The Design of the Assistant System for College Students

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Abstract: In order to solve the problems of tedious workflow and difficult communication in traditional student work, this paper proposes a design scheme of student assistant system based on Spring MVC framework with reference to old version. The system interface is simple and easy to operate and concurrency control.

1. Introduction

With the development of the times and the continuous improvement of Internet technology, the contents of college students' learning and life are becoming increasingly rich\textsuperscript{[1]}. In the face of many scientific research competitions, evaluation of excellent titles and other activities, an assistant of a counselor - academic assistant is also busy everyday. When students need to find counselors, they cannot learn the status of the counselors in the student work office according to the academic assistant, and often failed to find the counselor in time. Students often run to the assistant office to complete the application form when they borrow something, and they also need to wait for the assistant to query counselor to sign and seal the application, which makes the ordinary borrowing work very inefficient. The design of a student working assistant system based on Spring MVC can not only improve the efficiency of the academic assistant, but also facilitate the process for students to know the status of the counselors for consultation.

2. Materials and Methods

At present, computer technology is constantly integrated into the work of students in colleges and universities. In many colleges and universities in the country, there is a separate official website to facilitate and effectively accomplish the work of students. However, due to the activities of colleges and universities, scientific research competitions are becoming more and more abundant with the development of society. In some colleges and universities, there is a job to work as an assistant of a counselor to help them complete their daily affairs. In the information age, it is necessary to design and implement an academic assistant system to meet the needs of academic assistants and improve work efficiency.
3. Discussion

3.1. Software Requirements

When dealing with the needs of the new student assistant system, it is mainly from the teachers, assistants and students to obtain and analyze the needs, and combined with the previous student assistant system for reference [2].

For academic assistants, the academic assistant needs to be able to login account and show its information such as name and photos, and be able to write and save relevant duty records, publish some important information in time, update the teacher's status in the school, approve the student's application form, and reply to the student's question or message boards.

For ordinary user, students need to check some important information in the college, check the state of the teachers in the office, apply for loans, and consult the assistant and comments on message boards.

In order to facilitate the management of assistants' accounts, the system needs an administrator.

In order to achieve good performance of the system, set the following principles.

The system runs fast and facilitates students to do business quickly.

The system needs high scalability and easy maintainability, so that other students can maintain and improve their performance and expansion functions.

The system needs to handle concurrent operations effectively.

3.2. System Structure

According to the modular design, the system function diagram is shown in Figure 1. The system is mainly divided into three modules, academic assistant module, ordinary user module, administrator module. Each module has different access control to the database to achieve the accuracy and security of the information. If a user directly visits the URLs within the non-permissions, the system will force the user to exit through the filter technology.

![Figure 1 System function diagram.](image)

3.2.1. Frame Selection

The background framework of the system is a Spring MVC framework that is frequently used. In the Spring MVC framework, Spring technology is favored by developers because of its features such as facet-oriented programming, control inversion, dependency injection and high scalability. Because Spring MVC is a simple lightweight MVC (Model, View, Controller) development framework and easy to operate, the system selects Spring MVC as the background framework [4], shown in Figure 2.
3.2.2. Database Construction

In the database design, the entity diagram should be drawn according to the demand analysis results, as shown in Figure 2, and then the system E-R diagram should be drawn according to the relationship between entities. E-R diagrams, i.e. conceptual data models, are transformed into physical data models based on the functions of the tools after conceptual data models are drawn with the PowerDesigner tool. When the corresponding database table is designed according to the physical data models, the links between fields in the database table should conform to the requirements of the three paradigms as much as possible. However, when designing, the system designer needs to consider the query speed, and when necessary, the design of data redundancy can achieve the effect of space changing time. When designing the association between database table fields, this system adopts the uncorrelated database to achieve high expansibility. Some tables and fields are added on the basis of the previous database in the old system to achieve more functions and improve performance. Realized in a database table, it is important to note that the entity attributes of each corresponding database table of each field, such as colleges and universities college student work assistant table need student id, name, password, sex, telephone, class's and grade's field, college, Img_url, State of duty, shown in Table.1

![Figure 2 Spring MVC operation schematic diagram.](image)

![Figure 3: University college academic assistant entity map.](image)
Table 1 School assistant database table.

<table>
<thead>
<tr>
<th>Field meaning</th>
<th>The field name</th>
<th>type</th>
<th>The length</th>
<th>The constraint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student id</td>
<td>Stuid</td>
<td>Varchar</td>
<td>255</td>
<td>Primary key</td>
</tr>
<tr>
<td>The name</td>
<td>Name</td>
<td>Varchar</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>password</td>
<td>Password</td>
<td>Varchar</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>Sex</td>
<td>Varchar</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>Phone number</td>
<td>Telephone</td>
<td>Varchar</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>class</td>
<td>Class</td>
<td>Varchar</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>College</td>
<td>Int</td>
<td>11</td>
<td>Foreign key</td>
</tr>
<tr>
<td>Store picture path</td>
<td>Img_url</td>
<td>Varchar</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>State of duty</td>
<td>State</td>
<td>Int</td>
<td>11</td>
<td>Foreign key</td>
</tr>
</tbody>
</table>

3.2.3. Concurrency Control

As the system is oriented to the majority of the students, the operation of the database needs to be concurrently controlled to avoid the problem of data being destroyed and the data is not unique. In the system, the borrowing function of goods is needed to avoid multiple people filling out forms at the same time and borrowing the same item, so concurrency control is needed. This system adopts the idea of PV operation, and uses the method of controlling the critical area similar to PV operation. First, set the initial value \( s1=1 \); when the user needs to borrow the goods, the system needs to operate \( S1 \) with \( P \). If so, the user can fill in the application form and book the loan items, and \( S1 \) will perform \( V \) operation after the exit. If not, users need to wait to fill in the end of the user. Its functional schematic diagram is shown in Figure 4. If there are too many people waiting, the system will prompt too many people. Please do it later. In order to avoid some factors affecting the deadlock, the system detects deadlocks in a certain period of time. The system allows users to operate the borrowing function in ten minutes. If timeout occurs, the timeout will be displayed and forced to exit. If there is no borrower, the system will determine whether there is a deadlock every half an hour.

![Figure 4 Concurrent control of the function of borrowing goods.](image)

3.2.4. Page Design

Page design is based on the popular Bootstrap framework and JSP technology, supplemented by JavaScript, Html, Css, JQuery and Ajax technologies. In order to facilitate the use of PC and mobile customers, the system uses the col-sm-* and col-md-* technology in the Bootstrap framework to adapt the interface to the screen size adaptively. The mobile and PC end interfaces can make the user have a good sense of experience. The master interface of the academic assistant is shown in Figure 5.
The Spring MVC based College academic assistant system can improve the efficiency of student assistants. Although the school assistant system is a very simple system, this system can reduce the time for many students to go to the student work office. It allows students to know the important notice of the college and borrow things quickly. Since all the technical support comes from the student group, the operation and maintenance of the system is also a great task. When the work of academic assistants is constantly changing, the system also needs to improve with the change control.

References

[6]