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A Pharmacy Drug Information Management System Based on Django Development

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Abstract: *With the rapid development of information technology and the digital transformation of the healthcare industry, the construction of drug information systems has become particularly important. This article is based on the Django framework and designs and implements a drug information system, aiming to improve the efficiency, accuracy, and safety of drug management. The system covers core functions such as drug storage, inventory management, sales records, prescription management, and user permission control. Through a design of front-end and back-end separation, a responsive front-end interface is constructed using the Vue.js framework. The back-end is provided with powerful business logic processing and database interaction capabilities by the Django framework. The system adopts MySQL database to manage drug and user data, and uses Redis as the caching layer to improve data access speed. Through the research and practice in this article, not only does it provide effective information technology for drug management, but it also provides valuable references for the development of other similar systems.*

Keywords: *Django framework; Drug information system; Vue.js framework; MySQL database*

1. Introduction

In today's society, drugs are an important component of the medical and health field, and their management efficiency and safety are directly related to the physical health and life safety of the people[1]. However, traditional drug management methods have many shortcomings, such as incomplete information records, inconvenient queries, and low management efficiency, which cannot meet the needs of modern medical services[2]. Therefore, developing an efficient, accurate, and safe drug information system has become an urgent problem to be solved.

Django as a popular Python web development framework, has received widespread attention and application due to its high efficiency, ease of use and security. This article is based on the Django framework and combines Vue.js front-end technology to design and implement a drug information system[3]. This system can achieve comprehensive management of drug information, including core functions such as drug storage, inventory management, sales records, prescription management, etc. It also supports user permission control to ensure the security and reliability of system data[4]. Through the research and practice of this article, the aim is to provide an effective information technology solution for drug management, and to improve the efficiency and level of drug management.

2. Design the system

The drug information system adopts a B/S (browser/server) architecture, and the front-end uses the Vue.js framework to build a responsive user interface, providing a smooth interactive experience and good visual effects. The backend is mainly responsible for data processing, business logic, and API interface design, using the Django framework to ensure system stability and reliability.

The system uses MySQL database to store core data such as drug information, user information, and order information, while Redis serves as a cache database to improve data reading speed and system responsiveness. The overall architecture supports horizontal expansion, has high availability and scalability, meets the needs of efficient management of drug information, and provides users with convenient drug information query and purchase services. The system architecture diagram is shown in Figure 1.

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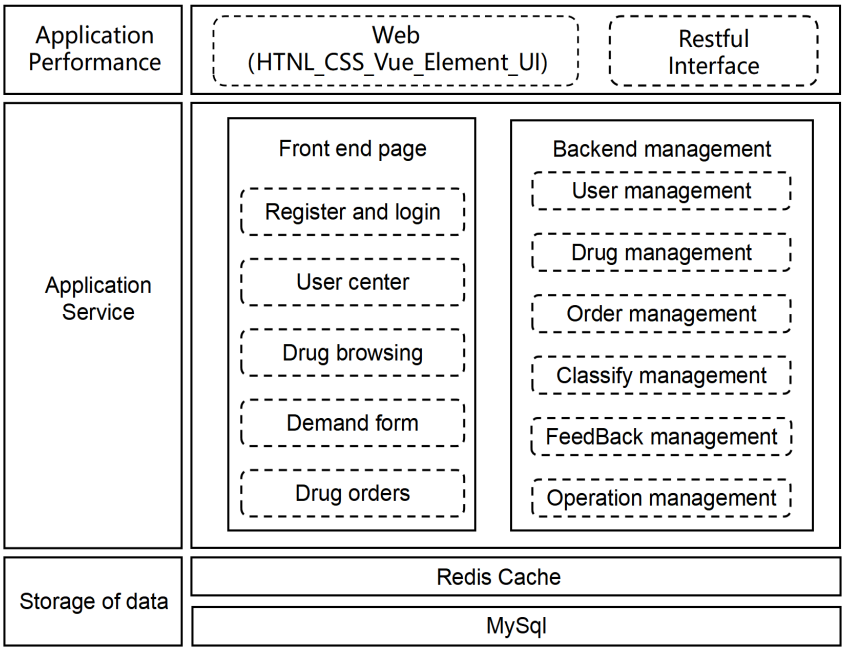

Figure 1: Overall system architecture diagram.

2.1. Design of front-end functional modules

(1) Registration module. Including the collection, verification, and storage of user information. When designing, it is necessary to ensure the integrity and accuracy of information, and set registration rules, such as username uniqueness, password strength requirements, etc. At the same time, it is also necessary to provide feedback on the user's registration status, such as notification of successful or failed registration.

(2) Login module. Including verification of username and password, maintenance of user status, etc. When designing, security needs to be considered, such as using password encryption for storage, limiting login attempts, etc., and implementing persistent login status to facilitate users switching between different pages.

(3) Homepage module. Providing a concise and clear layout and a user-friendly experience. When designing, it is necessary to display information such as drug classification, popular products, and promotional activities, and set up a search function to facilitate users to quickly find the desired drugs. At the same time, it is also necessary to consider user permission control and display different functional modules based on user roles.

(4) Drug details module. Including information such as drug name, specifications, price, inventory, etc., and allows users to make purchases. During design, it is necessary to ensure the accuracy and completeness of information, and set up image display, evaluation functions, etc. to facilitate users to understand drug details. At the same time, it is necessary to implement a shopping cart function to facilitate users in selecting products.

(5) Order module. Including order inquiry, order status tracking, order payment, etc. During design, it is necessary to ensure the integrity and security of order information, and provide real-time feedback on order status changes. At the same time, it is also necessary to consider user permissions, such as only logged in users being able to view and manage their own orders.

(6) User management of personal information. Including modifying personal information, viewing order records, managing shipping addresses, etc. During design, it is necessary to ensure the security of user information and provide a user-friendly interface to facilitate the maintenance and management of personal information. At the same time, it is also necessary to consider user permission control, such as only logged in users can access the personal center module.

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2.2. Design of backend functional modules

(1) User management module. This includes operations such as viewing user basic information, modifying user status, resetting passwords, and deleting users. Administrators can also analyze user data to understand user behavior and preferences, in order to better operate pharmacies.

(2) Drug management module. Responsible for managing drug information, including adding, editing, and deleting drugs, viewing drug details, setting drug prices, inventory, classification, labeling, etc. Administrators can also adjust drug strategies and optimize drug structure based on drug sales and user feedback.

(3) Drug order management module. This includes operations such as viewing order details, modifying order status, canceling orders, and deleting orders. Administrators can also analyze sales and understand user medication habits through order data, in order to better manage inventory and promote activities.

(4) Classification management module. This includes adding, editing, and deleting categories, setting classification levels, and associating drugs. Reasonable drug classification can improve user purchasing efficiency and help users quickly find the drugs they need.

(5) Label management module. This includes adding, editing, and deleting labels, setting label weights, and associating drugs. Drug labels can help users quickly find relevant drugs and improve the user experience.

(6) Feedback management module. Including drug evaluation, opinions and suggestions, etc. Administrators can promptly handle user feedback, solve user problems, and improve user satisfaction.

(7) Operation management module. This includes publishing promotional activities, setting up advertising spaces, managing coupons, and so on. Through the operations management module, administrators can develop effective operational strategies to enhance the competitiveness of pharmacies.

(8) Financial analysis module. Including income, expenses, profits, etc. Administrators can analyze financial data to understand the operational status of pharmacies, develop reasonable financial strategies, and ensure the healthy development of pharmacies.

2.3. Design of database

In the database design of the drug information management system, multiple data tables were constructed, including user table, drug table, drug classification table, drug label table, drug comment table, order table, order item table, address table, demand order table, collection table, announcement table, login log table, etc. The user table is shown in Table 1. The drug table is shown in Table 2. Other data tables together constitute the main body of the system data, providing support for comprehensive recording and management of drug operation data.

Table 1: User Database.

Field Name	Data Type	Length	Primary/Foreign Key	Allow Null Values	Default Value	Explain
user_id	INT	255	Primary Key	No		User ID, self increasing primary key
user_name	VARCHAR	50		No		User name
password	VARCHAR	255		No		Password
email	VARCHAR	255		Yes		Email
phone_num	VARCHAR	20		Yes		Phone number
created_date	DATETIME	25		No		Creation date
role	CHAR	2		No	1	Role (1: Administrator; 2: Regular user)
status	CHAR	1		No	0	Status (0: normal; 1: disabled
nickname	VARCHAR	20		Yes		Nickname
description	TEXT	20		Yes		Describe
avatar_url	VARCHAR	255		No		Avatar URL

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Table 2: Drug Database.

Field Name	Data Type	Length	Primary/Foreign Key	Allow Null Values	Default Value	Explain
drug_id	INT	255	Primary Key	No		Drug ID, self increasing primary key
name	VARCHAR	100		No		Drug name
description	TEXT	20		No		Drug description
price	DECIMAL	10, 2		Yes		Drug price
stock	INT	255		Yes		Inventory quantity
status	CHAR	1		No	1	Status (0: On shelves; 1: Off shelves)
created_date	DATETIE,	25		No		Role (1: Administrator; 2: Regular user)

3. Design the system

As shown in Figure 2, drug classification and labeling, including primary and secondary classifications, facilitate users to quickly find the required drugs and also facilitate administrators to manage drugs.

Figure 2: System interface for drug classification and labeling.

As shown in Figure 3, drug management includes adding, editing, and deleting drugs, setting drug prices, inventory, classification, labels, etc., to facilitate administrators in managing and maintaining drug information.

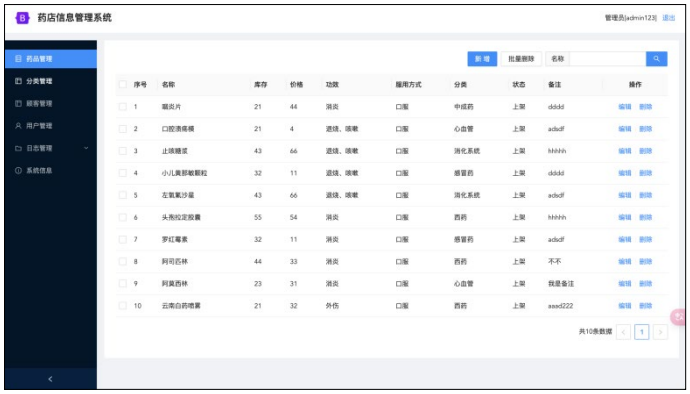

Figure 3: System interface for drug management

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As shown in Figure 4, classification management includes adding, editing, and deleting classifications, setting classification levels, and associating drugs, making it convenient for administrators to manage and adjust drug classifications.

Figure 4: Overall system architecture diagram.

4. Conclusion

The design and implementation of this drug information management system provides an efficient, stable, and safe information management tool for drug information management. The system adopts advanced web development technology and database technology to achieve functions such as drug information input, query, statistics, and analysis, and provides flexible permission management and logging functions, ensuring the efficiency and security of the system.

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