Design of Postgraduate Information Management System Based on Spring

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Abstract. This paper designs the postgraduate information management system for the information of postgraduate management in university graduate school. Through the development of the Spring framework, the system function module is analyzed, the overall architecture of the system is designed, the database design is carried out, and some problems in the detailed design are solved. The system can manage the comprehensive information of graduate students, adopt the Spring MVC three-tier architecture design, and establish the management log, which has good practicability and expansibility.

System Development Background

University graduate information is more complex, involving each graduate's basic information, political outlook, family information, paper information and defense information. In order to help the teachers, counselors and institutions of the major colleges and universities to manage and maintain the information of postgraduate students through information management, effective, safe and fast, the development of graduate information management system is devoted to solving such problems and reducing the number of graduate students The amount of work. So that the teacher to set the authority to log on the system as a different identity, you can enter the basic information of students, as well as the personal information of graduate students to track, but also the management of postgraduate documents and materials. In the effective management of students, you can according to the actual requirements of the information to change or delete, and comprehensive information on the students to statistics and analysis. Postgraduate information systems should be easy to maintain and extensible[1].In order to more rational and reasonable management of graduate students, the development of this graduate information management system is necessary.

System Development Technology

The main technology required by the system includes the current mainstream technology Bootstrap, JQUERY, JSP, Spring. The system is based on the Spring MVC design and development. The Spring framework is highly configurable, using IOC controls the way in which components are injected, annotating the way to find resources. Spring's decoupling reduces the dependency of the program, making the system scalability, maintainability has been greatly improved. EJB as the underlying system components technology [2].The system is designed according to the MVC three - tier structure is divided into Control, View, Model. Under the control of Spring MVC can be efficient and orderly work.

Functional Module Analysis

User Management Analysis. The role of the system can be divided into teachers, administrators, super administrators. Different user roles log on postgraduate information management system, will correspond to different levels of authority. The main function of the user management module is to manage the user information. The role of the teacher has the authority to log in, responsible for student management, information management. The role of the administrator role has administrator privileges

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to log in, responsible for teacher assignment, and rights management. The Super Administrator role is responsible for the unified allocation and management of the administrator.

Student Management Analysis. The student management module is divided into two functions, namely, adding students and querying students. Add student features include adding new students, entering basic information about students, and so on. The function of the query student includes the inquiry of the student who has already been entered and paged management. It also includes management operations such as modification, addition and deletion of information for all types of students.

From the point of view of the page design, add the student function to add the student's basic information and political face to the page. On this page, there is a detailed button, click here to jump this page, you can browse all the information of the students, and can modify and delete the information. Also provides upload function, when some information needs to upload files, click on the corresponding function button can be achieved.

From the point of view of the page design, query the student function on the page lists all the students recorded by the current system, you can view all the basic information of students, and provide sorting, paging, information export and other functions. This can improve the efficiency of teacher maintenance and viewing. The export of information is more convenient for the management of teachers.

Information Management Analysis. The information management module includes the basic information of the students, the political face, the defense information, the scientific information, the information of the paper, the information of the internship, the information of the award, the information of the leave, the information of the leave information and the file list, so as to facilitate the search and statistics according to the demand. Which students basic information and political outlook to provide export function, the file list shows all kinds of files uploaded to the server, and provide file download function. Among them, the basic information management, including the basic information of students, such as identity cards, names, gender, grade, place of birth, date of birth and so on. Political face management, including whether party members, party school time, time to join the party. The defense information management includes the student reply information including the thesis title, the instructor, the opening time, the reply time, the reply result and so on.

Scientific research management also need to include scientific research papers and the publication of the situation management. The basic functions include the management of the information of the scientific research institutions and the management of the manager's authority. Need to meet the various departments of the various departments of the scientific research results management, system settings also need to be more humane [3-5].

Scientific research information management, including scientific research project name, starting and ending time, but also upload scientific research documents. The paper information management includes the student's thesis title, the publication, the level, the publication time and so on. Internship information management includes whether there are internships, internship time, unit name, description and other information. Awarded information management includes reward time, reward name, reward level and notes and other information. Disposal information management, including punishment time, the name of the punishment, the level of punishment and notes and other information. Leave information management, including leave time, leave time, leave category, leave the reasons, comments and other information. Absence information management includes absentee time, absence type (such as meeting, classroom, etc.), description and other information. File list management includes all the list of files that have been uploaded, including the file name, date of upload, category, and so on.

Through the analysis of system functions, the main functions of the system can be divided into five modules, including Authority management, file management , scientific research management, practice management and credit management. The following describes the system function diagram of the system, as shown in Fig .1.

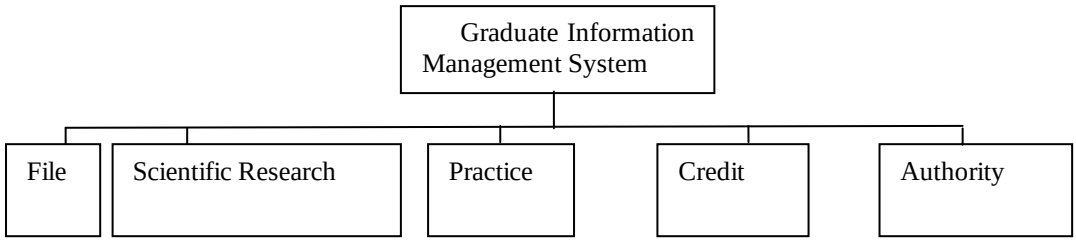

Figure 1. System function diagram

System Overall Architecture Design

Information management system development framework can save a lot of system design and development work, reduce system development costs, shorten the development cycle, improve development efficiency[6].

Through the analysis of the system, the overall structure of the system design. In the system design using structured, modular design ideas, each function of different modules are independent of each other, but also between the various modules of data transmission. The system uses the Spring MVC three-tier shelf. Graduate information management system is divided into three layers, namely, control layer, view layer, model layer. (refer with: Table 1)

Table 1 System level table

Level	Program name	Description
Control	Control	Responsible for the interaction between the front desk and the background.
View	Service,Dao	Get a database connection, complete the specific business logic processing.
Model	JSP	Front page display.

Database Design

In the development of Web systems, the database is a form of data management that we must use. Through the establishment of a reasonable relational database application model, according to the needs of the system to determine the needs analysis, to construct an independent DBMS product ER diagram, and then convert the ER diagram into a specific database product support data model to complete its logical design, Form the outer pattern on the data.

Server and database connection using the Spring JDBC framework to achieve the template design pattern, the code in the repeated part and complex tasks are implemented in the template, the use of Java5 features, such as automatic packing, through the variable parameters to simplify the use of JDBC template, Simplifies the use of JDBC. With Spring JDBC Template for us to complete the creation and release of resources, help to avoid the error, such as the connection is not closed. JDBC configuration file from the Spring framework into the Template, which also allows us to manage the database.

Postgraduate Information Management System is a medium-sized application system, using SQL Server database can meet the system requirements. In the database design, the following data sheet is designed. [7-10]The system has 12 tables, one of the tb_ admin user table is a separate table, a separate user administrator information. The remaining 11 tables, a tb_graduate student table, and 10 student information tables are connected via tb_graduate's t_id field numbers, thus ensuring the interrelationship between the data.

Detailed Description of the Detailed Design

Login to Achieve. Login module is divided into three kinds of user rights, that is, teachers, administrators, super administrators. The teacher is responsible for managing the student information, the administrator is responsible for managing the teacher, and the super administrator can manage all the information.

In the login module, the system uses the method of randomly generating the verification code to verify. The verification code can be 0-9 or A-Z characters. The page automatically sends the request when the background to generate a verification code, the background through the flow of the generated code to send the code to the browser. The detailed code is described below.

```
// step1 resets the brush color
Random r = new Random ();
P.setColor (new Color (r.nextInt (250), r.nextInt (125), r.nextInt (255)));
// step2 randomly generates a random number (5 verification codes)
String number = getNumber (5);
HttpSession session = request.getSession ();
Session.setAttribute ("number", number);
// step3 draw number new Font (font, style, size)
P.setFont (new Font (null, Font.ITALIC, 24));
// the coordinates of the number x y
P.drawString (number, 5,25); // Draw numbers
```

User Management Implementation. System users do not provide registration. After the system is deployed, provide the super administrator "admin" account, the administrator through the user management module to add users, assign user rights, all users to manage.

User-managed business logic needs to connect to the database, to add, delete and modify the operation of the database. The system database connection using the way Spring JDBC injection, configuration file inside the application configuration database configuration, through the Ioc into the class, through the call to achieve the database access.

```
<Bean id = "dbcp" class = "org.apache.commons.dbcp.BasicDataSource">
<Property name = "driverClassName" value = "# {dp.driverClassName}"> </ property>
    <Property name = "username" value = "# {dp.username}"> </ property>
<Property name = "password" value = "# {dp.password}"> </ property>
<Property name = "url" value = "# {dp.url}"> </ property>
<! - initial value when connection pool starts ->
        <Property name = "initialSize" value = "# {dp.initialSize}" />
<! - the maximum value of the connection pool ->
<Property name = "maxActive" value = "# {dp.maxActive}"> </ property>
<! - the maximum idle value. After a peak time, the connection pool can slowly have to use the connection is slowly released part of the time until the maxIdle ->
        <Property name = "maxIdle" value = "# {dp.maxIdle}" />
        <! - minimum idle value. When the number of idle connections is less than the threshold, the connection pool will pre-apply to some connections, so that the peak time to apply ->
        <Property name = "minIdle" value = "# {dp.minIdle}" />
</ Bean>
```

Log Management to Achieve. Use the Log4j log frame to print the log statement at the specified location and in the pre-set settings. By setting Log4j configuration file log4j.properties, the system will automatically generate the logdout.log and logerror.log log files in the specified directory when the server is first run. The first file is the current system all log, including some The execution statement of

the database. The second file is the error log that is generated by the current system run. This makes it easy to see how the system is running, especially the cause of the error, and the SQL statements and parameters that were executed at runtime. Easy error and system maintenance.

```
static{
 // Import the log4j configuration file
PropertyConfigurator.configure("src"+File.separator+"log4j.properties");
}
Logger log = Logger.getLogger(this.getClass().getName());
```

System Test

In the login interface, enter the user name and password, there will be permission to choose. Although the account is correct, but the authority to choose wrong, will also prompt the user name does not exist. The wrong password will prompt the user for the wrong password.

Different users will be able to display different pages. Teacher users do not have this user management column. Administrator or super administrator login, there will be users to manage this function module.

In the user management to add the user when the input has been an account, the system will prompt the account has been occupied. After two password input errors, the system will prompt two passwords are inconsistent. Users can only manage users lower than their authority, the super administrator can modify the administrator, the teacher, delete the operation.

All users can manage the students, the basic information on the students to add the time, such as student ID, identity card number when the operation will have the appropriate data validation. When the input information is not satisfied, click the Add button system will give the corresponding error message. Users in the student list inside, you can manage student information, you can delete, modify and other operations. Click on the details of the corresponding students can be modified.

After the system testing and modification, the graduate information management system to achieve the needs of the user function, to achieve the basic goal of the design.

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