University Sports Information Management System Based on Big Data

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Abstract. Student information management is not only the basis of realizing efficient education and teaching management in Colleges and universities, but also an important link. However, in recent years, with the popular development of higher education, the number of students is further expanded, the number of students has increased a lot compared with the past, and the work of student information management has become increasingly heavy, which has brought new challenges to student information management. This requires managers (class teachers, class cadres) to update the concept of student management, innovate the student management mode, and use modern information technology to manage class affairs and student information. This topic is based on the realization of the standardization, digitization and automation of student information management, which can help class teachers and class cadres save manpower, material resources and financial resources, further improve the efficiency and accuracy of class information management in sports colleges and universities, strive to improve the scientific level of student information management, and provide a platform for students to broaden their horizons and actively participate in school activities. In this paper, through the design and development of sports information management system, and through the function and performance test, it is found that the system can meet the needs of colleges and universities, which simulates the results of 200 users' concurrent number of operating system. The user concurrent number is the largest user concurrent number index of non functional requirements of the system, and the corresponding test items have passed the performance test requirements.

Keywords: Big Data, College Sports, Information Management System, System Development

1. Introduction
The third scientific and technological revolution with information technology as the core has made human society from the era of industrialization to the era of information. Especially since the 1990s, with the development of computer network and technology, information technology has broken the restrictions of region, time and other aspects, greatly reduced the cost of information transmission and transaction, made the sharing of information resources in the global scope a reality, optimized the
allocation and combination of personnel, capital and other factors in the global scope, and closely linked the economies of all countries, greatly improving the production efficiency, and has caused profound changes in the fields of economy, culture, science and technology [1]. Information technology has gradually become an important tool to promote technological innovation and management efficiency because of its wide penetration and strong driving characteristics [2].

At present, some colleges and universities still rely on the traditional manual way to manage students' grades, which has many shortcomings, such as: easy to lose data, inaccurate statistics, high labor intensity, slow speed and so on. Low efficiency, poor reliability, can not keep up with the needs of the times, leading to leaders, teachers and students can not timely query or access to important information. I focus on the exploration of network management, hoping to develop an open architecture, easy to expand, easy to maintain, with a good man-machine interface of student performance management system. Since the reform and opening up, China's economic and social development has been rapid, the demand for highly educated talents has increased year by year, which also promotes the development of higher physical education, and the scale of sports majors has been further expanded. In Colleges and universities, to do a good job in education and teaching management, student management is one of the main work. Students' information management is the basis of students' work. It is mainly an educational management activity that class teachers, counselors, teachers and relevant leaders plan, organize and implement students' values guidance, ideological and political education, learning, employment, career planning and extracurricular activities in accordance with the provisions of education and teaching management system. In Colleges and universities, the professional class is the most basic management unit. Many education and teaching management activities in Colleges and universities should be implemented and implemented through the class student information management. It can be said that the effective implementation of student information management is the basis for the effective improvement of university education and teaching management. If we manage the professional classes well, we will further manage the school. In the process of student information management, including teacher management and student self-management, self-education, in which student self-management is a supplement to student work, we must give play to students' subjective initiative, establish the concept of "people-oriented" in student information management, encourage students to actively participate in student information management, so as to improve the effectiveness of student information management [3]. With the rapid development of information technology, the computer has become the main tool in various fields. It is the right assistant for people to study and work. According to the survey, almost all college students now have a computer, which provides convenience for the construction and use of student information management system. At the same time, in recent years, the construction of campus network infrastructure has been continuously improved, which has covered all the activity areas in the campus. With the development of modern information technology and the popularity of campus network, it provides sufficient guarantee for the development and construction of student information management system. The development and construction of student information management system also brings great convenience for class teachers and class cadres to the information management of professional class students. Compared with ordinary colleges and universities, students in physical education colleges and universities have more personality, and their enthusiasm and enthusiasm in participating in students' information management are relatively weak, and their ability is insufficient, so there is more demand for students' information management system. The use of the student information management system can timely update the information of the class students, make timely statistics and query the relevant information, and make it more convenient for the head teacher, class cadres and relevant leaders to understand and master the student information. Compared with the traditional student information management, it improves the work efficiency and has greater advantages [4].

In this paper, combined with the characteristics of a sports university, the design and development of a sports university student information management system is discussed. Through the development of the system, on the one hand, it can reduce the investment in student information management, make
the management construction more standardized, orderly and efficient, on the other hand, it can improve the work efficiency, reduce the difficulty of work, and better serve the comprehensive development of young students. This paper introduces the analysis and design process of the system. In the process of analysis and design, it mainly analyzes the practicability, economy and feasibility of the system. Secondly, it describes the database design of the system, mainly discusses the logical structure and physical structure of the database. Finally, it describes the implementation and testing of the system. The system is implemented by oriented programming. The implementation of object technology is mainly the detailed design in the process of system design. Finally, the system is tested, and the test cases and test results are given.

2. Related Concepts

2.1. Cloud Service Platform

In the era of Internet economy, with the application of information technology, various industries and fields in the society will produce massive data information. Through the value analysis of these massive data information, it can assist enterprises in the process of project development, with scientific and reasonable data decision support. In order to achieve this goal, cloud service platform emerges as the times require, and it can be used without large-scale development. In the case of capital investment, the massive data information is processed deeply. And it contains the characteristics of low price and low threshold [5]. In the research on the efficiency of business value feedback in different industries, IBM organizations put forward that most enterprises and companies are investing in it software and equipment, 70% of which is spent on the maintenance of IT hardware equipment, which also means that most of the funds are not used for value return. The deployment of cloud services can change this situation, so that the information capital investment of enterprises can bring more investment returns to enterprises, and save the investment cost of enterprises [6].

Cloud computing includes two most obvious characteristics, one is the distributed storage scheme for resource information storage, the other is the utilization of infrastructure in information technology platform. Cloud services can provide centralized support for different information technology services. The data information can be isolated and distributed stored, so that the process of each functional module of the system can not be disturbed by a large number of access operations. At the same time, cloud technology services can provide continuous expansion demand for the storage space of data information, so that data storage can be used indefinitely, and data information can be saved permanently. Windows azure constructs SQL Azur, namely cloud database, through functional operations that can be continuously studied and the architecture of data storage center [7].

2.2. Cloud Database

The background of cloud database is SaaS. Under the wide application of cloud technology, in order to continuously expand the storage space of data, a kind of database technology is produced. Users of system software usually need to continuously analyze the internal business data of the system when operating the system. Therefore, cloud technology needs to have the characteristics of continuous expansion, which can let users use it frequently and break through the performance limits of the system itself, the system performance can be maximized. The database information service of the system can bring high availability to the system, but at the same time, it may also increase the information investment cost of the enterprise [8].

Through the sharing mode of different users, cloud database enables users to share data and information with different users at the same time, which reduces the investment in information technology of enterprises. At the same time, for the business data service of the system, cloud service provider service system mode is adopted, so that the system operators can reduce the cost of the system Service volume, reduce the pressure of system maintenance and upgrade. With the support of cloud services, it can protect all user data information in the cloud service system and build a security barrier for user data.
2.3. J2EE Development Platform

J2EE as a technical architecture of system development, it comes with a variety of related components. On the basis of J2EE structure, it can simplify the system development steps, standardize the system structure, and more importantly, it can improve the application portability and strengthen the system security [9].

Based on the consideration of feasibility and expansibility, this paper designs and develops the human resource information management system for university teachers with the idea of distributed and component-based development technology. On the basis of J2EE framework, the overall structure of the system is divided into four layers: customer layer, web presentation layer, logic layer and database layer. In the Internet environment, information transmission between client and server is realized by browser. The logic layer is implemented in the form of transaction, such as organizational structure management, personnel information management, salary management, performance appraisal management, insurance and welfare management, etc. while managing the normal business, it also ensures the consistency of operation and the integrity of data. In this system, all the data related to the information management of teachers' human resources are stored in the database layer. As long as the user who meets the permission requirements can easily access the database, and can also view or edit the data [10].

2.4. Relevant Calculation Formula

Weight calculation:

\[
CI = \sum_{i=1}^{5} W_i CI_i
\]

\[
RI = \sum_{i=1}^{5} W_i RI_i
\]

\[
CR_A = \frac{CI}{RI} A
\]

3. System Implementation

3.1. Programming Language Configuration

3.1.1. Spring file configuration. Application Context.xml File is the main configuration file for spring web development. This file mainly realizes the configuration of data source, the configuration of database user and login password, and the configuration of the association between classes, class entry and transaction management. In the spring configuration file, different java files can be configured clearly Bean management, through the configuration file can clearly see the relationship between each java bean, of course, developers can set zero configuration, so that the spring framework will automatically scan and annotate. The corresponding relationship between entity class and database field can be associated through configuration.

3.1.2. Struts.xml file configuration. Struts.xml the file is mainly used to configure and manage the action and namespace of Struts framework. In the configuration file, it mainly realizes the configuration management of package and the management of project's namespace. In the package configuration management module, different configuration files can be included through the include
command, Struts.xml the file mainly completes the action of some requests Management of diversion and distribution.

3.1.3. Hibernate file configuration. Hibernate is mainly to realize the encapsulation and management of the database. In the hibernate configuration file, the dialect of the database, the string of the database connection and the driver of the database are mainly configured. The configuration file can realize the creation of database script and the configuration of whether the statement of identifying database can be formatted and displayed.

3.2. Design of Cloud Server
Most of the procedures of the cloud server can determine the data through the instructions of the system operator. After the data processing by the third party, the data will be processed to the proof data, so that the data information of the system server can be saved, and the system database can be uploaded through the data stored in the cloud. Receiving files, because the cloud of the system needs to connect many operating users in the system, so use the line to process the data processing flow. The cloud in the system needs to connect the business process of the system to the business process of the system. As long as the data association is constructed, the data of users can be placed to record the data information of all online users.

4. System Test
Through the system test, we can see whether the various functions of the system can meet the needs of users, whether it can make the normal operation of various functions of the system under the normal hardware and software configuration, and judge whether the performance configuration of the system can meet the stability and security of the system according to the test results. We also need to judge the maximum number of users and the response speed of the system. In the management of University Teachers’ human resource information management system based on cloud service platform, we need to manage the input and output of system data through functional test and performance test. The test results of the system can determine the perfect mode of functional data information.

4.1. Response Time and CPU Utilization Test

| Number of concurrent users | Test specification | Test metrics | numerical value: | Adoption |
|---------------------------|--------------------|--------------|-----------------|----------|
| 200                       | Average response time | Number of login users changed | 0.018s | Yes |
|                           | system resource    | CPU utilization | 22.8%         | Yes |
|                           | Number of things per second | TPS           | 468            | Yes |
|                           | error rate         | None          | None           | Yes |

As shown in Table 1, it is the result table of system performance test. The result table shows the result of simulating the operating system with 200 concurrent users under the LoadRunner tool test. The number of concurrent users is the maximum user concurrency index for non functional requirements of the system, and the corresponding test items have passed the performance test requirements.
Table 2. Test Performance

| Concurrent quantity | Response time | CPU utilization percentage |
|---------------------|---------------|---------------------------|
| 200                 | 0.018         | 22.8                      |
| 600                 | 0.033         | 33.3                      |
| 1000                | 0.054         | 47.2                      |
| 1600                | 0.149         | 57.1                      |
| 2000                | 0.299         | 80                        |

4.2. Data Transmission Success Rate Test

According to Figure 1, in the data transmission success rate test project of the platform, after three rounds of test, each test time is one minute, and the transmission success rate basically meets the demand of more than 80%.

4.3. Investigation and Statistics
According to Figure 2, the Figure is changed to the teaching survey of the tested university sports information management system among the automation teachers and students in our school. After data statistics, more than 85% of the people agree with the design and implementation of the system, and only 5% of the people do not agree.

5. Conclusion
With the rapid development of information technology, all kinds of information management systems have developed rapidly. The pace of information construction in Colleges and universities is accelerating. The development and use of student information management system makes all aspects more conducive to the management of the school and the growth of students. In order to better manage the information of college students, according to the actual situation of an art university, we design and develop a student information management system, hoping to meet the needs of users through the system, so as to achieve more effective and targeted student management. Based on the actual needs of an art university, this paper studies and develops a set of student information management system, which saves time for the school, counselors, head teachers and teachers in the process of student management. It is also more convenient for students to self-management, so that the efficiency of student information management has been further improved.

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