Design and Implementation of Cloud Note System in University Classrooms

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Abstract. In view of the disadvantages of paper notes that are not easy to save, not conducive to record, and easy to miss information, this fast personal note-taking software is designed with simple and efficient operation interface, which can cross different platforms. The system chooses B/S architecture, Spring + Mybatis framework in the background, and HTML + JS + Ajax technology in the foreground. MySql is adopted in the database to realize data storage. It mainly includes six functional modules: Notebook module, Note module, Recycle bin module, Collection module, Activity module and User module. Through the cloud note system, it is convenient for teachers to prepare lessons, record key teaching points, and collect students' homework. Students are easy to record knowledge points in class. It can improve both work and learning efficiency.

Keywords: Cloud notes, Spring, Mybatis, Ajax

1 Introduction

With the development of society, information technology is constantly improving, which is often applied to teaching. In order to facilitate online learning students to record notes and store data information in time, the “Welearn Cloud Note” system is designed and implemented which changes the traditional mode of note-taking in the classroom. It uses B/S mode, and it is divided into Browser side and Server side. In the Server side, we mainly use the two lightweight frameworks of Spring and Mybatis for integration, and choose Spring pluggable MVC architecture. When we develop WEB, we can choose to use Spring’s MVC framework to integrate Mybatis and deal with database business. Using MVC layering idea, the code is divided into Control Layer, Persistence Layer and View Layer,
which fully decouples the system and facilitates later maintenance.[1] In the Browser side, the page is mainly composed of HTML, which can make the page static. The interaction mode is Ajax Request Response mode, which can process asynchronously the client logic, send request, and update the dynamic effects of the system interface.

2 System Design

2.1 Overall Functional Design of the System
Cloud note system adopts B/S structure (Browser/Server structure). In this structure, the working interface is displayed in the Browser side, and the main business logic is implemented in the Server side. This greatly reduces the pressure of the Client side and reduces the cost and workload of system maintenance. [2] The cloud note system implemented in this design is divided into six modules (as shown in Table 1): Notebook module, Note module, Recycle bin module, Collection module, Activity module, User module.

Table 1. Overall system function diagram

| Notebook module | Note module | Recycle bin module | Collection module | Activity module | User module |
|-----------------|-------------|--------------------|-------------------|----------------|------------|
| Add notebooks   | Add notes   | Recovery notes     | View the favorites| Participate in activities | Log in |
| Modify notebooks| Modify notes| Delete completely  | Search the shared | Collect notes   | Register |
| Delete notebooks| Delete notes| Share notes        | Collect the shared |                  | Change the password |

2.2 System Database Design
The database design of this system consists of 10 tables, which are (1) activity table: storing activities to collect homework after class; (2) activity state table: 1-normal, 2-timeout; (3) note table: storing notes, cloudnote_note_status_id is 1-normal by default; cloudnote_type_id is 1-normal by default; (4) activity note table: storing notes participating in activities; (5) note status table: Note status: 1-normal, 2-delete; (6) notebook table: storing users’ notebooks; (7) note type table: storing note types; (8) notebook type table: storing notebook types, 1-favorites, 2-recycle, 3-action, 4-push, 5-normal; (9) note sharing table: storing the shared note records (10) user table: storing user account information.[3] The structures of some tables in the database are shown in Table 2 and table 3:
Table 2. User table (cloudnote_user)

| Column Name         | Type    | Length | Primary Key | Non-empty | Comment     |
|---------------------|---------|--------|-------------|-----------|-------------|
| cloudnote_user_id   | varchar | 100    | T           | T         | user id     |
| cloudnote_user_name | varchar | 100    |             |           | user name   |
| cloudnote_user_password | varchar | 100 |             |           | password    |
| cloudnote_user_token | varchar | 100    |             |           | token       |
| cloudnote_user_desc | text    |        |             |           | description |

Table 3. Notebook table (cloudnote_notebook)

| Column Name         | Type     | Length | Primary Key | Non-empty | Comment     |
|---------------------|----------|--------|-------------|-----------|-------------|
| notebook_id         | varchar  | 100    | T           | T         | notebook id |
| user_id             | varchar  | 100    |             |           | user id     |
| notebook_type_id    | varchar  | 100    |             |           | notebook type |
| notebook_name       | varchar  | 500    |             |           | notebook name |
| notebook_desc       | text     |        |             |           | notebook description |
| notebook_create_time| timestamp|        |             |           | creating time |

3 System Implementation
The system uses MVC layering idea, and divides the code into Control Layer, Persistence Layer and View Layer, which fully decouples the system and facilitates later maintenance.[4] In Browser side, the page is mainly composed of HTML, which makes the page static. The interaction mode is Ajax Request Response mode, which can process asynchronously the client logic, send request, and update the dynamic effects of the system interface.[5]

3.1 User Module
1) User logs in. The user visits the homepage of “Welearn Cloud Notes” (that is, the login page). The user enters the registered account and password to log in.
2) User registers. When the user needs to register a new account, click the registration button on the login page to jump to the login page for registration. On the registration page, improve the user information and complete the registration according to the rules.[6]

3.2 Notebook Module
1) Create a new notebook. After logging in successfully, click the “plus” button on the right side of “All Notebooks” to open the pop-up page “New Notebook”. Fill in the “Notebook Name”, and then click the “Create” button to complete the notebook creation.
2) Modify the notebook name. Double-click the notebook pop-up page to be modified, enter the new notebook name in the text box, and click the “OK” button to complete the modification.
3) Delete the notebook. Use the mouse to hover over the notebook to be deleted, click the “×” on the right side, and click the “delete” button to delete the notebook completely. If there are notes in the notebook, they cannot be deleted. Notes in a notebook can be moved to another one or deleted.
3.3 Note Module

1) Create a new note. Click the plus sign on the right side of “All Notes”, enter the name of the note in the “Note Name” text box, and click the “create” button to finish creating the note.

2) Modify the note. In the note list, select the note to be modified. The title and content of the note will be displayed in the editing note area on the right. In the editing area, you can modify the note title and edit the note content.[7] After editing, click the “Save Notes” button to save the title and content of the note. After saving successfully, there will be a prompt of “Save Successfully” at the bottom of the page.

3) Delete notes. Click the arrow on the right side of the note to be deleted, and open the drop-down box. Select the last item, and delete the note. After clicking it, the user will be asked whether to confirm the deletion. Click the “Delete” button, and the note will be logically deleted and moved to the recycle bin.

4) Share notes. Click the arrow on the right side of the notes to be shared, and open the drop-down list. After clicking the second item “Share Notes”, click it to share the notes directly. The bottom right corner will prompt “Share the notes successfully”.

5) Move notes. This operation can move notes from the current notebook to other notebooks. Select the note you want to move, and then click the arrow on the right of the note name. Open the drop-down menu, and select the first item “Move Notes”.[8] After opening the page, select the target notebook to be moved, and click the “OK” button.

3.4 Recycle bin Module

1) Open the recycle bin. Click the “Recycle Bin” icon in the lower left corner, and open the recycle bin. You can see the logically deleted notes.

2) Restore notes. Select the notes you want to restore, and click the “Restore Notes” button on the right. After specifying the notebook to restore to, click the “OK” button to restore the notes.

3) Delete completely. Select the notes you want to delete completely, click the “Delete” button on the right. Click “Continue”, and then delete the notes completely. This performs physical deletion, and then it can’t be recovered any more.[9]

3.5 Collection Module

1) Search the notes shared by other users. Click the “Magnifying Glass” icon in the upper right corner, and enter the note name in the pop-up text box. Press the “ENTER” key, and search the notes shared by other users according to the note names. You can click “More” to load more contents.

2) Collect notes. Select the notes you want to collect, and click the “Collection” button on the right. Open the page, and click the “Collection” button to collect the notes into your own collection notebook.

3) View the collected notes.

   Click the bottom right corner to collect the notebook and view the collected notes.

4) Cancel collection. Select the notes to cancel collection, and click the “Cancel Collection” button on the right. Open the page and click the “Continue” button to cancel collection.

3.6 Activity Module

1) Open the activity page. Click the “Activity” button in the upper right corner to open the activity page.

2) Participate in the activity. Click the activity name to enter the “Activity Details” page, and then click the button on the right side of the activity note. Select the location of the activity note, and click the “OK” button to participate in the activity.

3) View the notes of other users participating in the activity. Click the note name, and the content of the note will be displayed on the right. In the note list on the left, you can click “Like”, “Stamp” or “Favorite” the record after it is selected,
4) View your own notes when participating in the activity. After logging in, click the “Notes Participating in the Activity” button in the lower right corner, and the notes of the current user participating in the activity will be displayed on the right side.

4 Conclusion
This paper focuses on the design and implementation of the cloud note system. The “Welearn Cloud Note” system changes the traditional mode of note-taking in the university classrooms. It adopts the B/S mode cloud note system. The system is designed to provide a note information exchange platform for students and teachers, and also provide rich note resources for both of them. Through this medium, students and teachers can easily meet their needs. To a certain extent, it can help students and teachers to learn and take notes everywhere, and effectively improve the management efficiency of teachers and students in taking notes and sharing notes.

Acknowledgements
This work is supported in part by the PhD startup Foundation Project of Jilin Agricultural Science and Technology University on 2018 and the Digital Agriculture key discipline of Jilin province Foundation.

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