Student Information Management System Based on JSP Technology

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Abstract: Student information management involves various departments in colleges. After years of informatization construction in colleges, a large number of systems have been put into use. The system can meet the needs of various departments in function, improve the management level of college departments, and promote standardization and institutionalization of university management is of great significance. The purpose of this paper is to study the implementation of student information system based on JSP. Firstly, JSP technology, the main application technology of system development. Secondly, the main function modules of the system are divided, and each main function module is analyzed and designed in detail. Enable system functionality and test system functionality. The system can maintain stable performance for a long time in the case of multi-user use.

1 INTRODUCTION

In recent years, the state has made great policy adjustments in education. As a result, there has been the expansion of colleges and universities in my country, the scale of the school has continued to increase, and the base of students has become larger and larger, and with it, there is an exponential increase in student information (Cobanoglu 2018, Cobanoglu 2019). A direct result of this is the impact on the daily student management of colleges and universities. It has always been managed manually, and the efficiency is obviously low, and it cannot meet the growing demand for work. In contrast, the advantages of computer management information are more obvious (Ramesh 2019).

A robust student information management system will help teachers and students provide complete answers for their studies and school life. Songsom reviews the technical, organizational, and administrative processes required to make data-driven decisions for effective systems management. Create the necessary information, develop a culture of open communication, information sharing and use, and build technical capacity. It shows several functional areas where universities use EMIS for data management (Songsom 2020). There are also obstacles to the activities of the University of Madura Career Fair

(KKN). One of them is that the site selection process for KKN has been delayed by many changes in temporary housing for many students. Putra F, in order to facilitate and assist the LPPM in identifying the status of KKN, established a computerized information management system to help identify the actual courses. A data management system was designed and implemented using algorithms (distance learning) to help identify graduates of Madura University KKN. This local project aims to implement MIS-KKN at the University of Madura to help improve the quality of student learning (Putra 2019). Therefore, people are very interested in learning how to manage student information based on JSP technology (Haddad 2019).

The student information management system includes four main functional modules: student basic information management, student course management, comprehensive evaluation management and tuition management. It is an integrated management information system, including all aspects of student management, for all departments of the school and users at all levels. The system is completely based on the school network to achieve centralized management of student, collaborative functions and information sharing, enabling traditional student management to develop digitally and laying a good foundation for further student management.

2 RESEARCH ON STUDENT INFORMATION MANAGEMENT SYSTEM BASED ON JSP TECHNOLOGY

2.1 JSP Technology

JSP consists of many parts, among them, HTML tags give the frame of the web page; and script elements give the dynamic part of JSP (Agarwal 2021).

The server sends a request to the JSP engine, and the JSP engine returns the interpretation result to the server.

On the other hand, another advantage of JSP (JavaServerPages) writing is that it is written in one program (Aziz E 2021, Alotaibi F 2020). Users can modify the content of JSP in most development platforms, and can run the JSP interface obtained by programming on any Internet server, or enter and operate this interface through any Internet browser (Ismail 2019, Abdullahi 2019).

JavaScript is a computer language that can be widely used on the client side, and its initial use is on HTML-based websites to add dynamic content to static HTML pages (Chandra 2021).

2.2 Application of Algorithm in Information Management System

Achievement is a part of system, and a powerful indicator of whether students have learned the professional skills they have learned (Kholis N 2021). Suppose the t class has m students, and the jth class of the ith class is T. The mean of class J is:

$$\overline{X}j = \frac{1}{m}\sum_{\eta=1}^{m} X\eta \qquad (1)$$

For any path m, the distance should be calculated by the method of sum of squares of deviations. Therefore, the distance between class p and class q must be defined as:

$$D^2(p,q) = \frac{n_p n_q}{n_p + n_q}(\overline{x}_p - \overline{x}_q)(\overline{x}_p - \overline{x}_q) \quad (2)$$

Among them, np and nq are the number of students in the p-th class and the q-th class respectively; finally, the distance between each student (as the m class) is calculated and written as a distance matrix. It is a matrix of order m × n. Contains m(m-1)/2 independent data in the following form:

$$\begin{pmatrix} 0 & d(1,2) & ... & d(1,m) \\ d(2,1) & 0 & ... & d(2,m) \\ ... & & & \\ d(m,1) & d(m,2) & & 0 \end{pmatrix} \qquad (3)$$

Calculate the distance between the new class and other classes.

3 DESIGN AND RESEARCH

3.1 System Development Environment

Browser: IEexplorer8.0

3 major development java technologies: JSP, servlet, mybean

Network application layer security protocol: SSLIPsec

Hardware development system; a router, 2 win7 computers, a switch

Database Development Language: Powerful Database Manipulation Language SQL

3.2 System Function Module Design

The main modules are as follows:

(1) Basic information management of students

After each year's college freshmen enroll, the staff can organize the student information in a unified manner and enter it into the system. The basic information attributes of students mainly include: the student's name, age, home address, family contact number, parents' names, parents' work status, and so on. The student basic information management module is shown in Figure 1 below:
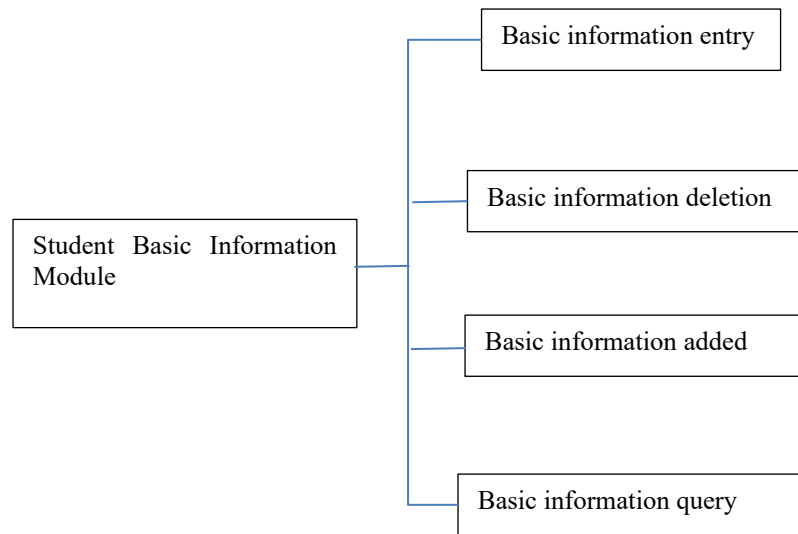
Figure 1. Student Basic Information Management Module

(2) Student Course Management

The specific work of the module includes the addition, deletion, modification and checking of information such as teachers' teaching situation. Similar to the general management system. Users need to be able to query the student's course information in real time and quickly.

(3) Comprehensive evaluation management

Generally speaking, the comprehensive quality of college students can be divided into three aspects: ideological and moral quality, academic performance and other qualities. In this module, students can only inquire about their own comprehensive evaluation results. Only counselors, department leaders, student management personnel and database administrators can enter and maintain, and other teachers have only the right to inquire.

(4) Tuition management

As the name suggests, the tuition management module is mainly used to manage the student's tuition information.

4 REALIZATION AND RESEARCH OF STUDENT INFORMATION MANAGEMENT SYSTEM BASED ON JSP TECHNOLOGY

4.1 System Implementation

This system applies the development mode of jsp+javabean+sqlserver2000. The system uses eclipse to provide connection with the javaweb server to control the operation of tomcat. Then a tomcat connection pool is created, and enough front-end and back-end database connection trees are reused by the application to transmit web page interaction information. The biggest advantage of this approach is to efficiently support the implementation of web hyperlinks for new users. The connection pool can also manage the total number and utilization of database connections, and always executes the process of "applying for connection - taking connection - disconnecting - putting back into memory". The steps to configure the tomcat connection pool are as follows:

(1) Reconfigure the server.xml database configuration file in tomcat, and add the following contents: database connection pool name, type name, default number of connections, maximum number of connections, database user name and password, driver name, factory name and object value, etc. information.

(2) Put the copy of the driver package (sqlserver***jdbc) into the tomcat\common\lib path, and delete other installation packages in this directory at the same time, so as not to be affected by the connection, it is safer to do so.

(3) Start to find the web.xml project configuration file in this project, and modify the following code for it: the modified object is the resource object name, resource object type, resource object user name

Add the following code to the WebRoot\WEB-INF\web.xml file in the project directory:

```
<resource-ref>
<description>SQL server text app</ description>
<res-ref - name> jdbc/ ConnectionPool </res-
ref-name>
<res-type>javax .sql.DataSource </ res-type >
<res-auth> Container</ res-auth>
</resource-ref>
```

(4) After the above steps, the configuration of the connection pool is completed. You can restart tomcat. After startup, the system will initialize the context object and update the data source and database connection object, so that we can use the data source of tomcat.

4.2 Performance Test

Our current system testing tool uses Microsoft Web

Application Stress Tool, which can effectively test website performance, especially loading performance. The software can simulate the simultaneous access of 100 users through the script, and can simulate the operation of some users, and can connect to the performance counter on the remote Windows server, that is, the performance counter. By analyzing this performance counter, bottlenecks in the system can be found. At the same time can analyze CPU and system memory performance. The CPU usage percentage reflects the general usage status of the processor. If the CPU usage continues to exceed 80%, the system connection will be interrupted. as shown in picture 2. Examples of performance tests are shown in Table 1:

Table 1. Performance Test Examples

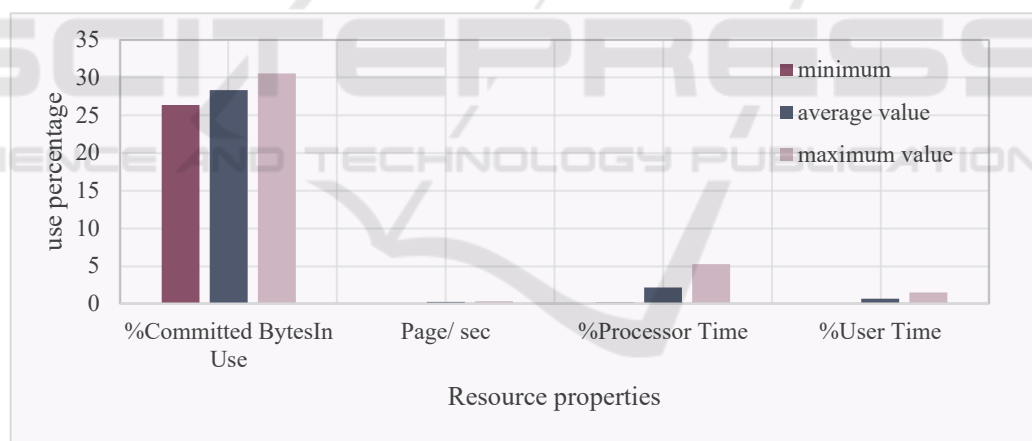| Resource properties		minimum	average value	maximum value
Memory	%Committed BytesIn Use	26.36	28.32	30.55
	Page/ sec	0	0.2	0.3
processor	%Processor Time	0.12	2.12	5.23
	%User Time	0	0.64	1.47

Figure 2. Test Results

After a long time of repeated testing, the results of this system basically conform to the test standards. The system can operate under the condition of large concurrency and can meet the needs of the current school.

5 CONCLUSIONS

Educational administrators at all levels and all kinds of counselors are unable to create, save, modify,

maintain, retrieve, and make decisions about student information. This system is a student information management system function based on network JSP. This design is functionally divided into the following modules: student basic information management, student curriculum management, comprehensive assessment management and tuition management. The system has a lot of room for expansion and development; the student information management system designed and developed this time should comply with the regulations on student information management in the TV University

system and meet the needs of student information management. Although the system has made a lot of optimization measures at the database level, there is still a certain pressure on the problem of concurrency. When a large number of students take courses at the same time, there will be a certain network delay, which is a major problem that needs to be optimized in this system. It is believed that with the further testing of the system, the stability, fluency and safety of the system will be continuously improved and improved.

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