

Design and implementation of college scientific research management website

Shugang Liu ^a, Wen Jing ^b, Haodong Du ^c, Linkun Zhang ^d

School of Computer Science, NORTH CHINA ELECTRIC POWER University, Baoding 071003,
China;

^alsg69@qq.com, ^b630673567@qq.com, ^c616837535@qq.com, ^d1021759619 @qq.com

Abstract: the design and implementation of scientific research management website is based on the Java language in the idea of the development, the overall implementation of the front page display, front and back end interaction, background code logic and database data management. The front page mainly includes user level management, user login record information and basic information management of scientific research personnel project. The background code framework mainly USES Maven to integrate the implementation of SpringBoot+Mybatis. I use MySQL for database. The main advantages of MySQL are its small size, fast speed, low total cost of ownership, open source code, and wide application, which are commonly used by small and medium-sized enterprises. You can be familiar with the application of database in advance.

Keywords: Scientific research background management system; SpringBoot + Mybatis; MySQL.

1. INTRODUCTION

In recent years, with the continuous improvement of science and technology, computers and networks have become more and more widely used in human production and life. Therefore, people's demand for and dependence on computers and networks has become higher and higher. Computer networks have become indispensable in human production and life. Part of the division. It is precisely because of this development trend that many enterprises and organizations have begun to design their own units or even their own departmental network management websites. Large educational institutions like schools need the support of management systems and websites because of this large-scale education. In the base, there are many scientific research projects and scientific research data that need to be fully recorded. In this situation, it is very necessary to develop an efficient scientific research management website for universities to use. It can efficiently manage the scientific research data and scientific research materials of scientific research projects in colleges and universities, and can truly improve the work efficiency of university teachers, students, and scientific research project managers.

2. CURRENT RESEARCH AT HOME AND ABROAD

In 1946, the first generation of modern electronic computers was born. Due to its appearance, huge innovations have taken place in management science and information models. The management information system is produced by the development of computers in the field of systems. With the development of information technology and the popularization of the Internet, the information management system has undergone great changes.

In the 1980s, American scholar Toffler once said that we have entered an information society. Nowadays, the world's three major resources are information, energy, and materials, which play an irreplaceable role in human production and social activities. When measuring the level of development and science and technology of a country, it is usually based on the use of information processing technology and information processing capabilities.

At present, in order to show the results of scientific research, strengthen the management of scientific research information, and promote the sharing of scientific research information, most universities in China publish a lot of scientific research information on the Internet through the form of web pages. Some universities have established their own research management websites through their own efforts. In this way, school administrators and scientific researchers can easily manage the website and protect the relevant information and data of the website. Even so, their scientific research management website still has many shortcomings that need to be improved. For example, some scientific research websites have relatively low office efficiency, hindered scientific research information, and the success rate of reporting is not high, project management is lax, and management techniques cannot keep up with the improvement of scientific research. It is necessary to establish a comprehensive scientific research management website.

3. USE OF RELATED TECHNOLOGIES

3.1 Front-end technology used in front-end development

The language HTML used in the front-end page display of this system is mainly for simple text display of some front-end pages; CSS is used to decorate the pages described by the language of HTML, classify the languages of the same style, and use the same kind The style is defined. In addition, we can specify a specific CSS style. When modifying the CSS style, we only need to find the corresponding style to be modified in the list and then modify it. Generally speaking, html is used nested with css.

3.2 Front-end interaction

The Ajax^[1-2] framework is a development technology for creating interactive, fast and dynamic web applications that can be updated asynchronously, which means that the page can interact with some parts of the background data without reloading; and Js^[3] (full name: JavaScript) is also used here, which is generally nested in HTML to realize the basic display function, and interacts with the json string when interacting with the backend.

3.3 Back-end development

The main language is Java^[4], and the spring boot+mybatis framework is used to systematically integrate Java code, which reduces the code redundancy of jdbc to connect to the database. The most

important thing is that mybatis is flexible. To put it simply, it is very convenient. It reduces the usage of the web server tomcat and reduces the memory and cpu consumption for the server.

3.4 Simple application of the database

MySQL^[5] can be used through the simple configuration of mybatis in the background. The main MySQL is light and convenient, simple to install, easy to maintain, and meets the actual needs of today's society. The main reason for low maintenance costs is that it is widely favored by small and medium-sized enterprises.

3.5 Implementation of the overall architecture

The front-end page displays the login interface, user modules, project modules, college modules, monitoring, notifications, etc. When the user (here refers to the system maintainer) performs a click event, it triggers Ajax^[6] and js^[7] (JavaScript) response processing. Interact with the back-end, the back-end logic analyzes the request data, judges and verifies the data elements in the MySQL database are accurately located through the mybatis configuration, and then sent to Ajax or js, and then analyzed and configured to be displayed on the page. The entire click event is even closed loop successfully.

4. SYSTEM DESIGN

4.1 Knowledge Reserve

Front page: HTML+CSS

Front-end interaction: ajax, js

Background logic code: Java

Background frame: spring boot + mybatis

Database: MySQL

4.2 System function structure diagram

Through the above analysis, the system can be developed and disassembled. Specifically, it can be divided into functional modules of user management, college management, project management, role management, and log management.

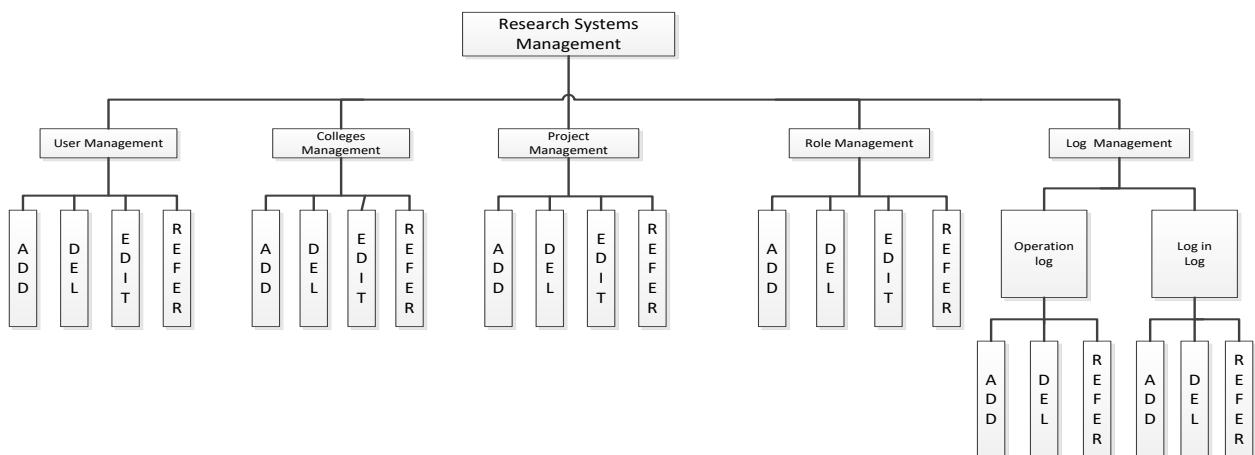


Figure 1 System function structure diagram

5. MANAGEMENT SYSTEM IMPLEMENTATION

5.1 Background code implementation

Spring boot+Mybatis integrates the code:

Introduce the spring boot core package:

```
<!-- SpringBoot core package -->
<dependency>
<groupId>org.springframework.boot</groupId>
<artifactId>spring-boot-starter</artifactId><exclusions>
<exclusion>
<artifactId>spring-boot-starter-tomcat</artifactId>
<groupId>org.springframework.boot</groupId>
</exclusion>
</exclusions>
</dependency>
```

Mybatis framework depends on:

```
<!-- SpringBoot integrated mybatis framework -->
<dependency>
<groupId>org.mybatis.spring.boot</groupId>
<artifactId>mybatis-spring-boot-starter</artifactId>
<version>${mybatis.spring.boot.starter.version}</version>
</dependency>
```

Spring core:

```
<!--The basic core tool of the Spring framework--->
<dependency>
<groupId>org.springframework</groupId>
<artifactId>spring-context-support</artifactId>
</dependency>
```

MySQL connection driver:

```
<!-- Mysql driver package -->
<dependency>
<groupId>mysql</groupId>
<artifactId>mysql-connector-java</artifactId>
</dependency>
```

The above dependency downloads are all done by maven self-downloading.

```
Code addition, deletion, modification and check implementation:public class GenConstants{
/** Single table (addition, deletion, modification and check) */
public static final String TPL_CRUD = "crud";
```

```

/** Tree table (addition, deletion, modification, check) */
public static final String TPL_TREE = "tree";
/** Tree encoding field */
public static final String TREE_CODE = "treeCode";
/** Tree parent encoding field */
public static final String TREE_PARENT_CODE = "treeParentCode";
/** Tree name field */
public static final String TREE_NAME = "treeName";}

```

5.2 Database Design

5.2.1 Database conceptual structure design

Database access: The database can be accessed through the client connection, and the database can be modified and authorized during the client's understanding process. At the same time, some data in the database can be inquired, modified and deleted, etc. A series of operations. For this client service, it is located between the database and the browser, and it can be returned to the browser user through the web application server's response information. At this time, the user can encrypt and verify the information fed back from the client on the display page, then encrypt the data in the database, and finally open it through the database. The E-R diagram of this system is shown in the following figure:

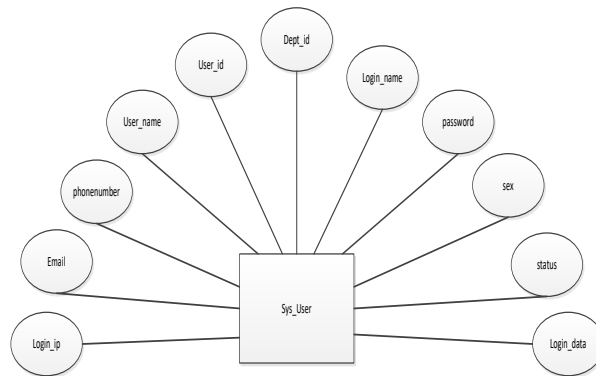


Figure 13 User entity diagram

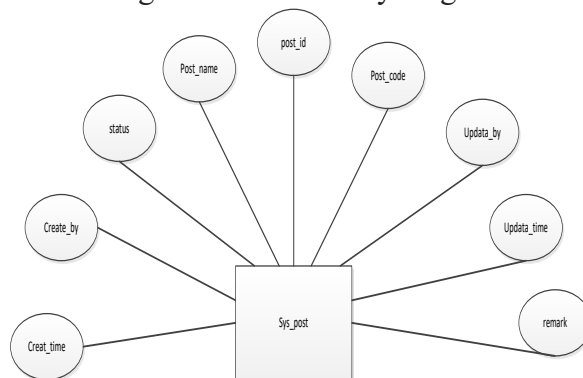


Figure 1 4 Project entity diagram

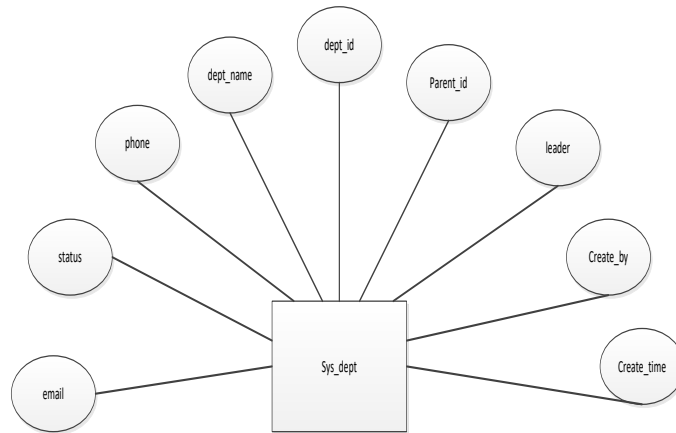


Figure 15 Institutional Entity Map

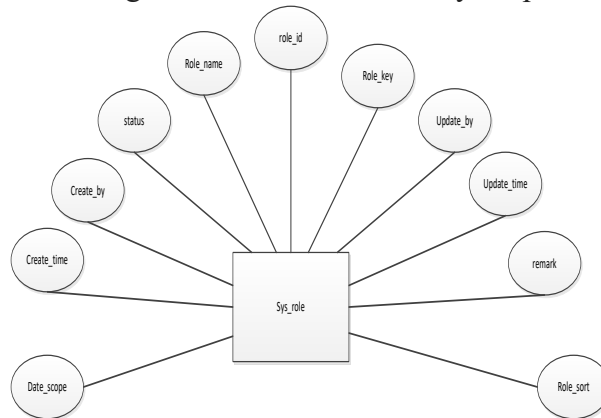


Figure 16 Role entity diagram

5.2.2 Database conceptual structure design

The database tables of this system are as follows:

Table 1 User table: sys_user

Field name	Type	Length	Remarks
yonghu_id	bigint	20	Use ID
yuanxiao_id	bigint	20	CollegesID
denglu_name	varchar	30	Login account
yonghu_name	varchar	30	User's Nickname
shoujihaoma	varchar	11	cellphone number
xingbie	char	1	User gender (0 male 1 female 2 unknown)
mima	varchar	50	Password
zhuangtai	char	1	Account status (0 normal 1 disabled)
chuangjian_time	datetime	0	Creation time
gengxin_time	datetime	0	Update time

Table 2 sys_role:

Field name	Type	Length	Remarks
jiaose_id	bigint	20	Role ID
jiaose_name	varchar	30	Role Name
chuangjian_time	datetime	0	Creation time
gengxin_time	datetime	0	Update time

Table 3 sys_post:

Field name	Type	Length	Remarks
xiangmu_id	bigint	20	Project ID
xiangmu_code	varchar	64	Project code
xiangmu_name	varchar	50	project name
chuangjian_time	datetime	0	Creation time
gengxin_time	datetime	0	Update time

Table 4 School Management Form sys_dept:

Field name	Type	Length	Annotation
yuanxiao_id	bigint	20	School id
xueyuan_id	bigint	20	College id
zujiliebiao	varchar	50	Ancestor list
yuanxiao_name	varchar	30	School name
fuzeren	varchar	20	principal
dianhua	varchar	11	contact number
gengxin_time	datetime	0	Update time
chuangjian_time	datetime	0	Creation time

6. ACCEPTANCE TEST

When we design and complete a system, the last task that needs to be carried out is the acceptance test^[12]. Acceptance testing is a test to check whether the product meets the agreement or user-specified requirements.

6.1 Login function

The login interface of the scientific research management system is a welcome interface for maintenance personnel and scientific researchers to perform login management.

When logging in with the admin default user and cc account normally, the page displays "Dear! Authenticating login, please wait..." is displayed normally.

Log in when the cc account password is entered incorrectly, the page displays "User does not exist/password error", this is a normal display.

When the login password of the cc account is empty, the red font "Please enter the password" will appear under the password box, which is a normal display.

Result: The login module has passed the test, and the next test operation can be performed.

6.2 User Module

This module is the most basic functional module for adding operations to the accounts of maintainers and scientific researchers.

User added:

The user name, mobile phone number, login account, attribution college, email address, and login password are required items and have been marked with stars. This test method is whether to create a user successfully without filling in a certain item. The finally is that the user creation function passed.

6.3 Academic Module

This module distinguishes the project personnel, and is an extremely important module menu mainly for project management.

Institutions to add:

School name and ranking are required items. This test scenario is whether it can be created successfully when one of the two items is not filled in. College add test passed

6.4 Project Module

This module is a record module for scientific researchers to conduct project research. Here you can check whether the project is progressing normally.

Item added:

The project name, project code, display order, and project status are required. The project status is normal by default, so here is to test whether the project name, project code, and display order are successfully generated without filling in one of the three items.

The test for adding the module to the project passes. It should be noted that the length of the project name cannot exceed 50 characters, otherwise the project cannot be created. If the project name is relatively long, you can fill in the remarks in detail.

7. SUMMARIZE

After nearly two months of repeated searching for information and learning new technologies, the tasks of scientific research management design and implementation have basically achieved their due functions as described in the requirements. Learning from previous development experience, I made it into a back-end management system for scientific research projects, aiming to reduce maintenance costs, facilitate management, and supervise the progress of each project; this scientific research system solves the need to remove most of the scientific research information from paper information. The trouble of filing greatly reduces the workload of the staff, saves a lot of manpower costs for the school and improves their work efficiency. Although the scientific research system has realized many basic functions of each module, it is a very complicated process when it comes to the management of the scientific research system. After all, there are many categories of schools, departments, majors, and projects. In addition, maintenance personnel are added. Most of them are students at school. There is no way to invest more time in this work, and the mobility is relatively large. Therefore, in the future, it is necessary to expand more functions, improve the entire process of the management information process, and strengthen the maintenance and convenience development of the system. At the same time, there is a lot of room for expansion in this project. For example, the project paper management can be uploaded and stored in electronic form, and the detailed information of each project can be consulted.

REFERENCES

- [1] (United States) Eric Freeman, (United States) Elisabeth Robson, Lin Qi, Zhang Ling translation. Head First HTML5 Programming (Chinese version) [M]. Beijing: China Electric Power Press, 2012: 30-112.
- [2] (United States) Aslison, (United States) Shuta, translated by Jin Ling. Ajax basic tutorial [M]. Beijing: People's Posts and Telecommunications Press, 2017: 15-26.
- [3] Liu Xiaohua, Zhou Huizhen. Detailed explanation of JSP application development[M]. Beijing: Publishing House of Electronics Industry, 2018: 38-124.
- [4] Lin Bangjie. Introduction to Java programming tutorial [M]. Beijing: China Youth Publishing House, 2017: 60-96.

- [5] Cui Yang, He Yaru. MySQL database application from entry to proficiency [M]. Beijing: China Railway Press, 2016: 32-226.
- [6] (English) Krahn, Pascarello, James. AJAX actual combat [M]. Beijing: People's Posts and Telecommunications Press, 2006: 19-43.
- [7] Wang Yi, Zhou Feng, Sun Gengxin. J2EE classic case design and implementation [M]. Beijing: Electronic Industry Publishing, 2016: 5-20.
- [8] Wang Xingyan. Java language and object-oriented programming [M]. Beijing: Tsinghua University Press, 2017: 34-80.
- [9] Zheng Aqi. SQL practical tutorial [M]. Beijing: Publishing House of Electronics Industry, 2018: 24-44.
- [10] (Japan) Yazawa Hisao. How does the program run [M]. Beijing: People's Posts and Telecommunications Press, 2015: 59-93 [2] Zheng Aqi. SQL practical tutorial [M]. Beijing: Publishing House of Electronics Industry, 2018: 24-44.
- [11] Wang Shan, Sa Shixuan. Introduction to Database System [M]. Beijing: Higher Education Press Press, 2017: 5-17.
- [12] Xie Xiren. Computer network[M]. Beijing: Publishing House of Electronics Industry, 2017: 80-120.