

Design of University Students' Learning Management System based on Massive Data Analysis

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Abstract: In order to realize the information sharing of College Students' learning management, and to improve the intelligence level of the information management of college students, a design scheme for the development of College Students' learning management system based on B/S architecture and mass data analysis is proposed. The system adopts the method of large data information analysis to carry out the scheduling and integration of College Students' information. The fuzzy clustering method is used to carry out the classification management of the university student's mass data. On the B/S architecture, the bus data transmission and remote communication design of the college students' information management system are designed. The system adopts the structure of LabWindows/CVI and B/S to carry out the software design of the college students' learning management system, and the learning management of college students is realized under the Linux kernel. The software development of the learning management system platform uses multi thread scheduling technology to improve the parallel computing and program loading ability of the platform. The simulation results show that the university student management system designed by this method has good information management ability, it has strong information processing ability, the intelligence and human-computer interaction are better.

Keywords: Massive data; Clustering; University students' learning management; System design

1. Introduction

With the development of society, education has been paid more and more attention. The number of students is increasing, and all kinds of data information make the staff feel headache, unable to update the data information in time, unable to obtain the fastest and latest information, the inefficiency of query is low, and the efficiency of work is decreased. With the continuous improvement of science and technology, computer science is becoming more and more mature, its powerful function has been deeply recognized by people, it has entered into various fields of human society and is playing an increasingly important role. As a part of computer application, the use of computer to manage student information has advantages that cannot be compared with manual management[1]. For example, search is rapid, easy to find, high reliability, large storage, good confidentiality, long life, low cost and so on. These advantages can greatly improve the efficiency of student information management, and also the scientific and regularized management of the school. The system has good operability, complete function modules and simple user use. Therefore, it is necessary to develop such a student information management system[2].

It is necessary to design an intelligent information management system for college students, adopt JSP programming method to design the software of the system, and use SQLServer2005 as the background database management.[3] The main task of this system is to realize the management of the students' basic information and detailed information of the school student information management office, the management of the students' performance and reward points, the management of the students' achievement and the management of the users' information when they participate in all kinds of competitions. At the same time to achieve the student information input, query, modify, delete and other functions. This paper presents a design scheme of university students' information management system based on B/S architecture and mass data analysis. Big data information analysis method is used to schedule and fuse the college students' learning information, and fuzzy clustering method is used to classify and manage the massive data of college students' learning situation. The design of bus data transmission and remote communication of university students' learning information management system is carried out on the basis of B/S architecture. The system adopts LabWindows/CVI and B/S structure to design the software of university students' learning information management system. The system provides a simple and

clear system and clear operating interface. As far as possible, user can input and query and other functions in convenience, and shortcut button creation is needed to facilitate user operations.

2. Overall Design Framework of the System

2.1. Overall framework

Firstly, the general design of the information management system for college students is analyzed and the function module is analyzed. The information management system of college students is built on the general computer system, and the intelligent scheduling and design of the system is carried out by cross-compiling control method. In the whole design, the student information management system is divided into four modules: user account module, basic information management module, query module, class module. Each module will implement a different function. User account module has three simple functions, respectively for modification, login, exit. The main function of Modification is used to modify the student's account number and password, but this can only be done by linking the network. "logon" function is equivalent to filter, when the user's account and password can continue to operate or enter the system, otherwise cannot be used[4]. The function of "exit" is to shut down the system directly. The student curriculum and class module are the class and course name of each semester after the students arrive at school. The courses are divided into compulsory courses and elective courses. The two functions of this module are inquiry and modification respectively. With the query function, users can clearly know their courses and classes, and the modification function can update the latest records of each student in a timely manner. The development tool used is Java language MySQL database[5], such as Photoshop, etc. The information management and intelligent settlement control of college students are realized by using RF RFID technology. The software development of the information management system for college students is carried out under the framework of B/S system. The network structure and database system of the information management system of college students are constructed. In the human-computer interaction environment, the comprehensive scheduling and intelligent information management of college students' learning information are realized, and the overall design framework of the system is shown in figure 1.

2.2. Functional structure composition

In the development of the university students' information management system, the system software is developed in the network environment under the B/S architecture, embedded ARM is taken as the core control unit. The functional and technical indexes of the information

management system for college students are described as follows: C/S frame system is adopted to realize the management and data construction of college students' learning situation. The embedded Linux design scheme is used to analyze the function modularization of the system. The information fusion and scheduling of college students are carried out by using quantitative recursive analysis method, and the data collection and adaptive scheduling of college students' learning information are realized by using Excel and Access technology. The functional modules of the university students' learning information management system are shown in figure 2.

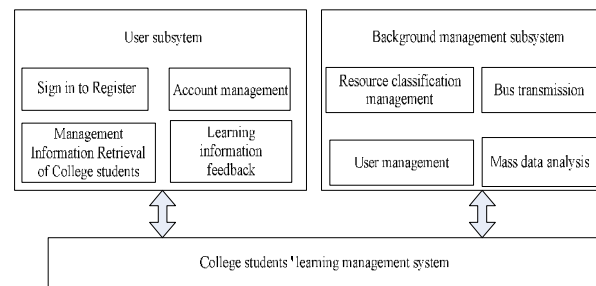


Figure 1. Overall design framework of the system

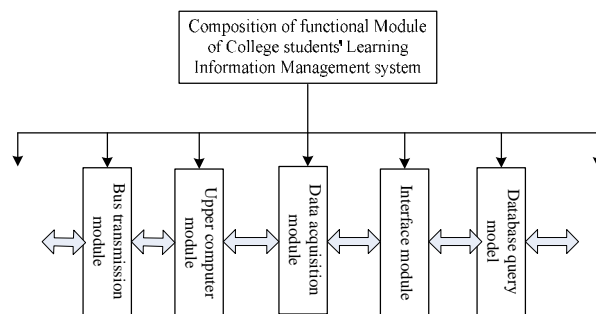


Figure 2. Composition of functional modules of university students' information management system

3. Analysis and Algorithm Design of Mass data

On the basis of the analysis of the overall design framework of the system, the algorithm of mass data analysis is designed. Big data information analysis method is used to schedule and fuse the information of college students. Based on association mining and fuzzy C-means clustering, this paper proposes a classification and fusion method for massive data of college students' learning situation, and fuzzy clustering method is used to classify and manage the massive data of college students' learning situation and adopts the method of correlation matching[6]. The MIMO distribution model of the data flow of college students is obtained as follows:

$$x_n = a_0 + \sum_{i=1}^{M_{AR}} a_i x_{n-i} + \sum_{j=0}^{M_{MA}} b_j h_{n-j} \quad (1)$$

The fuzzy time series analysis method is taken, the initial symbol sequence of the information flow of college students' academic data is obtained, and the finite data set of massive data distribution of college students' learning situation is obtained by using the method of association fusion:

$$X = \{x_1, x_2, \mathbf{L}, x_n\} \subset R^s \quad (2)$$

According to the classification of the attribute set of college students' learning situation, N samples of college students' knowledge are obtained from a limited sample:

$$x_i = (x_{i1}, x_{i2}, \mathbf{L}, x_{is})^T \quad (3)$$

A multi-attribute distributed scheduling method is used to divide the X of College Students' learning data into C classes.

$$x_n = x(t_0 + n\Delta t) = h[z(t_0 + n\Delta t)] + w_n \quad (4)$$

By using fuzzy C-means clustering method[7], the descriptive statistical analysis process of massive data classification of college students is obtained as follows:

$$\begin{aligned} a_0[1-1+2-2] &= 0 \times a_0 \\ a_1[c_2 - c_{-2} + 2c_1 - 2c_{-1}] &= 1 \times a_1 \\ a_2[c_2^2 - c_{-2}^2 + 2c_1^2 - 2c_{-1}^2] &= 0 \times a_2 \\ a_3[c_2^3 - c_{-2}^3 + 2c_1^3 - 2c_{-1}^3] &= 0 \times a_3 \\ a_4[c_2^4 - c_{-2}^4 + 2c_1^4 - 2c_{-1}^4] &= 0 \times a_4 \end{aligned} \quad (5)$$

Under the constraint of probabilistic confidence, the boundary convergence condition of massive data classification of college students is obtained:

$$\limsup_{n \rightarrow \infty} |f^n(x) - f^n(y)| > 0, \quad \forall x, y \in S, x \neq y;$$

$$\liminf_{n \rightarrow \infty} |f^n(x) - f^n(y)| = 0, \quad \forall x, y \in S;$$

$$\limsup_{n \rightarrow \infty} |f^n(x) - f^n(y)| > 0, \quad \forall x \in S, \forall y \in P(f).$$

The multi-layer spatial fuzzy search method is used to self-adaptively detect the attribute category of data classification, the statistical characteristic quantity of massive data component management of college students is obtained. Finally, the optimal solution of the classification output of massive data of college students is obtained as follows:

$$\begin{aligned} \min_{0 \leq a_i \leq c} W &= \frac{1}{2} \sum_{i,j=1}^l y_i y_j a_i a_j K(x_i, x_j) \\ &- \sum_{i=1}^l a_i + b \left(\sum_{i=1}^l y_i a_i \right) \end{aligned} \quad (6)$$

On the basis of the above analysis, the algorithm design of classifying management and optimizing scheduling of massive data of college students is realized[8].

4. Software Development and Design of System

The system adopts the structure of LabWindows/CVI and B/S to design the software of the college students' information management system, and the software of the university students' information management system is developed under the Linux kernel. The multi-thread scheduling technology is adopted to improve the parallel computing and program loading ability of the platform[9].

4.1. Database module

The database is the foundation of the whole information management system for college students. The database module is constructed by Excel and Access technology, and the ASP.NET is connected by bus control in the embedded module. The data source is written into the Data-Set of the university student information management system. In the synchronous source identification port, a RTP packet is sent, and a SDES(Source description) session mechanism is established to access and schedule the database of the college students' information management system.

4.2. Human-computer interaction module

In the design of man-machine interaction module, the ZigBee protocol stack is used to design the network architecture of the information management system for college students, and the C/S architecture system is adopted to realize the network management and data construction of the information management system. Combined with cross-compiling and human-computer interaction design, the software development and intelligent control of college students' learning information management system are realized, and the functional components and middleware of the university students' learning information management system are designed, and the human-computer interaction design is realized. The cross-compile interface of the man-machine interaction module is shown in Figure 3.

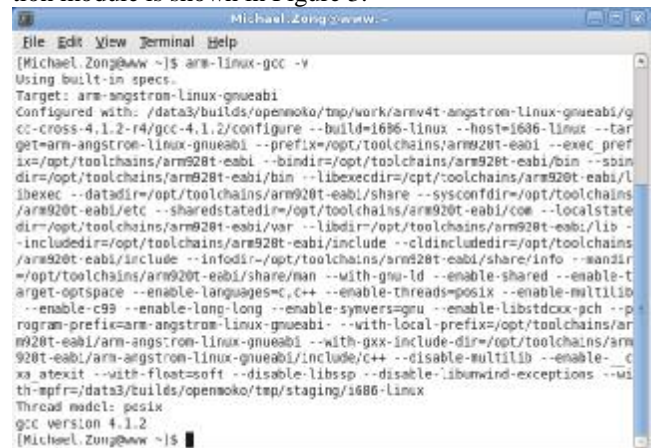


Figure 3. Cross-compile interface of man-machine interaction module

5. System Test and Simulation Analysis

In order to test the performance and debug of the information management system for college students designed in this paper, the server and network workstation are established based on Web, the massive data analysis of the information management system is carried out, and the ability of dealing with the information of college students is tested. The comparison of the exact transceiver probability for the information processing is shown in figure 4.

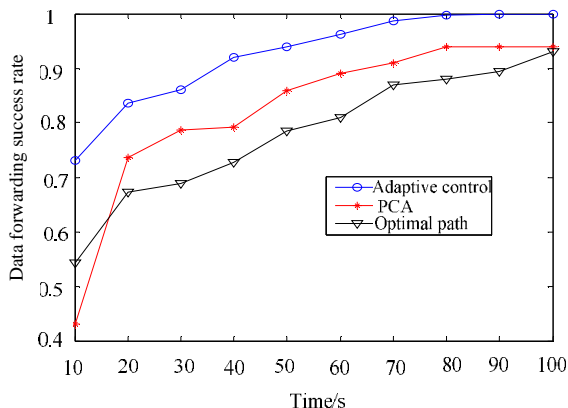


Figure 4. Comparison of performance of university students' information processing

Figure 4 shows that the method of this paper is used to design the information management system for college students, which improves the ability of information processing and mass data analysis.

6. Conclusions

Aiming to improve the intelligence level of the information management of college students, a design scheme for the development of College Students' learning management system is proposed based on B/S architecture and mass data analysis. The system adopts the method of large data information analysis to carry out the scheduling and integration of College Students' information. The fuzzy clustering method is used to carry out the classification management of the university student's mass data.

On the B/S architecture, the bus data transmission and remote communication design of the college students' information management system are designed. The learning management of college students is realized under the Linux kernel. The software development of the learning management system platform uses multi thread scheduling technology to improve the parallel computing and program loading ability of the platform. The simulation results show that the university student management system designed by this method has good information management ability, it has good application value in practice.

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