

Agricultural policy learning system design based on Vue-SpringBoot

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Abstract—With the increasing importance of case study teaching, purely paper-based related materials become unsatisfied. In response to this demand, we conceive and design an online learning system for agricultural policy, which is based on B/S architecture and adopts the front-end and back-end separation technology. The front-end is developed using the mainstream framework Vue.JS, while the back-end is deployed using Springboot framework and MySQL and MyBatis. The Axios library is called for linkage between the front-end and back-end. This agricultural policy learning System provides research students with rich cases to comprehend and experience, and reduces the workload of teachers. According to the trial run of the system, this system satisfies the learning communication of students and the teaching supervision and management of teachers.

Keywords: Vue; Springboot; MySQL; Agriculture Policy; Learning System

1 INTRODUCTION

The ability of farmers to get out of poverty and how to become rich has become the main focus of common prosperity in these years. In order to firmly grasp the wind direction of agricultural policy and promote agricultural development, it is necessary for college majors to offer the course "Agricultural Policy".

Unlike other courses, case teaching is an effective mean to combine theory and practice in such courses. However, in traditional teaching, case studies are fragmented, and many relevant policies cannot be presented in an integrated manner and are not easy for students to manage their data. To address this important need, an online agricultural policy learning system^[1] is designed and implemented based on the existing course arrangement, hoping to help teachers and students provide a convenient and informative policy learning platform through the intensive presentation and targeted discussion of cases and related policies.

2 DEVELOPMENT ENVIRONMENT AND TECHNOLOGY INTRODUCTION

The database and server used in this agricultural policy learning system are MySQL 8.0.34 and Tomcat8, respectively, based on Windows platform as the development platform. The project as a whole chooses B/S development architecture^[2], the front-end part uses Vue and Element-UI

components, the development framework used for the back-end is SpringBoot, the front-end and back-end interact through the axios library, and the development tools are IntelliJ IDEA, HBuilderX, Navicat. the programming languages are JavaScript, Java, Vue, HTML, CSS. HTML, CSS. PS6 as the corresponding beautification design, source code by git repository for management.

2.1 Vue.JS framework

Vue is a popular and progressive JS front-end design framework [3]. It is characterized by building layer by layer from the bottom up. Its core lies in the view layer, which consists of many convenient and powerful APIs that developers can implement to call. By using it in combination with the current development tools, it is possible to build quite beautiful front-end interfaces.[4]

2.2 Springboot framework

Spring is one of the important design layer framework that can perfectly cope with the loosely coupled relationship with other layers before. SpringBoot[5] in the inheritance of Spring good features based on the simplification of automatic processing configuration to achieve the development of the system and the construction of the environment. The use of SpringBoot can greatly improve the development efficiency of programmers to focus on writing code.

2.3 MySQL

MySQL [6] is one of the more popular relational database management systems (RDBMS) and is one of the best applications in the Web direction.

It can efficiently create, access, control, retrieve and replicate the saved data. Its small size, speed and low cost, and the interfaces provided can support multiple language connections.

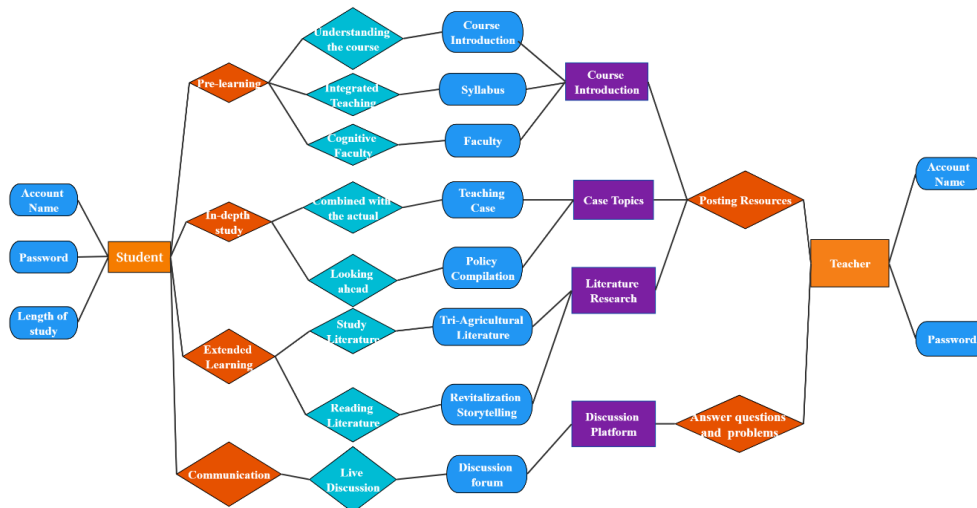


Figure 1: System E-R diagram

3 DEMAND ANALYSIS

The E-R diagram of this system is shown in Figure 1, in which the participating subjects are university students and teachers.

3.1 The requirements of student

Due to the fierce competition in the industry nowadays, competition is increasing. It is urgent to provide a more convenient and practical learning platform^[7] for policy research^[8] students. The main service group of this learning system is students, which provides four major sections for better policy learning: pre-study, in-depth study, extended study, and communication. Students can arrange their own study time, focus on querying materials, and initiate discussions and get answers from teachers in real time.

3.2 The requirements of teacher

How to better improve the learning efficiency^[9] of students and preferably manage their regular grades is a topic of great interest to college teachers. The learning modules of the system allow teachers to freely post resources and discuss them with their students. Teachers can also follow the length of studies to get an idea of their learning status, and this function can fully reflect the learning attitude and motivation of students^[10], and can grasp the status of students in a macro way.

4 SYSTEM DESIGN

4.1 System Design Architecture

The system adopts the overall architecture of B/S mode, which perfectly separates the front-end and back-end, and at the same time reduces the corresponding cost of maintenance and update of the system, and efficiently realizes online paperless agricultural policy learning. The front-end uses MVVM^[11] pattern to decouple the view from the business logic, and the data and view do not communicate directly, but use ViewModel^[12] to communicate; the back-end uses Springboot-Mybatis^[13] pattern to receive requests from the front-end, and then map the requests through the Controller layer to the Service layer and the mapper layer until the integration of Mybatis, implement the corresponding operation interface of the database, finally write to the database, and return the results to the front-end. The front-end and back-end architecture design is shown in Figure 2 and Figure 3 respectively.

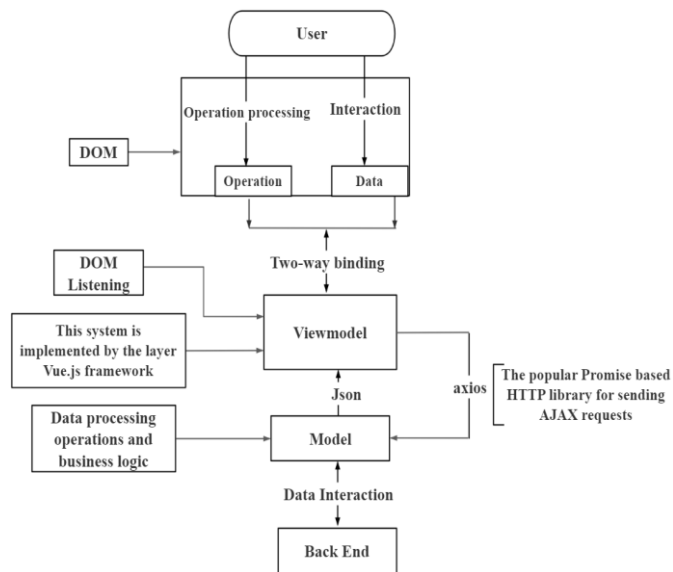


Figure 2: Front-end architecture setup vue plan

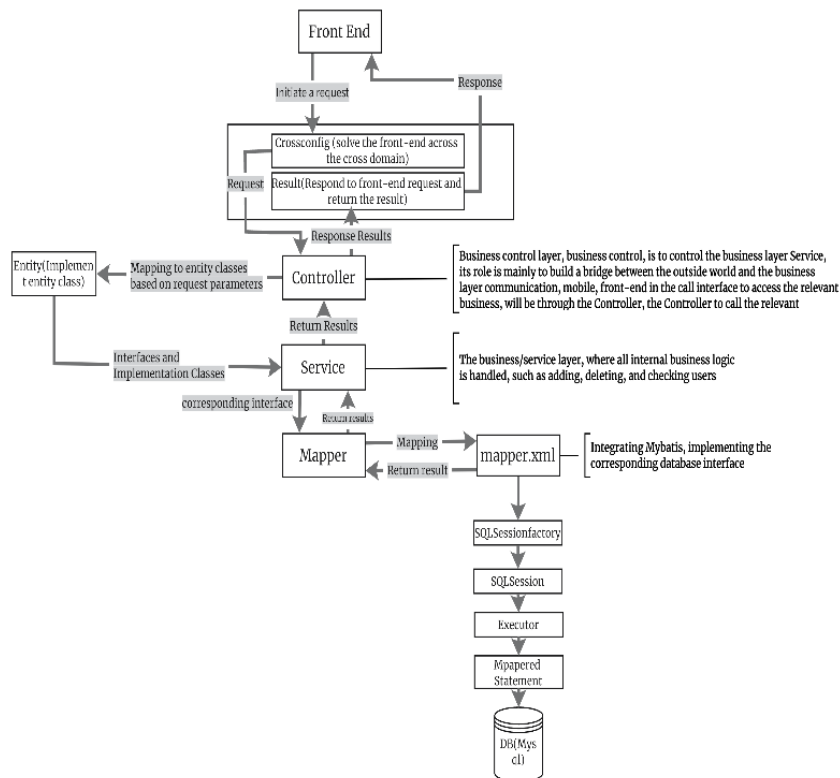


Figure 3: Back-end architecture design

4.2 System Function Module

The system is divided into front-end display and back-end management^[14], a total of 12 functional modules, will be described in detail in the next section, the overall structure as Figure 4.

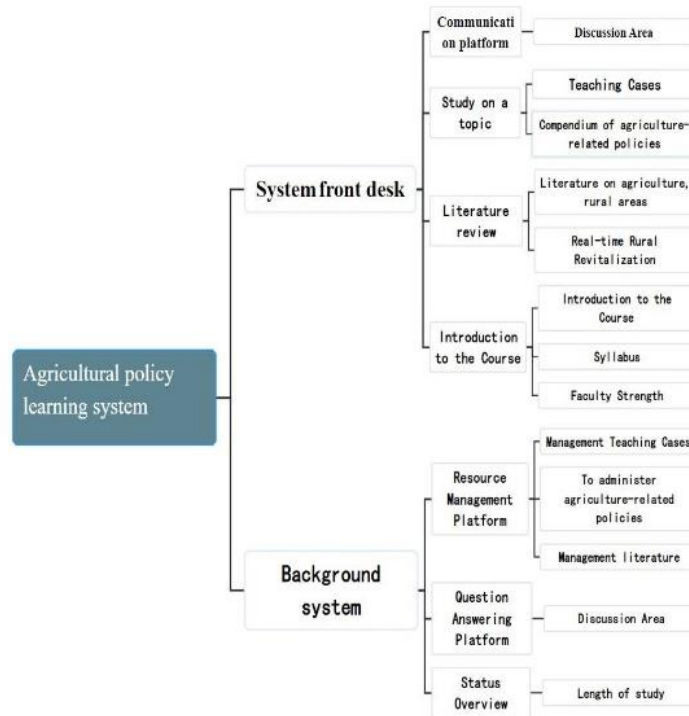


Figure 4: Functional module structure diagram

4.3 Database Design

The system database is implemented using MySQL, and the visualization tool is Navicat^[15], and the detailed data table information is shown in Table 1.

Table 1. Storage information table

No.	Data Table Name	Introduction
1	anli	Case information table, storing cases of agricultural policy applications
2	glopping	Discussion information sheet to store information about student discussions and exchanges
3	teacher	Faculty information table, storing multiple faculty research experiences and achievements
4	user	User information table, storing the user's account password, learning hours and other information
5	wenxian	Literature information table, storing relevant literature for easy searching
6	xczx	Rural revitalization table, store the latest articles and reports on rural revitalization
7	zhengce	Policy information sheet to store the latest policies and related notices for the benefit of agriculture

5 SYSTEM IMPLEMENTATION AND TESTING

5.1 Login rights and security analysis function implementation

After the user logs in and enters the user name and password, the cipher text encrypted with MD5^[16] encryption algorithm is compared and verified, if the verification fails, the account password needs to be re-entered for login; if the login is successful, different permissions^[17] are assigned according to different roles, which is specifically implemented by creating the login method of adminService, an object of AdminService entity class, for identification, and finally feedback to the front-end with the correct interface.

5.2 Topical learning functions

Since different students do not have the same level of learning and have different interests in policies, a thematic division of relevant policies is made. In order to facilitate students to save the resources locally, a download interface is provided to store the resources in the database. The specific implementation logic is: accept the download request initiated by students using @PathVariable, get the url of the file, download it, and then give feedback to the front-end.

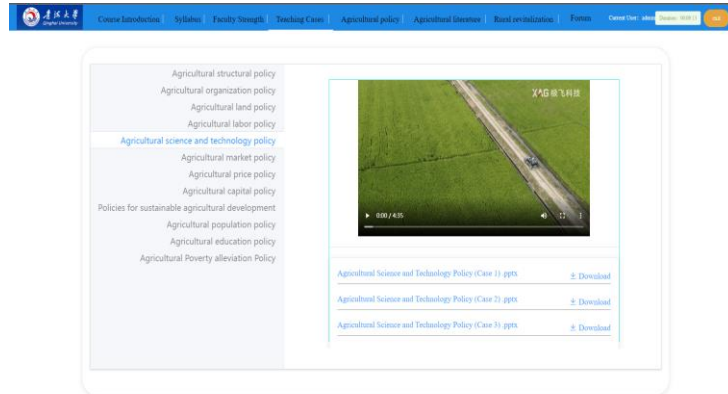


Figure 5: Thematic Study – Effect

5.3 Question and answer function

You can always start a discussion in the discussion forum if you have any problems in learning. The instructor can answer each question as it is resolved. The quality and compliance of the discussion should also be taken into account in the design, so teachers are given the permission to delete non-compliant discussions. The specific implementation logic is: use @RequestBody to accept parameters, use addComment() method to add comments, and teachers use clearComment() method to delete, the effect is shown in Figure 6.

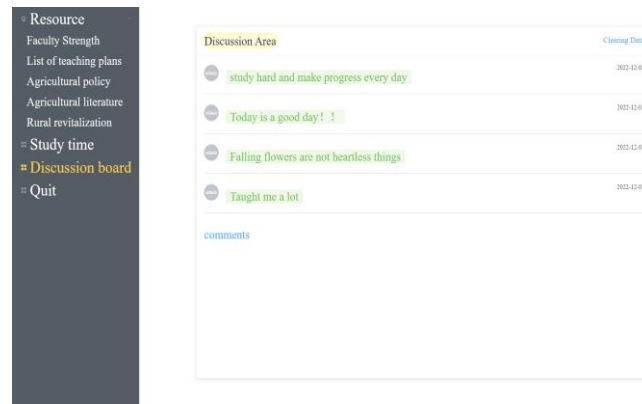


Figure 6: Discussion Forum - Effect

5.4 Resource management functions

There is a lot of data to be managed in this system. Therefore, we have set up a management backend for teachers to delete and replace and add data according to current events and relevant policies in a timely manner. The specific logic is to call DeleteWx() and addWX() methods to delete and add documents respectively. To prevent file renaming and conflict, use IdUtil.fastSimpleUUID() to generate random characters^[18] to add after the file name, so as to solve the effect as Figure 7.

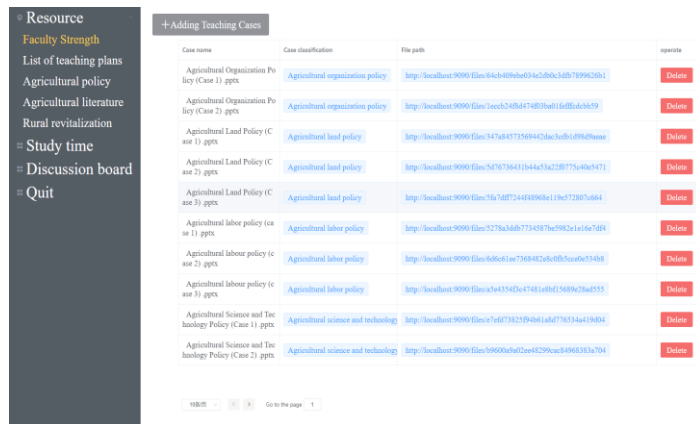


Figure 7: File deletion map

5.5 Status overview function

Students can view the length of their study during the learning process^[19]. For the teacher, after the class has studied once, he/she can have an overview of the study records in the backend and use it as a reference to adjust the lesson plan and details. The logic of this feature is: use @RequestBody module in the control layer to accept parameters, add method AdminSelectUser for teachers to query student records, and finally present it in the front-end, as shown in Figure 8 for students and teachers.

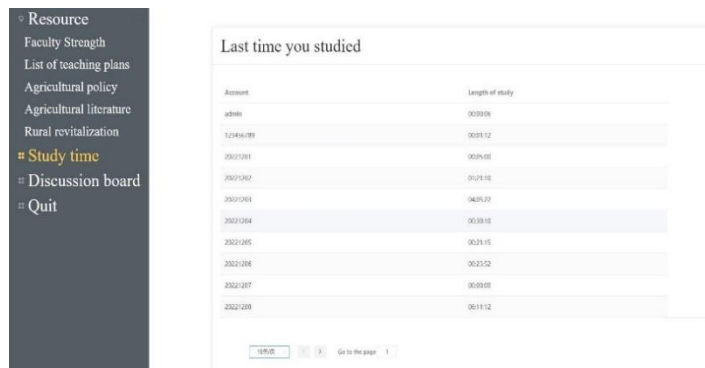


Figure 8: Learning Hours-Teacher side display

6 PROSPECT

This system fits the needs of teachers and students in universities for paperless learning and office in the information age, and has good feasibility and promotion. Several functional modules are provided for student users to learn and explore. The management backend is built to facilitate teaching management and arrangement for teacher users.^[20]

In order to give users better experience and satisfaction, the system will be improved mainly from

the following two aspects: page beautification design and enrichment of functional modules, so that the system has better value and meaning, and truly brings convenience to the majority of faculty members.

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