The Design and Implementation of Network Questionnaire System

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Keywords: Questionnaire, SSH, System design.

Abstract. In order to achieve the informatisation of scientific research and polls on campus, this network questionnaire system is designed by using Struts + Hibernate + Spring framework technology and MySQL database development technology, which carry out investigation and study through the network for the campus scientific research and democratic construction services.

Introduction

University campuses often need to carry out a variety of researches, scientific research, public opinion surveys of staff and workers, student solicitation of opinions, compared with other social researches, these researches have its own characteristics, such as the target is a fixed group, time constraints, or with a certain degree of organizational analysis of the survey results need to consider the identity of participants. Based on the above background, this study combines the mobile internet technology to develop a "campus network survey system", which includes mobile clients, portals, background servers. After the system was applied in the school, the system has served many times in scientific research and achieved significant results.

System Structure

The "Campus Network Questionnaire System" aims to achieve the goal of collecting public opinions, scientific research surveys and so forth from school faculty members and students anytime, anywhere to form a mobile information platform for the exchange between schools and staff, teachers and students, to vote for schools and to scientifically evaluate Research and other services. As the system belongs to our school information platform to build a subsystem.

From the System Distribution, the System is Divided Into Three Parts

1. Background Server: System and data published on the server, the server installed Linux operating system, Tomcat server, MySQL database.
2. Mobile: Android client development, after faculty and students logged in, you can vote and view the voting results within the given permissions. The data requested by the mobile client from the server needs to be obtained from its background server;
3. PC : On the one hand, the faculty members can vote after logging in and view the voting results within a given scope. On the other hand, different levels’ administrators can issue questionnaires within the given scope of authority and collect the questionnaires.

Divided from the User Permissions, the System Has Five Categories of Users

1. Super administrator: super administrator is a school-level administrator, only the PC, on the one hand, the system initialization and maintenance, with department management, college management, faculty management authority; on the other hand, it has a school-wide release, recycling questionnaire permissions.
2. Department administrators: college administrators, only the PC side, on the one hand, the Department of hospital information to initialize and maintain, with professional management and other rights; the other hand, for the Department issued, recovery of the questionnaire authority;
3. Professional Administrator: Professional administrator, only the PC side, on the one hand, the professional information initialization and maintenance, with class management, student
management functions, on the other hand has a professional-oriented release, recovery of the questionnaire permissions;

4. **Teacher users:** With mobile terminals and PC terminals, on the one hand, participate in the questionnaire survey, on the other hand, within the scope of the hospital department, after examination by the department, for some professional or class release and recovery of the questionnaire.

5. **Student users:** With mobile and PC side, participate in the questionnaire survey, and view the questionnaire results within the scope of the authority.

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![Figure 1. Function Description.](image)

**Mobile Client Design**

A school-wide survey of students ‘mobile phone models at my school was found out that over 90% of students use Android-based phones, and 100% of students had mobile network services and equipped with the hardware foundation to use mobile clients to vote. Mobile client has the following features:

In the case that, when the mobile APP client is not logged in, you can browse and view the news channel section's project and released research reports. In order to ensure the accuracy of user information, the account can be assigned only by the administrator. After a user logs in or binds a phone number, he or she can make a questionnaire inquiry, check the progress of the questionnaire, participate in the situation and view the investigation results within the scope of the authority.

**System Function Design and Implementation**

**Questionnaire Design and Implementation**

The system is used within the campus. There are two modes for the investigation and study. The first one is to vote anonymously, the second one is to determine the range of votes. Therefore, the questionnaire generation is divided into two steps: First, set the name of the questionnaire, release time, start and end time, Questionnaire nature, object-oriented questionnaire, such as several information; The second step, add the questionnaire questions, the questionnaire topics are divided into multiple choice questions and subjective questions three categories, in order to facilitate a large number of topics into the system, the system supports excel The questionnaire in the file is directly imported into the system, which greatly simplifies the operation and reduces the possibility of mistakes in entering the title. The questionnaire import is implemented by JXL. After the questionnaire is imported, the questions and options can be modified in the background.
Survey Data Storage Design

There is no direct relationship between the questionnaires. In the common network survey system, the relationship between the voter and the option is usually established. A record in the relationship table indicates that a participant has chosen an option, all the questionnaire records are recorded in the same table, this approach has many shortcomings: First, the relationship between the table access frequency is very high, if the table is damaged for some reasons which will result in a large amount of data lost; Second, all the research data are placed in a table caused by a large amount of data in the table, although the database supports mass data, but will still affect the query and statistical efficiency; Third, the data of the questionnaire has some timeliness, the data Export Analysis After the formation of the investigation report, the original data lost its storage value, which would result in the storage of a large amount of invalid data. Therefore, in the design of this system, we adopt the way of designing a separate data storage table for this questionnaire while creating a new questionnaire. The process of building tables and data storage is as follows:

1. Entity relationships are as follows (only primary keys and foreign keys are marked):
   - The Vote entity: Describes the information of registration questionnaire.
   - The VoteData entity: Records the results of each participant's survey.
   - The Question entity: Saves the questions of all votes.
   - The Option entity: Saves the options of all questions.

2. After the questionnaire is generated, the Data_Storage_Table is generated, and named voteData_**, where ** represents the ID of the corresponding questionnaire. The field of the table is designed as follows:

   Table1. VoteData_** Data Dictionary.

<table>
<thead>
<tr>
<th>Field name</th>
<th>Type</th>
<th>Constraint</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>id</td>
<td>int</td>
<td>primary key auto_increment</td>
<td>Option number</td>
</tr>
<tr>
<td>cyDate</td>
<td>date_time</td>
<td>not null</td>
<td>Time for submitting the questionnaire</td>
</tr>
<tr>
<td>userId</td>
<td>int</td>
<td>not null</td>
<td>Foreign key: Participant ID</td>
</tr>
<tr>
<td>question_*</td>
<td>varchar(200)</td>
<td>not null</td>
<td>* Question ID in the questionnaire</td>
</tr>
</tbody>
</table>

3. When a vote is publishing, we need to import the questions first. Each question is successfully imported, a new field named question_* is added to the voteData_** table, where * denotes the ID of the item in the question table.

4. When a user participates in the vote and submits the questionnaire, the data storage table voteData_** is found according to the ID of the questionnaire. Then, the participants and the submission time of the questionnaire are recorded in the table. Each completed a question, the option will be stored in the field question_, the field word is defined as the string type, the content is determined by the type of the question. If the type is radio, record the options ID. If it is a multiple-choice record, the multiple options' ID are separated with ";", just like "A;B;C". If it is subjective questions, the answer is directly saved.

Data Export and Analysis

Step1: View the questionnaire: If you want to view a participant's questionnaire (the questionnaire id=x), you can execute the following SQL statement:
(1) SELECT qId FROM question WHERE vId=x; // ID list of subjects for the questionnaire: id1, id2……

(2) SELECT * FROM VoteData_x WHERE VId=x; // Extract fields in turn: question_id1, question_id2……., and encapsulate them into a collection.

(3) Analysis the Strings of fields question_id1, question_id2 etc.in orderto extract the answers.

Step2: Summary the results: First, query all the questions included in the questionnaire where qId=a. Then, find out the the options witch are contained in the problem in turn. Finally, count the number of times each option is selected:

```
SELECT COUNT(*) FROM VoteData_x where(question_a like b+‘;’%’ or question_a like ‘%b%’ or question_a like ‘%;’+b)
```

Step3: Export the results: First, query all the questions included in the questionnaire by qId. Then, query the options for each question in turn. Finally, query the list of participants witch selected the option of the question. The participant information and the questionnaire survey information are exported from the database to the Excel table, then, statistics and analysis of the questionnaire results by the statistical analysis function of Excel.

Summary

The system changes the traditional data storage model of the questionnaire survey system, set up a separate form for each questionnaire, and improve the storage efficiency. The system has been used in our school campus network, and has realized the functions of voting management, questionnaire design and voting user management. It has the characteristics of convenient operation, friendly interface and powerful functions. It has contributed to school opinion survey and scientific research.

References

