers and suppliers are responsible for the maintenance of their respective MAS. In CMAS and MMAS, the system provides the management of workflow management services, management search Agent, negotiation Agent and Agent, etc.. Search Agent search product supply database and product demand database, provide product search service, and determine the negotiation opponent, etc., negotiate Agent to provide consultation services, and will negotiate the results entered into the negotiation history database, the transaction Agent to complete the contract and other follow-up work. And transaction history into the transaction history database. TTAS is a Agent server, for customers and suppliers to provide registration, arbitration and security and other intermediary services, such as Agent for customers and suppliers Agent authentication, TTAS can be certified by the. At the top level, the user interface is described and defined by the user interface.

Customers and suppliers interact with the system through the top of the man-machine interface. Before the transaction, in order to ensure the security of the transaction, customers and suppliers must be certified Agent authentication. After the identity authentication, the supplier can release the commodity information, the system will be the commodity information into the product supply database, customers can search Agent in the product supply database to find information. The customer also can submit customer demand information, the demand information will be stored in the product demand database, the supplier can search Agent to find customer demand information, and then to the right customers to sell their products according to customers and suppliers to distribute search Agent, search Agent database search for the system, if found a suitable agreement, the system Agent Agent. Negotiation Agent for a specific task to adopt a win-win mechanism for consultation, according to the results of the consultation to choose the best traders, according to the dynamic supply relationship, if the negotiation is broken, the agreement is concluded. After the success of the consultation, the transaction related data into the historical database, to provide a reference for future consultation.

5. Conclusion

In view of the traditional electronic commerce implementation technology can not adapt to the current situation of Internet on the expansion of information, and in order to make e-commerce better adapted to the network environment diversity and polymorphism, an intelligent e-commerce architecture was designed based on Agent. Agent technology was applied in many aspects of business activities. Furthermore, in the actual business activities, negotiation is one of the most important part. If automatic negotiation could be realised, the automation level of e-commerce system will be greatly improved. Through the research on the electronic commerce model, the research resulted enrich the content of Agent technology and e-commerce theory, and the innovative research on the application of Agent technology in electronic commerce was put forward. It provides more scientific basis and has practical application value for e-commerce.

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Implementation of Key Technology of Digital Forensics Based on Cloud Computing

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Abstract: Objective: With the advent of the information age, the network and information security problems are becoming more and more serious. The research purpose of this paper is to study the way of digital forensics based on cloud computing, and then solve the problem of criminal evidence through the digital information technology.. Model: In this paper, t we use the support vector machine SVM as the flow classification and introduce the kernel function for digital forensics. Process: By using the support vector machine SVM and the high dimension kernel function to carry out the distributed SVM calculation, and the calculation results of each data will correspond to each MAP task. Conclusion: SVM algorithm combined with the model and cloud computing technology in the face of massive data has a huge advantage. The combination of cloud computing and digital forensics has found a new solution for the problems that need to be solved.

Keywords: Digital forensics; SVM; Kernel function; Cloud computing

1. Introduction

With the advent of the information age, the popularity of the Internet, people's life has been linked with the computer network closely. When people began to skilled use all types of electrical equipment in a high efficiency returns a variety of problems will ensue. The most users concerned about the problem is undoubtedly the network and information security issues. To this end, the national Internet Emergency Center (Martini B, Choo K K R., 2012) released a CNCERT Internet security threat report. In the report pointed out that, as of July 2013, China's current level of security is moderate, the territory of infected with the virus in the terminal has about 2450000, the number of sites has been tampered with 8244, while the national information security vulnerabilities in the platform to collect 714 security vulnerabilities, which has 647 vulnerabilities can be used to implement remote attacks. These data clearly illustrate the importance of network security issues and the significance of this research. However, the study of the prevention of the invasion of the practice and cannot solve the security problems at present, for the occurrence of attacks, has been caused by the loss, more need for legal means to control

and deal with the source of responsibility. Therefore, digital forensics, this emerging and the law related to the cross discipline, has become a hot research in recent years.

Digital evidence (Ma H, Shen G, Chen M., 2015) can be found in many of the information to find the potential evidence, the entire acquisition of evidence in the legalization, standardization, and standardization of conditions to complete. The ultimate goal is to restore the crime scene as much as possible, to find out the causes of the case, and to ensure the security of the computer host and the network environment. At the same time, it is also called “computer forensic science” for the study of the prototype and the foundation of the crime that might happen in the future “ (Duhamel F, Gutiérrez-Martínez I, Picazo-Vela S., 2012). However, the difficulties faced by digital forensics is also a lot of: In the work of digital forensics, how to protect the integrity of the scene, how to obtain evidence, how to reconstruct the evidence chain, how to determine the correct attack, how to avoid the interference of privacy data, are the difficult issues and hot issues. At present, the target of digital evidence collection is not only to analyze the case after the event, but to retain the electronic evidence in the event at the same time, the various types of security incidents can play a role in early warning. This kind of vision promotes the emergence of dynamic evidence collection, and also promotes the integration of digital forensics and traditional intrusion detection technology. The idea of digital forensics (Wong S, Amaro R E, McCammon J A., 2009) is becoming a new target for researchers, which can be integrated into the early warning, field evidence collection, evidence collection, evidence analysis and future attacks.

2. Research Status of Key Technologies of Digital Forensics

Along with the development of digital forensic technology, the research is becoming more and more in-depth, and the technology of evidence collection is more professional and efficient. Foreign institutions of higher learning and research institutions have also invested more technology to develop this talent, At the same time, there are more companies to invest in the research and development of forensic tools, which allows digital forensics walking into the era of rapid development. With the DFRW meeting held, there are more and more people to participate in the research work of digital forensics, DFRW held a memory challenge, but also once let the memory of the research heat reached a peak. On the historical development of digital evidence collection and the future research status, the paper has a good summary in the Garfunkel: the early forensic work involves a variety of file formats (Foyer C H, Noctor G., 2005). Therefore, the work will be highly dependent on sharing time and centralized computing, due to the lack of standardized process, standardized tools and unified training, At the same time, due to the arrival of the golden age of evidence collection, so it has made a series of good research results. However, with the increasing complexity of network environment, the growing popularity of intelligent terminals, the growth of a wide variety of applications, new types of attacks, digital forensics is also facing the generation of various new problems.

Domestic digital forensic research, although it has a late start, but also in a short period of time to get a lot of obvious results. A number of computer forensic laboratories in the country began to build, and Beijing has set up the first specialized electronic data

forensic center (Runa, A. I. D. N. F., & Miranda, G. L., 2015), the current identification center has issued a court recognized the ability of electronic data forensic report. At the same time, a lot of theme meeting also came into being: China Computer Forensics Technology Summit (Evans A G, Zok F W, Davis J., 1991) held in 2005, which has been successfully held nine sessions, as a technology for the computer technology summit, it provides a good information exchange platform, many domestic and foreign experts and scholars were attracted to explore the hot technology; China Computer Forensics Technology Seminar and held in 2008, has been held for the three, and for the apple system forensics technology seminar has become one of the conference. At the same time, the domestic research and development of forensic products is gradually increasing, digital evidence has become a new kind of security service work, in the market also achieved a better response. At present, digital forensic services have become one of the most entrepreneurial success potential of the Internet industry in 2013 “. There is a typical representative of Chongqing Jun Shield Technology Co., Ltd., Boke Technology Co., Ltd., Shanghai rock Digital Information Technology Co., Ltd.,. Among them, Boke (Xiao M, Nembhard D A., 2014) as the leader, who was involved in the formulated the “electronic data storage media copy tool requirements and test methods”, “electronic data storage media write protection equipment requirements and test methods” (Ruan K, Carthy J, Kechadi T., 2013), the digital equipment evidence data found extraction fixed method “and other industry standards. At the same time, it also reflects the rapid development of China’s forensic industry. With the development of cloud computing and big data technology, the combination of traditional issues and new technologies is a new direction of China’s forensic research.

3. Design and Implementation of Digital Forensic Analysis Model of Network Traffic Based on Cloud

3.1. Realization of Traffic Acquisition Layer

Network traffic is one of the most important topics in the research of network architecture.. Measurement of network traffic can not only help people to understand the characteristics of the Internet, but also allow people to effectively understand the operation process of WAN and LAN. Some of the analysis of user behavior, network security incident analysis, intrusion detection system, the evidence of network forensics and he has a close contact. At the same time, traffic monitoring and statistical analysis is the basis of network security. For network traffic management, there are many ways to achieve the monitoring and traffic flow analysis function. Network traffic analysis is mainly used to solve the problem of network bandwidth, a lot of network traffic analysis of the hardware device is used as a bandwidth manager.

3.2. Flow Analysis Layer Design

Support vector machine is a kind of machine learning method, which is compatible with the advantages of statistical learning method, and it is a kind of excellent classification problem solving method. It was born on the AT& BC (Marston S, Li Z, Bandyopadhyay S., 2011), and the pattern recognition method based on statistical learning theory. Support vector machine classification is a learning process, he learned a function or a certain

type, in the future to carry out the work of the classification, can accurately predict the unknown type.

In the traffic analysis layer, support vector machine SVM is used as the main method of traffic classification. The network traffic can be divided into two categories: normal flow and abnormal flow. For support vector machines, this is a typical classification problem. Therefore, the most important work in the traffic analysis layer is to train the model with more accurate support vector machine. This layer uses the improved distributed SVM algorithm MRFSVM (Grispos G, Storer T, Glisson W B., 2013) to carry out the model training and the training process and algorithm of the model is introduced.

The basic idea of the support vector machine is to map the vector into a high dimensional space, so that the interior of the low dimensional space can be changed into a linear separable problem. At the same time, in order to avoid the problem of dimension explosion in this process, support vector machine is introduced into the kernel function, which can be calculated in the low dimensional space.

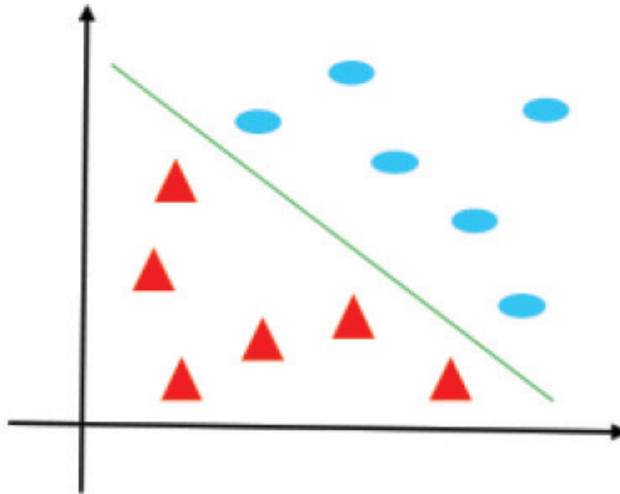


Figure 1 – Schematic Diagram of Linear Classification Problem

Assuming a linear classification problem is as follows Figure 1.

In Figure 1, the points of the triangle and the circular points are divided into two different categories, the real color line is divided into two parts, which can be considered as a feasible hyper plane in this classification problem. Then the classification function can be expressed as:

$$f(x) = \omega^T + b \quad (1)$$

Under the usual conditions, for $f(x) < 0$, y corresponding to -1 , for $f(x) > 0$ points, corresponding to $y = 1$, which is divided into two categories: positive and negative. In

the time of classification, the need to bring $f(x)$ into the x in the calculation of the value of the positive and negative, when the -1 is less than zero, 1 classes are more than zero. Specially, when $f(x)=0$, it does not belong to any category. By this formula, when the value of b and ω is determined, the classification function is defined, which need to start with the maximum interval of the search boundary.

From the graph, we can know that when a point is far from the plane, the higher the degree of confidence that the point is correctly classified. In other words, when the distance between this point and the super plane is close, the probability of the error is higher, so it is very important to point to the geometry of the super plane.

From Figure 2, we can calculate the classification function.

$$\gamma = \frac{\omega^x + b}{\|\omega\|} \quad (2)$$

$$\gamma = \frac{\omega^x + b}{\|\omega\|}$$

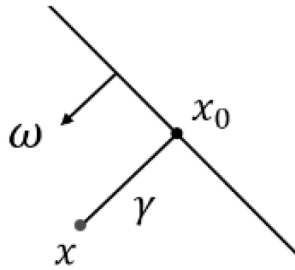


Figure 2 – Geometric Interval Diagram

Among them, $\|\omega\|$ is the two order norm of ω , the function interval is not used here because the value of the function interval can be enlarged and reduced with the change of the value of ω and b , and the change is not changed at this time. In the support vector, the geometric interval α can be represented by the product of γ and y :

$$\alpha = \gamma \cdot y \quad (y = 1 \text{ or } -1) \quad (3)$$

Moreover, the geometry of the α only changes with the change of the super plane, which is suitable for the study of the maximum of the interval. The objective function of maximizing the distance classifier is usually defined as:

$$\max \alpha, \text{ subject to } y_i (\omega^T x_i + b) \geq \alpha, i = 1, \dots, n \quad (4)$$

When the geometric distance reaches the maximum, it can get the optimal classification of the final decision. This is why in the support vector machine theory, the geometric interval maximization is a very important problem (Berglund A, Blackne J, Jansson N., 2014), because in this condition the classifier can get better generalization ability and prediction accuracy.

In order to deal with the problem of nonlinear separable problems, the concept of symmetric function one kernel with full Mercer is introduced. Kernel function in support vector machine in the feasibility, is due to appear in pairs of training examples, using kernel function (Dykstra J, Sherman A T., 2013) to replace the inner product can non-linear mapping of the data into high dimensional space.

The kernel function used in support vector machine is:

Linear kernel function:

$$K(x_i, x_j) = x_i \times x_j \quad (5)$$

Polynomial kernel function

$$K(x_i, x_j) = [(x_i, x_j) + 1]^d, d > 0 \quad (6)$$

Radial basis kernel function:

$$K(x_i, x_j) = \exp \left\{ -\frac{|x_i - x_j|^2}{\delta^2} \right\} \quad (7)$$

Sigmoid Kernel function

$$K(x_i, x_j) = \tanh(b(x_i, x_j) + c) \quad (8)$$

In the choice of kernel function, can refer to the data and a lot of experience to make a choice, in some scholars to research of kernel function that radial basis function better learning ability. But the sigmoid function in small sample, high dimensional data in the performance is slightly worse. But once you cannot find the best classification plane, using slack variables to control whether to allow a wrongly classified samples, the degree of error is how much and penalty factor, with a penalty factor to decide a point is a noise or a useful point.

Support vector machine has a good theoretical basis, it does not need too large scale samples to get a good training effect, the theory itself does not involve a large number of theorems and probability measures; At the same time, the complexity of the low dimensional space to high dimensional space map is solved by the complexity of the support vector machine and the number of support vector machines. This guarantees the stability of the support vector machine method, the change of the sample points of the non-support vector and the traditional methods such as neural network, Naive Bayesian and other classical methods, SVM is better, and his easy training is better than

the traditional method. For machine learning methods, it is very important to solve the problem that the problem can be solved. Because the real world is more complex than the experiment, it is just the support vector machines, such as text classification and image annotation. And for SVM, for SVM, the attribute value of the problem is not the upper limit, which is the traditional neural network method can not match.

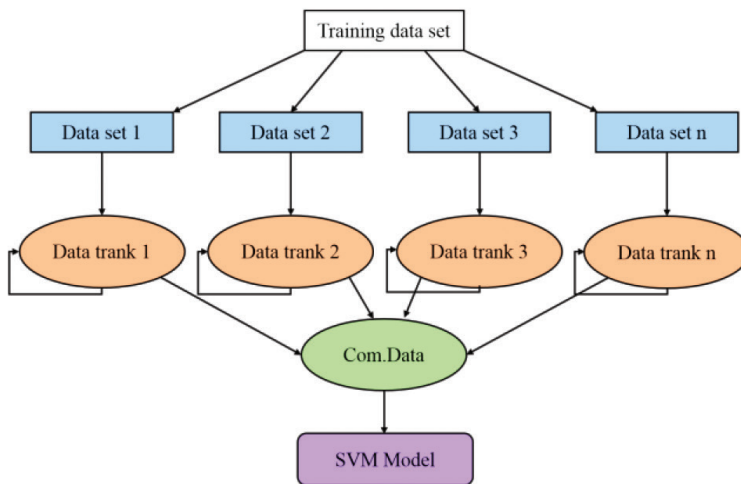


Figure 3 – Gistributed Algorithm Structure Diagram

3.3. Distributed SVM Algorithm

At present, a lot of people are trying to give the idea of distributed SVM algorithm and the basic structure of Hadoop (Yao Y., 2015), which uses MapReduce's structure to implement the distributed SVM algorithm with Khalid Altham, he proposed MRSVM. In MRSVM, we use a multi-layer cascade structure, so that the sample points of the non-support vector are deleted in the training process to achieve the global optimum, and the sample set is divided into a number of samples as the Map task to complete. This process is terminated when a set of support vectors is set, and if there is no convergence condition, we must run the process, and the process is repeated until the global optimum is reached. The main structure is as follows figure 3.

From this schema, the training set is shown in the graph. Chunk ATA, which is a small piece of data, each piece of data into a map task, the number of tasks and the number of points. The output of each map function is a local a vector. Alpha uses the data set of the image annotation in the article, and uses the Hadoop platform of a three node to carry on the experiment, the training time is shortened, and the performance of the system is greatly improved.

4. Experiment and Result Analysis

The hardware and software environment of the Hadoop based distributed forensic platform is set up, and the details of the system are realized. The results are compared with the single machine training.

4.1. Platform Hardware Design

This experiment uses four machines, built into a cluster of small local area network router, the machine configuration are 2.5 Intel Core i5 4GB processor, GHz memory, 2006 hard drive, the installation system for CentOS 6.4, Hadoop using the latest version of Hadoop 2.2. The task allocation of each node is shown in Table 1.

IP Address	Clustering Task
192.168.11.100	Act name node; secondary name node and Resource Manager as the role
192.168.11.101	Act data node and node manager as the role
192.168.11.102	Act data node and node manager as the role
192.168.11.103	Act data node and node manager as the role

Table 1 – Node Task Allocation

In the deployment of a good platform, as shown in figure, 100 acts as the HDFS and MapReduce management, it with 101, 102, three 103 data node process communication, consisting of HDFS file system. At the same time, 100 on the Resource Manager and other three machine node manager yarn platform, client submitted to the yarn application, Resource Manager will establish a Reduce Application Master Map (APP Master Node manager), APP Master MR will apply for the Manager Resource MR, and the corresponding node manager communications, MapReduce tasks.

In the experiment, the most important is to implement the MapReduce process. The task of SVM is to carry out Mapper training for the data subset, and remove the non-boundary samples. The task of Reducer is to judge the data set after processing.

4.2.Experimental Results

Experiments are carried out on a good experimental platform. The results are compared with the single machine running SVM training. The number of training data set is 10000, 2000030000 and 20000 respectively. Experimental data are shown in table 2:

As shown in the figure 4, with the increase of the number of training data, the experimental platform training time of growth is far less than the growth rate of SVM. However, due to the dispersion of training data, the accuracy of the experimental platform is slightly lower than the single SVM, but the difference is not large. How to maintain the accuracy of the training efficiency is the next research direction.

Article Data Number	10000	20000	30000	40000
Experiment Platform Time-Consuming	9s	15s	22s	39s
Single SUM Time Consuming	14s	44s	99s	176s
Platform Accuracy	79.6%	81.1%	82.5%	84.6%
Single Machine Accuracy	83.2%	83.5%	85.4%	87.3%

Table 2 – Experimental Results

5. Conclusion

The development of the Cloud computing, mobile Internet, big data, networking and other technologies has brought unprecedented challenges to the digital forensics, which includes the aspects of technology, laws, regulations and standards etc. In order to cope

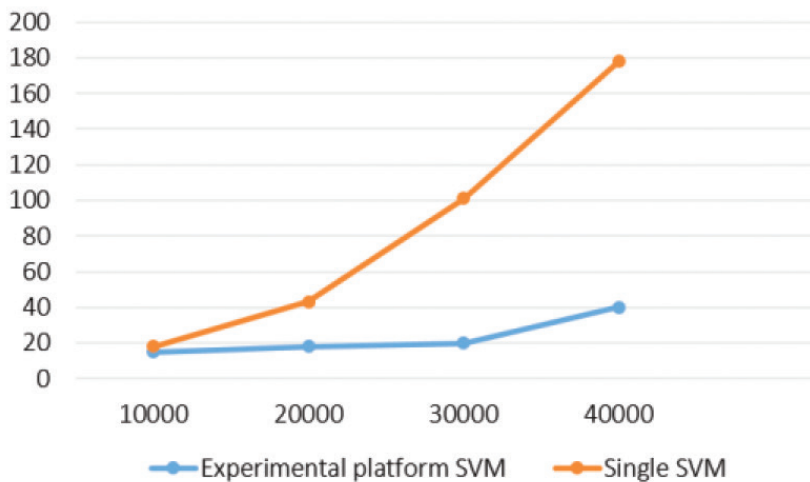


Figure 4 – Time Comparison of Experiment

with these challenges, so it requires the relevant judicial institutions, forensic appraisal institutions, technology research institute and product manufacturers to cooperate with each other, then creating our own perfect digital forensics system, and providing effective support for the protection of Cyberspace Security and the fight against cyber-crime.

In this paper, the cloud computing technology is introduced into the realization of the network traffic model. At the same time, it improves the distributed SVM algorithm, which is a good combination of the model and the cloud computing technology. As a new technology, cloud computing has the ability to solve the bottleneck of problems, at

the same time, it is conducive to the popularity of computers and the reduction of prices. We all know that digital forensics is an applied subject, and its research has always been closely around the needs of forensic work, therefore, we need to concern the following three basic tasks: good performance, high accuracy and stability, and the combination of cloud computing and digital forensics has found a new solution for the problems that need to be solved.

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Research on Electronic Data Tracing Method Based on Trusted Forensics

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Abstract: Objective: In order to strengthen the prevention and combating of network information crime. Method: Using the data traceability technology based on the trusted electronic forensics. Process: This paper introduced the application background and the importance of the role of electronic data forensics, elaborated the theoretical basis of the trusted forensic, studied the tracing technology of electronic data, displayed the data forensics technology and its workflow, and established the corresponding mathematical model. Result & Analysis: This paper studied the electronic data tracing system based on trusted forensics technology, analyzed the corresponding data of the system, and proofed out that the system can effectively carry on the trusted forensics to electronic data. Result: The electronic data tracing system in this paper can effectively carry on the recovery and tracing to electronic data, and promotes the social harmonious development.

Keywords: Electronic data; Tracing technology; Trusted forensics; Mathematical model

1. Introduction

With the continuous development of the information age, computer, mobile phone, internet and other intelligent information equipment have quickly integrated into people's daily life. A lot of economic and financial activities are carried on through the internet, and use the server to management background data, but crime cases based on these techniques have been common for a long time. The combination of various traditional crimes and cyber crimes such as internet fraud, network theft, cyber -attacks and so on, which infract other people's property, has rapidly increased (Li B, Wang Q, Luo J, et al., 2006). Information crime is different from the traditional crime. Most of the evidences from the crime scene are devices that store a large amount of electronic data, it is impossible to judge the crime from the appearance. All the evidence requires a series of processes, such as collecting, extracting and analyzing the electronic data, to be finally determined. Under the premise of ensuring the credibility of the process and the data obtained from the evidence collection, the traceability of electronic evidence can be achieved, therefore, it must ensure that the data forensics is credible to achieve the traceability of data. In this paper, we start from the data property and operation behavior of electronic data forensics, to research the methods of ensuring that these

two aspects are credible, thus ensuring the traceability of post electronic data (Fajiang Y, Huanguo Z., 2004). Figure 1 is a data recovery device, it is one of the electronic data forensics equipment.

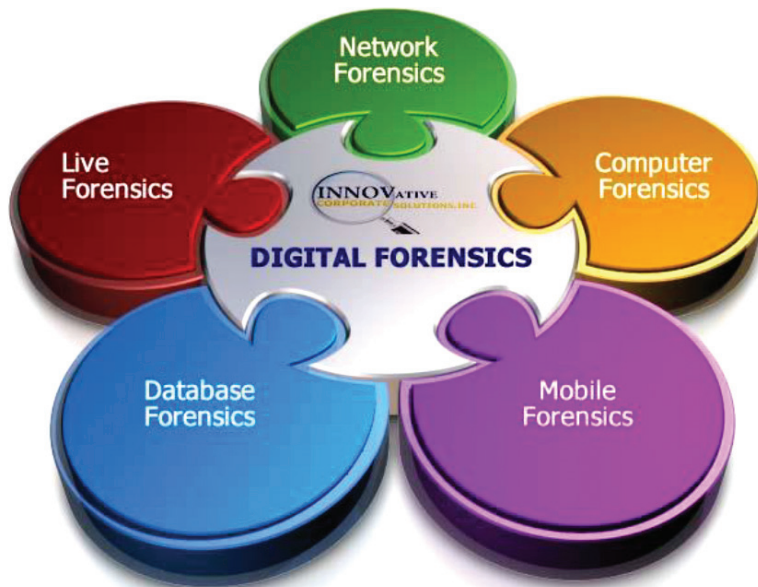


Figure 1 – Data Recovery Equipment for Electronic Data Forensics

2. Theoretical Basis of Trusted Forensic of the Electronic Data

In the field of information security, in recent years, the theoretical research and software development of computer forensics have gained a great development, but it can be found that, through the analysis of development and application of the software tool about the current computer forensics, computer forensics technology is still relatively backward and has great limitations. In the field of information security, in recent years, the theoretical research and software development of computer forensics have gained a great development, but it can be found that, through the analysis of development and application of the software tool about the current computer forensics, computer forensics technology is still relatively backward and has great limitations (Lamarre H, MacVicar B, Roy A G., 2005). In addition, a great part of the focus of the current computer forensics research is the acquisition and analysis of electronic evidence. The validity and credibility of electronic evidence and electronic forensics process are not demonstrated, thus the probative force of the electronic evidence is likely to be greatly weakened. The research of computer forensics based on traditional forensic technology has made some progress, at present, the main research direction is the study on computer dynamic forensic technology and formal forensic analysis technology (Zhang G B, Ran Y, Ren X L., 2011). The research of this paper is mainly focused on formal analysis techniques.

Trusted computing is that the behavior of a trusted component, operation, or process can be predicted under any operating conditions, and can well resist to damage caused by the application software, viruses and certain physical interference. The basic idea of trust is to ensure the integrity of the information. In the process of electronic data forensics, the theoretical system of the trusted forensics is established by referencing the idea of reference and trusted computing. The trusted forensics of electronic data can be decomposed into two aspects (Castela, N., Dias, P., Zacarias, M., & Tribolet, J., 2013): The first one is the trusted static properties, that is ensuring the static attribute semantic feature of the electronic data is credible in the two aspects of trusted discovery and trusted fixation; And the second one is the trusted dynamic behavior, that is describing the process or behavior required for the conversion of electronic data into evidence from the three aspects of trusted extraction, trusted analysis, and credible expression (Cai H, Zhao R X, Chen H M, et al., 2006).

3. Probability Theory and Petri Net Base

Concepts and formulas of probability theory can be found in the relevant literature, we need to pay attention to some of the basic properties of the conditional probability and independence, especially the full probability formula and Bayes formula. Assume (Ω, F, P) is a probability space, and $A_1, A_2, \dots, A_n$ is a limited part of Ω , that is $\sum_{i=1}^n A_i = \Omega$, and there is:

$$A_i \in F, P(A_i) > 0, i = 1, 2, \dots, n \quad (1)$$

For any event $B \in F$, there is a total probability formula:

$$P(B) = \sum_{i=1}^n P(B / A_i) P(A_i) \quad (2)$$

For any event $B \in F$, and $P(B) > 0$, there is the Bayesian formula:

$$P(A_i / B) = \frac{P(B / A_i) P(A_i)}{\sum_{j=1}^n P(B / A_j) P(A_j)}, i = 1, 2, \dots, n \quad (3)$$

The application environment of the total probability formula can be explained as follows: There may be many reasons for the occurrence of an event, and each of the reasons make a certain contribution to this result, the probability of every cause is known to solve the probability value, that may occur, of the result. Bayes formula is actually the “inverse problem” of the total probability formula, which can be described as: if the probabilities of a variety of reasons are known, and assume that the event has occurred in a randomized trial, so under this condition, we want to know what the probabilities of the occurrence of the various factors are. Petri net is a mathematical representation of the discrete parallel system, which has a strict mathematical formulation and an intuitive graphics expression. It has rich methods of system description and analysis technique of system behavior, and also provides a solid conceptual foundation for computer science (Schmoch U., 1993).

4. Trusted Fixing Method Based on Time Stamp

The key files that need to be transferred safely in computer system mainly include system security log, intrusion-detection log and the security records of all kinds of applications. These records are generated by file information, the first thing after the successful invasion of the network malicious intruder is to delete the information records or the file related to the invasion process directly. So the corresponding information record must be copied, signed and transferred as soon as possible. In order to quickly transfer the new generated information f_i , it's required to be copied, signed and securely stored at the time of the it's generation (Breschi S, Catalini C., 2010). The new generated record f_i is immediately transferred to the safe memory, and uses the digital signature software for hash calculation $d_i = h(f_i)$; And it's sent to the authority time-stamp server TSA for digital signatures, then sent back to the safety memory S. For the public requirements of p, q, g, the prime numbers p and q meeting the conditions are generated to calculate $g = h^{(P-1)/q} \bmod P$. At the same time, the randomly value of k, which is less than q, is generated to calculate the corresponding r and k^{-1} . From the above results (k_i, k_i^{-1}, r_i) , the corresponding public key y_i is calculated according to the formula:

$$y = g^x \bmod P \quad (4)$$

According to the formula:

$$S = (k^{-1}(SHA(f) + xr)) \bmod q \quad (5)$$

The corresponding s_i can be calculated. Thus, the gained r_i and s_i is the digital signature of the information record f_i by from the evidence collecting machine S. When a new information record is completed, S will signe the information records of r_i , s_i and f_i' , record the sequence number i and the generating time t_i , and send them to the secure storage object M. The validity of S signature can be verified, and it can also be verified by the corresponding information summary of the ith signature, that can effectively prevent the deletion and adjunction of any record between the ith signature and the i-th signature (SUN Z, REN Z, YAN H., 2005). Figure 2 is the workflow of the method.

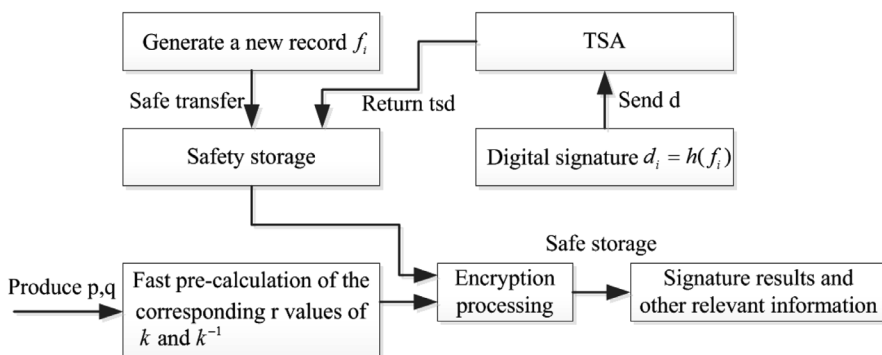


Figure 2 – Workflow of Trusted Fixing for Digital Data

5.Related Technology Research

5.1. Data Forensic Technology

The digital evidence collection is mainly for the electronic evidence recognition, preservation, collection, analysis and presentation, to reveal the criminal act or fault related to digital product. The crime evidence carry out by using computers and other digital products to in a digital form is stored and transmitted through the computer or the network, and thus appeared the electronic evidence. It is generally believed that the digital evidence, electronic forensics and the generalized computer forensics are equal. The purpose of digital forensics is to obtain electronic evidence. The doubtful electronic evidences include defective electronic evidence and argumentative evidence (Light A., 2010). According to the characteristics of electronic evidence, the model of behavior analysis based on the host is mainly divided into five modules such as: data backup, data recovery, data sorting, data analysis and data fixation, and there are specific refinements in different modules for specific evidence target. As shown in Figure 3, the forensic analysis module has been refined to find the relevant data mainly from the analysis of the three aspects: the file, network records, and USB connect (Yong Y, Huitang S., 2009).

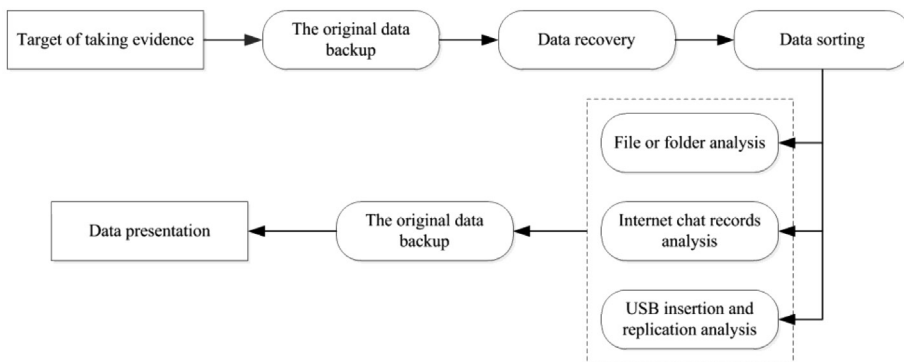


Figure 3 – Model of Behavior Analysis and Evidence Collection Based on Host

5.2. Trusted Digital Forensic Process

The concept of trust has been mentioned as early as in the “orange book” of the “Rainbow Series”, with the goal of proposing a security rule that can go beyond the default and run entities of special behavior. The achieve purpose of trusted computing includes two levels of meaning: One is to protect the specified data storage area to prevent malicious physical access, and the other one is to provide an operating environment that has not been tampered for the code running in the computer. The theory system of trusted and credible evidence is established by using the ideas of trusted computing. Electronic data forensics can be decomposed into two aspects: One is the static characteristic of the electronic data itself; The other one is a trusted process or behavior that is required for the conversion of electronic data to evidence (Ying-Nan S., 2006). On this basis, the

trusted process of electronic data forensics can be achieved, and the electronic data can be traced back. Under the premise of the relevant laws of our country, the credibility of forensic tools used in the process of the various forensic procedures is studied at first, to establish the trusted standard and tool library of electronic data forensics tools accord with our legal system. Based on this, the credibility of the obtained electronic evidence are demonstrated with formalization in the two aspects: the credibility of static attribute of the original data and the credibility of the dynamic forensics method, to structure evidence chain consistent with the forensic results (Flury M, Flühler H., 1995). Ultimately the proof system of trusted forensic evidence system of the electronic data is formed, as shown in Figure 4.

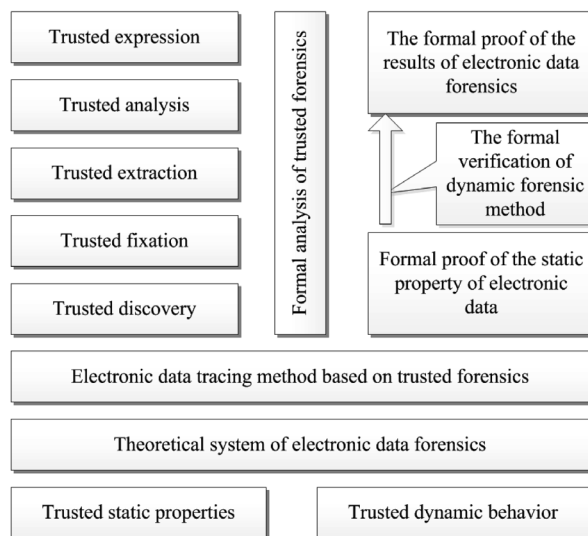


Figure 4 – Trusted Digital Forensics System

5.3. Tracing Technology of Electronic Data

Traceability, as its name implies, is tracing the source of the original development of things according to the existing information. The process of traceability of formed a mutual connection, which is “the source of the chain”, The correct derivation of every link can ensure the correctness of the source. Now the traceability is mainly used for food safety, from the cultivation of driven plants and raw material processing to food production process, attribute information of environment, quality, quantity and other attributes of the whole process are recorded and stored in detail, to prepare for the inquiry of the event of a major food safety accident. According to the stored information we can track back to the complete production process step by step, so as to find out the source of the problem and solve it. Forensics is a process of restructuring the criminal process, and the investigation of evidence also need to ensure the credibility of the full process, in order to strengthen the legal effect of evidence investigation. In the

process of reducing the crime by collecting evidence, it will continue to emerge associated data which is also need to be recorded. Information marking method is generally used in the network traceability, using labeled information to reconstruct path for query, it generally includes the recording source information, issue of traceability query requests, and attack path reconstruction (Jin-yan S U N., 2008).

Trackback, common in IP network data source tracking, is generally searching for the information of the intrusion when there is a network intrusion behavior. For example, in a DoS attack, forwarding pathes can be reconstructed according to the nodes' summary information saved in the route, so as to find the original source node. This kind of electronic data traceability generally adopts the log record technology, technology based on ICMP and probabilistic packet marking technology. The application of traceability is more extensive without specific field, showing the property of traceability or the traces of the data in a computer system. Traceability process is to find the source of evidence, map the relationship between evidences and finally structure the evidence chain. In cyber crime, the forensics of electronic evidence requires a specific procedure and technology to be adopted and accepted by the court. Under normal circumstances, the objective of these processes is to find out the origin of the pending evidence and the perfection of the chain of evidence. Of course, this is a voluntary choice of law. And the tracking of the evidence has become a key or important element of the digital survey process, because it is able to map an event from the acquired data to other events in the other supplementary survey. From a single electronic evidence, it's unable to obtain useful information, because the data does not make sense. Therefore, in order to avoid meaningless information, the collected digital evidence must be identified. The purpose of traceability is to identify and track the real or hypothetical objects through a process chain. In the case of a given object, it provides an opportunity to track the event chain or to predict the outcome of the process. In the network, it is the difficulty of establishing the source and destination between the computer and the communication network (Selin C., 2008).

6. System Architecture

According to the above evidence model and the validity analysis process, the system will combine the static and dynamic evidence collection, and it can be carried out by the dynamic forensics, which is based on the static evidence collection. Each module is connected with each other, and it has some independence.

System layer: the system layer supports the validity of the system, mainly including software and hardware platform, can provide proof of the required data access and applications running in a variety of environments.

Control layer: The control layer is located on the system layer, it is the core of the whole forensic analysis and the effectiveness of the system. Responsible for the various modules of the start, call, etc. to send control information, by the relevant module to complete the work and the system settings and other functions. Electronic evidence is easy to be modified, destroyed, or made in a convincing way. The information that is not correct is potentially more destructive than it is without information. In forensic work, to avoid the electronic evidence is accidental or malicious modification is required to complete the work of the control layer. On the one hand, it used to ensure

the strict implementation of the standard operation process. By strengthening the supervision and evidence collection process, and further standardize the operation of evidence collection to ensure the implementation of evidence. On the other hand, it's used to carry out the verification work. The credibility of the evidence used in the process of reasoning is classified, and evidence from a single source, for example, is trying to find other evidence that can be used as evidence to complete the verification of the evidence (Liu W, Jiao P N, Wang J J., 2005).

Function layer: Intrusion detection system is responsible for real-time monitoring, when the need for monitoring, the intrusion detection module can be started, and the acquired data is stored in the database to be used. Data collection module is mainly responsible for data acquisition, through the call related tools to complete the collection of raw data, and the collected data for verification and storage. The security module is mainly responsible for the security of the system, and can be set according to the need. For example: with the analysis of the module of the data after the analysis of the Trojan virus and virus database update, when a network is required to use the network for data transmission to determine whether the data is encrypted and the use of encryption. Also includes the local storage of data security and other security settings and other functions. Reduction analysis is based on the existing data, including the acquisition of raw data and analysis process in the process of data, reduction analysis of the whole invasion process. According to the original data, the original data and the process of the crime, the interpreter is combined with the knowledge base form the "credibility + data source + evidence rules" of the evidence format, and is responsible for the evidence of the need for, in order to present in the court more instructions. The database is used to store all kinds of data, and the rule base consists of intrusion detection system, evidence collection rules, validity rules, knowledge base and so on. Data include all kinds of data and documents, including the original data, the process of the intermediate data, the result data and the previous case data. The toolkit contains a common tool in the process of evidence collection, such as: data recovery tools, disk image tools, password cracking tools, case tools, integrity verification tools, etc., in the process of collecting evidence from the relevant module (Kikuchi K, Holdway J E, Werdich A A., 2010).

Expression layer: After the completion of the layer of data analysis, the formation of evidence, by the expression layer of evidence format for processing. According to the laws and regulations, the legitimacy of the evidence of the "credibility + data source and evidence collection rules" which is formed by the functional layer is examined, and the evidence is processed according to the format prescribed by laws and regulations.

User layer: It is an important part of the whole system, it is the interaction between the user and the system, which is responsible for the interaction between the user and the computer.

7. Verification Conclusion of System Function

In this paper, we use the system to analyze the electronic evidence, in the analysis of activity time, the number of files, the number of effective recovery files, and the number of clues to find out the effect of the collaborative analysis of computer forensics

collaborative analysis system, and gives the verification conclusion. The input data source of the verification system is the computer, and the test data are shown in Table 1.

Contrast Item	Single Machine Analysis	Cooperative Analysis
Investigators	1	5
Investigation time (hours)	32	8
File number	1022	3579
Data recovery time (min)	1.5	56
Recovery system	387	482
Found clues	976	1043

Table 1 – Example Data of the Sysem

Through analysis, we can foud that computer forensics collaborative analysis system not only can effectively data recovery, and can effectively reduce the analysis time, improve the efficiency and accuracy of analysis (Bhatt T, Zhang J J., 2013).

8. Conclusion

With the development of computer security technology, electronic data forensics technology has become an important research direction in this area. This paper introduces the theoretical basis of electronic data evidence, gives out the general steps of tracing the source definition and the network tracing methods, studies the method of electronic data tracing based on trusted forensics,and establishes a trusted digital forensics model based on workflow with the trusted fixed method of time stamp. This model focuses on the credibility of the digital forensics process, and can analyze the electronic evidence. It’s found that the electronic data traceability system described in this paper can be effective for data recovery and credible evidence through verifying the experimental data.

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Research on Circuit Fault Diagnosis Based on Artificial Intelligence

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Abstract: It researches on circuit fault diagnosis based on Artificial Intelligence. Theoretical research, system design and case analysis. Firstly, Basic theory knowledge of electronic circuit fault diagnosis and basic theory of BP neural network are studied. Secondly, a circuit fault diagnosis system based on BP neural network is designed. Finally, examples analysis of this system is carried out. The diagnostic efficiency of the circuit fault diagnosis system based on BP neural network is 98%, which shows that the BP neural network has high accuracy and fast characteristics for the diagnosis of circuit fault. Neural network method can greatly improve the diagnostic ability of the circuit fault diagnosis.

Keywords: BP neural network, Circuit fault diagnosis, Artificial Intelligence.

1. Introduction

According to the U.S. Department of defense statistics, the typical weapon system maintenance costs as high as 23%, the cost of procurement is 67%, while the cost of development is only 10% (Estima J O, Cardoso A J M. 2011). In our country, the maintenance costs is 80%, the purchase cost is 14%, while the development costs accounted for only 6% (Cui J, Wang Y. 2011). With the rapid development of the electronics industry, the scale of the modern engineering technology system is expanding, and the electronic products are becoming more and more large, high-speed, automatic and intelligent. These systems can cause significant casualties and huge property damage as soon as the accident occurs. In April 1986, the Soviet Union Chernobyl nuclear power plant unit four occurred in severe vibration caused by nuclear leakage, resulting in more than 2000 people died, the direct economic losses of \$3000000000 (Estima J O, Marques Cardoso A J. 2013). These serious incidents continue to occur, forcing people to a lot of research in the fault diagnosis of equipment, forming the machine equipment, and engineering structure and process of the fault diagnosis of this new research area (Freire N M, Estima J O, Marques Cardoso A J. 2013). Therefore, it is very important to protect the reliability and safety of modern complex systems and electronic products.

Secondly, testing is the basic method for people to understand the objective world which obtains the qualitative or quantitative information, and it is the source of information engineering and an important part (Yang C, Tian S, Long B. 2011). Today, with the

development of science and technology, the test work will be in the first place in the design and manufacturing of advanced equipment, and become an important symbol of productivity, manufacturing capacity and practical level. According to statistics, the current testing costs have reached 50% of the cost of the development of the equipment, and even 70%. How to make the electronic equipment in a good condition, how to make the maintenance of electronic equipment more efficient and accurate, is an important issue we are facing.

Electronic equipment is made up of various components, due to the influence of manufacturing process, service life and working conditions. Therefore, in time, the fault treatment is related to the reliable operation of the instrument and the whole system (Luo H, Wang Y, Cui J. 2011). No matter what method you use to deal with the fault, the first and most important is the fault diagnosis. Only to find out where the fault is, we can effectively repair or replace the device to ensure the normal operation of the system. Fault diagnosis is a very complicated work, and the test object is very complex (Belo, A., Castela, G., & Fernandes, S., 2013).

The tolerance effect of the elements in the circuit is brought to the analysis of the circuit, so that the accuracy of the diagnosis is affected. The fault of analog circuit is complex, which brings difficulty to the diagnosis. Artificial neural network (ANN), such as text recognition, speech recognition and so on, which has the characteristics of associative memory, large-scale parallel distributed processing, distributed storage, strong robustness, adaptive learning, real-time computing and hardware implementation, shows its advantages. Fault diagnosis is a problem that is reflected from the fault. It is currently in the field of machinery, control system, chemical industry and so on (Pei X, Nie S, Chen Y. 2012). So the artificial neural network is a promising new research field for simulating circuit fault diagnosis. In particular, neural network has the ability of fault tolerance, which is expected to be used to diagnose the fault of tolerance circuit fault. It is possible to open up a new way for the fault diagnosis of circuits.

2. Electronic Circuit Fault Diagnosis

Fault diagnosis is a comprehensive technology, which involves modern control theory, signal processing and pattern recognition, computer science, artificial intelligence, electronic technology, statistical mathematics and other disciplines. Once the power electronic equipment is failure, small can take electrical product damage, traffic congestion (Jiang C, Youren W. 2010), industrial and mining enterprises. Great threats are people's lives, property security, and even cause major casualties or disasters, affecting the normal operation of the national. Therefore, the fault detection and diagnosis of power electronic equipment is becoming increasingly important.

2.1. Role of Electronic Circuit Fault Diagnosis

1. It can early forecast to prevent accidents.
2. It can realize predictive maintenance and improve equipment management level.
3. It can convenient maintenance, shorten the maintenance time, and improve the utilization rate of equipment.

4. It can improve the design and manufacturing level of the equipment and improving the quality of the products.

2.2.Method for Fault Diagnosis of Electronic Circuits

Power electronic circuit fault diagnosis technology consists of two aspects: first, the detection of fault information: a certain detection technology (Slamani M, Kaminska B. 1992). Second, fault diagnosis: according to the fault information of the detection, fault diagnosis, and fault analysis and reasoning. Traditional fault diagnosis method is widely used in fault diagnosis of power electronic circuits, such as fault dictionary method, fault tree, expert system, etc.

3. BP Neural Network

3.1. Basic Theory of BP Neural Network

Artificial neural network is a complex network composed of a large number of simple processing elements, which is put forward on the basis of the research of human brain tissue in modern biology (Tzeng G H, Chiang C H, Li C W. 2007). Its research results show that artificial neural network has the basic characteristics of the human brain function: learning, memory and induction, which solve some of the limitations of artificial intelligence research. It is different from the theory and method of logic and symbol processing, which is widely used in the field of artificial intelligence, and has opened up a new way (Guo Z, Wu J, Lu H. 2011). The combination of theory and technology, such as expert system, will produce better simulation thinking, memory and learning, which is the combination of the characteristics of the distribution and the function of the parallel processing, discrete and continuous time calculation and global information. Among them, the research of BP neural network has been a hot spot. Especially its application uses in the circuit fault diagnosis, and it is the focus of discussion.

BP algorithm is the abbreviation of Back-Propagation Algorithm. It is a supervised training of multilayer neural network algorithm proposed by D.Rume-llart et al (Ding S, Su C, Yu J. 2011). Each training example is passed through two times in the network. Forward propagation calculation starts from the input layer, pass through each layer and after processing, generate an output, and get an error vector of the actual output and the desired output. On the other time, from the output layer to the input layer, the weight is modified by layer by layer. BP algorithm has a strong mathematical basis, dramatically expanding the use of neural networks, many successful examples of applications, and the study of neural networks has played a great role in the rise again.

3.2.Structure of BP Neural Network

BP neural network is a multilayer feedforward neural network with three or more three layers (Li S, Liu L J, Xie Y L. 2011). The upper and lower layers of each neuron are fully connected, that is, each unit of the lower layer is connected with each unit of the upper layer, and no connection between each layer. Its structure is shown in Figure 1. Actually BP algorithm can also be used for multi - layered network.

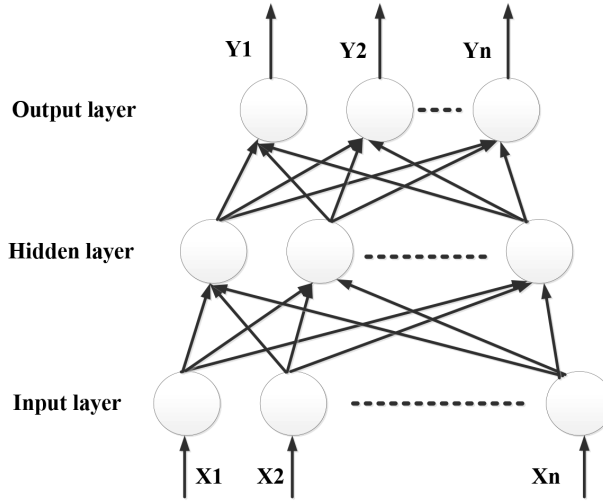


Figure 1 – Structure of BP Neural Network

3.3. The Algorithm of BP Neural Network

We assume that the input layer is an n node, the output layer is m nodes, the hidden node number is A , and the output function of the hidden layer node is:

$$Z_r = f\left(\sum_{i=1}^a \omega_{ir} x_i + T_r\right) \quad (1)$$

$$Y_j = f\left(\sum_{i=1}^a \omega_{ij} + Q_r\right) \quad (2)$$

Among then, ω_{ir} is the connection weights between the input layer ω_i to the hidden layer Z_r . ω_{ij} is the connection weights of the hidden layer Y_j to output layer, T_r is the threshold of the hidden layer, Q_r is the output layer. F is the activation function of neurons, which can have many choices, such as linear function, polynomial function, hard limiter function and Sigmoid. BP learning algorithm requires that the neuron characteristic function is differentiable. Therefore, there are many functions that can be used as a characteristic function.

$$x'_j = F(X_j) = \frac{1}{1 + \exp(-X_j)} \quad (3)$$

When $X_j = \sum \omega_{ij} x_i$ meets this requirement, its partial derivative is:

$$\frac{\partial x'_j}{\partial X_j} = x'_j (1 - x'_j) \quad (4)$$

The characteristic of Sigmoid function is that it is a monotonically increasing function, and it is a continuous change in $[0, 1]$.

$$\lim_{s \rightarrow -\infty} f(s) = 0 \quad (5)$$

$$\lim_{s \rightarrow +\infty} f(s) = 1 \quad (6)$$

3.4. Training Process of BP Algorithm

The purpose of the training is to adjust the weights of the network. The network can produce a desired output vector, which is composed of an input vector and the target vector with the desired output. The two together are called “training”. Training a network need to use a lot of trainings, for example, a training of the input vector is an English letter, the output of the target vector is the letter in the alphabet of the serial number, or the input vector is a text, and the output of the target vector can be the pronunciation of the Chinese characters. If you need to train a network to distinguish between 26 English letters, at least 26 training pairs (Dash P K, Pradhan A K, Panda G. 2000). The training of these training examples set with the nature of the network is often referred to as the classification of neural networks or neural networks.

At the start of the training, the whole weight of the network must be initialized, generally set to a small number of random, which can ensure that the maximum value of the network is not due to saturation or abnormal situation. Training steps are as follows.

1. Take a training of the input vector as the input of the network from the training sample;
2. Calculate computing network output vector;
3. Calculate the error between the output vector of the network and the training of the target vector;
4. Reverse calculate from the first intermediate layer to the output layer and reduce the error direction adjust the network weights;
5. Repeat the above steps to focus on each instance of the training examples 1-4, until the entire training set is the smallest.

3.5. BP Network Improved Algorithm

Because the traditional BP neural network convergence speed is slow, easy to fall into local minimum value and learning process will appear concussion, a series of improved algorithms have emerged, such as Traingdm, Traingda, Trainrp, Trainlm (Costa A, Crespo A, Navarro J. 2008). These algorithms can overcome the above disadvantages to some extent. In this paper, we use the additional momentum algorithm (Traingdm).

Momentum batch gradient descent function (Traingdm) is also a kind of training algorithm for batch processing. It not only has a faster convergence speed, but also introduces a momentum term, which effectively avoids the local minimum problem in network training. The so-called momentum term is added in the network each time the weight and the threshold to change the amount of change in the amount of the first time, the weight and the threshold value of the K cycle can be expressed as:

$$\Delta\omega(k+1) = -a_k g_{\omega}(k) + mc * \Delta\omega(k-1) \quad (7)$$

$$\Delta b(k+1) = -a_k g_b(k) + mc * \Delta b(k-1) \quad (8)$$

The essence of the additional momentum algorithm is to change the influence of the weight of the last time. When the momentum factor is zero, the change of the value is generated according to the gradient descent method. This is the general BP algorithm. When the momentum factor is 1, the new weight change is set to a change of the weights, and the change of the gradient method is ignored. In this way, when the momentum term is added, the training error of the network can fall into local minimum, which can produce a movement of the positive slope and jump out of the shallow peak. Then, still in the role of additional momentum, it reached certain height automatically return, and as marbles rolling as swinging back and forth until stay at the minimum point. It promotes weight adjustment toward the flat area at the bottom of the error surface, and node error will become very small.

So $\Delta\omega(k+1) \cong \Delta\omega k$, thus prevent the triangle $\omega(k) = 0$, help to make the network out of local minima of the error surface. Therefore, it can solve the local minimum problem in a certain extent, but the convergence rate is still very slow. The additional momentum method reduces the sensitivity of the network to the local details of the error surface.

According to the design principle of the additional momentum method, when the weight of the correction results in the error, the new weight should be canceled without being used. When the new error rate changes to its old value more than one set of the maximum error rate change, it is also to cancel the weight change. So in the design of the training program of the additional momentum method, we must add the conditions to determine the correct use of its weight correction formula. Generally the use of momentum method which determines the conditions are as follows.

$$mc = \begin{cases} 0 & E(k+1) > 1.04E(k) \\ 0.95 & E > 0 \\ mc & other \end{cases} \quad (9)$$

E is the network error output squared.

3.6. Fault Diagnosis Ability of BP Neural Network

Fault diagnosis and its core technology is pattern recognition. And neural network can well solve the complex problem that the traditional pattern recognition methods are difficult to satisfactorily resolve because of its many advantages. The neural network has ability to distinguish cause and the fault type. So the neural network is an effective method to solve the circuit fault diagnosis. Essentially, the circuit fault diagnosis is equivalent to a pattern recognition and classification problem, which is divided into normal and abnormal operation condition of two kinds, and the abnormal state is what kind of failure mode, which is a pattern recognition problem. Therefore, the neural network provides a new solution for the circuit fault diagnosis.

3.6.1. Rule based system

This diagnosis system uses the post editing rules to achieve the fault diagnosis. As it is well known, the form is the bottleneck of the rule system, which limits the application of the diagnosis system in the fault diagnosis of analog circuits. The neural network can automatically deduce the relationship between the fault symptoms and the cause of the failure in the training phase, without the need of explicit rules.

3.6.2. Model based system

This diagnostic system is usually required to grasp the circuit principle and the action model of the comprehensive knowledge. This method has obvious shortcomings in the complex large-scale integrated circuits. Neural network diagnosis method avoids the problem of calculation circuit parameters and fault modeling.

3.6.3. Expert system

Because analog circuit cannot achieve good modeling, especially in fault situation, lack of appropriate domain knowledge, so the expert system method is not widely used in circuit fault diagnosis. Because of its own properties, the neural network can acquire the knowledge automatically in the training phase of the sample, and the characteristics and the fault of the analog circuit can be found.

3.6.4. Fault dictionary method

The method can only recognize the fault in the dictionary. Because the neural network has certain ability of reasoning, it can identify the faults that are not explicitly included in the training set.

4. Design of Circuit Fault Diagnosis System Based on BP Neural Network

The fault diagnosis method of BP neural network is usually used in the condition of certain excitation, and the corresponding theoretical values of the normal state and normal state are obtained by PSPICE. Then, the neural network is used as a sample.

The structural design of fault diagnosis system based on neural network is shown in Figure 2.

Its concrete steps are as follows.

The first is to extract fault samples. Through the circuit simulation software, the simulation of a given circuit is carried out, and the state data is obtained.

Second is feature extraction. Analysis of characteristic parameters of the state data is presented.

Third is the network structure optimization. According to the characteristics of the input data and the result of the system needs, the number of nodes in the input layer and output layer are determined respectively.

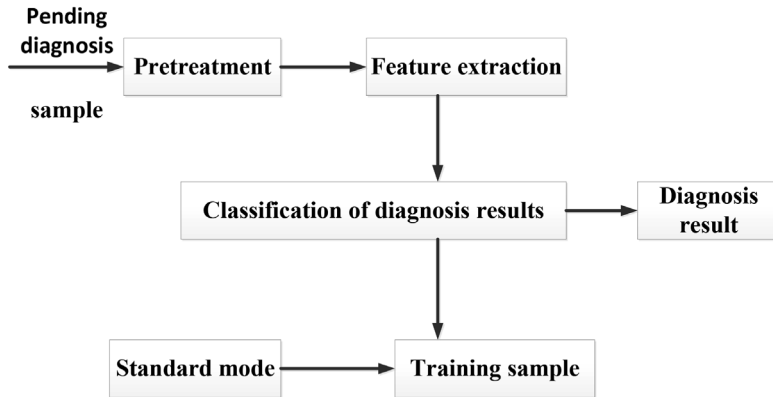


Figure 2 – The Structural Design of Fault Diagnosis System Based on Neural Network

Fourth is training and recognition. The sample, that is, after preprocessing and feature extraction, the vector parameter is obtained, which can be trained, and the fault signal input will be identified.

5. Case Analysis

Figure 3 is a part of the module of a comprehensive selection circuit, which is required for fault diagnosis of the part of the circuit.

5.1. Definition of Fault Category

This case mainly discusses the diagnosis of hard fault (resistance short-circuit or open circuit), the choice of normal, R1 (OC), R2 (SC), R3 (OC), R4 (SC) as the 4 state of failure (OC stands for open circuit, SC for short circuit).

5.2. Data Acquisition and Processing

Table 1 is a normal and fault state, and the corresponding feature vector of the measurable points.

In the tolerance range of components, the Monte PSPICE is used to analyze the 20 Carlo for each state. Table 2 is the analysis of test samples served as a feature vector.

5.3. Establishment and Training of Neural Networks

BP neural network is used to identify the characteristics of pattern recognition. The hidden layer function is Tansig and the output layer is Logsig. According to the actual circuit requirements, the number of neurons in the input layer is 3, and the output neuron is 5. The results of the training are shown in Table 3.

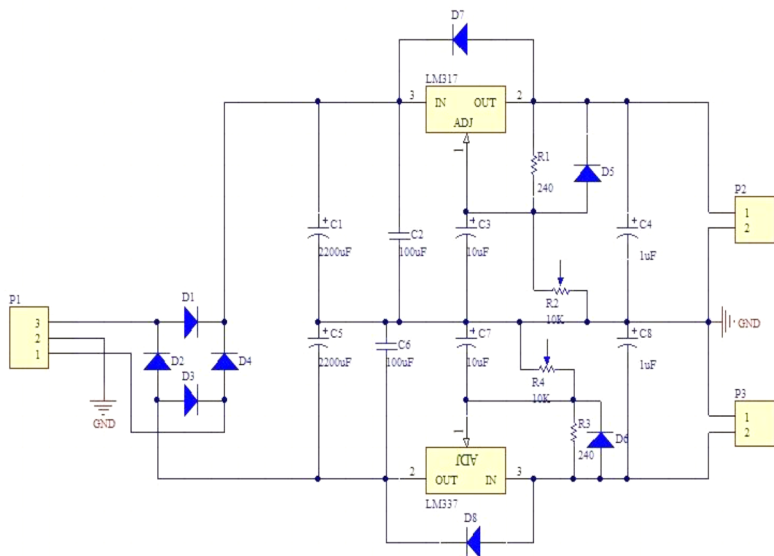


Figure 3 – The Module of a Comprehensive Selection Circuit

State	Normal	R1(OC)	R2(SC)	R3(OC)	R4(SC)
U1	0.06881	0	0.08448	0	0.07758
U2	0.08432	0.8354	0.08425	0	0.09516
U3	0.1191	0.1204	0.1215	0.0799	0.1264

Table 1 – Fault Feature Vector

State	Normal	R1(OC)	R2(SC)	R3(OC)	R4(SC)
U1	0.06895	0	0.08436	0	0.07761
U2	0.08413	0.8317	0.08433	0	0.09519
U3	0.1288	0.1205	0.1211	0.08048	0.1258

Table 2 – Fault Feature Vector of Test Sample

Method	Training Times	Diagnostic Efficiency
Improved algorithm	980	98%

Table 3 – The Results of the Training

From table 3, we can see that the efficiency of the BP neural network algorithm, which is improved by this paper, is 98%, which shows the validity of BP neural network for the diagnosis of circuit fault.

6. Conclusion

Neural network is widely used in circuit fault diagnosis, which has the function of improving the accuracy of circuit fault diagnosis. However, it also has some disadvantages, so it is better to cooperate with other ways to better ensure the safety of the circuit.

Acknowledgements

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The Research on the Prediction of the Network Traffic Based on the Improved IAC-Gray Method

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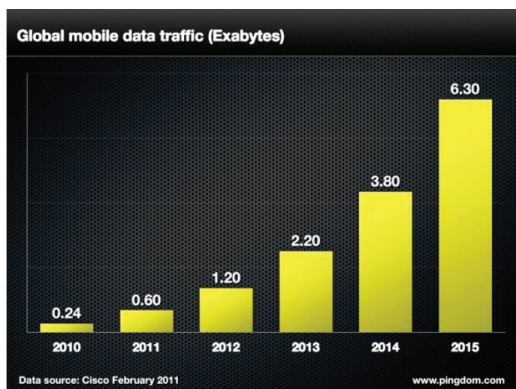
Abstract: To improve the efficiency of the prediction of network traffic; Methods: Establishing the model of analysis system of network flow based on the Improved Grey Theory. Process: This paper introduces application situation of the prediction technology of network traffic at home and abroad, expounds the working principle and process of the packet capture module of network's original data, and establishes the gray prediction model of network traffic by using the basic of Grey Theory. Results & Analysis: This paper studies the application of the improved grey GM (1,1) neural network model in the prediction of network traffic, analyzes the network traffic data, and found that the improved grey system prediction model can accurately predict the network traffic. Conclusion: The network traffic prediction model in this paper is effective and reliable

Keywords: Network traffic, GM (1, 1) model, Forecasting model, Grey-system.

1. Introduction

With the rapid development of Internet and increasing business requirements, the construction of the network installment in the park is carried out. Brings the variety of equipment types, heterogeneity, management and maintenance of the dynamic, complex, operational requirements of high efficiency, stability, qualitative, storage and transmission of the expected security, reliability, and other phenomena, contradictions and problems become more prominent. Figure 1 (a) - (b) shows the rapid growth of network traffic.

At the same time, the function of the network user to the network, the performance requirements continue to improve, to provide a strong network capabilities and good network performance has become very important. Network traffic is a network design and simulation, which is one of the basic performance of the network, service quality assurance and network management are important reference factors, in a certain extent, can be used as the evaluation of network performance and network industry main performance index. Network traffic prediction can be the network bandwidth allocation, traffic control, routing control, admission control system (Felizardo, V., Sousa, P., Oliveira, D., Alexandre, C., Garcia, N. C., & Garcia, N. M., 2014), error control and security management, and provide effective basis, at the same time, is also the construction of



(a) Data Traffic Situation in Mobile Networks



(b) Rapid Growth of Global Network Traffic

Figure 1 – Rapid Growth of Network Traffic

the network, long-term planning effective reference resources the accuracy of prediction and the characterization of the model are analyzed to understand the dynamic behavior of the network, as well as the design and improvement of the flow control are important to guide the work (Deng J L. 1989).

2. Domestic and Foreign Research and Application Status

At present, there are many organizations in the world in the Internet performance, traffic, routing, topology measurement and analysis, and so on. A lot of research is carried out. Some domestic famous enterprises, such as HUAWEI, ZTE, Datang and some research institutions, etc., in this area of research has made great progress. Traffic measurement, NetWorks SEE-IT company's F5 network manager is very representative. SEE-IT is a predictive trend and analysis tool. Network administrators can use it to predict when the network will need additional servers, interface upgrades and other changes to the network capacity to maintain the existing level of service. SEE-IT can provide a map diagnosis, in order to predict when the Internet will have the problem of congestion. Network administrators can also be forward-looking adjustment variables, to determine the impact of new network applications, and to predict the results of an increase in user capacity (Ju-Long D. 1982). If the network component exceeds a predetermined threshold value, SEE-IT will alert the user through a visual image or email notification on the display. In China, Wuhan University has done research in this area, and has realized the function of some modules. Their proposed network performance analysis and forecast support system can accomplish the performance analysis of a specific network node, and the performance of the nodes is analyzed, can set up a mathematical model for the evolution of long-term network performance history data. At the same time, it can also complete the online performance prediction of the network. The related design uses the modular, has the good intelligence, the very good scalability and the adaptability. Due to the high price of foreign products, some of the functions of the park network is currently not required, we need to address the specific needs research performance and traffic prediction module. For the prediction module, the commonly used forecasting

methods can be divided into the classical prediction. The classical prediction method including exponential smoothing trend extrapolation method, time series method and back the modern forecasting methods mainly include gray system theory, expert system, neural network and fuzzy analysis. method, etc.(Shiyun L L S Q W. 1989).

3. Gray System Overview

3.1 Basic Ideas of Grey Theory

Grey system theory was founded in 1980s. In 1981, Deng was professor at the Shanghai US China control system in the academic report of the “control of the unknown system” in the first use of the term “gray system”. In the second year, the gray theory was formally put forward in his article. Through nearly thirty years of efforts, the gray system theory has gradually developed and perfected, it can be said that in the study of the method of uncertainty in the problem of further innovation. Gray problem refers to the problem of incomplete information, such as external features, internal structure and so on. The gray system is based on the information cover, and the system is processed and processed from the multi angle and multi direction to find out the inherent law of the system (Kayacan E, Ulutas B, Kaynak O. 2010). “Gray system theory” is the British scientist Ashby proposed the “black box” on the basis of the concept of interpretation to. Deng’s gray theory is characterized by the idea of starting from the system, through the analysis of the study from the internal characteristics to a more clear understanding of the system. This will avoid the “black box” theory from outside the system analysis of things, and ignore the defects of the known data. So, grey theory compared to the “black box” theory is more accurate. The conventional methods for exploring the uncertainty system are: grey system theory, probability statistics, and fuzzy mathematics. Gray system theory points out that the impact of the system’s prediction is gray, that is to say, the final statistical data sequence of the system is the result of the gray scale. This result will certainly reveal some laws of the system, to see through the original data out of order. The main work of the grey system theory is gray model. By processing and processing of the data series, the new sequence can be obtained. Generation and transformation of the original data sequence by a certain rule, the new sequences are obtained, and then the grey model is established (Wang Y F. 2002).

3.2. Basic Principles of Neural Network

“Artificial neural network” (ANN), referred to as a new type of information processing method, which has been developed rapidly in recent years, is a kind of engineering system, which is based on the understanding of the structure and operation mechanism of human brain. The actual network connection is the right to adjust the rules. The principle of network learning is that if the network makes a wrong judgment, through the network of learning, reduce the possibility of making the same mistake next time. There are mainly two ways of network learning, which is that the teacher is teaching and learning and the learning of the teachers is not. The teaching method of the teachers is the comparison of the network according to the actual output and the evaluation standard, determine the connection power of the adjustment method, the evaluation standard is artificially made from the outside to the network, the process is shown in Figure 2 (a). The learning style of the teachers is not only the network, which is based on its special network structure

and learning rules, automatic classification of patterns belonging to the same category is implicit in the network's interior (shiyun l l s q w. 1989), as shown in Figure 2 (b).

3.3.Gray Forecasting Model

Grey forecasting is the quantitative forecast of grey system, that is, in a certain range of changes, and the time of the gray process to predict. Grey prediction is the difference between the development trend of the system factors, namely gray correlation degree analysis, and the original data is generated and processed to find the law of the system change, generate a strong regularity of the new data sequence, then set up the corresponding differential equation model, and then forecast the trend of the future development of the system. The grey prediction model GM (Gray Model), is the original sequence by accumulating generation (AGO) or inverse accumulating generation (IAGO)

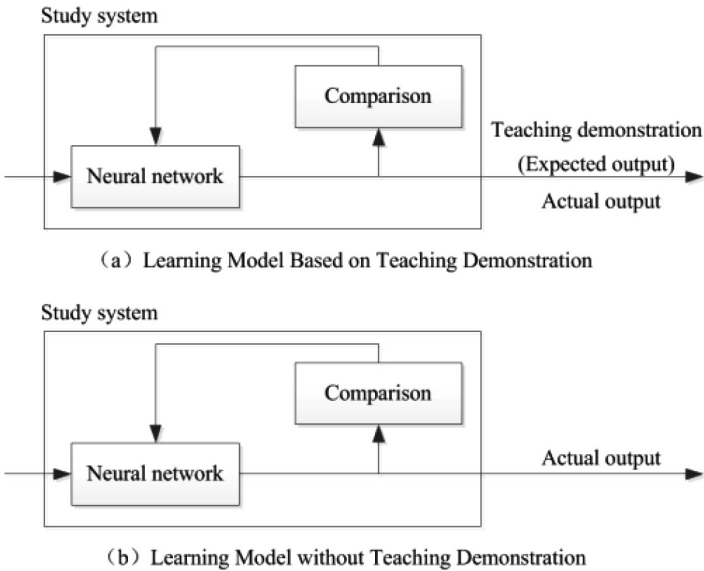


Figure 2 – Learning Model of Neural Network

after, the forecasting model of grey differential equation using the cumulative number sequence. Because the system is contaminated by noise, the original series shows the disorder, chaos sequence is grey, grey or process, grey forecasting model is the model of gray process (Guan-Jun T. 2000). It is not considered to be a random process of observation data series, but as the grey quantity or grey process of the time change, the cumulative generation or subtraction generated gradually so that the amount of gray whitening, thus, a model for solving the differential equation is established and the prediction is made. The grey forecasting model is short of observation data, the grey forecasting model is a useful tool for some projects with only a few observational data. In the establishment of grey system forecasting model, grey system theory is divided

into five steps, namely, the first step language model, the second step network model, the third step model, fourth step dynamic model, fifth step optimization model (Ju-Long D. 1982). Grey forecasting model GM is divided into two categories: static model and dynamic model, the static prediction model is denoted as GM (0, N), which can be based on the information available at a certain time, prediction of other unknown information at the same time, these unknown information has the same or similar characteristics with the known information. Dynamic forecasting model has many forms, they are mainly about the same information, the situation of different times to predict the situation. In the application of the grey forecasting model, the grey forecast of the economic gray forecast, such as the total amount of the national economy, grey forecasting of electric power load, grey forecast of urban noise, as well as the grey forecasting of natural disasters and the forecast of highway passenger traffic and freight volume, especially in the uncertain systems (such as agriculture, ecological environment). And lack of data on the situation in a more widely used (Bai C, Sarkis J. 2010).

3.4. Calculation of Grey Generating Sequence

A basic idea of the grey theory is to view all the random quantities. Gray amount of variation is in a certain range. Gray theory to deal with the gray data, instead of looking for probability distribution, it does not seek its statistical laws, is actually a way to push the number of several. The general grey system mainly uses the cumulative generation (AGO) and IAGO of these two kinds of methods to generate and process data. Set the original sequence to:

$$X^{(0)} = \{X^{(0)}(k) | X^{(0)}(k) \geq 0, k = 1, 2, K, n\} \quad (1)$$

To generate a sum of the sequence (1-AGO):

$$X^{(1)}(k) = \sum_{i=1}^k X^{(0)}(i) \quad (2)$$

That is to get a cumulative generating sequence:

$$X^{(1)} = \{X^{(1)}(k) | X^{(1)}(k) \geq 0, k = 1, 2, K, n\} \quad (3)$$

If the m times to generate (m-AGO):

$$X^{(m)}(k) = \sum_{i=1}^k X^{(m-1)}(i) \quad (4)$$

IAGO is accumulated generating operation and inverse operation, namely of the generated sequences, both before and after the data were subtracted (Keller J M, Gray M R, Givens J A. 1985). The formula is:

$$X^{(m-1)}(k) = X^{(m)}(k) - X^{(m)}(k-1) \quad (5)$$

4. Application of Improved Grey Gm(1,1) Model in Network Traffic Prediction

Taking into account the gray GM (1,1) model is applied to a single exponential growth model, it is difficult to deal with the abnormal situation of sequence data and the lack of the relationship between multiple sequences, the neural network is used to improve the prediction model. GM (1,1) model prediction results are sometimes larger errors, mining using the residual error correction model, the relationship between a single sequence is used to modify the relationship. If multiple sequences are used to modify the residual error, a number of models are required to build the model, and the door is independent of each other, the prediction of each sequence data will be ignored (Huang Y P, Huang C C. 1996). In this section, we use the combination of GM (1,1) model and neural network, improve the accuracy of the model. GM (1,1) neural network combination model prediction algorithm is described as follows:

Step 1: test the non negative of the original data sequence. If there is a negative number in the sequence, the non negative treatment is carried out, and the absolute value of the minimum number of the data will be added to all the data. If the zero sequence contains, there will be an accumulation on the processing, eliminate zero sequence.

Step 2: quasi smoothness and quasi exponential law of the test sequence. If satisfied, then turn to step 3; Then, the raw sequence data is considered for smoothing.

Step 3: set up the original data sequence, which is tested by Step 1 and Step 2:

$$X^{(0)} = (x^{(0)}(1), x^{(0)}(2), \dots, x^{(0)}(n)) \quad (6)$$

Calculate a cumulative sequence (1-AGO):

$$X^{(1)} = (x^{(1)}(1), x^{(1)}(2), \dots, x^{(1)}(n)) \quad (7)$$

And there is:

$$x^{(1)}(k) = \sum_{i=1}^k x^{(0)}(i); k = 1, 2, \dots, n \quad (8)$$

Step 4: build a matrix:

$$B = \begin{bmatrix} -\frac{1}{2}x^{(1)}(1) + x^{(1)}(2) & 1 \\ -\frac{1}{2}x^{(1)}(2) + x^{(1)}(3) & 1 \\ \vdots & \vdots \\ -\frac{1}{2}x^{(1)}(n-1) + x^{(1)}(n) & 1 \end{bmatrix} \quad (9)$$

Step 5: by $(a, b)^T = (B^T, B)^{-1} B^T Y$ to solve a and b, where

$$Y = \begin{bmatrix} x^{(o)}(2) \\ x^{(o)}(3) \\ \vdots \\ x^{(o)}(n) \end{bmatrix} \quad (10)$$

Step 6: calculate the fitting value $\hat{x}^{(1)}(i)$ according to the following time response formula:

$$\hat{x}^{(1)}(k+1) = (x^{(o)}(1) - \frac{b}{a})e^{-ak} + \frac{b}{a} \quad (11)$$

Step 7: using these reduction, that is:

$$\hat{x}^{(o)}(i) = \hat{x}^{(1)}(i) - \hat{x}^{(1)}(i-1), i = 2, 3, \dots, n \quad (12)$$

Step 8: establish a neural network model for the residual series. Set $e^{(o)}(L)$ as the residual sequence, $i = 1, 2, 3, \dots, n$,

If the prediction order is S, the input sample is $e^{(o)}(i-1), e^{(o)}(i-2), \dots, e^{(o)}(i-S)$, predict the expected value of $e^{(o)}(i)$ as a network training.

Step 9: determine the new predictive value for $\{e^{(o)}(L)\}$. Set the $\{e^{(o)}(L)\}$ neural network training model to predict the residual sequence is $\left\{ \hat{e}^{(o)}(L) \right\}$, on this basis, a new predictive value $\hat{X}^{(o)}(i, 1)$, that is constructed.

$$\hat{X}^{(o)}(i, 1) = \hat{X}^{(o)}(i) + \hat{e}^{(o)}(1) \quad (13)$$

Then $\hat{X}^{(o)}(i, 1)$ is the grey model of the artificial neural network. Among them,

$$e^{(o)}(L) = x^{(o)}(L) - \hat{x}^{(o)}(L) \quad (14)$$

That is the difference between the original data and the model simulation of L (Daganzo C F. 1995).

5. Flow Collection Function Module

5.1. The Application of Winpcap in Network Capture

We focus on the use of Microsoft's Win32 software development platform built in Wincap, to achieve the basic functions, complete the data packet-capture function unit. We mainly use the Win32 development platform to design and implementation of network data capture, at the same time, the implementation of data analysis and processing of the open source database system. We can design and implement a lot of network program through this platform, especially in network security and network

management and control of the application, common network management, traffic control software, network ARP prevention program, network bridge and network management procedures, Scanner and other network security management procedures. We use the WinPcap module based on the Win32 platform to realize the network data information receiving and forwarding, however, in the network data to prevent and control other aspects of the network software and other functions is very weak (Paxson V. 1997). We use the Win32 platform built in WinPcap module to monitor the entire network environment of data information, and not control the flow of the entire network, and the function of the network firewall. We usually use the network software is using Socketes and other components to connect to the internet.

In our operating platform, we realize the specific module of the bottom layer of the system, such as network connection protocols, data packets, etc., at the same time, there are a lot of functions to achieve the function of interface RW, we use the provided interface function to design and develop a lot of network security software. However, the above working principle cannot achieve all of our functions, so our operating platform often use the internet protocol standards to achieve networking, instead of the original data packets. Therefore, a lot of network data is required to be connected with the network, but no data are needed for the packet processing, cannot play a role (Zhu K, Mukherjee B. 2002).

5.2. Flow Chart of Data Capture

We design, development of data acquisition, identification of the core of the system is the core of the function module is the network of the original data packet capture, and we are the basis for the following procedures. We only realize the network data capture can realize network traffic control, therefore, the design level of the data grasping unit is related to the success or failure of the whole system (Riedi R H, et al. 1999). Specifically, there are several aspects of the function:

1. Higher level of actual can improve the quality of the whole system. Generally speaking, including the network raw data packet capture analysis, data storage, it's network traffic management interface functions and other modules. In the network adapter module, there are many types of network data, so we designed this unit to handle all the transmission of the original data, at the same time, we analyze the whole data storage mode to improve the level of our network management.
2. Stability is the core of the whole sub module, assuming that the data is processed, the sub module error, then the whole system will be paralyzed, at the same time, the performance of the whole system and the stability of the hardware are also affected. Recognition system based on our design, the working principle and process, we use the following network data packet capture module (Ohira T, Sawatari R. 1998), as shown in Figure 3.

6. Case Analysis

The network traffic data cited in the article is based on the outlet flow monitoring points of a university's main trunk. A total of about 15000 information points; Internet computer

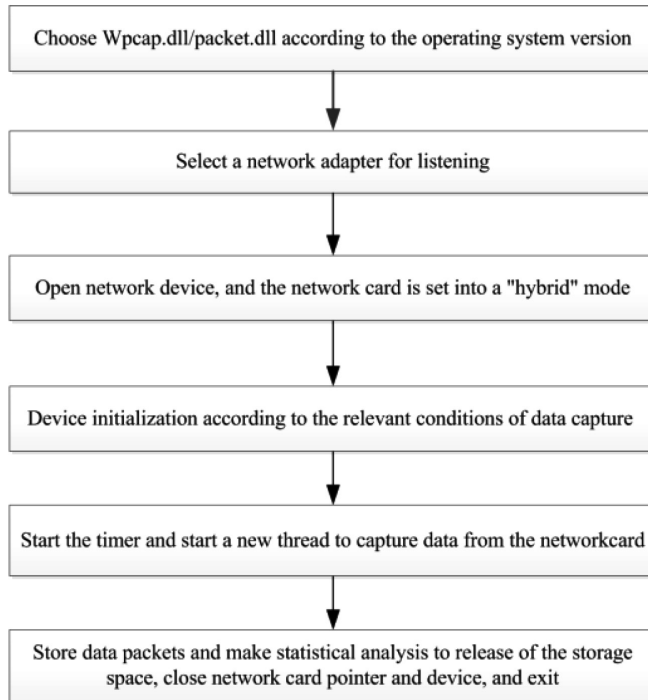


Figure 3 – The Working Principle And Process Of Capture Module Of Network Data

about eight thousand units; The campus network users more than 9000 people, up to seven hundred units; switch router. In this paper, the traffic flow of the DR.COM system in the University was collected in January 23, 2010, and the gray theory was used to analyze and forecast the network traffic of 17:00-22:00, and compared with the measured values (Friesz T L, et al. (1989), as shown in Table 1.

In the table, MAPE is the mean absolute percentage error, and MSE is the root mean square error. From the table, we can see that the gray theory model can predict the network traffic, and the improved.

G(1,1) model is better than the general G(1,1) model, its predictions are valid and reliable.

7. Conclusion

With the Grey-Theory and neural network theory are becoming more and more mature, the neural network model of grey theory can be used to predict the flow of multiple data, and it has high reliability. This paper introduces the basic idea of grey theory and the application of WinPcap in the packetcapture, Based on the grey theory research of the improved GM (1,1) model, the grey system mainly uses the AGO and IAGO these

Time(h)	Measured value	General G (1,1)		Improved G (1,1)	
		Predictive value	Prediction error	Predictive value	Prediction error
17	18.1	19.3	1.2	18.3	0.2
18	21.3	22.3	1.0	20.7	0.6
19	20.1	25.7	5.6	23.5	3.4
20	22.0	29.6	7.6	26.6	4.6
21	22.6	34.2	11.6	30.2	7.6
22	21.4	39.5	18.1	34.2	12.8
MAPE(%)		34.94		22.53	
MSE		9.6		6.52	

Table 1 – Comparison of network traffic forecast (10⁴KBps)

two kinds of methods to generate and process data. This paper analyzes the network traffic data, and finds that the prediction model of network traffic in this paper has high accuracy and reliability.

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Research on Adaptive English learning Model Based on Computer Network

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Abstract: Objective: It researches on on adaptive English learning model based on computer network. Method: Methods of document investigation and model design. Process: Firstly, literatures study was carried out. Secondly, the traditional learning system of based on the network, adaptive learning theory, and the adaptive learning theory of based on the network has been studied. The model of adaptive English learning system based on computer network was designed. Finally, test of learning effect was carried out. Result& Analysis: This model is beneficial to the improvement of students' English reading level. Result: With the continuous development of economy and information globalization, adaptive learning based on the network will play a role in English learning.

Keywords: Adaptive English learning, Computer, Network

1. Introduction

With the development of computer information technology, network technology and multimedia technology in education, the whole world has gradually set off a boom of online education. Network education is an open education system. It provides a large amount of learning resources and learning support services for the learners. Learners can make a learning plan according to their own actual situation (Chen C M, Li Y L. 2010). At present, the network teaching platform has become increasingly mature in the issue of teaching information and course content. Many of the teaching material are no longer a paper form, it basically realizes the digital, the form is more diverse, and the content is constantly enriched. But this one also gradually exposed a more prominent problem. With the increasing number of online resources (Cruz-Cunha, M. M., Simões, R., Varajão, J., & Miranda, I., 2014), learners can correctly evaluate their learning ability in the network education, and find a suitable teaching content, which has become an urgent problem to be solved.

With the development of globalization, English learning is becoming more and more important (Sandberg J, Maris M, de Geus K. 2011). However, now China's English learning level is still at a relatively low level influenced by the traditional English education. How to learn English well is a difficult problem for English learners.

Therefore, it is a very important task to develop a web-based adaptive English learning system based on the network.

2. Traditional learning System Based on Network

The traditional learning based on network refers that the general studies link put online, learner patrons can enjoy online schools offer the service (Ehri L C. 2005), and can browse the lesson piece, questions and interacting with other students to take the exam at home. The learning based on the network is a kind of non-real time distance learning (Wang Y H, Liao H C. 2011). The online learning diagram is shown in Figure 1.

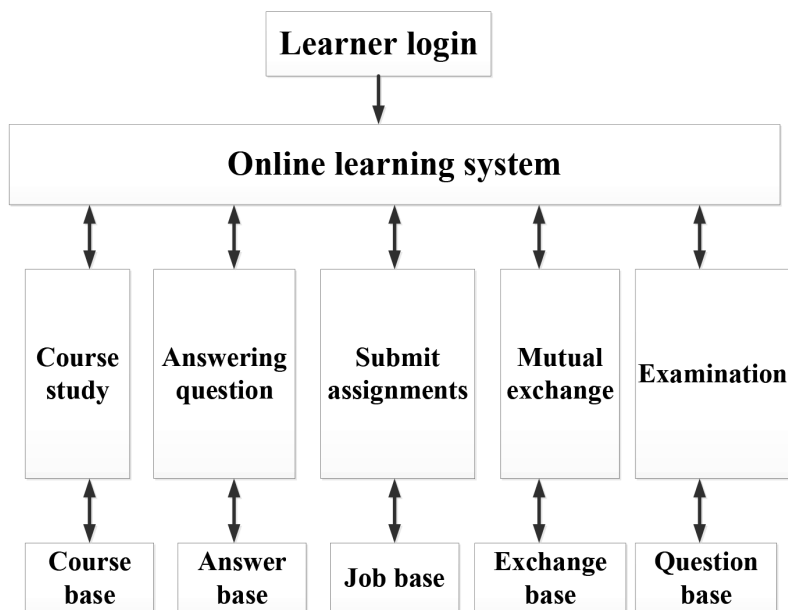


Figure 1 – Traditional Network Learning System

Traditional network learning system takes itself as the center and does not take into account the user needs and learning habits (Akbulut Y, Cardak C S. 2012). It asks people to adapt to the system rather than the system to adapt to the user, and takes not fully in accordance with the law of people's learning to carry out education, so the interaction is poor, the learning effect is not obvious and many other issues (Inprasitha M. 2011). As the network learning is used by more and more people, there are more and more learners in the network learning system. The main defects of the traditional network learning site in our country are as follows.

It is difficult to realize the real online autonomous learning and more difficult to adapt to learning (Weir M K. 1991). Online learning is the first independent learning which rely on their own teaching and learning through the online courses to achieve specific teaching

objectives (Jiu-le T, Wei Z. 2010). So how to design and construct and develop the adaptive learning system based on network is an important and urgent problem to be solved.

It does not have the real learner centered online teaching management function. Teaching management is an indispensable teaching activity or teaching activities will fall into chaos.

It cannot have a more objective evaluation of the learning activities of the learners (Kantartzis K, Imai M, Kita S. 2011). Although there are some websites that have the test, examination and evaluation system for the learners' learning activities. But the vast majority of it takes only the traditional test as the electronic test, and as a means to evaluate the learner's learning ability and academic performance. It is not a good use of network technology and artificial intelligence technology to learn the ability to learn and to make a more objective and timely evaluation of the results of learning.

The learning process is lack of proper interaction and timely feedback (Inprasitha M., 2011). At present, the online course just ignored this point, and especially the design of the feedback function in the learning process is less. This also hinders the learning of the learners.

3. Theory of Adaptive Learning

Self-adaptation is that while the process of processing and analyzing data (Mustafa Y E A, Sharif S M. 2011), it can automatically adjust the processing method, processing sequence, processing parameters, boundary conditions or constraints according to the data characteristics of processing data, so that it can be adapted to the statistical distribution of the data and the structural characteristics, so as to achieve the best treatment effect.

Adaptive learning is a new field in modern learning system. It is a fully personalized learning process, which is based on the support of adaptive learning system (Jeong H Y, Choi C R, Song Y J. 2012). In this process, the students can be seen as an individual, and place in a more personalized learning environment. Through the students' own knowledge, experience and adaptive learning system to obtain the knowledge, training ability, it can be based on the actual situation of students to estimate the learning ability and the degree of domain knowledge, learning plan, dynamic choice of learning strategies, and control the whole learning process.

Adaptive learning has the following characteristics.

Teaching content has dynamic adaptation mechanism. In the process of adaptive learning, the teaching resources can be adapted to different kinds of learners' needs, and it is also the teaching content of the organization and presentation with the individual characteristics. It provides different teaching content for different starting point of the students.

Teaching content has dynamic navigation system. According to the students learning progress and ability level, it has the dynamic adjustment of the teaching content of the navigation strategy (Dehuri S, Cho S B. 2010). By testing the actual level of the students, the teaching strategy is determined according to the test results, and the appropriate teaching content is extracted from the domain knowledge base.

Teaching content has dynamic construction. According to the learner's personal characteristics and knowledge background, it is to make a study plan, follow the learning process, and record the dynamic information of the learners.

It has cooperative problem solving mechanism. The whole process of learning is the process of exploring and cooperating with others in the field of knowledge space.

It has adaptive learning strategy selection mechanism. At any time it responds to the actual level to generate a suitable for learners to practice or guidance according to the actual level of students, and determines the corresponding teaching strategies of the strain capacity, change teaching mode, strategy design according to the situation of the students.

4. Adaptive Learning Theory Based on Network

The adaptive learning based on the network is a kind of learning system, which is based on their own situation (Lo J J, Chan Y C, Yeh S W. 2012), and can make their own learning plan and free choice for their own learning content and learning methods, and then make progress.

4.1. Feature of Adaptive Learning Based on Network

It takes learning as the main body. Adaptive learning based on the network is a process of learning knowledge. In this kind of network education environment, learners can make a learning plan according to their own time, energy and ability, and can control the whole learning process. In this environment, learners are active participants in the learning, and the teacher is a guide leading.

It has individualized learning. Adaptive learning based on the network can be adapted to each individual learner, and it is the basic requirement for the realization of the complete individualized learning. Learners can choose a more comprehensive learning content in a different way, which is convenient and flexible. In this network environment, learning content and structure can adapt to learners themselves, and learners must have the ability to independently learn (Bhasin S, Sharma N, Patre P. 2011). Based on the above analysis, we believe that the adaptive learning based on the network is a kind of individual learning.

It has self-monitoring learning. In the process of adaptive learning based on the network, the learners should adjust themselves according to the progress of their own learning, and not only that, with the continuous improvement of the learning situation, learners should monitor the learning activity.

4.2. The Necessary Conditions for Realizing Adaptive Learning Based on Network

It has rich learning resources. In the adaptive learning based on the network, it is necessary to choose the free choice of learning objectives and learning styles, and learning resources must be rich, which is based on the basic conditions of the network adaptive learning that can be carried out smoothly. So we can say that the adaptive learning based on the network is a kind of resource based learning, which can adapt to the different needs of different learners.

It has timely and accurate information feedback. In the adaptive learning based on the network, the learner is trained by the self-monitoring and adjustment of cognitive

activities. In the process of monitoring and learning feedback information, the learners can find out the problems existing in the process of cognitive activities and reduce the blindness in the learning process. This can improve the efficiency and success probability.

It has accurate and objective assessment. Accurate and objective assessment of learners is important, and the most important function is to diagnose and adjust the function. Specifically, the learners learn to diagnose their own learning situation by learning the feedback of the system, and find their own problems in learning, adjust the learning process, and achieve their learning objectives. Learners in the process of learning based on the network, they can carry out accurate and objective assessment according to the information of many aspects of their own, and learners can understand their learning situation in the assessment process, and can control the learning process (Dale A, Armitage D. 2011). It can be said that learning activity is a kind of assessment activity, because it is an important basis for learners to understand their learning ability.

5. The Design of the Model of adaptive English Learning System Based on Computer Network

5.1. Architecture of Adaptive Learning System Based on Network

In the study of the basic structure of the adaptive learning system based on the network, we must first understand the overall logic structure of the system which is shown in Figure 2.

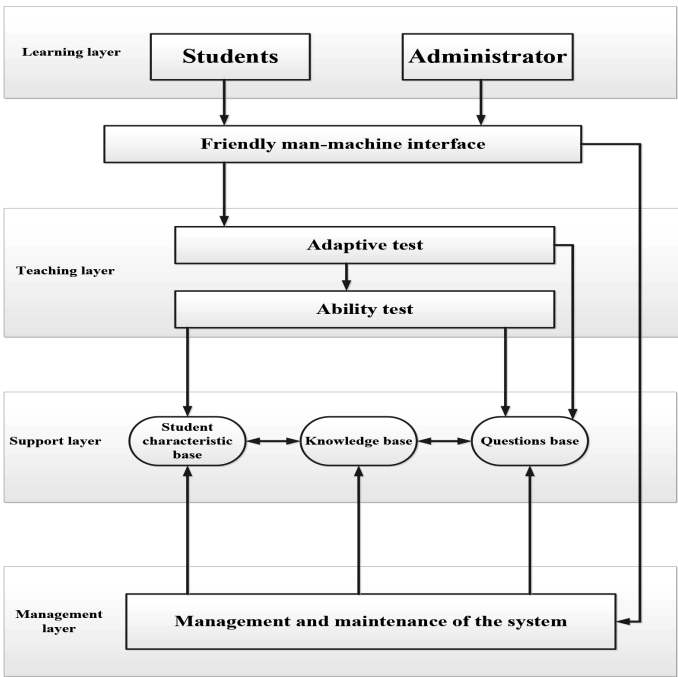


Figure 2 – Logic Structure Diagram of Adaptive Learning System Based on Network

5.1.1. Learning part

Learning part reflects the basic characteristics of the network based adaptive learning, when the learners want to learn certain resources on the Internet, the first needs to register the account, then it accounts into the adaptive learning system according to this, if the learner is willing to that, the system will evaluate the level of knowledge of the learner.

5.1.2. Teaching part

The logic rules formulated by the teaching part mainly is to meet the specific needs of learners, in the network based adaptive learning system, the guide is the dominant, which can interact with any part of the system.

5.1.3. Support part

The supporting part is composed of the adaptive test question bank, the learner's record database and the knowledge base. The content in each database can be rewritten according to a certain principle. It can be edited by the guide in a certain scope. In the adaptive learning system based on the network, the support part is the basic guarantee for the learners to realize the adaptive learning.

5.1.4. Management and maintenance part

Management and maintenance of the main work is to establish a test question bank, the teaching content is divided into mutual contact and relatively independent cognitive unit, and the cognitive unit of the professor, the professor is in a different way. When the learners have some problems in the process of learning the network resources, the main function of the management and maintenance is to coordinate and manage the students' cooperation.

In the part of management, it is the focus of the topic design model. The design is as follows.

First, determine the scope of the question. The scope of the test question is determined by the student's click behavior on the front interface.

Secondly, determine the difficulty of the exam. The scope of the test is the first parameter adaptive model to determine the topic, in addition, but also to determine

Determine the difficulty value of test questions. For each student who uses this system to test, from the question bank, the medium difficulty level is randomly called as the starting point. Let $d_1, d_2 \dots d_m$ indicate the difficulty level of the m in the selected range, and $D(n)$ is the difficulty of the n problem.

$$D(1)=D(2)=\left[\frac{d_1+d_2}{2}\right] \quad (1)$$

If we take into account the random factors of the students' answer, the design of the initial two questions can be more objective to measure the level of students. If they have the answer, this indicates that the ability of the students is rather than the difficulty; if

they answered incorrectly, that ability is under the given difficulty; if a pair is wrong, we believe that only by these two topics is temporarily unable to determine the ability of students, but also need to use the same difficulty to measure. From the beginning of the third questions, the difficulty level is determined by the upper and the last question. So, when $n = 3$, we can draw the following formula.

$$D(n) = D(n-1) + 0.1 \quad (2)$$

The $n-1$ and $n-2$ have the answer.

$$D(n) = D(n-1) \quad (3)$$

Only one of the $n-1$ and $n-2$ has the answer.

$$D(n) = D(n-1) - 0.1 \quad (4)$$

Both the $n-1$ and $n-2$ have no answer.

Third, determine whether the test is available.

Fourth, generate a dynamic temporary table. When the above three conditions are determined, we can put all the questions that meet these conditions to the collection of questions, and store them in a temporary table.

5.2. Design principle of adaptive learning system based on network

The design of adaptive learning system based on network environment is mainly for the learning environment of network learning environment, learning behavior model and operation method, and describes the dynamic changes of some intelligence and non-intelligence factors, which makes the learners better understand and evaluate their own ability. Under the network environment, the adaptive learning system construction is based on the following design principle: 1. To adapt to the individual difference and improve the overall quality of the principle; 2. System integration principle; 3. The principle of feedback control; 4. Dynamic contingency principle; 5. Rules of the principle of efficiency.

5.3. Construction Strategy of Adaptive Learning System Based on Network

5.3.1. The construction of the learner's personalized learning model.

The goal of this paper is to construct a system which is suitable for the study of learners' personality. The ultimate goal of this system is to realize the individualized learning.

5.3.2. It is a diagnosis of the learner's cognitive ability and knowledge level.

In the process of learning, it includes the learning diagnosis all the time, which is the basis of constructing the adaptive learning system based on the network. In constructing

adaptive learning system, it is necessary to use adaptive testing technique. By timely and effective diagnosis, learners can have a timely and accurate understanding of their learning situation, so as to better carry out adaptive learning. In the adaptive learning system based on the network, it is mainly for the learners' cognitive ability and knowledge level, and the accuracy of diagnosis must be high.

5.3.3. Learning strategies for system learning environment

In the adaptive learning based on the network, the learners in the network system can monitor their own learning process. According to their own learning situation, they use the most suitable learning strategies. In the process of learning, the essence of learning strategy is to adjust and control the learning activities. From another perspective, cognitive strategies are the effective use of learning style, mainly because of the increasing demand for computing.

5.4. Model of Adaptive Learning System Based on Network

Any study cannot be separated from a specific knowledge area, and adaptive learning based on the network is also true. Therefore, the author designs and develops adaptive learning system based on the network, first of all, the different knowledge domains in the form of subjects to be distinguished. Due to the limited time and energy, this system is mainly designed and developed in middle school English as an example. As shown in Figure 3, the adaptive learning system developed here is divided into three subsystems, which are the main body of the operation, the public subsystem, the learner subsystem, the guide subsystem. Each subsystem contains a number of functional modules.

6. Learning Effect Testing

The subjects were students of 2014 grade in our school. There were 50 students in the experimental group, and adaptive English learning model based on network is used.

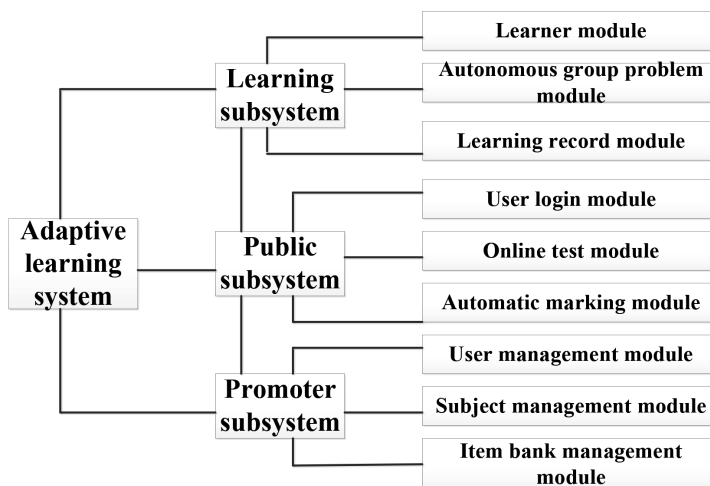


Figure 3 – The Diagram of Adaptive System Structure and Function Module

In the control group, there were 48 students who used the traditional English learning model. The experimental time is the first semester of 2014-2015. Before and after the experiment, the English reading test (total score is 50 points) was carried out (Figure 4). Calculate the average score and standard deviation, and the results was carried out P test. Experimental results are shown in table 1.

From table 1, it can be seen that before the experiment, the results of the control group were slightly higher than that of the experimental group, and $P > 0.05$, which showed no



Figure 4 – Multimedia Scene Teaching

Project		Experience group	Control group
Before the experiment	Mean value	26.88	27.56
	Standard deviation	10.16	9.67
	P value	0.168	
After the experiment	Mean value	35.48	32.25
	Standard deviation	9.56	10.15
	P value	0.021	

Table 1 – Results of Experiment

significant difference between the experimental group and the control group. After the experiment, the scores of the experimental group were significantly higher than those of the control group, and the $P < 0.05$, which showed that the model was beneficial to the improvement of students' English reading level.

7. Conclusion

There is still a long way to go in the study of adaptive learning based on the network, but it will eventually become the future development direction. Better computer network can provide a better tool for the study of the majority of students, so as to better promote the realization of the true sense of the adaptive learning based on the network.

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Application of Language Education Information Management System Based on Component

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Abstract: Objective: The establishment of the University Language Education Management System (ULEMS) is to improve the efficiency of the management of educational functions and promote the development of language education. Method: System design based on component. Process: Through the analysis of the shortcomings of the information management system of language education in the University, the methods of the component based software development method was put forward to develop the university language education management system. The system framework of the ULEMS was designed based on component development and the component assembly language education management system is carried out. Result& Analysis: The productivity of software development is greatly improved by the development of the component based language education management system. Result: The educational management system is helpful to improve the education level of language education.

Keywords: Component; ULEMS; Management System.

1. Introduction

We have entered the information society, the world is in the era of rapid growth and renewal of information, the objective fact of the educational reform and the University's management put forward new requirements (Wold S, Esbensen K, Geladi P. 1987). The traditional management mode and the teaching mode of the University under the new environment is under the stern challenge. In the information society, the advanced education mode is bound to combine educational theory and modern information technology. It is applied to computer network based information technology, to build a network, digital, intelligent, new education, learning and research of campus platform, create digital campus"(Montagnini M, et al. 2014; Bansal H S, et al. 2004).

With the rapid development of China's education and the deepening of the reform of education, the number of participating in education is increasing year by year, which brings new challenges to higher education and management. The establishment of the ULEMS (Hall C M. 2014), the development and utilization of information resources, not

only can provide the basis for the decision-making of the leadership. It can also make use of today's advanced technology, especially computer technology, so that the educational functions of the management of the work scope, work style, operating mechanism and so on, so that different levels of change, so that the effectiveness of management, efficiency and quality, promote the development of language education(Mittal D, Gubin M M, Schreiber R D. 2014).

In the existing management system, there is no full consideration of the future of the system can be expanded, reusability, reliability and maintainability, with the expansion of the size of the school, the changes in the management of business and the improvement of the efficiency of the requirements, the drawbacks are increasingly exposed. Such as:

1. cross platform, different development tools to develop the application of the general can not transplant other customers on the platform.
2. maintenance and upgrade is very inconvenient.
3. on the client software and hardware requirements, in particular, the continuous upgrading of the software, the hardware requirements continue to improve, increase the cost of the whole system.
4. lack of openness, it is difficult to integrate with Internet, the system of users outside the system is difficult to access the system resources, the system of the client is also difficult to access system resources.

With the popularization and development of nternet, the application system is more and more complex, and the complexity of software is increasing, especially the management information system (MIS), which is becoming more and more complex in the MSI software system(King N P, Bale J B, Sheffler W. 2014).

The design and implementation of the information management system of University Language Education Based on the idea of software component is proposed, which solves the problems of the current education management software(Qiu Z, Dubin A E, Mathur J. 2014).

2. Software Components and Related Technologies

2.1. Software Component

The reuse technology based on software component technology has become the mainstream technology of software reuse, component technology has become the core technology of software reuse. Early components mainly refers to the code can be reused, commonly referred to as code. In this period, the main problem of software production is to improve the efficiency of software development by making full use of the existing source program code, subroutine library and class library (Jiménez, D. L., Redchuk, A., Dittmar, E. C., & Vargas, J. P., 2013). Now, the scope of the software component is expanded, including analysis, design, code, test pieces and other types, this paper mainly studies the component technology of the code.

Software component(Voss F K, Ullrich F, Münch J. 2014) is a software unit that is individually developed and has a specific function to be assembled into an application system with other components and supporting environment. This common element shows the three basic features of the component:

1. The unit features--the component is not a complete application, and multiple components can be constructed by assembling an application;
2. Reuse characteristics--It can be called or work with other components in the heterogeneous environment of the cross address space, the network, the language, the operating system;
3. Commodity characteristics--component is a pre fabricated knowledge service, which needs to be encapsulated. From the component characteristics, it can be seen that it is the basis for the implementation of distributed computing unit(Klauda M, Lauff U. 2008).

This article is defined as: the component is the design and implementation details of the design and implementation of the interface only to provide the interface of the relatively independent and reusable software unit, which can form a larger component of other components. Components are not only limited to the source code, but also to the needs, system and software architecture, documentation, test plan, test case and data, and other useful information on the development of activities, these information can be called software component. For components, it should be designed, implemented, packaged and written in accordance with the requirements of reusable. The member should be cohesive and has a fairly stable open interface. Generally speaking, the component has the following characteristics:

1. The platform has nothing to do with the software to realize the real interoperability between different manufacturers. The component can come from different software component developers. It can be produced, obtained and configured independently.
2. The language has no sex, the software component must be released in binary form, so that it can be implemented in the programming language, so it has nothing to do with language and development environment(Tsai Y R, Talley P C. 2014).
3. Location transparency, software components, and the use of its programs can be run on the same process, different processes or different machines. The software component is the same for the remote component processing mode and the processing method for the local component.
4. The component package has the internal design and implementation details, but only to the external interface. The external access component can only be passed through the interface of the component.
5. Scalability, since each component is independent, only through the interface and external communication, when a software component needs to provide new services, can be completed by adding new interfaces, will not affect the original interface users, and new users can re select a new interface to access services.
6. The component has relative independence. Component relative to other components, it is loosely related to other components.
7. Components can be combined with other components to become more components, supporting collaborative work.

2.2. Software Component Development Process

The development of application system based on software component generally includes the following steps:

1. system demand analysis

Demand analysis is to understand the problem domain space, to obtain the demand of each typical system in the field and component requirements. As the component is used in the whole field of the system development, it is different from the requirement analysis of the system software. System software requirements are defined in the system, and the requirement analysis of the component is defined in the whole field.

2. establish the system model

The establishment of the system model is the use of UML modeling technology, according to some of the requirements of the previous analysis, the establishment of some typical systems analysis model.

The first step is to carry out systematic investigation and functional analysis, the personnel, the external system, which is to determine the system boundary and the problem domain. At this stage, the system analysts in the field of expert assistance, and learn from the successful case of the past, mainly through the CASE USE block diagram to describe.

The second step is to analyze the process of each CASE USE of the system, that is to define the implementation process of each CASE USE. In this step, the system analyst communicates with the domain expert, CASE USE's end users and their related roles, and designs the SEQUENCE block diagram and COLLABORARIN diagram of each CASE USE. For SEQUENCE block diagram and COLLABORARIN diagram, they are expressed in each CASE USE implementation steps, each step is actually achieved by function, and as for each function belonging to which class, how to achieve this is not determined.

The third step is to analyze the method of object oriented analysis, and combine the SEQUENCE block diagram and USE diagram of each CASE COLLABRATION to establish the CLASS block diagram of the system (including the object layer, the feature layer and the relational layer). Each method in the CLASS block diagram only needs to define the interface, that is, the input and output parameters, and does not include the implementation details, the specific implementation (including the program block diagram, implementation code) to stay in the design phase.

3. a software component model

After the establishment of the system CLASS diagram, the system structure and development of the system are considered.

Platform, build system component model.

4. design software component

Before the design of the component, the query can reuse the component library, the existing components (the same direct reuse, similar

Reuse of the new components by modifying reuse. The new component design includes interface design (IDL

File design), each function of the program block diagram design, algorithm design and complex algorithm pseudo code.

5. realize the new software component

Software component implementation is a component of the code to achieve and compile the package, etc.. Use software tools to transform design components

For the available modules.

6. software component testing

2.3. Development Method Based on Software Component

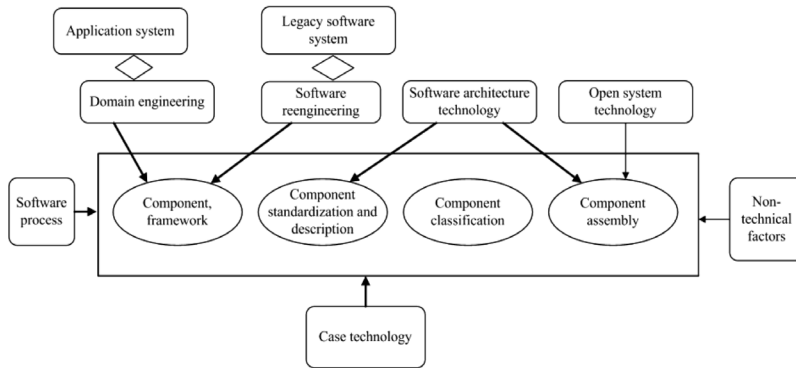


Figure 1 – Software development model based on software component

Based Software Development CBSD (Component) is the development method of the application system which is based on the Off-The-Shelf Commercial (COTS) (or reusable component). CBSD is the process that the organization uses the component to carry on the software development process, which may be the COTS member's revised edition, also may be by the developer completely from zero. It is the process of constructing software system with high efficiency and high quality, which is based on the support of a certain software component model and one or more software components in the library. When using CBSD, the design and development of personnel in the realization of the time is very few, more time spent in the analysis, design, planning and integration. According to the characteristics of CBSD (See figure 1), the main contents of CBSD research include:

1. component acquisition: a component production and mining component from existing systems;
2. component model: the essential characteristics and the relationship among the components;
3. the specification and description of the component: a component model, which is based on the component model, solves the problem of precise description, understanding and assembly of components;
4. component classification and retrieval: Research on component classification strategy, organization model and retrieval strategy, establish component library system, and support component of effective management;
5. component assembly: a component assembly mechanism based on the component model, which includes a source code level assembly and a run level assembly based on component object interoperability;
6. standardization: standardization of component model and standardization of component library system;
7. software architecture: how to use the software component to construct the system structure of the software component quickly and reliably, and focus on the overall structure of the software component system and the interconnection between the components.

3. Component Based Language Education Information Management System Design

From the perspective of management and service functions provided by the university language education management system, the management system of language education in university includes system management, teaching management, network teaching support system, university language education resource pool management. The functions and structures of each part are introduced in the following sections.

3.1. System Management

System management includes the following modules:

1. User management: user management for students, teachers and administrators. Management includes user rights management, adding users and user information; management and maintenance of user basic information; management and maintenance of user related applications; receiving user's financial information through information interface between settlement system.

The user management system for teaching situation analysis and evaluation system to provide users with the behavior analysis of the data, performance analysis of the basic information.

2. system setup and maintenance: responsible for system maintenance, parameter setting, data backup and recovery. System security and data integrity, consistency is mainly determined by the module.
3. Announcement and communication management: system maintenance (such as bulletin boards, school news column updates, etc.), to respond to customer requests, provide (on the system's) advisory Q & A, timely troubleshooting, to ensure the normal operation of the system, support for inter departmental reporting.
4. The authority control: the system users are divided into different roles, different roles specify different functions to different users, only to provide him with the function of the interface, control the display of information.
5. Safety management: the system should set up the security level and the level of authority, take the necessary software or hardware isolation measures to ensure system security.
6. Data backup: regular to the system key data backup, and the backup file for detailed record, once the accident, the system can be based on the backup data and backup record data recovery.

3.2. Teaching Management

1. The student status management: student management to students as the unit, the use of the system of information management functions, through the establishment and maintenance of the students' e-learning files to manage the learning process. Electronic learning archives include the identity information of students, course information, learning task

information, learning activity record, learning evaluation information, electronic activity set, etc(Land S M. 2000).

2. Curriculum management: the management of the course includes the addition of modifying the new curriculum to develop the training plan and setting up the pilot relationship. In the course of the curriculum management, the management of the administrator is part of the “teaching service management” of public information, teachers are part of the management of network teaching as well as “courseware production” curriculum and courseware information. The inter school curriculum management including curriculum sharing management. Training plan expansion management (teachers sharing course into the school training plan), the school students in the curriculum of many universities, there are some constraints on the choice of. Analysis of the course of the school and the school demand information sharing, provide information for the adjustment of the teaching plan. Through the analysis of students behavior and achievement, adjusting curriculum system, mutual recognition of credits shared directory (Sudnikovich W P, Pullen J M, Kleiner M S. 2004).
3. The remote examination system(Green W. 2014): the teacher can choose manual or intelligent test paper way, generating test paper for students online examination or test. The students’ test papers by automatic scoring system after deposit grade database, teachers can obtain all kinds of information according to the statistical analysis.
4. Performance and public information management: performance management module is the main management of students in the past year and the results of the report, the students report card, student achievement entry and modification of the time, etc.. The function of public information management is to publish, manage, maintain and inquire about the educational administration announcement, the communication between the departments and so on(Desmond E, Briggs F. 2014).
5. Learning information management: in order to effectively monitor the students’ learning situation, to understand the progress of students’ learning, to find the problem in time, to guide students to be specific, the network teaching management system should also have students tracking function. The student tracking system should analyze and evaluate the activity information of students and the teaching platform, collect and deal with the basic information (including student’s score, total score, group score, individual, etc.). Using these data, the teachers could not only to teach students in accordance with their aptitude, also can improve and enhance the curriculum quality, such as WebCT can according to student tracking system of statistical results to understand the course of each page clicks and duration, which data can be speculated the teaching content of interest and difficulty degree.
6. The academic activity platform: academic activity is an important part of the undergraduate and graduate students in the research teaching is to improve students’ learning interest, and stimulate students’ creative ability. The construction of academic activity platform can provide a network support environment for students to carry out academic exchanges and academic research.

3.3. Language Teaching Support System in University

In the environment of language teaching in university, the role of language teaching supporting system is dual, which is to realize the students' learning and teachers' teaching.

1. The teacher prepares a lesson system: for the teacher to use the personal resources storehouse and the public resources storehouse in the teaching resources, the nimble establishment, the revision and the publication multimedia electronic lesson plan.
2. The system: to provide students with common questions, intelligent question answering system, Q & a discussion room, BBS discussion area and other four kinds of question answering discussion mode. The teacher puts the questions that the students often put forward to answer the questions in the "common problem" for the students to inquire.
3. Homework mark system: teacher arrangement, correcting, statistics, analysis of the course work, the overall situation of browsing operations. Students' online complete and modify the job, online submission of work. And can browse by the teacher's comments and system analysis results of the analysis report. Understand the knowledge points.
4. The virtual experiment system: the experimental results and the experimental report of the curriculum of the teachers are corrected, the statistics and analysis. Students to the teacher layout of the experiment before the experiment. Conduct online simulation experiments, and submit the experimental report after the completion of the experiment.
5. Remote examination system and test generation system: teachers online editing various forms of questions. The system automatically generates and releases the examination papers. The examination results are corrected, statistics and analysis. Students online check the test, complete and submit the test, the system provides a side test analysis report.
6. Other auxiliary systems: including the course, the course introduction, the teacher introduction.
7. personal resources system: including my poster, personal homepage, address book, memo, and personal mail.

3.4 Management of Language Education Resources in Universities

The resources system of language education in university is composed of six parts, which are public resources, personal resources, resource management system, resource search system, teacher role application interface and students role application interface.

The resources in the public resource database are unified management, and the teachers have no right to upload the teaching resources to the library directly. At the same time, in order to meet the flexibility of teachers' use of resources, the teacher has a personal personal resource library, the library resources to file format, by the teachers' self-management. If the teacher needs to upload the resources of the personal resources to the public resource database, it needs to be strictly audited by the management system, but it can download the teaching resources in the public resource database to the personal resource library. The structure of this kind of

resource can not only ensure the security and unification of the teaching resources in the public resources database, but also take into account the management of the teachers' personal resources.

Teachers use the function of the teacher to provide the interface, according to the teaching requirements of the organization, publishing public resource database in the basic resources, also can use the integrated unit to complete the specific teaching activities, but also directly to the courseware database directly to students. Students can only use the specified resources through the application interface of the student role. The network resource management system is only a strict management of the resources in the resource database, and not interfere with the teacher's personal resources.



Figure 2 – Media instruction

Network resource library management system has audit, add, modify, delete and other functions. Under the management of the resource pool management system, the teaching resource library will be in the process of the teaching activities of the teachers, and the rapid “growth” to better serve the teaching.

4. Language Education in University

4.1. College Language Education Information Management System Framework Design

The framework of the university language education management system uses the idea of layered, which will be separated from the environment related part and business logic. It provides a large number of reusable components, the system functions and business process templates, and supports the rapid development of distributed information system with three layer structure. The overall structure of the university language education management system is shown in Figure 3.

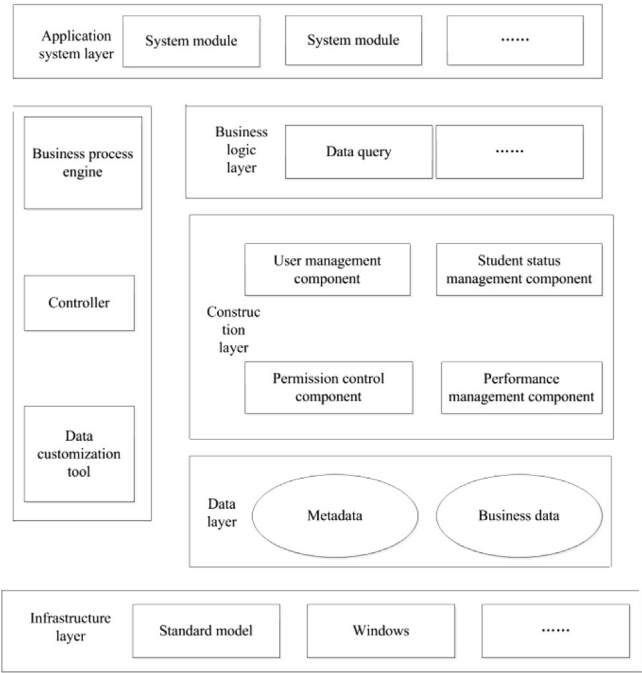


Figure 3– Frame structure of education management system in university

4.2.Design of Parts of the Domain Component

The component is divided into component parts and component instances. The parameters of the component classes are generated by giving examples.

From the traditional point of view, the software component is equivalent to the process and the data structure of the data structure. For example, a number of programming languages of the mathematical functions, processes, etc. can be seen as a software component. In the process of using the advanced programming language to design the procedure and function, or from the function library to select the function to meet the needs, the use of the program design language provided by the structured statements and select the function (including custom functions). In the development of the application software based on the software component technology, we must first obtain the suitable component, use the component's assembly and the control to construct the application software.

4.2.1. The design of the software component of the user management

User management, including user registration, delete, verification, distribution of authority, etc.. Like this kind of user management soft component in the general public construction bank have, belong to the public component. Can be retrieved from the component library use, we have here to design a study and use. The soft component of the user management is a composite component, which is composed of a composite of a

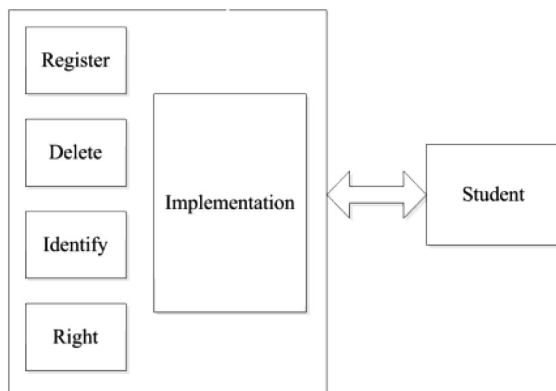


Figure 4 – User management entity component model

registered atomic member, a member of the atomic component, a verification atom, and a power allocation. Its component entities, as shown in Figure 4.

4.2.2. The design of the software component of the curriculum management

The educational administrator is responsible for the increase of the course, the revision of the plan, the creation of the training program, and the editing and publication of the public information of the course. Component model.

4.2.3. The design of the soft component of performance management

The main functions of the performance management of soft components are all kinds of report management, student achievement entry and modification management, public information release, management, maintenance, performance, query, academic announcement and so on. Its component model is shown in figure 6.

4.3. Component Assembly of Language Education Information System in University

Component assembly refers to the process of using the software component to assemble into the application software.

Software assembly process is generally:

1. select the appropriate, the higher level of the component as a template, if there is no suitable template to re design, to add components.
2. a lower level component is chosen as a sub component, which is assembled. If there is no suitable sub component in the component, it also needs to be redesigned.
3. if the sub component is still a high level of abstraction, then repeat the above process.

In this paper, a simple selection method is adopted, which is composed of the conditional expression and execution sequence. The basic selection of the connection part only contains a conditional expression, if it contains a conditional expression, which is called

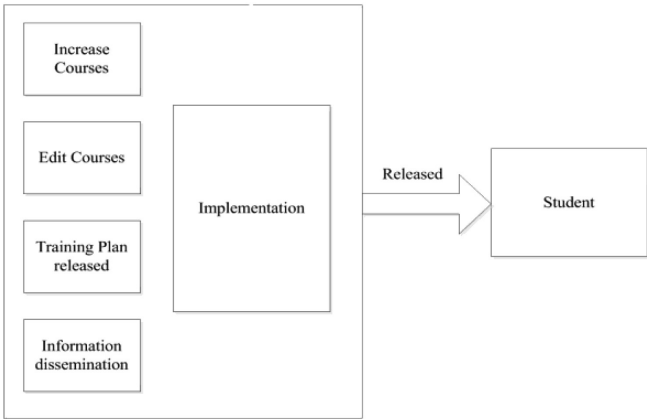


Figure 5– Course management component entity model

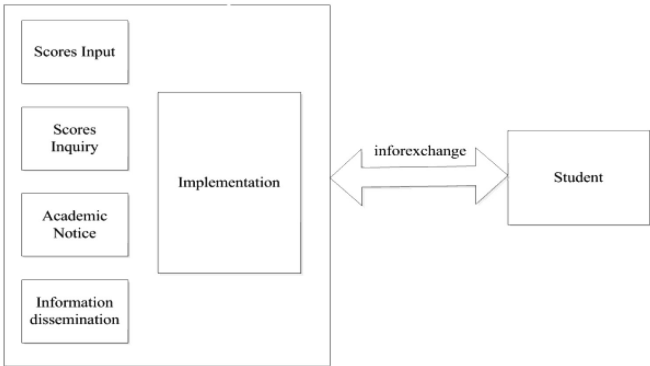


Figure 6 – The entity model of the performance management component

a composite choice link. We use depth first search algorithm, the composite selection of the connecting pieces by layer traversal.

5. Conclusion

In order to cater to the needs of the information management in the language education in university, a component model of the ULEMS was designed. Through the analysis of the shortcomings of the information management system of language education in the University, methods of the component based software development method was put forward to develop the university language education management system. The system framework of the ULEMS was designed based on component development and the component assembly language education management system is carried out. The ULEMS is conducive to improving the education level of language education, the level of students' language, the level of information management in universities.

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Research on Electronic Music Arrangement Based on Computer Platform

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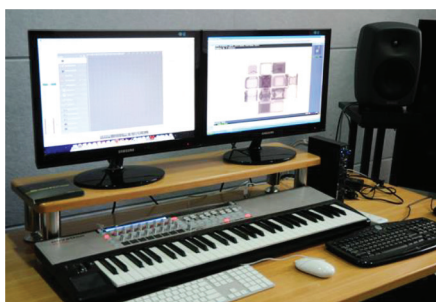
Abstract: Objective: In order to promote the development of intelligent manufacturing of electronic music. Methods: Establishing a research method of electronic music based on then computer platform. Process: This article introduces the application of computer music at home and abroad, describes the theoretical basis of speech enhancement algorithm, and establishes the principle of computer quantization of syllable information based on the sound synthesis. Results & Analysis: The article compares the musical prototype and the electronic music based on the computer platform, analyzes the process of computer quantized rhythm information, and through the analysis of the experimental data, it's found that the electronic music system based on the computer platform can synthesize the music which is similar to the original music. Result: The electronic music research system based on computer platform can promote the development of electronic music.

Keywords: Electronic music; Computer platform; Sound synthesis; Syllable information

1. Introduction

The computer music is usually refers to the use of the computer and music production software as the main creative tool, with the synthesizer, audio or audio software as a creative resource, combined with the traditional theory of composing music and modern music theory, music creation, and finally make a creative form of “sound” music. The development of computer music is closely related to the development of hardware, application of computer music in addition to the production of software, need a sound source, sampler, MIDI keyboard, MIDI controller, synthesizer, MIDI interface and other hardware. Due to the development of science and technology, at the same time, in order to adapt to the development of computer music production technology requirements, computer hardware and software are constantly changing, these changes also make the development of computer music production technology has changed. The source is an indispensable equipment of computer music making, because no matter what kind of music production can not be separated from the sound. So the music producer in the process of making the constant pursuit of better sound, more polyphony, we put forward higher requirements on the sound source. The source of the manufacturers in order to meet the needs of the market, continued research and development of new and better sound. Early classical sources are generally 32 polyphony 16 channel capacity of only

tens of megabytes, waveform. Making a simple music, so the number of channels and polyphony can, but if you want to make more complex music often needs several audio work together to complete the task. So the source of the initial development is mainly to increase the tremolo number and channel number. Such as the Roland Sc8850 reached 64, channel 128 polyphony(Billinghurst M, Starner T. 1999). Even though there is a large enough number of channels and the polyphony, but making music sounds or not too good to be true, this is mainly due to the audio waveform capacity is too small. Figure 1 (a) - (b) shows the electronic music manufacturing platform and equipment.



(a) Electronic Music Creation Laboratory



(b) Electronic Music Equipment

Figure 1 – Manufacturing Platforms and Devices for Electronic Music

In order to make the sound more real, gradually developed sampler, it not only can be sampled to produce a variety of musical instruments and the existence of the nature of the sound, and it can be edited into musical instruments, and not compressed. Because the tone is not compressed, the sound quality can be improved greatly when making music. I want to make a lot of music teachers and classmates have seen Yamaha A3000, EMU e5000, Akai S6000. Akai Z8 early samplers. Now the combination of traditional audio and audio sampler advantage, using more storage space, also joined the sampling function, such as ROLAND Fantom XR, Roland V-Synth and other audio, not only has a large waveform capacity, but also can be edited to the tone, at the same time, it has a certain sampling function, so that the sound quality reached an unprecedented height (Paradiso J. 1997).

2. Materials and Methods

2.1. Speech Enhancement Background

At present, people can only use some data and experience to quantify the voice, in order to approximate the feeling of human ear. Speech signals in real life are often noisy, in order to obtain the best possible pure speech signal, we need to enhance the speech. The perception of human ear has many interesting features. For the perception of human ear, the amplitude of the speech spectrum is relatively easy to detect, while the spectrum of the phase change is not easy to detect. Human ear has masking effect (Prata,

P., Fazendeiro, P., Augusto, C., Azevedo, S., & Machado, V. C., 2013), the strong signal at a certain frequency can mask the weak signal of the frequency of the signal. These features are used to enhance the speech signal. Speech enhancement is mainly based on the different characteristics of speech and noise. Although the speech is non-stationary random process, however, the physiological changes of human vocal system is limited, so voice has short time (10-30ms). Gauss white noise is a typical stationary wideband noise. Redundancy of speech signal is very strong, even if the pure speech signal to a frequency square wave pulse amplitude modulation, speech intelligibility is not big. The rise of digital signal processing technology, is a turning point in the history of speech processing. The fast Fourier transform and the development of linear system theory gave birth to the model of speech sound (Griffiths P. 1981). Figure 2 is the voice sound model.

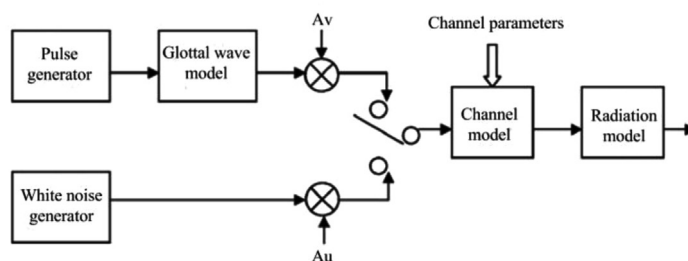


Figure 2 – Voice Sound Model

Where A_v and A_u represent the voiced and unvoiced excitation amplitude, the transfer function of the vocal tract model is represented by the full pole model:

$$V(z) = \frac{1}{1 - \sum_{k=1}^N a_k z^{-k}} \quad (1)$$

Where N is the model order, is the coefficient of the poles, and Z is the independent variable of the Z transform domain. This model is equivalent to the linear prediction encoding model, which can be used for fast recursive algorithm, coefficient of the model of output signal. In the late ninety's, the rapid development of communication, especially the rapid development of mobile communication, provides a very realistic impetus for the study of speech enhancement. People use the results of the previous speech enhancement, and a new attempt. As for speech with noise wavelet transform, transform a Karhunen Lowe', and artificial neural network to achieve the purpose of speech enhancement (Paradiso J. 1997).

2.2. Method of Speech Enhancement

In a variety of methods of speech enhancement, spectral subtraction method is applicable to a simple and practical algorithm to enhance the humming signal. Spectral subtraction method is more suitable in the different background of humming signal

quickly enhanced effectively. Noise power from the background noise of the recording, such noise power varies with the surrounding environment, expand the use range of humming retrieval algorithm, increase flexibility. The late seventy's, subtraction (SS-Spectral) because of its simplicity and efficiency, became the focus of the study of speech enhancement algorithm. The test results prove that it is the most effective speech enhancement algorithm in many methods (Burraston D, Edmonds E. 2005). Linear prediction of F.Ball Steven in the United States of America Utah University (LP-Linear Prediction) analysis of the study, proposed and developed the classical spectral subtraction method for the estimation of the noise spectrum. Then the researchers put forward some improved methods for reducing the spectral method, the most important is proposed by Berouti et al. The experimental results show that the performance of the optimal estimator is close to the minimum mean square error of the minimum mean square error, in fact, the method of spectral subtraction is the standard of other speech enhancement algorithms. Even in recent years, there are also a lot of reports on the study of the spectral subtraction method, which proves that the algorithm is very much alive. In the study of the auditory characteristics of human ear, the amplitude of the speech spectrum is the main function of the auditory characteristics of the human ear, and the phase of the speech spectrum is very small (Rodgers T. 2003). So in the use of spectral subtraction enhancement when humming signal, emphasis is placed on the accurate estimation of the magnitude spectrum. The phase spectrum of the noisy speech is generally used as the phase spectrum of the speech signal. Spectral subtraction method does not use the reference noise source, in order to estimate the short-time spectrum of speech, assuming that the noise is statistically stationary, that is, the expected value of the noise amplitude spectrum of the speech is equal to the expected value of the noise amplitude spectrum of the non speech period. And then the use of the noise and the speech is not related to the characteristics of the, with no voice during the measurement and calculation of the noise amplitude spectrum estimation values instead of speech noise during the period of the amplitude spectrum, and noisy speech spectral magnitude subtraction, estimated speech amplitude spectrum was obtained. When the value of the above difference is negative, it will be set to zero. The amplitude spectrum and the phase of the noisy speech are performed by the FFT transform, can get the result of enhanced (Cascone K. 2000). The principle diagram of the method is shown in Figure 3.

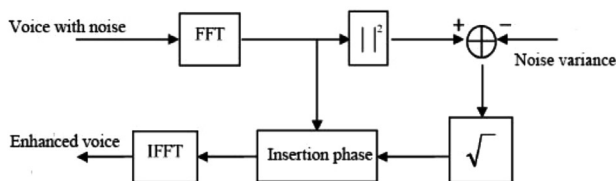


Figure 3 – Schematic Diagram Of The Method

Pure speech signal $s(n)$ for stationary signal, $w(n)$ for the stationary Gauss noise, $Y(n)$ is a noisy speech signal, there is:

$$y(n) = s(n) + w(n) \quad (2)$$

Among them $0 \leq n \leq N-1$, Fourier transform of the three signals:

$$Y_k = S_k + N_k \quad (3)$$

Thus available:

$$|Y_k|^2 = |S_k|^2 + |N_k|^2 + S_k N_k^* + S_k^* N_k \quad (4)$$

The $*$ denotes the conjugate. As $s(n)$, $w(n)$ is independent, so N_k and S_k are independent, and N_k for the zero mean Gauss distribution, so there are the following formula:

$$E(|Y_k|^2) = E(|S_k|^2) + E(|N_k|^2) \quad (5)$$

$$|Y_k|^2 = |S_k|^2 + |N_k|^2 = |S_k|^2 + \lambda(k) \quad (6)$$

Among them, as long as the $|Y_k|^2$ minus $|N_k|^2$ from the $|S_k|^2$. Without considering the phase relationship, ears are not sensitive to phase. $\lambda(k)$ statistical average of the noise power spectrum $|N_k|^2$ for no speech (Magee W L. 2006).

$$\lambda(k) = E(|N_k|^2) \quad (7)$$

Thus, the estimated value of the pure speech signal is:

$$|\hat{S}_k| = \left[|Y_k|^2 - E(|N_k|^2) \right]^{1/2} = \left[|Y_k|^2 - \lambda(k) \right]^{1/2} \quad (8)$$

In order to prevent the negative power spectrum, using half wave rectification method:

$$|\hat{S}_k| = \max \left\{ \left[|Y_k|^2 - \lambda(k) \right]^{1/2}, 0 \right\} \quad (9)$$

The gain function for defining the k spectral component is:

$$G_k = \frac{|\hat{S}_k|}{|Y_k|} \quad (10)$$

And a posteriori SNR:

$$\gamma_k = |Y_k|^2 / \lambda(k) \quad (11)$$

Can be rewritten as:

$$G_k = \left(1 - \frac{1}{\gamma_k} \right)^{1/2} \quad (12)$$

By the upper formula can clearly see the physical meaning of the subtraction method it is equivalent to the noise of the voice of each spectrum multiplied by a coefficient G_k . When the signal to noise ratio is high, the possibility of the speech is very large, and the attenuation of the noise is small. On the other hand, when the signal to noise ratio is small, it is considered that the probability of the speech is small, and the attenuation of the noise is increased. The $\lambda(k)$ in the formula is the noise spectrum of the current analysis frame in place of the noise variance of the silent period (Furr-Holden D. et al, 2006). In fact the noise is subject to Gauss distribution, the expression is:

$$p(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-(x-m)^2 / 2\sigma^2} \quad (13)$$

Among them, m is the mean of x , and σ is the standard deviation. The noise of the frame power spectrum random variation range is very wide, in the frequency domain. The maximum and minimum values of the maximum and minimum values are often different from several orders of magnitude. Therefore, after subtracting the noise spectrum, there are some of the larger noise power spectral components of the residual part of the spectrum is a random occurrence of spikes, the formation of a certain sense of rhythm and rhythm of the residual noise, so called musical noise (Pachet F. 2003).

2.4. Basic Principles of Computer Music

Synthesis sound is usually considered as the whole process of sound synthesis and production. The first step is the synthesis of sound production is obtained in the static spectrum concept. The simplest sound is a sine wave that contains only one point (fundamental frequency). Mathematician Fourier has proven: any periodic waveform, can be broken down into one or more of the superposition of 2 sine wave. This is the famous Fourier theory. The first step in the synthesis of sounds is the idea of a target sound, determine the appropriate sound synthesis algorithm. For example, the simulation of the two major camps in the synthesis of the subtraction and addition synthesis, synthesis of FM (frequency modulation) and AM (amplitude modulation) synthesis in digital synthesis. The primary task of the practical operation of the sound synthesis is to obtain the sound source, that is, the vibration source, generally through the electronic oscillation, digital audio and real-time audio three ways to obtain. At present, the use of digital technology of electronic music products almost completely replaced the oscillator, the synthesizer and its some of his electronic music composition uses the standard configuration of the audio part (for short), digital circuit and digital design are more general and more accurate, and the price

is also cheaper (Cross L. 1999). The advantage of this kind of digital processing is obviously reflected in the commercial recording industry, so digital recording replaces the long established analog audio technology. FM frequency modulation synthesis technology was invented by Stanford University Chowning John, the core part of this synthesis technique is called an operating device, which is composed of three parts: sine wave oscillator, Amplitude controller, envelope oscillator. Its working principle is first generated by a sine wave oscillator, and then use the envelope to modulate the waveform, and the output of the sound quality and the volume is adjusted by the amplitude controller. Since each FM synthesizer has more than two operating devices, so they can start the work at the same time, change the tone of the operating device. The sound produced by the FM synthesis technique has the characteristics of complex harmonic components, but its disadvantages are obvious. The tone is very difficult to carry out manual intervention. FM synthesis technology in the field of expertise is through the DX7 Yamaha series. The synthesizer has a reputation for its popularity, which has six operating and 32 different kinds of preset, with a combination of different operating and preset, can produce a very delicate and complex electronic color tone and sound texture. And in the popularization of the use of FM synthesis technology is a success (Paradiso J A, O'modhrain S. 2003). In the last few years, most of the PC's sound card, FM Synthesizer YAMAHA OPL3, which can be found using the chip of this kind of synthesis technology, is a kind of cheap sound card in the last few years, FM frequency modulation synthesis technology is widely used in all kinds of game consoles and popular electronic piano sound module, but it is due to the wide spread of the degree, the music that makes the sound of the FM synthesizer is heard in the ear, was slowly given a kind of commercial low color, the musical sound of human beings is eager to the traditional sound of the instrument. This directly led to the gradual withdrawal of FM synthesis technology in today's mainstream synthetic technology stage, let in the following synthesis technology. Because of the increase of the CPU frequency and the capacity of hard disk and the maturity of the programming technology, with the development of the synthesis technology of audio sample playback software is worth more attention based on, because we can almost certainly predict, only on the field of synthetic technology for the sample playback, with the computer performance and internal data exchange rate rose sharply, the software sampler and the source will be the future development trend (Tzanetakis G, Cook P. 2000).

2.5. Quantifying Pitch Information By Computer

In physics, the pitch information is produced by the vibration of an object. In the computer, the content of the scale is from a low to high order, which is divided into a 0-127 position, called tone symbol. Pitch information can be determined by means of sound symbol information. With a byte, 8 bit binary number to store all the information. We define the tone symbol to the piano as the central C as the voice symbol 60, as the center of the center in the range of 0-127. So relative to 0-127, in the range of C-1 to G8 audio and sound symbols between symbols. In the 88 key piano range is A-1 to C-7 audio and sound symbols between symbols, but we can actually contains 10 to eight degrees. The relationship between intervals are two tones in pitch. Whether has appeared two notes form a melodic interval or they appeared at the same time the two tone harmonic interval is in time of interval between two. We usually defined between the two notes, notes for interval difference. The interval is equal to the difference tone minus the root crown symbol tone symbol (Qahwaji R, Colak T. 2007). When the interval difference is

positive, that root crown sound pitches when the difference is negative, that tone of voice with low crown root. Whether the interval difference is positive or negative, the name of its absolute value and the corresponding interval is. Melody line, namely the pitch relationship of the melody, it is sound in time continuous process, a morphological mark composed of different interval and direction. In the computer, according to the method of ` , said interval, the first tone as root, that is to initialize, and follow each tone in turn with the previous one, the interval difference by stored in the computer. In the first mode, according to the mode to determine the tonic position and corresponding sound symbols. And then, according to the law of the natural scale, to determine the sound symbols of the other sounds.

For example, the first to determine the central C major diatonic scale is the tonic (Houtz L E, Gupta U G. 2001), the symbols are 60, 62, 64, 67, 69, 65, 71, 72.

3. Results and Analyse

The length of the organization is called the rhythm. The same time as stress and stress free, in accordance with the order of the cycle of repeated, called the beat. The beat is organized by the strong or weak. Every time used to form a beat, called a unit shot. In music, the rhythm of the music is labeled with the mark. The number of units of each section of said film, said unit took note value denominator.

In the computer, we will be in a four note the average is divided into 480 parts, each part is called (Tick), the eight notes for 240, and so on (Schindelin J, et al. 2012). According to the above, we can use the bar, point to represent tempo and rhythm, as shown in Table 1.

+	Beats	Beat point	Tone symbol
1	1	0	62
1	2	0	62
1	2	240	64
1	3	0	66
1	3	240	66
1	4	0	69
2	1	0	66
2	1	240	66
2	2	0	64
2	2	240	64
2	3	0	62

Table 1 – Rhythm Quantization Table

A comparison between the Ampol and the piano sonata No.2 Op.10 produced by the computer. Produced by the melody is composed of a set of two exchange pitch, these two examples is not the same, but were similar for the two exchange of pitch cycle of repetition, and at the rear sound high school occurred modulation changes. The piano sonata ‘pitches in the music and the sound. The main feature is the melody changes after

the three repeat. Again, this chord changes in the last beat of each bar, however, Ampol scores did not show this change in pitch, the reason is the change of harmony.

Comparison:

A-item=ampoln:

Notes-A: 57 60 57 60 57 60 64 60 57 60 57 60 57 60 67 60

B-item=beets0102:

Notes-B: 59 61 59 61 59 61 60 63 61 65 61 65 61 65 60 63

PitchCor: 0.12

Linear-PitchCor: 0.12

PitchDif: 45/180

Interv-A: 3-3 3-3 3 4 -4 -3 3 -3 3 -3 3 7 -7

Interv-B: 2-2 2-2 2 -1 3 -2 4 -4 4 -4 4 -5 3

InterCor: 0.127

Linear-InterCor: 0.222

IntervDif: 45/120

Fuzzy-A: 1 -1 1 -1 1 1 -1 -1 1 -1 1 -1 1 2 -2

Fuzzy-B: 1 -1 1 -1 1 -1 1 -1 1 -1 1 -1 1 -2 1

FuzzCor: 0.155

Linear-FuzzCor: 0.548

Fuzsamenes: 11/15

Direct-A: 1 -1 1 -1 1 1 -1 -1 1 -1 1 1 -1 1 -1

Direct-B: 1 -1 1 -1 1 -1 1 -1 1 -1 1 -1 1 -1 1

DirecCor: 0.464

Dirsamenes: 11/15

We can see from the linear association between the fuzzy interval and the direction of the mutual distance, although the pitch and interval of the mutual relationship not very high, however, the music produced by the computer is similar to the original music. According to the display of the data, it can be said that the melody and the original music is a similar style(Magnusson P S, et al. 2002).

4. Conclusions

With the rapid development of computer technology and the concept of digital music teaching developing in the hearts of the people, more and more colleges and universities set up the course of computer music production. Computer music was produced when the computer enters the field of music, it produces the electronic music, and also greatly developed the electronic music, so it's the product of the combination of computer and music. Based on the background of speech enhancement, the rhythm of the computer information is quantified, the development of modern music and the combination of computer is more and more closely, so the study of computer electronic music becomes more and more important. Based on the combination of the computer application technology and the principle of sound synthesis, this paper analyzes the method of quantitative syllable information in computer, introduces the principle of sound synthesis in computer music, and through the comparison between the computer simulation, it's known that the melody produced by computer and the related music production software is similar to that of the original music.

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Two kinds of Computer Desktop Image Compression Algorithm Based on Clustering Algorithm

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Abstract: Objective: Two different clustering algorithms are proposed, which is based on computer desktop image compression algorithm, and the other is the computer desktop image compression algorithm based on HEVC and clustering algorithm. Method: Theoretical analysis and encoding. Process: Image compression algorithm based on color clustering algorithm is divided into 16 * 16 non overlapping blocks, color rich text / graphics block for color clustering, and the natural image block using H.264 method, the hybrid block using hybrid encoding method. The compression scheme based on HEVC and clustering algorithm is used to classify the computer desktop image. The color clustering algorithm is used to cluster the blocks. And then use HEVC intra prediction algorithm to compress the block of the encoding algorithm. Image compression algorithm based on color clustering algorithm is divided into 16 * 16 non overlapping blocks, color rich text / graphics block for color clustering, and H.264 method was used for the natural image block, hybrid encoding method was used for the hybrid block. The compression scheme based on HEVC and clustering algorithm was used to classify the computer desktop image. The color clustering algorithm is used to cluster the blocks, and HEVC intra prediction algorithm was used to compress the block of the encoding algorithm. Result& Analysis: Two different kinds of computer desktop image compression algorithms are used in different compression technology and have different characteristics. Result: The two kinds of computer desktop image compression methods are efficient image compression technology, which can promote the development of image compression technology.

Keywords: Clustering algorithm; Computer desktop; image compression algorithm.

1. Introduction

With the rapid development of computer application technology and computer network, people begin to use the Internet to realize remote control, monitor computer supported cooperative work, and get more and more extensive application, which mainly include network multimedia conference, remote office, remote teaching, product demonstration, stock analysis system and cloud computing application based on desktop sharing. These applications directly promote the generation and development of desktop sharing

technology, but because of the huge amount of information on the computer desktop image, it must be compressed before transmission.

Computer desktop images include text, graphics, and natural image information, which are collectively referred to as mixed images. Traditional image and video compression standard JPEG series H.26X(Kanungo T, et al, 2002) series and mpeg-x series is formulated based on the characteristics of human visual sensitivity and natural image tone continuous, they for natural images can achieve a good compression effect, but if contains text / graphics information and natural image information to the mixed images at the same time, the direct application of the these traditional compression standard to compress can achieve the ideal compression efficiency and the compression quality, such as decoding images are prone to significant ringing effect. Therefore, the traditional compression standard is not suitable for to the computer desktop image compression.

To this end, this paper makes an improvement on the computer desktop image encoding method, and puts forward two kinds of computer desktop image compression algorithm based on clustering. Is based on color clustering of the new computer desktop image compression algorithm and the HEVC and clustering algorithm based on the computer desktop image compression algorithm (Martins, J., Gonçalves, R., Santos, V., Cota, M. P., Oliveira, T., & Branco, F., 2015). The former has the characteristics of high compression efficiency, clear dividing and so on. The latter is easy to implement and the quality of the decoded image is higher.(Cacciari M, Salam G P, Soye G. 2008)

2. Related Studies

At present, the computer desktop images of the compression encoding is mainly divided into 2 classes based on the layer and block. Algorithm based on layer based on layer 3 mixed raster content (MRC) (Catani S, Dokshitzer Y L, Olsson M. 1991) image model, the hybrid image is decomposed into the foreground layer and the mask layer and the background layer, then code. The block based algorithm is to divide the image into blocks that do not overlap the same size, and block the encoding. Compared to the former classification more accurate. For the high quality of the scanned document image compression, commercial software Digipaper(Chatterjee M, Das S K, Turgut D. 2002), Lura-Documnet(Maulik U, Bandyopadhyay S. 2000), DjVu(Likas A, Vlassis N, Verbeek J J. 2003) are all of these methods. But it is precisely because this kind of precise and complex classification method greatly reduces the computing speed, so in the real-time strong desktop image compression, low complexity block based method is more suitable for.

Existing computer desktop image compression algorithms are based on block. Network Computing AT&T(Chan H M, Milner D A. 1982; Escott E J, Rubinstein D. 2003) (VNC) is a lossless compression algorithm based on sub rectangle classification, but the compression efficiency is too low when it is applied to natural images. As an improvement, the paper proposes a hybrid desktop image compression algorithm, which divides the $8 * 8$ block into text / graphics block and image block, and uses JPEG-LS and dynamic JPEG compression. The algorithm for text only or image has better compression effect, but when the mixture of the two, JPEG compression caused the ringing artifacts in the text. Another classification of a more refined hybrid compression algorithm is proposed by the literature, which is carried out in the image

block of text / graphic elements of the extraction and classification of encoding, greatly improving the quality of encoding images.

3. Computer Desktop Image Compression Algorithm Based on Color Clustering

3.1. Computer Desktop Image Compression Algorithm

3.1.1. Overall Process

In order to compress the image of the computer in real time, this paper presents a new compression method based on the different characteristics of the text / graphics and image in the desktop image. The whole process is shown in Fig.1.

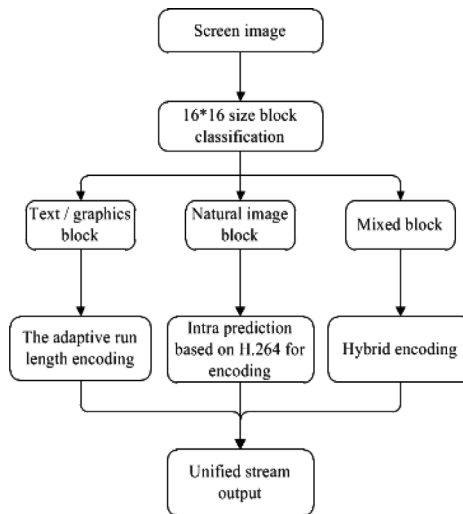


Figure 1 – Overall Process of Computer Desktop Image Compression Algorithm

This chapter first divides the computer desktop image into $16 * 16$ sizes of non overlapping blocks. Then, according to different color and texture features, different block is divided into 3 types: text / graphics block, block and image block. The text / graphics block is a lossless compression method. The image block is similar to H.264 frame. The hybrid encoding mode is used to predict the hybrid block.

3.1.2. Block Classification Algorithm

For the computer desktop image, the image is divided into $16 * 16$ sizes, and the classification of the $16 * 16$ block is based on the histogram information. Because the color of the text / graphic block is simple, the texture changes dramatically, and the color

of natural image block is rich, and the texture is smooth. So based on histogram analysis, the algorithm is simple and efficient. Their respective histogram information, mainly the following 2 points:

1. the number of colors of the text / graphics block is small, and the number of natural image blocks is rich;
2. the histogram of the text / graphic block is discrete, and the histogram of the natural image block is continuous.

The processing of block classification is shown in Fig.2.

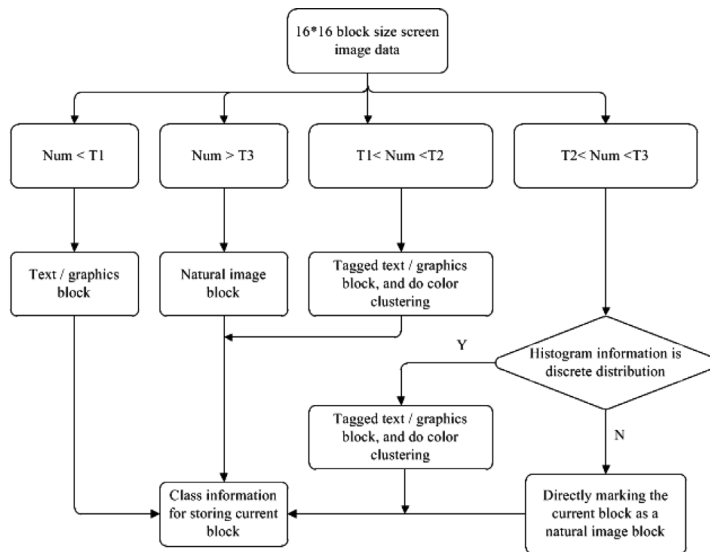


Figure 2 – Processing Procedures for Classification

T_1 , T_2 and T_3 are 3 kinds of different colors of the threshold value (T_2 , T_3 , T_1 , respectively, 4, 20, 9), Num is the number of colors. For simple text / graphics fast color types will not exceed T_1 , therefore, the number of color types is not more than T_1 (including T_1) block is directly divided into text / graphics block; and even though some of the text / graphics block of the number of colors more, but not more than T_3 . Therefore, the number of color types is greater than the T_3 of natural image block; for the number of colors is greater than T_1 and less than T_2 , it is also divided into text graphics block, but this kind of situation requires that the color data of this kind of block is processed, which makes the color number of the T_1 , so that the next step of the text block is lossless compression encoding; For the color types of T_2 and less than T_3 , because of the distribution of natural image block is non discrete, so that the histogram of the block is analyzed. If the histogram distribution is non discrete, then it can be divided into natural image block. If the histogram distribution is discrete, then it is divided into text / graphic block.

3.1.3. Color Clustering Method

Clustering method has been widely used in computer field, such as machine learning and data mining. This paper applies clustering method to computer desktop image

compression field for the first time, which makes the compression of computer desktop image improve.

For more than the number of kinds of colors in the T1 text / graphics block, because the number of kinds of color has been more, if directly to this kind of text / graphics blocks using lossless adaptive run length encoding, greatly increase the compression complexity and reduce the image compression ratio. After the color clustering process of this kind of text / graphics block, the number of its color types is reduced to T1, which can reduce the complexity of lossless compression and improve the compression ratio of the image.

The clustering of color is the classical algorithm in the non hierarchical clustering algorithm, the K-Means(Haffner P, Howard P G, Simard P. 1998; Thomas C, DeVries P, Hardin J. 1996) algorithm. The main idea is that the random selection of K objects, each of which represents the average value or center of a cluster. To the rest of the object, according to its distance from the center of each cluster, it is assigned to the nearest cluster. Then the average value of each cluster is calculated. This process is repeated until the criterion function converges. The concrete steps of the K-means algorithm are as follows:

Step1: randomly selects K objects from N data objects as the initial clustering center.

Step2: calculates the distance between each object and the center of the object according to the mean value of each clustering object, and then divides the corresponding object according to the minimum distance.

Step3: to calculate the mean (central object) for each (a change) clustering.

Step4: loop Step2~Step3 until each cluster is changed so far.

3.2. Block Compression Algorithm

3.2.1. Text / Graphics Block Encoding

Because of the strong edge and shape features, the human eye is sensitive to text / graphic information, and the quality of the decoding is higher, so the method is the best choice. After treatment of color clustering, the number of kinds of color does not exceed T1. Therefore, this paper proposes adaptive run length coding and index table, coding combined with lossless compression algorithm, as shown in Fig.3.

The lossless compression algorithm of text / graphics block first converts the actual color value of the block to the index value and constructs the index table with the corresponding index value. Then, the index table is used for the actual encoding. This can greatly save the code stream, so as to improve the compression ratio. The color value to the index table of the conversion process as shown in Fig.4, which, from the left to the right, respectively, block the original pixel distribution, color data converted into an index data and converted block index data distribution(Le P Q, Dong F, Hirota K. 2011).

The converted data using the adaptive run length encoding algorithm to compress the. The main principle, according to the statistical characteristics of image pre designed a variable length code table, numbers of each codeword, numbered in ascending order

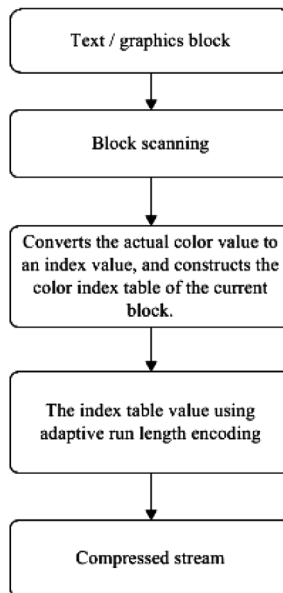


Figure 3 – Lossless Compression Algorithm for Text / Graphics Block

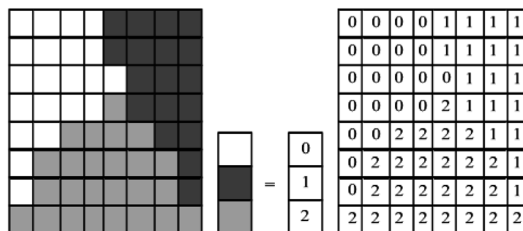


Figure 4 – The Conversion Process of Color Value to Index Table

corresponds to a codeword of from short to long. Code to run length distribution of a corresponding code number, according to the frequency of run length, dynamic update run the corresponding code number, the high frequency of run length corresponds to the smaller number, which correspond to the shorter codewords. The update process run corresponding number of codewords as shown in figure 5. Among them, run 10 original corresponding code number is 8, first through the code number 8 search code find corresponding code, use this code to run 10 code, and then update the code number corresponding to run 10, updated run 10 corresponding to the codeword number 7, next appears again run 10, with a codeword number for 7 of the corresponding codeword of the code(Wallace G K. 1992).

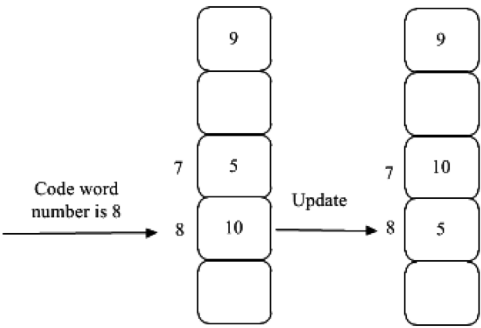


Figure 5 – Update Process of Code Corresponding Code Word Number

3.2.2. Natural Image Block Encoding

Natural images(Cai J F, Candès E J, Shen Z. 2010) have rich color information, the texture is smooth, and the quality of the human eye is relatively low, even though some of the human eye is not too large, so the image block can be compressed effectively.

This paper is similar to the use of the image block is similar to the H.264 of the intra prediction encoding algorithm, the brightness components using 3 x 16, 8 x 8 and 4 x 4 of the encoding mode, each model uses 9 kinds of prediction direction, the color difference components using 8 x 8 intra prediction mode, 4 kinds of prediction direction of each model, the use of the context adaptive variable length encoding encoding algorithm.

3.2.3. Hybrid Block of Encoding

The hybrid block contains both text and graphics information and information of natural images. Therefore, it is divided into natural image blocks in the early stage of block classification. The image block is detected by using the method of the image block, which is a mixed block and the approximate lossless compression method is used to carry out the encoding.

In the frame of H.264, the distortion of the decoded image is controlled by the quantization step size, and the encoding is used to reduce the quantization step size to achieve the lossless compression, which is simple and effective to realize the compression of the hybrid block.

4. Computer Desktop Image Compression Algorithm Based on HEVC and Clustering Algorithm

4.1. Adaptive Block Classification and Color Clustering Algorithm

In the face of the complexity of computer desktop image information, it is necessary to pre process the image information. The block classification and color clustering proposed in this paper is a relatively simple way to deal with the computer desktop image information, and its structure is shown in Fig.6:

Num represents the number of colors of the block, and T represents the number of colors of the T1=4, T2=9, T3=20.

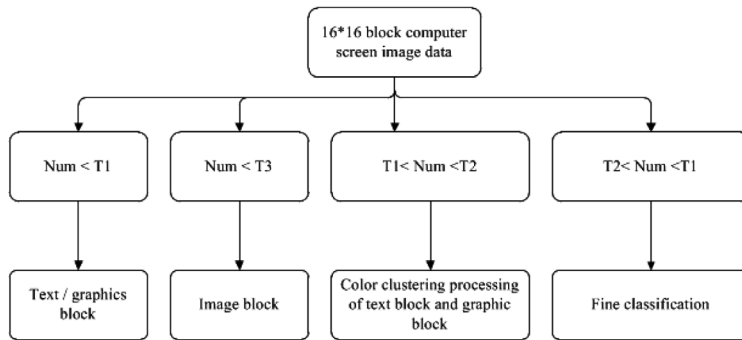


Figure 6 – Block Classification and Color Block Structure

4.1.1. Block Classification

In the computer desktop image data, data includes different texture features, text data, graphics data, image data, mixed data. In this paper, the block classification of hybrid image compression algorithm based on, first to the computer desktop image for block, will block of text, graphics block in a lossless adaptive run length encoding algorithm code, image block to hevca intra prediction coding algorithm code, mixed block to a hybrid coding algorithm for encoding.

Compared to the image block, the text block and the graphics fast color to be relatively simple, this paper selects the 16*16 size block, each size block has different amount of color, according to the pixel value to classify, so can improve the quality of the computer desktop image reconstruction.

4.1.2. Adaptive Block Size Partition

Adaptive block size is divided into the computer desktop image block classification, according to the fixed size of the block, adjacent block type or similar, can be used as a combined block to encoding, so you can reduce the number of classified information.

4.1.3. Color Clustering of Text Block and Graphics Block

In computer desktop image, the threshold value of text block and block is usually less than or equal to 4. However, it is found that there is a large amount of error classification according to the threshold value. This is because when the image block is divided into 9, the threshold value is, which can improve the accuracy of block and block.

4.2. Computer Desktop Image Encoding Program Implementation

4.2.1. Basic Frame Design

In this paper, the design of the computer desktop image encoding program is the use of text block, graphics block and image block of color, texture and the use of different encoding algorithm for compression encoding, encoder frame fig.7. In this paper, the text block, graphics block and image block according to the different color and texture,

divided into blocks of text block, block and block, and then use different encoding algorithm to compress encoding, block of text block, graphics block using lossless encoding algorithm; image block using the prediction of the encoding algorithm; hybrid block using hybrid encoding algorithm.

4.2.2. Text Block, Graphics Block Encoding

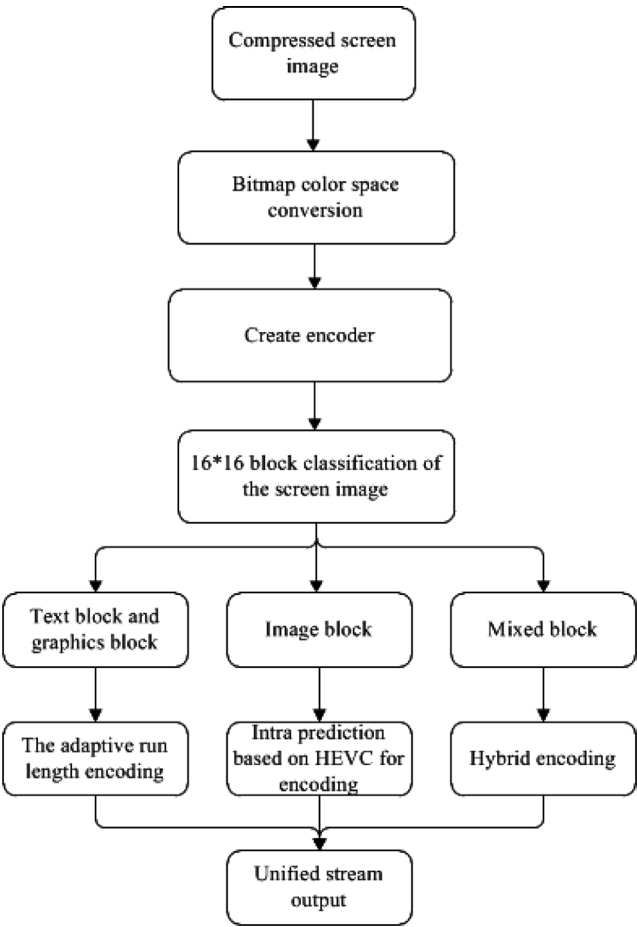


Figure 7 – Encoding Project Framework Design

Due to block of text and graphics block(Heyduk A F, Nocera D G. 2001) the edge color is rich, the lossy coding algorithm for image coding will joint block of text and graphics block the image is blurred, so only use a lossless coding algorithm, this paper establish a adaptive run length coding and index table with lossless coding algorithm and the algorithm to construct a index table, use the index values expressed as pixel values, are not directly encoded image blocks to the actual pixel values, the index of the index table value is encoded.

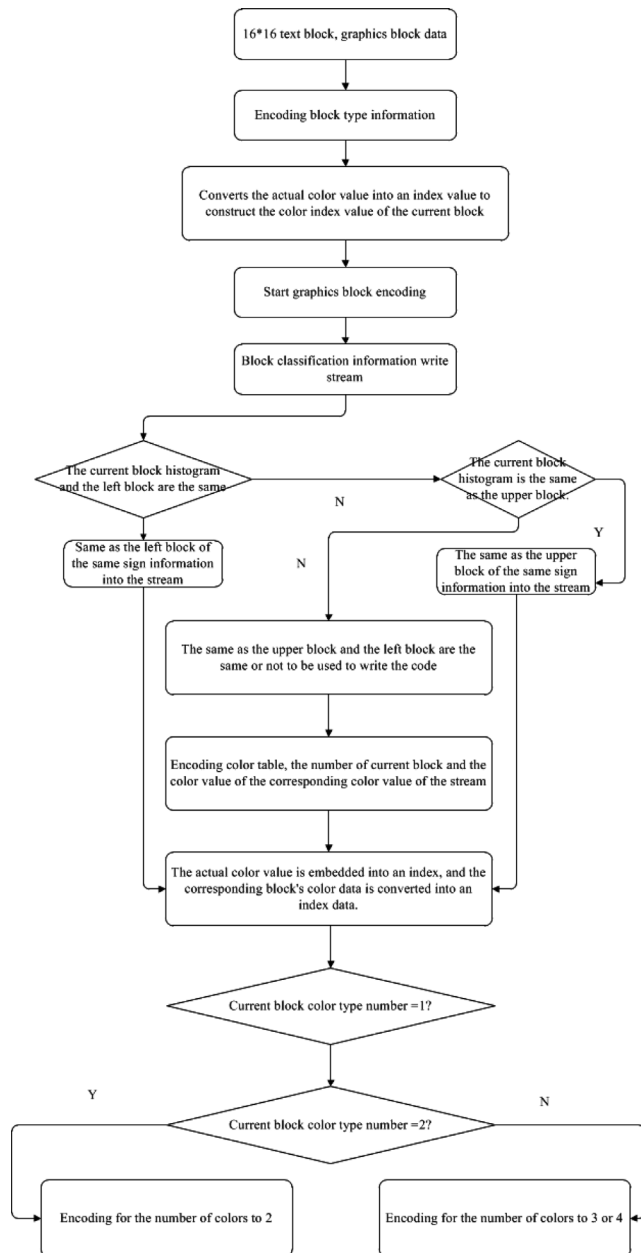


Figure 8 – Text Block, Image Block Encoding Process

4.2.3. Image Block Encoding

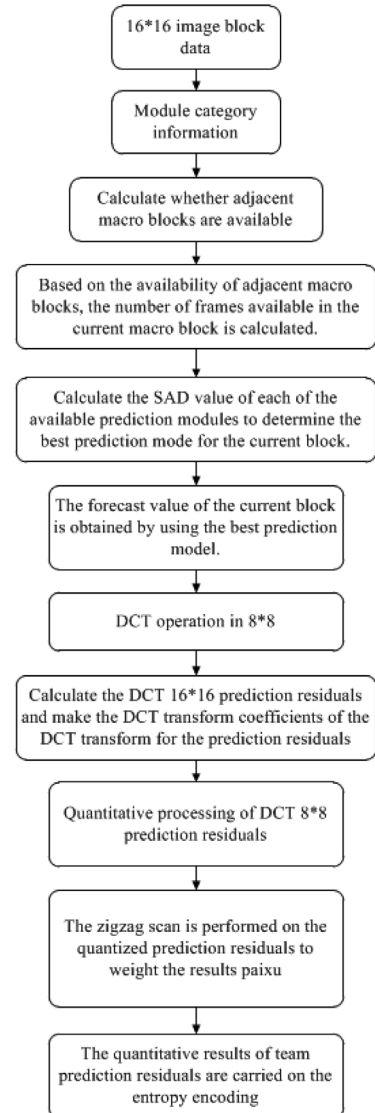
The image block is rich in color and texture is smooth. The use of HEVC (Craft D J. 1998) in the prediction of encoding's algorithm is mainly based on the spatial correlation between the image blocks, which is the value of the pixel value of the current encoding block and its adjacent pixels, which can improve the efficiency of encoding. In the image block encoding, because the color difference component and the intensity component may have the same texture information, so the channel correlation and linear model can be used to reconstruct the pixel value of the pixel value of the pixel values as a reference for the prediction of the color difference components. Forecast method:

$$predc[x,y] = \alpha RecL[x,y] + \beta \quad (1)$$

Wherein, Predc is Color difference component prediction, RecL is Corresponding block value.

4.2.4. Hybrid Block Encoding

The hybrid block contains text, graphics information and information of the image, and the hybrid block is identified by the fine classification algorithm, and then it is compressed by using the similar lossless compression method. In the algorithm based on the transform and quantization, the distortion of the decoded image can be controlled by the quantization step size, and the image distortion is more serious. The image distortion is more serious. Because of the mixed block, the image distortion is smaller, and the quality of the image is reduced, which makes the decoding image almost have no distortion. In this paper, the natural image block of encoding is applied to the hybrid block of encoding, but the quantization step in the process of quantization is very small, set to 1.



5. Conclusion

With the rise of cloud computing, network sharing, information exchange and other Internet emerging services, computer desktop remote became more and more popular for

Figure 9 – Image Block Encoding Process

users. In the computer desktop remote sharing technology, efficient encoding algorithm was used to compress the computer desktop image to the demand side, and the final demand for decoding compressed stream to reproduce the computer desktop image. Image compression algorithm based on color clustering algorithm is divided into $16 * 16$ non overlapping blocks, color rich text / graphics block for color clustering, and H.264 method was used for the natural image block, hybrid encoding method was used for the hybrid block. The compression scheme based on HEVC and clustering algorithm was used to classify the computer desktop image. The color clustering algorithm is used to cluster the blocks, and HEVC intra prediction algorithm was used to compress the block of the encoding algorithm. The two kinds of computer desktop image compression methods are efficient image compression technology, which can promote the development of image compression technology.

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Research on the Application of Cloud Computing English Teaching in the Purpose of Cross-Cultural Communication

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Abstract: With the accelerated process of economic globalization and integration, communication and cooperation between countries become more and more frequent, and cross cultural communication has played a decisive role. Therefore, the importance of the English language ability based on cross cultural communication has become deeply obvious. The new English teaching mode combined with computer cloud computing has gradually become an auxiliary method of English teaching. This paper firstly introduces the background and significance of cross cultural communication and the teaching of cloud computing, expounds the theoretical basis of cross-cultural communication, and analyzes the effectiveness and ability of intercultural communication. Then it introduces the theoretical and practical application of the cloud computing, and puts forward the basis of the English teaching. Then it introduces the theoretical and practical application of the cloud computing, and puts forward the basis of the English teaching.

Keywords: Cross-cultural Communication; Cloud computing; English teaching

1. Introduction

Globalization is the most important and the most rapid development trend and irresistible tide in the world. The great progress of human science and technology and the rapid development of social economy have promoted the communication of people in the world (Abolfazli, S. et al, 2015). The people of all countries are increasingly frequent contacts and more closely linked to the use of foreign languages, especially English. People in different cultural backgrounds cannot avoid cultural differences in communication. In foreign communication, people cannot use foreign language to communicate effectively if they do not understand foreign culture. To use foreign language to communicate, we must understand foreign culture, through learning foreign language and cultural knowledge, and understand and experience foreign cultural differences in order to improve their language ability, social and cultural competence and intercultural communication skills. Only in this way can we guarantee the effective communication and information in the process of communication, which is effective and smooth (Nookhong J, Wannapiroon P.2015).

For a long time, most of the English classroom teaching is the basic mode of the teaching method and the small amount of practice. With the continuous improvement of education theory, science and technology, more and more new technology is applied to the field of education and teaching. Computer Assisted Instruction in recent years, as a symbol of multimedia computer, has become the mainstream of education and teaching. The emergence of cloud computing has greatly promoted the development of hybrid learning and ubiquitous learning. But through the author's preliminary investigation, the author finds that the application of cloud computing and Computer Assisted Instruction's application in English teaching and learning are limited to the items of the objective questions in the listening and reading, while the translation and writing and other tests have little research on the subject (Abreu, A., Rocha, Á., Cota, M. P., & Carvalho, J. V., 2015). In the writing course, the traditional classroom teaching basically follows the same pattern: Teachers talk about the so-called writing methods and writing skills and the students are very passive listening; teachers develop topics and students are required to write. In this teaching environment, the students' individualized thinking is severely restricted, which seriously hinders the students' initiative.

Cloud computing platform can achieve multi person collaboration, creating, editing, sharing of documents and knowledge, which is in accordance with the characteristics of the theory of constructivism and cooperative learning and can create a strong learning atmosphere and provide a collaborative environment for collaborative learning. Therefore, it is the main content of this thesis that how to cross-cultural communication through the cloud computing (see figure 1).



Figure 1 – Application of Cloud Computing in Life

2. Cross-cultural Communication

In the process of global integration, the people of all countries in the world are increasingly frequent, more closely related to each other. Material civilization from other culture can be completely accepted, but other cultures and their own culture in the presence of a huge difference in spiritual civilization, such as religion, social norms, values and behavior are difficult to accept. People in different cultural backgrounds cannot avoid cultural differences when they engage in communication. With the development of foreign language teaching in all countries of the world, people with higher education have been trained in foreign language courses. In the process of international communication, language is not an obstacle, but the real obstacle is the people's understanding of

different cultural patterns and cultural traditions, and do not accept. Therefore, in foreign exchange, if people do not know foreign culture, it is impossible to use foreign language to communicate effectively. In our country, the traditional foreign language teaching heavy language form, light cultural factor, and the cultivation of the students lack of cross-cultural communication ability. We are more and more clearly that we must understand the culture of foreign countries and experience the difference between Chinese and foreign cultures and improve their social and cultural competence and intercultural communication competence. Communication research and culture teaching must be promoted to important position (Mandhala V N, Gupta N Y. 2014).

2.1. Effectiveness of Cross-cultural Communication

Sometimes gestures of nonverbal communication between people of different cultural backgrounds often occur in cross-cultural communication, communication between the two sides is sometimes intimate conversation, sometimes acrimonious verbal confrontation. The effects of these communicative actions are often not the same. Communication is a process of exchanging information and giving it meaning. For the exchange of information, the two sides to their respective encoding and decoding, that is, the information given to this information, give an explanation. The information sender and receiver of the above potential process to do exactly the same, even with the same cultural background of the two people is almost impossible, and cross cultural communication because of its cross cultural characteristics, which makes this completely the same meaning to give more difficult to achieve (Mandhala, V. N., & Gupta, N. Y. 2014).

The effect of communication depends on how much information is given by the two parties to the exchange of information, which is to be able to rule out the misunderstanding in the extent to which the information is exchanged. Misunderstanding exists and a successful communicator will try to minimize it. As a result, the communicative effect is not usually the understanding of each other's meaning and expression of its own meaning, but to a large extent to share information and to reduce the extent of misunderstanding (Merkin R, Taras V, Steel P. 2014).

In the process of communication, encoding, decoding, information sender, information receiver, channel, noise, etc. are all the factors that affect the communication effect. In cross-cultural context, the sender and receiver of information have different cultural backgrounds. They are accustomed to their own cognitive, thinking, the process of their encoding, decoding and the way they often have their own cultural imprint. Such as Americans straight communication style often make a habit to euphemistic Chinese and Japanese people feel uncomfortable and embarrassed. In addition, if, in the cross cultural communication with the aid of translation, the translation level and fidelity will influence the effect of communication. Effective communication means that the information receiver can understand the intention of the information and make appropriate feedback in any context. Of course, this kind of mutual understanding is only relative and we can understand that it is to minimize the misunderstanding. The validity of communication is closely related to the interpretation of the similar meaning. The successful communication is the mutual understanding, but mutual understanding is not the agreement between the two sides. Although the two sides to achieve mutual understanding, but the idea to reach a consensus and to keep the differences are possible.

Both the mutual understanding and the common meaning of the communication are all the reflection of the communicative competence.

In short, effective communication is not usually achieved in the purpose of communication or to achieve a consistent communication, even if one party rejected the request of the other, but both sides of the intent of the other side is clear, communication is effective. To achieve effective communication or to improve the communicative effect, it is essential to develop intercultural communicative competence.

2.2. Competence of Cross-cultural Communication

Cross-cultural communicative competence is the ability to carry on the successful intercultural communication. It refers to the ability of people with different cultural backgrounds to carry out effective and appropriate communication. Cross-cultural communicative competence is an important research topic in the field of intercultural communication. People must pay attention to two important concepts: one is the effectiveness of communication, the suitability of the two is the communicative competence. The former refers to the ability of people to achieve the desired goal through communicative action, which is the ability of people in a specific social environment or the use of the most appropriate communicative behavior (Wolf, H. G. & Polzenhagen, F. 2006).

Cross-cultural communicative competence generally consists of three basic elements: affective factors, cognitive factors, behavioral factors.

The characteristics and constitution of Brian Spits Berg's communicative competence are explained: the communicative competence is embodied in the appropriate and effective communicative behavior of the individual in a specific situation. In the context of cross culture communication, the common points of both parties are reduced, the difference is increased and the communication difficulty is increased. The variables that affect the effective communication include language differences, cultural differences, world outlook, values, etc. Cross cultural communication ability is composed of three factors: knowledge, motivation and skills. The three influence each other. Cross cultural communication skills need to be enough cross-cultural knowledge, positive motivation and effective communication skills, the three factors should be at the same time, any one factor cannot constitute a cross-cultural communicative competence. Klum Si believes that a person with intercultural communicative competence can choose the correct and appropriate forms in a certain social environment, and not only speak and write according to the academic standards and social etiquette of a certain social group. Specifically speaking, a cross-cultural person should be able to do the following 4 points: 1) Able to identify conflicts in the relationship between the two groups; 2) Able to explain the behavior and beliefs of conflict; 3) Able to resolve conflicts or to negotiate the conflicts that cannot be resolved; 4) Able to evaluate the quality of an interpretation system and construct an effective interpretation system according to the information of a speaker with a specific cultural background.

3. Current Situation of Traditional Teaching

In English teaching, the traditional teaching mode is the teaching mode of "preview before class, study in class and practice after class". Seemingly reasonable teaching process in fact, there are many drawbacks.

First of all, the implementation of pre class preparation is not good. Over the years of teaching process, I found that in the course of the study of the contents of the full preview of the proportion of small, most of the students learning tasks are placed in the classroom teaching of the limited time. The special nature of language learning requires that learners should put a lot of time to consolidate and strengthen the language input (see figure 2) (Lee A L, Mader E M, Morley C P. 2015).

Second, the traditional classroom teaching activity is often based on the teaching, the students' participation is not enough. After the introduction of multimedia technology into the teaching, the use of multimedia courseware is becoming more and more extensive. But in the use of multimedia courseware appears more and more the two extremes, one is the multimedia courseware designed electronic lecture notes, dull to arouse students' interest in learning; Two is a multimedia courseware to add a lot of beautiful pictures and audio, video, animation, has greatly attracted the attention of students, but often leads to the neglect of the content of knowledge.



Figure 2 – Multimedia English Teaching

Third, it is often followed by a large number of boring after-school practice after the study of the classroom, which has a serious impact on the students' learning interest (see figure 3).

Constructivism theory points out that the teaching process should pay attention to the students' knowledge structure and the construction of the knowledge system (Logan S, Hunt C. 2014). With the continuous advance of teaching, counseling with autonomous learning has become the mainstream of today's English teaching mode (Nickerson, C. 2005).

3.1. Analysis of the Current Situation of the Traditional Network Teaching Mode

Data communication technology and computer network technology not only have a profound impact on human life and work, but also make the traditional education teaching mode is also a great challenge. Today, in a lot of teaching activities, not only use the multimedia technology, but also add teaching content is to the multimedia information.

However, this teaching method also has a lot of disadvantages: 1) the courseware and video are uploaded to the network and students download them offline, and cannot be a good in-depth exchange of students; 2) most of the distance education mode is based on the text data + a small amount of static pictures, lack of attraction, even if there are a variety of media is not synchronized, cannot

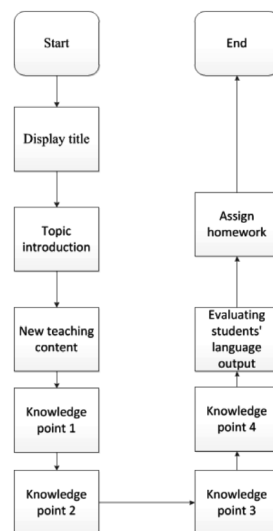


Figure 3 – Traditional Teaching Mode

play its integration effect; 3) due to the large volume of multimedia courseware, it is not effective in the network transmission, which affects the teaching value.

To overcome the above shortcomings, so that remote teaching more vivid image, the introduction of cloud computing technology can effectively solve the above problems. Through the cloud computing technology network teaching, students can easily learn to the needs of teaching resources, teaching management staff can easily generate courseware. “Teaching” and “learning” in a timely manner, the effect of distance education is greatly improved.

4. Cloud Computing and Its Application

What is cloud computing? Google, you'll find at least a few dozen different definitions. Currently widely accepted by the U.S. National Institute of standards and technology research (NIST) definition: cloud computing is a kind of pay per use, this model provides the available, convenient, on-demand network access, access to configurable computing resources, including network, server, storage, application software, services, these resources can be quickly provided, simply put little management work, or with service providers to carry out very little interaction. Cloud computing provides users with the perfect service, from the hardware to the software and even provide the software for the personalized customization and development platform (Karahasanoglu, S. & Skoog, G.2009).

4.1. The Application of Cloud Computing

Cloud computing is a launch with its strong computing power, convenient way of use and low prices and by the parties concerned. With the continuous improvement of technology, and now cloud computing has come to many areas around us (see figure 4).

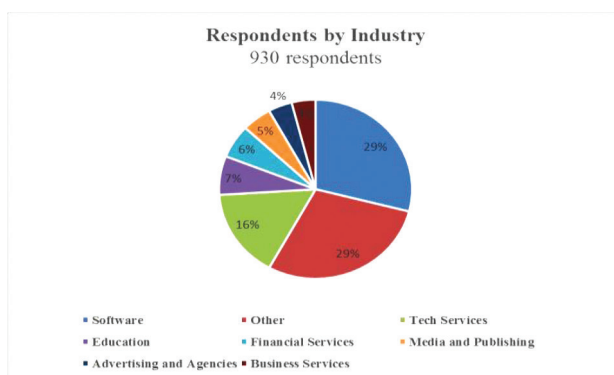


Figure 4 - RightScale 2015 State of the Cloud Report

4.1.1. Cloud storage

This is one of the most accessible cloud applications around us. Now many companies are offering unlimited capacity of the mail system and huge storage capacity of disk, each user with from a few terabyte to tens or even 100 terabyte of storage space is through the cloud computing technology to achieve (Zhu W, Deng X, Li J.2014).

4.1.2. Cloud security

Today, a lot of network security software has launched its own cloud security center. Strategy conception of the cloud security: “more users, each user more secure, because such a large user base, enough to cover every corner of the Internet, as long as a site is a horse or a new Trojan virus appears, you will immediately be intercepted. Cloud security through a large number of clients on the network to monitor the behavior of the network, the latest information on the Internet to get the latest information, malicious programs, push to the server side for automatic analysis and processing, and then distributed to the virus and Trojan solution to each client.

4.1.3. Cloud gaming

Online games with its fine screen and real-time interactive features by a large number of young people and even middle-aged people’s love. However, the network game, especially the 3D effect of the network game, the biggest drawback is that the huge client and ultra-high computer configuration requirements. But in recent years page emergence online, the same beautiful picture, the same vivid effect, interactive features of the same human nature, but do not need to complete the huge client installation, simply open the web page to the fun of the game, which is using the cloud computing to play the huge role. In fact, the game is no longer on the local client but on the remote server, the server will be the screen after rendering together with other game data compression and transfer to the user, the user is no longer required ultra-high image processing capabilities, and only need to have the most basic video decompression ability.

4.1.4. Cloud education

Cloud education or cloud computing assisted education is the product of the development of computer aided education to cloud computing. December 2008 annual meeting of the China Education Technology Association, the Department of science and technology, Shanghai Normal University, Professor Li, Professor of mathematics and Information Technology Department of the Department of science and technology, Professor Li, Professor of Cloud Computing Assisted Education and Cloud Computing Assisted Instruction two concepts, which is the first official occasion of the two concepts. Second years, the China Education Technology Association began in the country to carry out Cloud Computing Assisted Instruction outstanding case selection activities. In May of the same year, “the first national Cloud Computing Assisted Teaching Advanced Training Course” in Shanghai, the purpose is to further promote the development of Cloud Computing Assisted Education Theory and technology, to help those who have the ability to develop a cloud computing platform to build up the CCAI platform to further improve the quality of education and promote the further development of China’s education. Since then, the application of cloud computing in the field of education has begun to receive more and more attention, the proposed Cloud Computing Assisted Instruction, but also for the modern distance education and the ubiquitous learning has played an invaluable role in promoting.

4.2. The Basis of Cloud Computing in English Teaching

The university English teaching mode of the cloud computing technology is totally in line with the four teaching steps presented by the constructivist view of teaching.

First of all, it can provide a variety of situations (such as movies and virtual dialogue scene), which can meet the needs of the teaching content, so that students can receive a variety of classroom content, fully reflect the cognitive point of view, and realize the multi-dimensional input of language teaching, and help them to understand. At the same time, the pronunciation and intonation of pure and authentic, which is good for the students to imitate, improve their learning interest. Secondly, the teacher is the organizer of the whole classroom teaching activity, which plays a guiding role in this kind of teaching mode. The students use the network to obtain information, make or choose teaching courseware. At the same time, the College English teaching mode of the cloud computing technology can be divided into the students in the classroom by the multimedia equipment and the network technology. In the network environment, different groups of students can be discussed at the same time, and each other without interference, teachers can always enter a group, or through the text, or to participate in the discussion, comments on the students. Finally, students play a subjective initiative, according to the requirements of teaching, combined with their own interests and practical level, in the context of their own problems, to find a solution to the problem, to complete the construction of knowledge.

5. English Network Teaching Based on Cloud Computing

5.1. English Teaching Framework Based on Cloud Computing

First of all, the various types of multimedia teaching resources (such as electronic lesson plans, classroom teaching video, experimental demonstration video, etc.) are produced into a unified format of streaming media file. Of course, you can also use audio and video capture equipment for on-site real-time collection. Then, put them in a certain way to the cloud server, according to the actual teaching needs, the dynamic allocation of teaching resources to the learners. Cloud computing provides a new resource and new requirements for the training of teachers' educational technology ability. On the

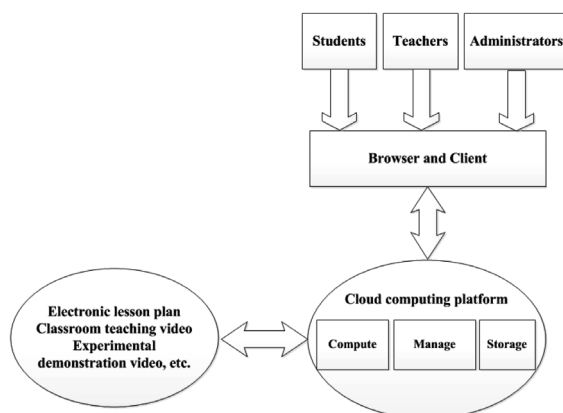


Figure 5 – English Teaching Framework Based on Cloud Computing

one hand, teachers have more cloud service resources for teaching. On the other hand, teachers need to understand the learning characteristics of the students in the cloud era, can choose the appropriate cloud computing services platform, according to the need to provide more suitable for students of personalized teaching, master the use of cloud computing to build a new concept of learning environment. According to the actual needs of students, through the corresponding “cloud” to service providers to order the required teaching resources and service.

5.2. The Characteristics of Foreign Language Network Teaching Based on Cloud Computing Technology

The purpose of foreign language teaching is to cultivate learners' language competence and pragmatic competence. This not only includes the ability of learners in listening, speaking, reading and writing, but also has a profound understanding of Western culture. Cloud services brought by cloud computing provide services for our teaching, resource sharing and unlimited storage space.

1. Resource sharing. Access to resources is not time and place. Visual audio streaming media is stored in the cloud server. Through the cloud computing server URL and directory storage structure, students can obtain from the streaming media server as the audio stream file, without the need to save, carry these media files from any location on the network and at any time.
2. On-demand service, timely and convenient, low cost. “Cloud” is a huge pool of resources, which is the end of the user equipment requirements. Cloud can be like running water, electricity, gas as required to purchase and billing, and it is very convenient.
3. Download time is short. As the audio stream is not required to download the client to play, the delay time is very short, and has nothing to do with the size of the streaming media file, only with the performance of streaming media server, client and network.
4. Students can easily learn to quality teaching resources. Teaching management staff can facilitate the formation of courseware, so that teaching and learning can be timely communication, to a large extent, improve the effect of distance teaching.

5.3. The Advantage of English Teaching Network Based on Cloud Computing

Cloud technology applied in the network teaching will let the network teaching activity simulate the real nature of the classroom and make teaching more vivid and effective. In the premise of increasing the burden of network and server, cloud technology can transfer data to the user as fast and accurate as possible. Network teaching based on cloud computing technology has great practical significance to promote the popularization of network teaching and establish a lifelong learning system.

6. Conclusion

In the global integration, the communication between people of all countries is becoming more and more frequent, and the use of foreign languages is becoming more and more

extensive. People from different cultural backgrounds cannot avoid cultural differences. In foreign communication, people must have a certain ability of language, social culture and intercultural communication skills to ensure the effectiveness and smoothness of communication. The traditional English teaching mode has been unable to meet the needs of cross culture communication, so the new model of English writing teaching Based on the strong advantages of cloud computing and mobile technology is another bold exploration of the integration of educational technology and English curriculum.

This paper first discusses the effectiveness and ability of intercultural communication, and expounds the important position of intercultural communication in the process of global integration. Then it analyzes the current situation of the traditional English teaching mode and the network teaching mode and the many disadvantages. Then it introduces the application of cloud computing in various fields in recent years, and expounds the basis of cloud computing. At last, with the combination of the traditional English teaching mode, the framework of English teaching based on cloud computing is put forward, and its characteristics and advantages are analyzed in detail.

The computer network technology makes the cross cultural communication become more and more small, but the use of computer technology for cross-cultural communication may also encounter the following problems: anxiety; emotional alienation; minority cultural information poverty; violation of privacy; lack of professional responsibility; global cultural integration and diversity of contradictions; hacker intrusion and so on. Any thought or action that is not scientific and development trend is not feasible, we should try every means to overcome and eliminate all kinds of problems. Cloud computing represents the latest development of the computer and Internet technology in twenty-first Century, and will become the core technology of the Internet era of the wisdom of the earth. Cloud computing will outline the development of education reform in the future of education network, and relying on cloud computing cloud education it will show a blueprint for education network. Because of the limitation of the research condition, the content of this paper is still a lot of problems, which need to be further studied and improved in the teaching practice in the future.

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Application and Development of Computer Intelligent Vision in Manufacturing Industry

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Abstract: Objective: The research results of computer intelligent vision application technology in manufacturing industry are analyzed. Method: Analysis and summary of computer intelligent vision application. Process: Based on the classification of visual inspection, the construction of visual model and the characteristics of computer vision, the relationship between intelligence, vision and computing in computer vision was illustrated. The visual detection technology Respectively is introduced to be used in drawing die hole shaped visual detection system, the surface of the steel plate automatic detection system and image acquisition system. The application status, development trends and difficulties of visual inspection was analysed, and the problems were clarified in the development of computer vision inspection technology in china. Result& Analysis: In recent years, computer vision application technology has been improved, but the problem is very serious. Result: The prospect of computer vision application technology is very bright, and its development will promote the development of manufacturing industry.

Keywords: Computer intelligent vision application; Intelligent Vision; Manufacturing industry

1. Introduction

In the development of technology, with the use of technology, the development of computer aided quality (FMS) system, with the promotion of technology, is becoming more and more important (Rautaray S S, Agrawal A.2015). With the development of technology, the development of computer aided quality (AVI) system has been proposed. With the development of CIMS technology, the development of computer aided quality (CAQ) system has been proposed(Gómez-Sanchis J, et al, 2014).

1.1. The Significance of the Study

Computer vision is not only in the national economy, scientific research and national defense construction and other fields have a wide range of applications (especially equipment manufacturing, industrial components testing, medical images, industrial measurement, packaging inspection, printing detection, etc.) and to provide a good platform and window, which means that human beings may have a better understanding

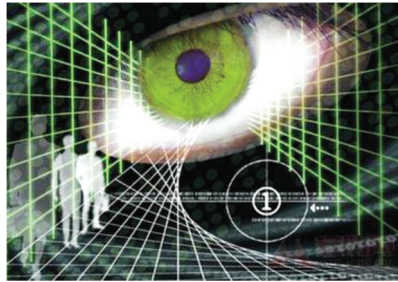


Figure 1 – Intelligent Vision

of the fundamental mechanism of human intelligence(Gómez M J, García F, Martín D.2015; García G J, Jara C A, Pomares J.2014).

1.2. Relationship between Intelligence, Vision and Computing

As early as the twentieth Century 50's people have noticed that the human intelligence and the machine may exist between the close contact. Then people try to use machine to achieve and simulate human intelligence, and to produce artificial intelligence of this subject. (Wolff J G. 2014) Over the past 60 years, simulation of artificial intelligence on the part of the function of the human mind, such as reasoning, learning, planning, and achieved good results, however, in cognitive simulation, mind, thinking in images, inspiration thinking, adapt to the unknown environment (Runa, A. I. D. N. F., & Miranda, G. L., 2015), and the function of organic fusion is far did not reach the expected effect, intelligent level is still very limited. In fact, because of the very limited understanding of the brain and mental work mechanism, which makes the simulation of the brain is very difficult(Cyganek B, Gruszczyński S.2014). DNA, genome, proteome and protein structure can be used in intelligent vision. Then, the visual, intelligent, the relationship between the calculation can be shown in fig. 2.

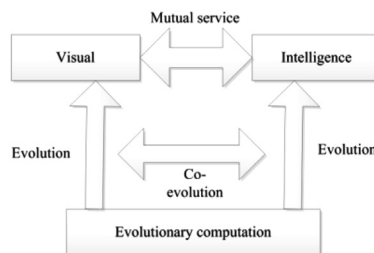


Figure 2- Relationship between Intelligence, Vision and Computing

This relationship is very typical in biological systems: the retina is in fact very similar to the cerebral cortex and the structure is very similar. Research has shown that not only is the structure, they have a lot of common features of the way. In this paper, the vision and intelligence are based on the calculation, the physical computing devices and

biological computing devices are not different on the level of computation. The vision and intelligence are generated, sustained and disappearing through the information processing mechanism (Aksenov A Y. et al, 2014; Huang L. et al, 2014).

2. Application of Computer Technology in Visual Inspection

2.1. Digital Image Processing Based on Computer

To achieve artificial intelligence, the computer processing of vision is very important in the field of computer vision applications, if we want to make our computer understand the image information must be through a series of processing - digital image processing. Digital image processing includes 5 steps: image preprocessing (removing noise), segmentation and segmentation, measurement, image interpretation and image processing techniques. According to the different level of abstraction and processing method, image technology can be divided into three levels: image processing, image analysis and image understanding. These three levels of organic combination also known as image engineering. And computer vision is to use the computer to achieve human visual function, to the objective world of three-dimensional scene perception, recognition and understanding. Visual inspection according to the type of data which is processed can be divided into two value images, gray images, color images and depth images. In addition, X ray detection, ultrasonic detection and infrared detection(Choi K H, Oh W.2014).

As a new detection technology, AVI makes full use of computer vision research. It can meet the development needs of modern manufacturing industry. AVI is more emphasis on precision, speed and reliability than general image processing. For example, it is suitable for manufacturing and developing, which is based on the principle of triangle method, which is suitable for the production and development of computer vision technology. Distance; (2) it is observed that the moving parameters of the target object; (3) it can even determine the internal characteristics of the target object; (4) it is inferred that the surface characteristics of the target object, and sometimes require the formation of three-dimensional vision(Zhou S Q, Lan Z X, Fu H.2014).

2.2. Development of Visual Processing Model

Since 1970s, researchers have entered into a more substantive stage of computer vision research, mainly from the combination of optical, physiological and projective geometry, the study of imaging and inverse problem. In this stage, some experts with Marr as the core, which are expressed as the core, take the algorithm as the intermediate conversion process of the general visual processing model. Marr stressed the importance of "Expression" and the research on the information processing in different levels. The work of this stage promoted the improvement and development of HMM, Bayesian, network, Kalmanfilter/Condensation, Particlefilter and EM in practice(Brooks A K.1994).

2.3. Dimensions of Typical Industrial Machine Vision

Typical industrial machine vision applications include the following parts: light source, lens, CCD camera, monitor, image capture card, image processing software and input /

output unit, etc., two value image data format is adopted for commercial visual inspection system. (Fornell C, et al, 1996) Here, CCD is an important part of the system. It can be used to measure the single geometric elements, and the accuracy of the image is not high. Color image visual inspection is mainly used for furniture, food and accuracy requirements of the manufacturing industry, generally according to the shadow or color change to judge whether there are defects, this time with two value, gray or color image detection is not enough, because they can only detect two-dimensional (3D) features, the system can detect the real-time changes of the contour part and color. If the 3D feature is used to describe the surface information. Therefore, three-dimensional (3D) measurement is the future for the manufacturing industry. (Powers C, Lampel H P.2015)

2.4.Computer Vision Based on CAD

Computer vision technology including visual surveillance, stereo vision, motion tracking. The basic principle is that the image information of the target is recorded by the image sensor, and a series of sampling and amplitude quantization is sampled. After the image information is digitized into a computer, the digital image is processed in the computer, and the required measurement information is obtained. Realize the on-line detection and monitoring of production line, ensure the product quality, and realize the product quality control. CAD based AVI is the first proposed by BirBhanu, and the key is how to establish a visual model for the visual inspection based on the existing CAD model, and to generate the CAD data as the upper level knowledge. Visual inspection to achieve the integration of CIMS, it is necessary to establish a smart vision inspection plan, so that the robot to control the operation of parts. Park and Marefat have made active exploration, the model of visual programming, AVI is facing the problem of 3D geometric modeling. The focus is on how to set up the three-dimensional model of vision. (Kou T C, Lee B C Y, Wei C F. 2015)

3. The Development and Application of Computer Vision Inspection Technology in Manufacturing Industry

3.1. General Application

Computer based visual inspection system is to convert the object into image signal by computer vision products, which is transmitted to the image processing system, and the image processing system is transformed into digital signal according to the pixel distribution and brightness, color and other information. The computer image system is used to extract the features of the target, and then to control the action of the device according to the results. Application in a wide range of areas of precision testing, robot hand eye system, precision guidance, 3D shape analysis and recognition and intelligent man-machine interface. In the United States, Germany, Japan and other developed countries in the manufacturing industry in a wide range of applications, electronic manufacturing industry is the most active and most successful industries, such as automobile manufacturing, wood processing and textile manufacturing, etc.. The use of computer vision technology to detect the quality of the product, with the following features and features: non contact, rapid measurement, visualization, automatic identification, the results of quantitative, real-time, accurate positioning, automation. Such as computer

vision measurement of human body 3D data, the optimized parameters can for clothing CAD provides reference data; industrial robot hand eye system is successfully applied in the system. In addition, applied to the seamless steel pipe straightness online detection and bar production and free curved surface detection, can avoid the traditional methods due to known differences and visual fatigue caused by error.

3.2. Research on the Development of Modern Manufacturing Industry

3.2.1. Wire Drawing die Hole Detection System

Die must pass through the hole detection before production, in order to ensure the accuracy of drawing. At present, the detection of the hole shape of the common microscope and projector. The small hole mold (0.03mm) is generally detected by the human eye observation under the microscope. Larger pore size mold, in order to facilitate the detection by injection of silica gel method reflected wire drawing die size, the shape of the silica gel mould, and then tests the silica gel mould. The detection of silicone rubber is carried out on the projector. When the test is made, the silica gel is used as the image of the projector, and then the model is compared with that of the model. Or in the projection of the three characteristic regions, and then calculate the diameter of the district's cone angle, length and diameter of the district according to the position of the edge of the projector. This two methods have slow detection speed, is greatly influenced by human factors, are often not fan detection results differ big, thus to wire drawing die processing quality evaluation of trouble.

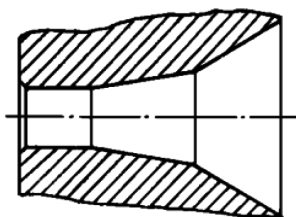


Figure 3 – The Hole Shape of the Wire Drawing Mold

1. Wire drawing die hole detection system

In order to solve the problem of detecting hole shaped mold in the actual production, we use computer vision detection technology development from a wire drawing die hole shape detection system. The whole system consists of the optical imaging system, industrial camera, image acquisition card, computer and monitor.

Detection system of the basic working principle is as follows, first using the injection methods silica gel reflect to be seized wire drawing die size and shape of silica gel mould, then the silicon convex mold is arranged in the optical imaging system of the loading platform. By optical imaging, the silicone punch is made on CCD image, and the image acquisition card is used to collect the information of CCD image, then the automatic measurement of the hole shape is completed by the computer vision detection software

2. Computer vision detection algorithm for hole size

Tested the silicone mold through optical system magnifying, and by the CCD camera and image acquisition card, digital image to be detected by silica gel model.

1. edge feature extraction of silicone mold

Edge feature points sub pixel accuracy extraction algorithm is used to search the edge gray area, and the gray distribution information of the effective distribution area is used to obtain the coordinates of the edge points. Then, the points of G2 and G1 are respectively and N respectively.

In Fig.4, the discrete point set is obtained by the edge extraction. Get on and off the edge point set can be followed by the introduction of the size of the detection algorithm.

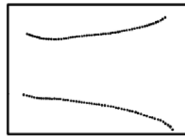


Figure 4 – The Extracting Results From the Edges

2. dimension detection algorithm

There are three steps in the dimension detection algorithm: the curve filtering, the center line, the image rotation, and the size of the test.

(A) curve filtering

The surface of silica gel is often found to have a small protrusion, which makes the extraction of the edge burr, in addition, due to the noise of the image, the extracted curve is random. In order to reduce the influence of these factors on the measurement results, the curve filtering is needed.

Edge curve equation can be expressed in the following formula:

$$Y_j = f_j(X) \quad (1)$$

The curve equation of the upper edge and the lower edge is respectively represented by the $j=1,2$.

Considering the bus wire drawing die hole is a smooth curve, the spatial spectrum of $Y_j = f_j(X)$ is limited.

Because of the surface defect of silica gel surface, the edge of the edge is obtained by the extraction of the edge, and the median filter is used in the process of image processing. But the experimental results show that the median filtering method can not receive good

results. The analysis shows that the curve is not very flat, and there is a curve slope, that is, the curve itself is rising or falling along the X axis (Gosens J, Lu Y. 2014; Chunrong Z, Lu W. 2015). In this case, it is not very big. In order to eliminate the influence of this factor, the following method is adopted:

STEP1: deterministic signal separation method

Because the median filter is suitable for the signal is slowly changing, it can be treated by the linear fitting of the curve, and the linear equation is $Y=K \cdot X+b$. Then use the original curve and the fitted straight line subtraction, i.e.:

$$\Delta Y_j = f_j(X) - (K \cdot X + b) \quad (2)$$

The signal changes on the said signal Delta Y_j has been very smooth, which may be the expression of the curve of median filter in Formula(3). Assuming the filtered signal is:

$$\Delta Y_j = g_j(X) \quad (3)$$

The results can be expressed as a result of the median filter:

$$\Delta Y_j = g_j(X) + K \cdot X + b \quad (4)$$

Experiments show that this method has better effect.

STEP2: circular rolling curve filtering method

The constant diameter circle is a non slip rolling along the curve. If there are two points in the rolling process, there are two points in the same time. If there are other curves, the point on the arc is replaced by the point. After this treatment, the burr on the curve can be smooth. The narrow burr interference should be filtered by a small radius, and the wide use of large radius circle should be used for the filtering of the narrow burr. In order to get better results, the circular rolling filtering method and low pass filtering method are combined. Experimental results show that the best use of circular rolling filter to burr.

(B) center line seeking, image rotation transformation

First, the upper and lower edge points are fitted with two straight lines:

$$\begin{cases} l_1 : Y = K_1 \cdot X + b_1 \\ l_2 : Y = K_2 \cdot X + b_2 \end{cases} \quad (5)$$

The l_1 and l_2 are the central line equation. Assuming that the angle of the angle is $Y = K_o \cdot X + b_o$.

$$\begin{cases} K_0 = \frac{1+K_2^2}{1+K_1^2+1+K_2^2} \cdot K_1 + \frac{1+K_1^2}{1+K_1^2+1+K_2^2} \cdot K_2 \\ b_0 = \frac{1+K_2^2}{1+K_1^2+1+K_2^2} \cdot b_1 + \frac{1+K_1^2}{1+K_1^2+1+K_2^2} \cdot b_2 \end{cases} \quad (6)$$

The image coordinates x axis to the consistent with the center line direction, then the coordinate system X 'oy'. Conversion relationship between two coordinate systems was set up:

$$\begin{bmatrix} X' \\ Y' \end{bmatrix} = \begin{bmatrix} \frac{1}{1+K_0^2} & \frac{K_0}{1+K_0^2} \\ -\frac{K_0}{1+K_0^2} & \frac{1}{1+K_0^2} \end{bmatrix} \begin{bmatrix} X \\ Y \end{bmatrix} \quad (7)$$

According to Formula (7), the curve point set can be converted to X 'OY' coordinates. After such treatment, the curve point set in the X 'axis is no longer equal intervals, and two curves on the X coordinates of the same point in the 'x 'oy, coordinates of X' is no longer equal, for the convenience of subsequent processing should be of two curves in the X 'axis direction etc. spacing resampling, to obtain a new curve point set G 1, G 2. At this point G '1, G' 2, can be used for subsequent measurement of the size of the operation.

(C) dimension detection

Use by coordinate transformation and resampling process after the point set G 1, G 2 for curves in different X 'coordinates of two curve angle to obtain shaped holes along the X' axis direction cone angle change curve. When calculating the angle, using the linear fitting method, such as angle of solving X ' (x' - Delta x, X ' + delta x) within the range of the curve, straight line fitting, and calculate the two sections of the straight angles. The length of the interval should be according to the wire drawing die of fixed size determine, generally selected sizing value of 5% as the sampling length. Curves can be isolated from three interval, and calculate the length of each interval. In the practical application, the ratio of the length to the diameter, the taper angle of the district and the curve of the cone angle are determined.

3.2.2. Automatic Inspection for Steel Plate Surface

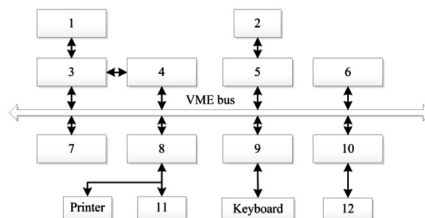


Figure 5 – Structure Diagram of Machine Vision Inspection System for Steel Plate

Wherein, 1 image sensor (Digital Interface); 2 operator monitor; 3 digital signal processor; 4 defect automatic classifier (optional); 5 graphics display subsystem; 6 system master control module; 7 data analysis module; 8 document, graphics / image management subsystem; 9 human machine interface unit; 10 network interface unit; 11 storage database system; 12 quality control computer

As shown in Fig.5, the basic structure of the system has been developed for the detection of the surface of the steel plate, including the light source and the image sensor, the digital signal preprocessing subsystem, the defect automatic classification subsystem, the graphics display subsystem, the quality analysis data statistics and report generation subsystem, document and image database management subsystem, human computer interface management subsystem, etc.. Reflected in the system design idea and the specific technical realization on the characteristics are as follows:

1. standard digital CCD camera and lighting components were taken to use, and have a margin left in the selection of specific technical indicators. Is generally used as the number for 2048 to 4096 linear CCD sensing unit, the chip frame transfer rates generally >10kHz, camera of a / D converter sampling rate usually is about 20MHz/8bit, lighting light source according to the specific needs of the tested plate surface morphology, can be high intensity fluorescent lamp, the array of tungsten lamp or a fiber optic light source.
2. through the use of standardized bus structure and modular design technology, the system hardware structure, function, flexible, stable and reliable, improve and upgrade is very convenient. From the point of view of the specific technology, VME bus is the preferred system bus. Because of the wide range of VME bus in the open commercial standard, many manufacturers are supported by the VME bus.
3. low level visual computing tasks such as smoothing, enhancement, segmentation and description are finished by the special processing unit. The current research trend is to use high speed DSP device as processing components, such as TI TMS320C40 QUAD-C40MCM Transputer series and INMOS series, etc..
4. people have tried to solve the problem of automatic classification and recognition of complex steel plate surface defects, which are based on symbolic system to imitate the human intelligence (such as machine learning) and from the bottom of biological system simulation method (ANN). But the existing defect automatic classifier can show its validity in some specific application background and specific types of defects.

3.2.3 Application in Other Fields

Computer vision inspection system has been widely used in other industries and engineering fields, such as automatic assembly line detection of parts quality and classification of parts, printed circuit board defect detection, auto body detection technology, the stress analysis of elastic mechanics, fluid mechanics, lift analysis, textile material identification and quality assessment.

3.3. Image Acquisition System

The vision system is characterized by the increase in production flexibility and automation. In the past, the image acquisition system based on CCD camera and the acquisition card is the core. CCD camera converts the optical image signal into the signal with the image space information in the local field of view, and the video signal is synthesized from the synchronous signal, which can not meet the needs of the times. The new digital camera is transmitted to the computer by serial or parallel port, and the distortion coefficient and the intermediate matrix are solved by the computer. Then the computer is separated from the matrix, and the digital camera is controlled by the driver software. Such as the integrated timing generator and analog front-end circuit function module AD9995 driver CCD, the A/D controller in the DMA controller, through the PPI DSP interface directly transmitted to SDRAM memory, which can be applied to high performance digital camera and industrial real-time image acquisition. Also, such as SIEMENS VS720 series products in the Simatic configuration software, because it has a lot of detection capabilities, it can provide a user-friendly way to create customized image processing solutions, that is, when no camera connection, you can use the emulator to configure.

3.4. Solving the Core Problem of Intelligent Welding

Intelligent welding robot, which can identify the target environment, at any time, and adjust the welding parameters, has become one of the important development trends in the field of welding.

For example, submarine, large ship welding is one of the most important parts in the manufacture of submarines and large ships. The pros and cons of welding quality not only relates to the subsequent assembly can be normal, for submarines, large ships are more likely to affect the strength and safety.

With the help of infrared imaging instrument, CCD cameras, speed cameras and other high precision image sensing equipment and intelligent image processing method, the intelligent welding robot can accomplish such as acquiring and processing disturbance of strong arc and splash of welding seam image and space position of welding seam detection and welding torch pose planning and real-time extraction of welding pool characteristic parameters. At the same time, the intelligent welding robot can predict the welding structure, structure and performance, and realize the automatic welding of special occasions when the human is difficult to operate. Foreign GMF, Motoman, Adept, KUKA and other manufacturers have developed a computer vision detection capabilities of the robot, has begun to be widely used in the production of submarines and space.

4. Computer Vision Detection Technology in the Development of the Manufacturing Industry

As a new detection technology, computer vision detection has the characteristics of direct, non-contact, agility, high accuracy and automation, the efficiency, reliability and adaptability of the detection method is difficult to compare with the traditional detection methods, but still faces some difficulties.

4.1. With International Standards cannot be in Line

For a long time, the domestic computer visual inspection products are mainly based on foreign brands, independent research and development started late. In recent years, China's manufacturing industry sustained rapid growth, a large number of local computer vision testing equipment manufacturers are keen to develop the international market, the future of computer vision testing products will gradually be in accordance with the international standards of uniform standards. With the gradual opening and development of China's auto industry, it will lead to the gradual opening of its related products technology. In addition, because the user's needs are diverse, and the degree of demand is not the same. Then, the personalized program and service in the competition will become increasingly important, it is best to develop according to the needs of the user, the function is easy to expand, can from the height of the system to provide a variety of solutions for customer needs. Therefore, the closure of technology will hinder the development of the whole industry, only a unified and open standard, flexible and diversified product line, to promote the development of China's computer vision inspection products in the international level.

4.2. Computational Theory and the Development of New Sensor

Computing theory is the core of computer vision detection technology. The new computing model can solve the problem of theoretical level, which is expected to achieve a new breakthrough in high speed array processing unit and the algorithm. The new sensor and sensor can solve the problem of data acquisition.

4.3. Quantitative Techniques and Calibration Method

Vision is a complex process involving physiological and psychological, and computer vision detection technology is a multidisciplinary cross technology, involving computer, electronic, optical, mechanical and thermal fields. The purpose of computer vision is to achieve the simulation and extension of human vision, for human purposes, the vision is a simple function, the machine is different, the visual process is difficult to use similar to the problem solving method, which needs to be calculated in the model and calibration method for further development and improvement.

5. Conclusion

With the rapid development of information acquisition and information processing technology, the analysis, judgment and disision of objective phenomena was carried out by computer vision. Based on the classification of visual inspection, the construction of visual model and the characteristics of computer vision, the relationship between intelligence, vision and computing in computer vision was illustrated. The visual detection technology Respectively is introduced to be used in drawing die hole shaped visual detection system, the surface of the steel plate automatic detection system and image acquisition system. The application status, development trends and difficulties of visual inspection was analysed, and the problems were clarified in the development of computer vision inspection technology in china. Computer vision will be bound to greatly promote the development of manufacturing industry.

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Research on the Control of Automatic Rail Quenching Process Based on PLC System

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Abstract: With the development of economy, the development of high-speed railway has become more and more rapid, and as one of the most important parts of high-speed railway—the rail, the quality of the rail directly affects the development of the railway. Objective: Rail quenching is the most important link in the production process of the rail, in this paper, the purpose is to establish a method for the control of the quenching process of the steel rail. Methods: In this paper, we established the control system of PLC electrical components to control the rail quenching. Process: Through the electrical principle of PLC system to control the machine tool and select components, and finally to achieve the purpose of controlling quenching. Conclusion: By using PLC electrical automation and control of rail quenching, the quality and efficiency of the products have been greatly improved, what's more, it provides reference for the automatic rail quenching in the future.

Keywords: High speed railway; Rail quenching; PLC electrical components; Process control

1. Introduction

Programmable logic controller (PLC) (Xin-yu D U. 2014; Abdelhameed M M, Darabi H. 2014; Totten G E, Luo X. 2014; Harrison C S. 2014) has the advantages of high reliability, strong anti-interference ability, rich function and so on. However, from the current application situation, PLC also mostly only assume the most basic control functions, such as sequence control, data acquisition and PID feedback control. PLC manufacturers also in their product design PID module. Although the PID (Brudnyi V N, et al, 2015) algorithm control has a high stability, but for some complex control systems, PID control is difficult to meet the requirements of control, which also makes the development of PLC is facing a challenge. With more and more PLC control system, it is possible to embed the advanced control algorithm into PLC conventional control system. In this paper, the control function of PLC is studied and discussed in order to improve the application level and application range of PLC controller. The research and application of PLC advanced control strategy, its purpose is to realize the PLC and configuration system by studying some advanced control algorithms. And the development of the corresponding application, after verification of the final application to industrial process control.

Railway is an important national infrastructure, which is the national economy of the great arteries, with irreplaceable special status and important role. Rail is the most critical parts of the railway facilities, and its importance is beyond doubt. Rails need to bear the pressure, friction and impact load of the locomotive, the requirements of the strength, hardness and toughness, high quality requirements. Especially after general speed railway passenger and freight transport, rail quenching treatment, the manufacturer to rail heat treatment ability put forward new requirements. In the processing technology of the rail, the medium frequency induction hardening of the rail surface is a key step, and the quality of the quenching process determines the effect and the life of the rail. Rail in the quenching process of the rail, to intensify, induction heating, cooling and other parts of the need to be strictly controlled, so that the coordination of the work, so the control system of the quenching machine has a very high demand. Control system to be used in the temperature sensor of the rail heating temperature of the sample, and the results of the sampling feedback to the microcontroller control system to adjust the feed rate, so as to control the rail temperature.

2. Research Status of Rail Quenching Heat Treatment

After heat treatment, the stress is defined as heat treatment residual stress, the shape and size of the workpiece, and the performance of the workpiece are affected by the residual stress (Szabó g. 2015). If the residual stress of the rail is greater than the yield strength of the material, it will cause a large deformation, if the residual stress is greater than the strength limit of the material, the rail will break. From these considerations, it should be as much as possible to reduce and eliminate the residual stress after quenching. But it is necessary to control the residual stress in a certain condition and make it reasonable to improve the mechanical properties and service life of the parts. Therefore, the change of the stress in the process of heat quenching and the change of tensile stress and compressive stress, and the distribution of stress, and the use of the technology to improve the distribution of the stress, the service life of the rail, and improve the quality of rail has a great practical significance.

In order to obtain high hardness and high strength, the structure and properties of the workpiece must be improved by controlling the temperature and flow rate of the quenching medium. However, the workpiece is often brittle, and there is a large residual stress, and in the process of quenching will produce deformation, which affects the flatness of the workpiece, will eventually lead to distortion and even the cracking of the workpiece caused by scrap. Data show that in the manufacturing industry developed in Europe, because the distortion caused by the distortion of the straightening process of the cost of the heat treatment costs accounted for 20% ~25% (Patle D S, Ahmad Z, Rangaiah G P. 2014). So that the product manufacturing cost in the total cost of the proportion of the total cost of more than 4%. At the same time, the German Industry Association (VDMA) (Burrowes P, Dobson B, Ferguson E. 2014) has done a survey, the results show that in the machinery manufacturing and other related to power transmission manufacturing industry. In Germany because of the elimination of residual stress caused by the distortion, increased production costs only in 1995 a year as much as 850000000 euros. In order to reduce the cost, improve the production efficiency,

improve the old technology, the development of new technology has become a lot of research workers engaged in heat treatment. This has prompted people to understand the change of temperature, microstructure and stress, strain and so on in the process of heat treatment. In order to predict or control the residual stress, deformation and damage that may occur after quenching.

Recently, Panzhihua iron and steel through the independent technology research and development for the first time to solve the problem of rail thermal straightening, oriented constraints and other process technology, developed a complete set of process equipment (Gillani B, Gillani R. 2015). The equipment can realize the rails are rolling, using remaining heat by rail continuous jet air to rail quenching heat treatment process, whereby the Panzhihua Iron and steel also become the only have rail line heat treatment technology for the production of iron and steel enterprises. The research and development of heat treatment control unit can be stable and reliable on the 50, 60, 75 kg/m rail heat treatment, the production of fast, large production capacity, product service life is two to three times the ordinary rail, among the world's advanced level of similar products in the ranks of countries. The technology has been applied to a number of patents in China and has been authorized by the state for 13, and has been awarded the Tenth China Patent Excellence Award (Castela, N., Dias, P., Zacarias, M., & Tribolet, J., 2013). This marks to Panzhihua Iron and steel as the representative of China's iron and steel industry in the field can also be reached the international advanced level, makes China's rail industry competitiveness in the international market further enhanced.

3. Design of Electric Control System for PLC Electric Control System of Rail Quenching Machine Tool

The rail hardening machine is based on the PLC electrical control system to achieve the overall coordination of the various parts of the action and automation control, the electrical control system can be divided into induction coil and machine tool two modules (Tang Y, Liu Q Y, Xie C, et al. 2015). This chapter mainly introduces the main circuit, control circuit, PLC connection and program code of the machine tool part.

3.1. PLC Basic Structure and Configuration

Generally speaking, PLC is divided into two kinds of box type and module type. But they are the same. At what types of PLC bus (Hill G B, Sweeney J B. 2014), belong to the open type structure, its I/O capabilities can be extended and combined according to user needs. The basic structure of the PLC block diagram is shown in Figure 1, mainly including the following parts (Semerdjieva N. et al, 2015): the central control unit; the input and output interface (I/O interface); the power; memory; the bottom or the frame; the peripheral equipment; the communication connection.

3.2. The Basic Work Principle of PLC

Although PLC has many features of computer, its working mode is very different from computer. The computer generally uses the work way of waiting for the command, such as the common keyboard scan mode or I/O scan mode, a key press or I/O action, then

into the corresponding program. No key press, then continue to scan. PLC is used in the way of circular scanning mode of operation (Towslee J S. 2015).

When PLC is running, there are a number of operations that need to be implemented in the user program, but the CPU is unable to perform multiple operations at the same time, it can only perform one operation at a time when the operation is performed at each time. Because of the high computational speed of CPU, the results from the macro point of view appear to be completed at the same time. The process of such a split is called a CPU scan of the program.

Start scanning from the storage address stored in the first user program, without interruption or jump to control the situation, according to the memory address, increasing direction in order to scan the user program is sequentially item by item execution user program, until the program ends. Each end of a scanning program constitutes a scan cycle (Smith A A, Offodile O F. 2014), and then start scanning, and go round and begin again to repeat.

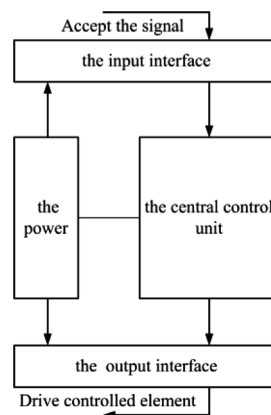


Figure 1 – PLC Basic Structure Diagram

4. Electrical Schematic Diagram and Component Selection of PLC System

Mechanical transmission of the machine tools are three-phase asynchronous motor as the original motivation, so, the main content of electrical control is to make the motor start, running (including the implementation of the various requirements are being reversed, variable speed) and stop (including braking). In addition, the electronic control circuit also includes a variety of protective links, some of the transmission part of the machine uses the hydraulic, and the machine is, as well as electromagnetic clutch

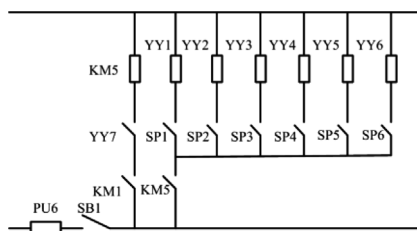


Figure 2 – Circuit Diagram Design

and other transmission device. Therefore, the electric control object in addition to the motor, but also includes the control of electromagnetic components.

4.1. Circuit Diagram Design

According to the machine tool feed drive system, the drive part of the workpiece and the workpiece clamping hydraulic pressure. The configuration and use of the dynamic system, the main circuit diagram shown in figure 2.

4.2. Selection of Electrical Components

Electrical control system is composed of the electrical components, a large automatic control system for the electrical components have thousands or even tens of thousands of. Therefore, how to choose the right components, the design of the electrical control system is very important. When selecting electrical components, the requirements of this paper are as follows:

According to the requirements of the function of the charged component, the type of electrical components, such as the relay and the contactor, are determined. When the element is applied to the main circuit of the power circuit, the AC contactor should be chosen; if the component is used to switch the circuit with less power, the intermediate relay should be chosen.

According to the electric control voltage, current and power to determine the size of the components to meet the load capacity of the critical value and service life.

To grasp the working environment and supply of components, such as oil, dust, supply, etc.

In order to ensure the reliability, the corresponding reduction coefficient is needed, and some necessary calculation and verification are carried out.

4.3. Selection of Fuse

Selection of fuses, in fact, the main choice of type, rated voltage, fuse current rating. And the rated current of the melt, and the melt current is the key to select the fuse, the choice of the melt and the load nature. Generally available in two ways; one is load stable, no peak current, such as lighting, signal, electric resistance furnace, etc., according to the rated current to choose; two is the load with the peak current, such as asynchronous motor, the starting current is 4~7 times of the rated current. At this point cannot be used for the calculation of the current rating must be used in the method of empirical calculation.

For a single long term work (not often start) can be used to choose as the following:

$$I_R = (1.5 \sim 2.5) I_{ed} \quad (1)$$

I_R —Melt rated current; I_{ed} —Motor rated current.

For a long time to share a fuse with a fuse protection, then use the next type to choose:

$$I_R = (1.5 \sim 2.5)I_{emax} + \sum I_{ed} \quad (2)$$

According to the above principle, the quenching machine tool circuit in the selection of the fuse is more than one motor for a long time to share a fuse protection, so the capacity of the largest motor rated current to calculate the rated current. And in order not to make the motor at the start of the melt into the fuse, the safety factor to take a big point, in the circuit capacity of the largest motor rated current $I_{emax} = 15.7A$. And

$$\sum I_{ed} = 5.7 + 3.7 * 2 = 13.1A \quad (3)$$

$$I_R \geq 15.7 + 13.1 = 28.8A \quad (4)$$

Therefore, the use of RLI-60 type of fuse, the rated current of 6QA, the rated current of the fuse 35A.

4.4. Thermal Relay Selection

The thermal relay is used to protect the motor. For working time is short, a longer period of time the motor stop, such as a machine tool turret or misappropriate motor, and in the long run, motor overload the possibility is very small, such as exhaust fan, cannot set up the overload protection. The main choice of the thermal relay is the motor rated current to determine the thermal relay model and the thermal component of the current rating. The rated current value of the thermal relay is generally 0.95~1.05 times of the rated current of the motor, while the rated current of the heating element should be equal to the rated current of the motor. At the same time, the setting current value should have a certain upper and lower limits.

The rated current value of the thermal relay in the quenching machine is $I \oplus (0.95 \sim 1.05)I_1$. In electric circuit, the thermal relay of each motor is selected:

Feed system device driver motor rated current by the table to check the 5.7A, so the rated current of thermal relay $I \oplus 5.415 \sim 5.985A$, the round the whole 6.4A, the rated current for the JRO-40 6.4A type of thermal relay can meet the requirements.

The rated current of the motor of the hydraulic pump drive motor is 15.4A, the rated current of the thermal relay is $I \oplus 14.63 \sim 16.17A$, and the circle is 16A. The thermal relay with a JRO-40 type of 16A with the rated current can meet the requirements.

4.5. Selection of Intermediate Relay

The intermediate relay is mainly in the circuit of signal transmission and conversion. Because it contacts more, can be real. Now multi-channel control, and can be a small power control signal conversion for the large capacity of the contact action, the expansion of the control of other electrical appliances.

Code	Name	Number	Model
HM	Indicator light	1	AD11
SP	Pressure relay	6	MJ-02-P-L-L
PLC	Programmable logic controller	1	FX1
SA1	Button	1	LAY3-11X/3
SB	Button	12	LAY5-BW3161
S	Intermediate relay	4	DZ-50 AC 220V
SQ	Holzer proximity switch	9	TL-Q5MC 24V
M4	System device driver motor	1	IAG132M-450-2.2
M2	Induction coil drive motor	1	
M3、M5	Conveying roller drive motor	2	Y90S-6 0.75KM
M1	Hydraulic pump motor Thermal relay	1	Y112M-6 2.2KM
FR	Thermal relay	2	JR0-40 6.4A-16A
KM	AC contactor	5	CZ20-63 AC 380V
QS	Circuit breaker	1	DZ15L-63
FU	Fast breaking fuse	16	RL1-60

Table 1 – Main Electrical Components of Quenching Machine Tool

The choice of the intermediate relay is mainly based on the voltage level of the control circuit, but also to consider the contact, quantity, type and capacity to meet the requirements of the control line.

The quenching machine tool for the general industrial products, the application of the control voltage is 220V, so the choice of the intermediate relay model for the DZ- 50 type of intermediate relay, to meet the use requirements. Integrated above, the main electrical components used in the automatic quenching machine tool are shown in table 1:

In the process of quenching, it is possible that the workers will be temporarily left, in order to improve the processing efficiency, can be used for manual and automatic two kinds of work mode. Through the switching of these working conditions, the status of the unattended operation can be realized in some situations. In this way, the control of the PLC is required to have these functions, and the combination of the limit switch and the time relay can achieve the purpose of automatic operation. However, the time parameters of the time relay must be set according to the required time in advance. As the rail is quenched after the completion of the need to cool down, to be cooled down to put down the rail, so the final steps do not need to be set up automatically, in order to make the rail completely cooling, of course, can be set automatically unloading mechanism directly from the machine after quenching, placed in a specific location to complete cooling, in order to improve the efficiency of processing.

The design of the new quenching machine tool as a whole has realized the automation, the product quality, the production efficiency and the operation of the workers have

been greatly improved. PLC automatic control is realized, the frame part automatically adjust the position of the induction coil, realize servo (with rail space position changes and automatically adjust the position change); feed system are controlled by PLC, the conveying roller rails will be transmitted to the working position; and control of feed speed, namely the control of the rail heating time; hydraulic servo system can effectively realize the stability of the rail quenching process; all aspects are to ensure that the process automation and processing quality of excellent, guaranteed the safe and reliable operation of the whole machine.

5. Conclusion and Suggestion

As the research on the development of rail transportation is not enough, the whole machine tool design process still need to be improved, the machine tool can also increase a set of feedback system based on the change of quenching temperature, at any time to adjust the induction coil current and feed rate. PLC with its compact structure, high reliability, and powerful, fast, low price advantage no matter in now or in the future of industrial automation in the field will play its irreplaceable role. It will drive the development of the whole industry, and lay a solid foundation for the coming of the scientific and technological revolution.

At the same time, according to the latest research, the method of finite element simulation is proposed to analyze the process of the waste heat quenching. It can not only observe the changes of the rail quenching process, but also can extract the relevant data from various aspects of the rail hardening. It can reproduce rail quenching process, and the new production process for preview, in order to provide a reference for the improvement of rail quenching process.

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Research on Multi English Teaching Model Based on Cloud Technology

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Abstract: With the development of social economy, the teaching mode of English is also changing, especially with the development of information technology, the teaching mode of College English plays a huge role in promoting the development of English teaching and learning. We all know that the traditional English teaching has some shortcomings, such as examination, boring and lack of teachers, which the English teaching model based on cloud technology has many advantages, for example, it can integrate the teaching resources, remove the tiring, what's more, it has strong flexibility and a lot of teaching modes, which can supply students' actual operation ability etc. However, it also has some shortcomings, such as lack of binding, limited management and so on, therefore, the combination of classroom teaching and cloud English is the most reasonable development direction of the future teaching mode.

Keywords: Cloud technology; English teaching mode; Teaching resources; Information technology

1. Introduction

With the development of our country economy, the resources of productivity and production structure re identified, so that the sudden emergence of the higher vocational (Chlebus E, Krot K. 2016; Truong D. 2015; Rathmanner M. 2015) and technical education, has aroused widespread concern in the country. It is becoming more and more powerful vitality, and it has become an important force to promote social economy, talent and education development. However, in the past ten years, although higher vocational education has achieved rapid development, but subject in Higher Vocational general curriculum system and students factors restrict, the reform of Vocational College English are still struggling. Especially in recent years, higher vocational education is faced with the domestic overall student shrinking, ordinary undergraduate colleges and universities are also actively restructuring and training applications, such as multiple pressures. Therefore, in 2011, Some opinions on promoting the scientific development of Vocational Education in the reform and innovation of Higher Vocational Education were put forward "Higher vocational education in order to cultivate the production, construction, service, management of the first line of high-end skilled personnel for the main task," (Anandharajan T R V, Bhagyaveni M A. 2014) the concept of

high-end skilled personnel training objectives, the aim of this talent is to enhance the core competitiveness of higher vocational education. So, the high-end skilled personnel is not only to have a superb professional skills, but also have a strong comprehensive quality, can use technology to solve problems and deal with information. It cannot only use the technical practice, but also be able to quickly absorb new knowledge to guide practice. Therefore, cultivating high skilled talents is to cultivate talents with comprehensive knowledge, technology. The new higher vocational talents training target location of natural for English such as the humanities quality of teaching, which could improve the high-end skills training, therefore, it is necessary to improve their basic human qualities, since English learning is particularly important.

2. Problems Existing in the Traditional English Teaching Model

As for English teaching, the traditional teaching mode is the teaching mode of “Preview before class - classroom learning - after class exercises” (Ergen Ö B, Tanrıseven I. 2015). Seemingly reasonable teaching process in fact, there are many drawbacks.

2.1. The Implementation of Pre Class Preparation is Not Good

Over the years of teaching process, I found that in the course of the study of the contents of the full preview of the proportion of small, most of the students learning tasks are placed in the classroom teaching of the limited time. The special nature of language learning requires that learners should put a lot of time to consolidate and strengthen the language input.

2.2. The Traditional Classroom Teaching Activity is Often Based on the Teaching, The Student's Participation is Not Enough.

After the introduction of multimedia technology into the English teaching process, the use of multimedia courseware is becoming more and more extensive. However, there are two extremes in the use of multimedia courseware (Vickers, et al, 2015). One is the design of multimedia courseware into electronic text, it is difficult to arouse the students' interest in learning dull as ditch water (Jiménez, D. L., Redchuk, A., Dittmar, E. C., & Vargas, J. P., 2013); two is a multimedia courseware to add a lot of beautiful pictures and audio, video, animation, has greatly attracted the attention of students, but often leads to the neglect of the content of knowledge.

2.3. After the Study of the Classroom, It is Often Followed by A Large Number of Boring After-School Exercises, A Serious Impact on the Students' Learning Interest

Due to various reasons, the final result is difficult to guarantee the students' learning effect (Leviäkangas P. et al, 2015). Constructivism theory points out that the teaching process should pay more attention to the construction of students' knowledge structure and knowledge system, to fully mobilize the initiative of students learning. Should pay more attention to the process of the study of students and not one-sided emphasis on the final assessment of the score. Learning activities should be clear about the main status of students, teachers should play a guiding role in the teaching process, at the

same time, and they should pay attention to the dynamic growth of the students, and cannot only pay attention to students' test scores, to cultivate students' autonomous learning awareness. With the introduction of the requirements of the teaching, the national colleges and universities began a vigorous reform of College English teaching, the construction of students' Autonomous Learning Center, to provide students with good autonomous learning places and quality facilities. With the continuous advance of teaching, counseling with autonomous learning has become the mainstream of today's English teaching mode (See Figure 1).



Figure 1 – Students Lose Interesting in Traditional English Teaching

2.4. English Learning Weight Test Process.

Learning is a process in itself, but now many college students ignore the learning process, they regard the test results as the final goal. At the same time, on the basis of the test results, it is difficult to form a harmonious interactive (Cabellon E T, Junco R. 2015) learning community environment, which is a kind of learning community environment, which is a kind of learners.

2.5. Lack of Confidence in the Exchange of Students

In the business situation, a problem encountered in the application of many China students English is not say, afraid of making mistakes. But the real reason is the lack of confidence in their ability to use English. Although the teacher constantly encourage students to speak English, as far as possible in English expression, also, they gave the students positive and praise, but students still lack enough self-confidence.

2.6. Lack of Teachers, Students Cannot Get Personalized Counseling.

China's colleges and universities is relatively low, the teacher is very difficult to achieve for the guidance of students, only for all students with unified teaching method, which is obviously deviates from the spirit and teach students in accordance of their aptitude.

3. English Teaching Research Based on Cloud Technology

3.1. Structure of Cloud Education System

Cloud education system contains a very complex structure system, which involves a lot of content, mainly including two aspects; hardware and software Among them, the

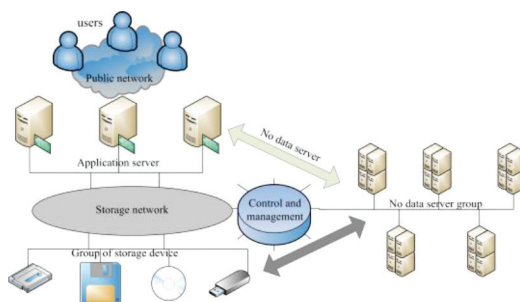


Figure 2 – Cloud Education System Structure Diagram

hardware structure of the cloud education system includes five parts: application server, data storage network, computer group, external connection network and network storage device. The specific structure is shown in Figure 2. And its specific functions are as follows.

Application server (Chiu F Y. 2014) - a large number of service interfaces are provided for the application platform of cloud education.

Data storage network is the core network of data storage in cloud education system, a large number of storage devices are connected through the internal high-speed network, and these data are effectively integrated by the Metadata server.

Externally connected network is a network that connects the system to the external network, and its performance directly determines the quality of service (QOS) (Chiu F Y. 2014) of the cloud education system, such as network bandwidth, data delay, “data jitter” (Jitter), etc. Because it is directly to the user, so the user experience is particularly important.

The core of the computer group, cloud computing, cloud technology, grid computing, parallel computing, cloud computing provides a large number of computing resources, can dynamically provide users with convenient and quick education type of service.

Network storage device - a device that provides data storage for cloud education, and all data and information related to the education are stored in a network storage device. The core system (Tsai C W, Shen P D, Lu Y J. 2015) of software architecture includes operating system, distributed file system, video audio multimedia service, etc.

3.2. On the Significance of the Combination of Cloud Technology in English Teaching

Based on the inheritance and innovation of higher vocational education (Kaden R, Kolbe T H. 2014), the purpose is to build a platform to support teachers' effective teaching and students' autonomous learning, and to change the three key issues in Higher Vocational English teaching.

1. From the aspect of learning, we need to solve the problems that the students' English learning autonomy and participation is poor, and they lack of learning

enthusiasm, meanwhile, the learning effect is not ideal. The completion of the teaching system of the Higher Vocational College English 'cloud technology' will build the ideal self-learning and resource sharing platform for students. Completely get rid of the old mode of the traditional English Teaching (a book, a pen, a mouth) + simple multimedia tools (Alebrahim A. et al, 2015), so that teaching and learning in this platform fully shared. Cloud technology is not only a need to provide services, save costs, improve the security of data, a high scalability platform. And it is an interactive platform for teachers and students through the cloud storage technology in the smart phone client to achieve English teaching resources at any time to browse, download, upload, and practice and process control. Its completion will truly make English learning as an open, diverse, and measuring learning tool. Any student in any place (including the classroom and outside) can get the English learning resources through a special device. The establishment of "cloud technology" English teaching system can make the students' homework, oral communication, written examination and other online, and teachers can also make students experience the real time teaching of teachers in the domestic and foreign cooperative schools. Through the wide range of services, the goal is to let each student find a solution for their own English learning, and the language learning process, from the fundamental to the students from passive learning to active learning, the students become masters of English learning, to find language learning fun, improve learning efficiency.

2. From the aspect of teaching, to solve the problem of teaching methods, teaching methods, teaching methods and teaching resources are limited. The completion of the Higher Vocational College English 'cloud' teaching system " (Ho T V. et al, 2015), for teachers to provide more diverse, personalized and more flexible teaching methods, means and resources selection, the English classes to realize the true meaning of" contention of a hundred schools of thought".
3. From the aspects of the assessment, to solve the problems of the students' lack of practical operational ability in the work of the society and the employing units. The construction of the "cloud technology" teaching system in Higher Vocational College will directly guide the teaching practice., highlighting the application ability and basic knowledge to cultivate the characteristics of both hands and hands, so that students meet the needs of social and economic development, and further to achieve the effect of vertical depth of talent development, emphasizing students' Lifelong Learning. Not only to meet the needs of the employer to the first post competency of higher vocational graduates, but also to enhance the students' development potential and job migration.

3.3 Analysis of English Teaching Based on Cloud Education Model

English learning needs a lot of resources, such as excellent English teachers, excellent English teaching materials, good language environment, etc. These resources have the following characteristics in china : (1) distribution is extremely uneven. Excellent English teaching resources are mainly concentrated in the central city, a large number of small and medium cities of English teaching resources, and even have many towns of English teachers themselves are not good at English. (2) Lack of a good language environment. Language learning needs to be repeated to strengthen, once out of the environment,

it requires a lot of time, money, energy to master the language. (3) Lack of excellent foreign teachers resources. To learn a language, the best teacher is a native speaker. Have excellent foreign teachers, students can really master the essence of English, can really master the language. I have less education resources, excellent foreign teachers are even more scarce resources.

Cloud education is a virtual education system that has no boundaries. Through this system, teachers and students can not hinder the exchange, and do not care where they are. A student's English teacher may be a Native American, or an English gentleman. And they may be in their own home, enjoy a delicious coffee, since they can learn English through the video. And the students just stay in the comfort of the home, they can accept the authentic English learning, learn a good English. The adoption of cloud education mode for English learning, relative to classroom learning, has a huge advantage, the main performance in: (1) to achieve the integration of cross regional English teaching resources. Through the network without borders, the massive English teaching resources can be effectively integrated. Through the way of the video, the excellent English teachers can be brought to the students. (2) It can avoid the long journey of Laughton. Through cloud education, which can make numerous students stay at home to learn their knowledge, and it can avoid long haul traffic troubles. (3) There is great flexibility (see figure 3). Students can customize the learning plan and content according to their own needs. English learning is a cumulative process, through education cloud flexibly adjust the learning schedule every day, learn English for half an hour, will be far more than a week to focus on learning the effect of four hours.



Figure 3 – Great Flexibility Could be Used in English Teaching Mode Based on Cloud Technology

3.4. Analysis of English Teaching Mode Based on Cloud Technology

1. “Immersive” teaching environment. Language communication is a basic condition of English acquisition, which can be used to support the upper and lower perception of the cloud computing, and it is the basis of human interaction. Basic programs are: the original data from the sensors, such as the acquisition of English interactive and interactive space, according to the acquired data to calculate the judgment, whether or not the integration of the context information prediction system should be reflected, and then the reasoning results driven by the end of the free adaptation of the terminal display. The learner can perceive

- and experience a near real space in the virtual space. (Win N W, Thein T. 2015)
2. “Everywhere can learn” learning methods. “Cloud” will all the resources to focus on an advanced platform, so that the resources in the unified management of the platform, with the maximum flexibility and utilization, and ultimately to provide users with the form of service. Teachers and students can use the built-in PDA (radio frequency identification sensor), PAD, RFID or mobile phones in any time by the wireless network to connect the mobile core server to verify, read the PC hard drive in the cloud, then you can obtain the required English learning information. For the students to set up their own level and schedule, can be a slow CNN news, and teachers and foreign friends on a theme dialogue, or transmission a composition for marking, or is part of a lecture given by a famous professor in a famous university. This kind of interactive teaching will enable us to do “everyone is to learn, to learn from time to time, to learn everything, to learn everything.”
 3. Global resource sharing teaching mode for “all for me”. Cloud computing system is an autonomous system, different management tasks are automatically completed, when the user needs, the system will be adjusted according to the user’s requirements, such as customer needs of the hardware configuration, network bandwidth, storage capacity, etc. At present, the educational resource database is gradually integrated, which can be used as a loosely coupled system to deploy the virtual service to the data center.

4. Development Prospects of Cloud Education Model

Cloud education platform based on cloud education model, will affect the teaching of the classroom for many years to the teaching method. Teachers and students can choose all kinds of terminals to achieve the purpose of teaching. For example, smart phones, PC, handheld computers, etc. can become a virtual classroom carrier, as a platform for teachers and students. Students can use their own a lot of debris to study, which improves the learning efficiency a lot. Space will no longer be a barrier to effective communication among students and teachers.

Although cloud education model has many advantages, but this does not mean that it will replace the traditional classroom teaching mode. Classroom teaching still has its irreplaceable advantages, specific performance in: (1) binding on the students. Course teaching has the teacher’s supervision, the teacher and student can communicate more effectively. In the course of carrying out the knowledge education, the teaching of the classroom can carry out the ideological and moral education. Classroom teaching in a certain sense is also the behavior of students, and the lack of such binding cloud education. (2) Effective interaction. Although cloud education can virtual students and teachers and students interact, but the effect with the actual interaction between the teachers and students is certainly a gap. Cloud education is difficult to create a classroom atmosphere to infect each participant. (3) Effective management. Teachers and students can be effectively managed in the classroom. Cloud education is still in the exploration stage for teachers to carry out effective management.

Based on the above considerations, cloud education system should be a supplementary means of traditional teaching, the use of advanced Internet technology, cloud computing technology, artificial intelligence technology can bring the maximum convenience for the traditional teaching, and in the school education, and cloud education system has incomparable advantages.

5. Conclusion

With the rapid development of the Internet, cloud computing, multimedia and other technologies, cloud education, which can provide massive educational resources, is becoming a new developing direction in the education industry. Cloud education system can effectively integrate the educational resources, also, it can provide a flexible and diverse teaching mode for the user, and therefore, this approach is very suitable for English learners who has a long learning cycle and large input of learning. As a kind of cloud computing services, the cloud English will has a huge development in future. With the further development of information technology and cloud computing, we can achieve a low price, on-demand customized, personalized education information platform, what's more, a large-scale electronic learning system will be applied in English teaching. The study of English teaching based on cloud technology has played a positive role in improving students' English proficiency, and it can cultivate students' reflective ability at the same time, as a result, it provides a reference for our college English Teaching in China.

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The Development of Rural Tourism Circular Economy and the Application Technology of Renewable Resources in China

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Abstract: With the continuous improvement of material life, people pay more and more attention to the tourism, now the rural tourism becomes more and more “hot” in China. Rural energy utilization is an important issue related to the sustainable development of rural areas, it is also the key to the development of rural tourism circular economy. In this paper, a series of problems in the current rural tourism are analyzed, and the application of renewable resources in rural tourism circular economy is analyzed. Finally, suggestions and measures are put forward for the protection of renewable resources in rural tourism. In the end, the conclusion is that the utilization of renewable energy in rural tourism is the future development trend, and its advantages will be more obvious in rural tourism area.

Keywords: Rural Tourism; Circular Economy; Renewable Resources; Energy Utilization.

1. Introduction

Rural energy utilization (Yuan X, Zuo J, Huisingh D. 2015) is an important issue related to the sustainable development of rural areas, especially in rural areas of many developing countries. Household energy use is often associated with the resource environment. In order to solve the problem of rural energy sustainable supply, many countries have carried out a lot of research and discussion, such as improving the structure of energy consumption, improving energy efficiency, looking for new alternative energy sources. Among them, the promotion and application of renewable energy (Coca-Stefaniak A, Carroll S. 2015) in rural areas has become one of the key factors of its development, and it has become one of the most important policy guidance in many countries. The farmers' decision-making behavior of renewable energy consumption is an important factor in the application of renewable energy. A lot of research is carried out at home and abroad for the choice of energy consumption behavior. In Tim Jackson's (Gupta S D. 2015) research, he thinks that the energy consumption patterns of the residents include the rational choice model, the expected value model, the ecological value belief model, the attitude behavior and the background model, the pattern of persuasion

and social learning, to change the bad habits, the positive behavior pattern, the social symbolic identity pattern, and the changing behavior. Martis Kainen (Sujan M A. et al, 2016) analyze energy consumption behavior, which is divided into efficiency and restriction, for example, external wall heat preservation measures to improve the energy efficiency of the investment behavior, which is the efficiency of the family energy use decision-making behavior theory and empirical analysis, and achieved many results. But mainly based on the traditional towns or rural families, the paper mainly focuses on the rural tourism farmers.

Rural tourism (Ricchi P, Marsella M. 2015; Sumabat A K. et al, 2016; Lopes M S G. 2015) has become one of the important driving factors for the transformation of rural energy consumption (see Figure 1). National Tourism Administration is expected in 2016 the number of rural tourism will be more than 800000000 people, tourism income of more than 120000000000 Yuan, directly employed 10000000 people, 40000000 indirect employment, equivalent to the 2010 national rural labor force 10%. Under the guidance of rural tourism development, the energy consumption model of rural household is experiencing the transition from the inner self circulation model to the “life to the production system”. In the new energy consumption patterns, the consumption of renewable energy has an important proportion. However, with the traditional urban residents and rural residents in the energy consumption decision-making, rural tourism household energy consumption is mainly to meet their own needs, more attention to the consumer demand (Castela, N., Dias, P., Zacarias, M., & Tribolet, J., 2013), both internal and external type consumption two characteristics. Therefore, in this paper, the method of questionnaire survey and quantitative model is used to study the theory of consumer behavior. In this paper, based on the analysis of the theory of behavior geography and economics, the main factors affecting rural tourism farmers’ renewable energy consumption are analyzed. A theoretical model of the rural tourism farmers’ decision to construct the consumption of renewable energy.



Figure 1 – Rural Tourism is Becoming More and More Popular in China

2. The Problems of Natural Resources in the Development of Tourism Economy

2.1. Limited Natural Tourism Resources are Facing the Enormous Pressure of Over Exploitation

China’s tourism resources (Zhang C. 2015) are very rich, but on the relative number of tourism resources is short of. Such as China’s per capita forest area in the world’s

134th, but in recent years, in the process of tourism development, some areas of forest vegetation has been destroyed, many animals and plants species and quantity are significantly reduced, resulting in the deterioration of the ecological environment of the tourist area. Inappropriate development of scenic areas, so that the landscape and vegetation damage, soil erosion. Especially in the scenic areas of the hotel and houses, the location of the building, on both sides of the highway, the reservoir around, the phenomenon of soil erosion is more serious, which resulted in the effective protection of wild animals and plants to reduce the regional scope. Inappropriate development of scenic areas, but also limited natural resources have been seriously damaged. In recent years, the amount of water in Qinghai Lake has declined at an alarming rate. The lake is shrinking, the original island surrounded by water, has become a peninsula connected with the land; serious salinization of the lake, lake ecological environment deteriorated sharply. And the area of the famous Crescent Spring and the flow is also reduced, beautiful scenery is becoming more and more degradation.

2.2. Sharp Contradiction Between the Rapid Expansion of the Fragile Ecosystem and Tourism Demand

Many domestic famous tourist scenic areas, the ecosystem itself is very fragile, the ability to resist damage and disturbance is very low. In Jiuzhaigou and Huanglong scenic spots, the original forest cover rate is more than 90% (Redman G. 2015), but of deforestation in the 1990s, due to the long-term logging and overgrazing, forest area is gradually reduced, resulting in scenic water obviously began to shrink, narrow lake, water level drops, the scenery is far less than the previous. Many places still follow the traditional way of tourism, the development of a low level of extensive tourism products, so that many precious tourism resources are destroyed, which undoubtedly to the sustainable development of tourism has brought many obstacles.

2.3. Negative Impact on the Amount of Excess Load

Eco tourism zone has no rules to over exploitation, the one-sided pursuit of economic benefits, the blind expansion of scale, and the overload operation of the scenic area, the ecological environment and tourism resources are damaged and destroyed, the ecological environment is increasingly.

Deterioration. During the annual Golden Week, many scenic areas in order to obtain the maximum economic benefits, a lot of introduction tourists, this is far more than the ecological system itself, the capacity of environmental capacity overload, which seriously affected the sustainable development of tourism.

2.4. Due to Improper Development of the Loss of Tourism Characteristics

In the development of tourism resources and related projects, due to the attention of the maintenance and maintenance of the environment and the characteristics of the tourism resources, to carry out inappropriate projects, damage the image of the tourist area, resulting in the natural scenic area urbanization, project construction. Improper some scenic spots of building facility layout (He Y, Xu Y, Pang Y, et al. 2016), architectural style and the local environment and landscape coordination, the original features are disappearing.

2.5. Serious Environmental Pollution in Tourist Attractions

According to the survey, the water quality, air, soil and vegetation of the vast number of tourist scenic areas in China have been polluted and damaged by different degrees (see Figure 2). The pollution of tourist attractions mainly comes from two aspects, that is, the supply and demand of tourism. Tourism supply side on the ecological environment caused by pollution and destruction is occurred in the process of tourism resource development and tourism business in the process, mainly in tourism service facilities emissions of “three wastes” (Vazquez A, Astariz S, Iglesias G. 2015) (waste water, waste gas and waste residue) and layout caused by improper pollution on the ecological environment and.



Figure 2 – The Pollution of Rural Tourism Area is Becoming More and More Serious

The pollution and damage to the ecological environment of the tourism demand side has occurred in the process of the tourists' flow and temporary residence. As is known to all, the per capita consumption of material and energy is far greater than that of the tourism destination. Especially in the tourist season, the tourist is increasing, the noise is increasing, and the solid waste is becoming more and more serious, which brings about the destruction of the ecological environment. Large scale increase in the emissions of various kinds of transport emissions of air pollution caused by atmospheric photochemical smog. Water pollution is widespread, and the increase of the amount of sewage discharged by the tourists is increasing, which makes the eutrophication of water body increase.

3. Development and Application of Renewable Energy Technology in Rural Tourism Circular Economy

3.1. Circular Economy Theory

Circular economy (Zarghami E, Abad A S H. 2015) is in the sustainable development of the ideological guidance, in accordance with the way of cleaner production, the implementation of comprehensive utilization of waste related to the production process. Circular economy is a kind of economic development model, which is built on the basis

of material recycling. It requires the economic activity to be organized into a resource, the product, the material of the product, and the circulating flow. The whole economic system as well as the production and consumption of the process is basically not produce or produce very little waste, only misplaced resources, and no real waste tourism circular economy to the efficient use of resources and recycling as the core. 6R (Muche T, Höge C, Renner O, et al. 2016) is the basic principle, that is: reduce, reuse, recycle, rethink, repair, and reorganize. Characterized is natural resources of low input, Gregory and waste low emissions, of tourism damage to take timely remedial measures, and thus fundamentally dispel the long term conflict between environment and development. "Circular economy is essentially a kind of ecological economy, which requires the use of ecological law to guide the economic activities of human society". In short, circular economy is to use natural resources and environmental capacity in accordance with the law, and realize the ecological shift of economic activities.

3.2. Sustainable Tourism Development Theory

Sustainable tourism development is the concrete embodiment of the theory of sustainable development in tourism industry, and it has the same meaning as the sustainable development theory in general sense: First, to meet the needs of the development of tourism industry is the first through the appropriate use of environmental resources to achieve economic income, to meet the basic needs of the local community, improve the living standards of local residents: on this basis, to meet the needs of tourists on the higher quality of life, to meet their development and enjoyment of high level. Second is environmental restrictions, resources to meet human at present and future needs of ability is limited, this restriction reflected in tourism is the tourism environment bearing capacity, namely a certain period of time, under the condition of certain area can bear the function of human activities of the threshold (Halbac-Cotoara-Zamfir R. et al, 2015). It is the measurement of the self-adjustment function of the tourism environment system, and the main sign of the sustainable tourism is the coordination of the tourism development and the environment. Therefore, as the environmental carrying capacity of the tourism environment system and the development of tourism, it should become an important indicator to determine whether the tourism industry can sustainable development. Three is fair. It is emphasized that the fair distribution of the limited tourism resources and the tourism demand cannot be satisfied with the environment of tourist areas, and the contemporary people cannot meet their own needs and interests, and damage the rights and utilization level of the tourism resources.

3.3. The Significance of Renewable Energy Technology in the Application of Tourism Circular Economy

Renewable energy technology in the development of tourism circular economy. Renewable energy technology is a kind of ecological technology, which can effectively alleviate the energy supply of rural tourism area. Fundamentally solve the energy use of rural ecological tourism zone, is a kind of ecological environment friendly, the tourism industry growth mode has a substantial change in technology. The application of renewable energy technology in rural tourism area, has positive practical significance.

3.3.1. Save operation cost

Coal and firewood is simple and convenient to use, pre need equipment investment, so rural tourism area of coal, firewood utilization occupies a large proportion of, used in the same manner is limited to the basic combustion mode. Using renewable energy (see Figure 3) is the most important equipment investment, the cost is relatively large, but in the long run, renewable energy equipment only one-time investment (Mathias J D, Alzina A, Grédiac M. 2015), the latter almost no cost, and the economic environment, can save the operating costs of rural tourism area.



Figure 3 – More Clean Energy Should Be Put Into Rural Tourism Area

3.3.2. Reduction of conventional energy consumption

Reducing the proportion of the use of conventional energy is an important target for the application of renewable energy. Rural ecological tourism area has a wealth of renewable energy reserves, such as solar, biomass, wind, etc. some of the tourist area is also rich in geothermal energy. To make reasonable use of these renewable energy technologies, we need to make use of the program system, which is based on the combination of renewable energy in rural ecological tourism areas, and apply it to various industries, departments and regions involved in the tourism area.

3.3.3. Purification of ecological environment

The use of conventional energy sources, such as soot and burning waste, seriously affect the light environment, atmospheric environment, biological environment, water environment and soil environment, and so on. Application of renewable energy, no, smoke emissions, no solid waste generated, will not affect the environment, air quality in the tourist areas, the environment can play a role in the tourism area.

3.3.4. Provide development ideas

It is a useful exploration to introduce the renewable energy into the development of the tourism circular economy in rural areas (Gupta S D., 2015). At the same time, it also provides a new way for the development of tourism, that is, as long as the new

technology and new ideas for the utilization of the tourism industry can be incorporated into the scope of tourism industry. Renewable energy can be used in the tourist areas, as well as the green building technology, waste resource technology, efficient use of coal, etc. can be used for tourism, and create a better efficiency, to achieve cleaner production in the tourism industry, is conducive to the sustainable development of tourism.

4. The Measures of Promoting the Development of Circular Economy in Rural Eco-Tourism

Rural tourism is more beautiful environment, a better combination of resources, with the development of rural tourism, the problems such as conventional energy consumption, environmental pollution is increasingly serious, waste free piling up the attention of people. The advantages of renewable energy technologies in rural areas can be used in the development of tourism circular economy. For the rural areas, energy saving and emission reduction, optimizing environment, improving air quality and promoting the recycling of resources can play a role in promoting. In detail, the circular economy in the rural tourism area should be based on the policy, technology, concept and application.

4.1. Policy Incentives

Compared with the traditional biochemical energy use, the use of renewable energy in the early stage of investment, tourism enterprises is difficult to accept, so the government should formulate preferential policies to stimulate the application of renewable energy technology in tourist areas. First, formulate incentive policies. Formulate policies to promote renewable energy, according to the size of rural tourism areas, energy use, etc, to develop a policy for rural tourism areas of incentive. Second, the implementation of price subsidy policy. The use of renewable energy technologies in rural tourism enterprises to provide policy and financial support, tax relief, price subsidies and other concessions, enterprises use of renewable energy technology, the initial cost by government subsidies.

4.2. Technology Improvement

Renewable energy technology in China is still in its infancy, a large number of technology has not reached the stage of large-scale application, the application of high cost, and it should be from the national level to increase the research and improvement of renewable energy technology. On the one hand the need to strengthen the research and development work, the scientific research departments, colleges and universities should actively carry out research and practice of renewable energy technology, so that a group of technology in the pilot stage to reach the promotion level, rich renewable energy application system. On the other hand, active introduction of foreign advanced technology, the United States and Japan's renewable energy technology research and development in the international advanced level, it should actively introduce and learn to digest.

4.3. Concept Update

Renewable energy utilization technology is a kind of environmental protection, no pollution, recyclable energy system, but because of the high cost of equipment, there is

no attention to the rural area tourism enterprises. Should actively guide the rural areas of tourism enterprises operators to realize the potential advantages of renewable energy, and to give its certain policies and price concessions, so that the concept of the use of this technology to realize the importance and feasibility.

4.4.Demonstration and Popularization

China's rural tourism is in the initial stage of the development of the tourism industry, and its energy use system is not perfect, especially in the rural tourism area, which is the main source of renewable energy. The establishment of rural tourism and renewable energy demonstration area, has important significance. First, it can play an exemplary role, the economic benefits, environmental benefits, social benefits and cost-effectiveness of the tourism area, especially in rural tourism area. Two is the operation mode which is built up, which will be used for other tourist areas, and provide experience for other tourist areas to establish the model of renewable energy use.

5. Conclusion

The application of renewable energy technology in the scale of the tourist area system has certain feasibility, it can play an important influence on the development of the tourist area. At the same time, renewable energy technology is a developing process. With the development of technology, the cost is getting lower and lower. So the comparative advantage of it with the conventional energy becomes more and more obvious. The application of renewable energy technology in the tourist area must meet the local reality, select the appropriate technology and equipment, and make a system application scope and ways to achieve the purpose of the cycle. Bailing Lake Rural Ecological Tourism Area of solar energy, biomass and wind power are more abundant, in the region making full use of solar energy technology, biomass energy technologies and wind energy technology can bring good economic benefit, ecological benefit and environmental benefit for the tourist areas.

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