

Design and implementation of idle Book Trading System Based on Web

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Abstract: At present, kinds of second-hand trading websites emerge endlessly while still lacking targeted trading platform for idle books. This paper designed and implemented an idle book trading platform based on MVC (Model View Controller) model, spring boot, and Vue framework to solve this problem. Based on the analysis of users' needs, the books were strictly classified to achieve the fast and efficient query of information and purchase of idle books to ensure the safe and efficient transaction of idle books.

1. Introduction

With the rapid development of the Internet, people's demand for book reading has significantly increased. The traditional method of purchasing the book is mainly based on offline mode. Excessive production of books will cause problems such as environmental protection and waste. Simultaneously, the cost of producing new books is far greater than the cost of recycling idle books. This paper intended to design the idle Book Trading System based on the Web to achieve environmental protection and cost-savings. Decomposing the system into the front end and back end, business logic and front-end access control were separated to complete the system's main functional architecture. The purpose of the system was to realize the transaction of idle books to make full use of books more effectively. Meanwhile, the system divided users into multiple categories according to the evaluation and credit rating, which helped identify and select and improve the user's experience of purchasing and selling idle books.

2. Requirement analysis

Functions of idle book trading system were mainly divided according to the different restricts of users and administrators, among which users mainly include buyers and sellers. Users can search book information in the front end, publish books that need to be sold, modify the information of published books, remove books from shelves, modify prices, buy idle books of other users, evaluate the purchased goods, and check the reputation of buyers and sellers. At the same time, the platform strictly classified the books to facilitate screening. Administrators mainly played the auxiliary role of

monitoring transactions, generally did not directly intervene in user transactions. The following is the requirement classification of the system:

(1) User function design: Book Search, idle book information release, login, registration, book information modification, purchase books, off-shelf goods, view user's information.

(2) Administrator function design: delete goods, commodity classification, limit user permissions, off-shelf goods.

(3) Information real-time update function: after a new user registers or cancellation, the database immediately adds or deletes the user's relevant information. After the user publishing the book, the database updates the book information in real-time.

(4) Evaluation management subsystem: users can evaluate each other. According to the level of evaluation, users can be divided into three grades: high credit, medium credit, and low credit. At the same time, according to the words used by users, using machine learning-related principles for user sentiment analysis, it is divided into two modules to deal with user comments: "comment crawler capture" and "user Positive or negative sentiment analysis." To help get the following experience: the credit degree of trading partners so as easy to screen quickly obtained. II real-time feedback on the satisfaction degree of trading. The functional structure of the system is shown in Figure1.

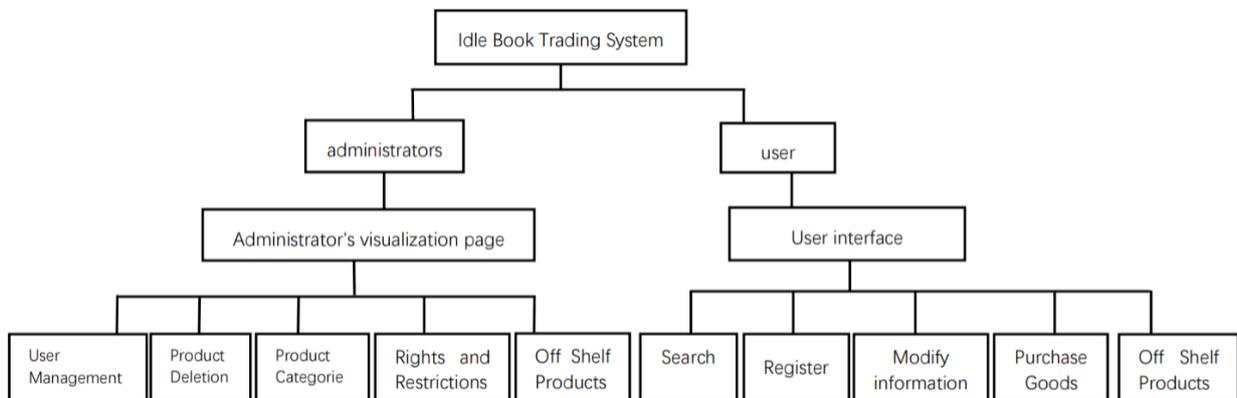


Figure 1: system function structure diagram

3. System architecture design

3.1 Syetem structure

The system was designed based on the Web browser, and the main business logic was implemented in the server, so B / S architecture was adopted. Traditional B / S architecture divides the whole system into three layers: presentation layer, logic layer, and data layer. Idle book trading system expanded B / S architecture into user layer, visual layer (presentation layer), component layer, persistence layer, and data layer. The system based on B / S architecture is easy to access without installation. The system was directly placed on the wide-area network, and the access rights of customers were handled through certain logic. In this architecture, the user's client-side access will initiate HTTP requests to the webserver. The web service processes HTTP requests and calls the RESTFUL interface to process and filter information and then interact with the database. The presentation layer of the system is the

interactive page between the user and the website, which is beautified by the front-end framework of Vue, which is convenient to use. The component layer and persistence layer are the business logic layer of the whole system. With particular components and general components, the system can collect and transmit data at the front and back end. The persistence layer provides the interactive interface and helps to collect and maintain data from the back end. The system architecture is designed based on the MVC model.

3.2 Frame

3.2.1 Back-end development framework -- Spring boot

The development tool of this system is the IntelliJ idea, and the back end uses the spring boot framework, which Maven compiles. Spring boot framework is an open-source framework that simplifies the configuration and development of all aspects of spring application. It can integrate many other frameworks with high stability and solve version dependence of various packages between most previous projects. It is also the mainstream development model of the web. To solve too many XML files using spring boot, the idle book trading system adopts yaml file configuration, which significantly improves development efficiency. When testing the idle book trading system, spring boot also brings great convenience. Spring boot can automatically generate test classes in the Java directory. Its test method is similar to JUnit's method, which makes full use of the advantages of Spring MVC. In selecting the data source, the system mainly uses Spring AOP to process the SQL statements of MyBatis mapping to filter the data source.

3.2.2 Front-end development framework——Vue.js, Element-UI

Vue.js is a progressive front-end framework for building the user interface, which can be applied layer by layer from bottom to top ^[2]. The page sends the request, responded by mapping the HTML file, and enters the front-end model and local cache data. Vue.js is easy to use syntax with high efficiency. With the UI component library's use, developers can easily and quickly make beautiful front-end dynamic pages.

3.3 Database configuration and interaction

At the bottom of database interaction, the MyBatis framework is used for database configuration. MyBatis not only supports ordinary SQL queries and storage but also simplifies the writing process of classes. It can automatically map SQL statements to XML files and reduce coupling. When the user visits the presentation layer, that is, the user's page, the data access request is sent to the Dao layer, and the SQL statement is configured in the MyBatis file to form an interface, and the database is received and accessed. The front-end application interacts with the back-end application in JOSN format. When the front-end requests the back-end data, Axios is installed in the Vue.js Project, the back-end data back to the front-end. In the early stage of system development, a small database is selected for a simple test. To access the database, the JPA of Spring boot is used, which is easier to use than MyBatis. It does not need programmers to write SQL files, so it is convenient for the correctness test of small data. The system architecture is shown in Figure 2.

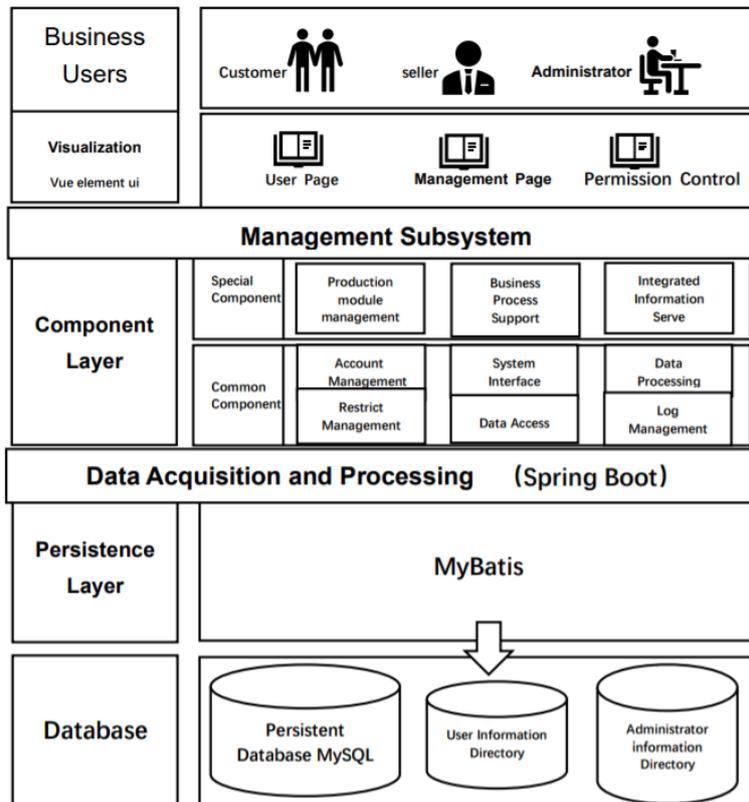


Figure 2: server system architecture

4. System function realization

4.1 Registration and login

When users enter the idle book trading website, the login and registration window will be displayed. If the user has not registered an account, it can be selected the [registration] option, personal input information, send the request to the server, and the background will query, analyze and process the data according to the user's request, then assemble the response message and respond. If the Ajax request fails, the registration fails. Otherwise, it is successful. Then the user can enter the registered information in the login window. After the background server responds to the result, the user will usually complete the login and enter the personal page.

4.2 Personal information module

To improve the compatibility and development efficiency of the system, the Vue framework and element UI are used to design personal information pages. The whole page uses the element container layout container, < El container > as the outer container, < El aside > as the sidebar container, providing users with information items to modify, such as personal profile, birthday information, etc. The top bar covers the user's Avatar module, uses the upload module of the element, and uses before upload to limit the format and size of images uploaded by users. The system converts the user's

information into a binary stream file and stores it in the database for data backup.

4.3 Information release module

Users can enter the book details writing page by clicking publish books on the personal homepage. Use the markdown editor component of maven-editor. After entering the book information, the back end receives the information in HTML format and transmits the content to the database, and then the publishing is completed. The post-release information appears on the personal home page (as shown in figure 3). All users can access other people's home page and view the products published by users in the main part of the page. The left navigation bar of the page also provides other information such as user credit rating, the content of concern, evaluation, etc.

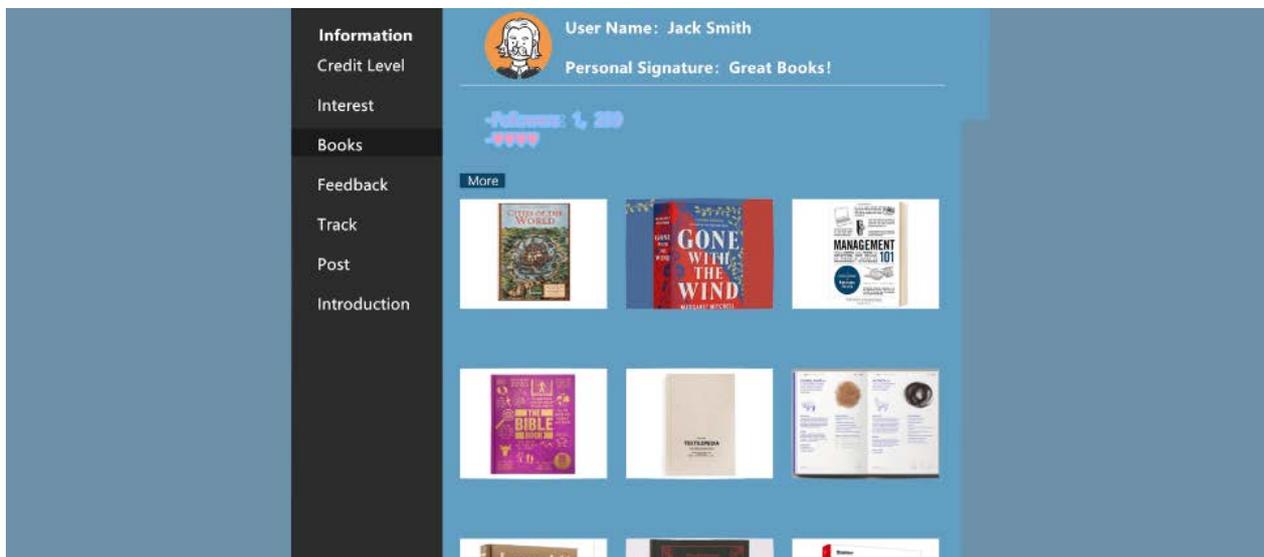


Figure 3: User home page

4.4 User information management module

The administrator can view the book information published by all users on the information management page and manage the books published by users and their permissions centrally. The main functions include using jQuery language to delete books, user permission settings, and information modification. The user's book information is integrated into the form through el-table to facilitate the administrator's management. Ajax transmits the data between the front-end and back-end, that is, asynchronous XML technology. Reduce the coupling degree of the system, realize the effectiveness of Web services, facilitate the collection and processing of user information, simplify the background programming process, improve the user experience. Different from the traditional web project, the MVC model decomposes the project into control layer, model layer, and view layer, reduces the coupling degree between each layer, divides the programmer's work more clearly, reduces the development cost, and enhances the maintainability and expansibility of the web system [3].

The system introduces an efficient data detection tool to monitor the response speed and stability of the page.

5. Conclusion

This paper designs and develops an idle book trading system, which uses Vue and spring boot framework to build the front and back end, respectively. MyBatis is used to interact with the database, and element UI is used to design the front-end page. The system realizes the business separation and low coupling development of background data, and foreground view improves the development efficiency of the platform and the efficiency of user data transmission, as well as the security of user information and the compatibility of operation, and provides a convenient platform for the majority of users who need to buy idle books.

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