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Design and Implementation of Store Management System based on IDEA

Wen Jing, Shugang Liu

North China Electric Power University, Baoding, Hebei, 071000, China

Abstract

This With the continuous development of computer network and information industry, the use of manual data processing has been unable to meet the current needs, and more and more businesses have to change their business model and use computers to manage manpower and materials. The store management system is designed to improve the operation rate of individual businesses, so as to facilitate the store management personnel to manage the purchase and sale of goods. In this paper, the author studies on store the overall management system adopts B/S structure, using IntelliJ IDEA as a development environment of the whole code, front-end using easyUI framework for the preparation of the JSP page, the back-end using SSM framework, using MySQL database for data persistence, through these finished goods management module technology, purchasing and supply management module, order management module, user management module development, and through the function test and analysis, system can stable operation, to achieve the desired effect. The realization of the system can improve the management efficiency of individual businesses on materials, procurement, sales and personnel, making the operation of staff more convenient and avoiding mistakes in the operation process.

Keywords

Store Management System; B / S Structure; IntelliJ IDEA; MySQL Database; JSP; Spring; SpringMVC; Mybatis.

1. Introduction

All Today in the 21st century, with the progress of the times, the Internet technology is also developing rapidly, and the management methods of enterprises are also constantly developing. The development of the network provides a powerful means for enterprise management, which not only facilitates small and medium-sized enterprises to manage personnel. It provides great convenience for material management [1].

Through the management of personnel, the store management system can make the personnel management of the store clear, and the workload of each person is clear; the management of commodity inventory and sales provides a way for merchants to understand consumers' preferences; through the statistics of commodity sales , to provide a basis for the purchase volume of each commodity and reduce the backlog of commodities; through the management of orders, it can provide convenience for users' needs from time to time; it can truly reduce the pressure for individual merchants and improve their management efficiency.

In 1954, the United States, a developed country, began to use computers to process data. Computers have been widely used for decades. Today, in terms of material management, the utilization rate of computers is as high as 80%-100%, and the management level of stores is getting higher and higher. However, in the 1990s after the reform and opening up, my country began to introduce the store management system. At present, many stores in my country still have manual or semi-manual operation management. Some even use calculators to calculate

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sales, and use this book to record monthly sales. Relying on manual calculation of commodity purchase amount [2] makes the work inefficient, and the economic benefits are lost due to the backwardness of technology.

This paper designs a store management system for small stores, which has certain practical significance, which can bring convenience to the management of individual merchants and improve the deficiencies in manual management. Through the development of this system, it can also help students master the development process of a project from zero to one, master the method and related technologies of a Web project system development, and improve students' future self-ability and employability.

2. Related Technologies and Methods

2.1. Commodity Management System Architecture Introduction

This system uses the currently popular Spring+ SpringMVC+Mybatis framework to build the project. Among them, Spring is a lightweight IoC and AOP container framework, which is used to manage other frameworks and objects. The original intention of the formation is to simplify the development of JavaEE, and use basic JavaBeans to replace EJB to complete things that could only be done by EJB before [3]]. SpringMVC mainly describes the decoupling problem of view and controller development, which solves the problem of inconvenient management caused by the original Servlet as the controller in the project and too many objects occupying too much memory space [4]. The predecessor of MyBatis was an open source framework under Apache, iBatis. Later, the code was migrated to the GoogleCode platform and renamed MyBatis, and later migrated to GitHub. It is a framework that does not depend on containers, mainly encapsulating JDBC, providing After the interface and the corresponding XML file are obtained, the records in the database can be operated without the need to implement the class and the specific code of JDBC [5].

The framework is the code that has been encapsulated by some programmers. We can use these frameworks to reduce the writing of code, which greatly improves the development efficiency and makes it easier and more convenient to use.

2.2. Introduction to Key Technologies

In this system, the most important thing is the processing of data information, and the processing of these data requires writing sql statements to operate the database. In this system, the MyBatis reverse engineering technology is used, which is officially provided by MyBatis. The data access layer interface and mapper.xml configuration file are automatically generated for a single table in the database, and programmers do not need to write SQL statements, but focus more on complicated business logic [6].

2.3. Development Tools

The front-end pages of the system are developed using JSP + JavaScript[7] integration technology, in which JavaScript uses the easyUI and JQuery frameworks. These two front-end frameworks encapsulate JavaScript, making us more friendly to JavaScript.

The database uses the MySQL database. MySQL is one of the most popular relational databases at this stage. Compared with Oracle[8], it occupies a small amount of memory, runs fast, and is easy to use. It is widely used in development. .

The IDE tools used for development are: IntelliJ IDEA. The web server uses the Tomcat server. Tomcat is an open source middleware under Apache, which is easy to use. With the update of the version, its performance and stability are getting better and better [9]. Finally, the system chooses JDK1.8 as the development and compilation environment.

ISSN: 2688-8645

3. Analysis of Store Management System

3.1. Feasibility Analysis

3.1.1. Technical Feasibility

In this system, the technologies used are all popular development frameworks on the market at this stage, and there are no loopholes [10]. As long as the use of these technologies is mastered, the writing of the project can be completed completely, and the MySQL database used is sufficient to store the amount of data and information of the merchants is technically sufficient to ensure development.

3.1.2. Economic Feasibility

In the original operation of individual merchants, a large number of employees are required to manually operate, and some human errors may occur in the operation process, resulting in a waste of merchants' time and funds. After using this system, using computers instead of manual work, firstly, it reduces the excessive investment in business personnel; secondly, it avoids the losses caused by human errors; thirdly, using the system can clearly analyze the sales volume of goods for the businessmen, to provide a procurement plan for it; moreover, the system does not require much expenditure, and the use cost is very low. To sum up, the system is completely feasible economically.

3.2. Demand Analysis

3.2.1. Overall System Requirements

The system is a management tool for merchants, and the most important thing is to make it easy for merchants to use and to meet their needs. First of all, the staff only needs to master simple computer operation methods to get started directly, and this requires a simple, beautiful and convenient operation interface; The information will be different; then various management pages are required, such as user management modules, commodity management modules, etc.; finally, the calculation and arrangement of various data needs to be completed by the system itself,Reduce manual involvement and avoid mistakes.

The specific requirements are shown in the figure:

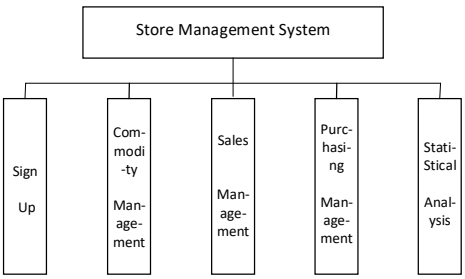

Figure 1. System requirement analysis

3.2.2. Use Case Diagram Analysis

Figure 2. Manager use case diagrams

ISSN: 2688-8645

Figure 3. Seller Manager use case diagrams

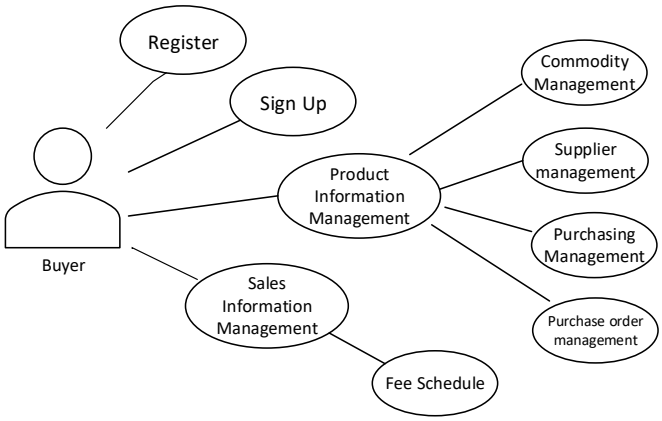

Figure 4. Buyer use case diagrams

4. System Outline Design

4.1. System Overview

The system adopts the SSM framework, a client sends a request, the web server receives the request and performs business logic processing, and then retrieves it from the database, and returns the data to the client through the web server. The working principle of the system is as follows:

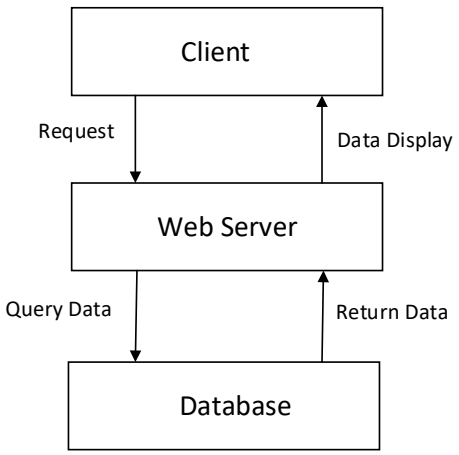

Figure 5. System working principal diagram

4.2. System Function Structure Diagram

Through the above analysis, the system can be divided into three modules: system management, commodity management and sales management. Its functional structure diagram is shown in Figure 6 below.

ISSN: 2688-8645

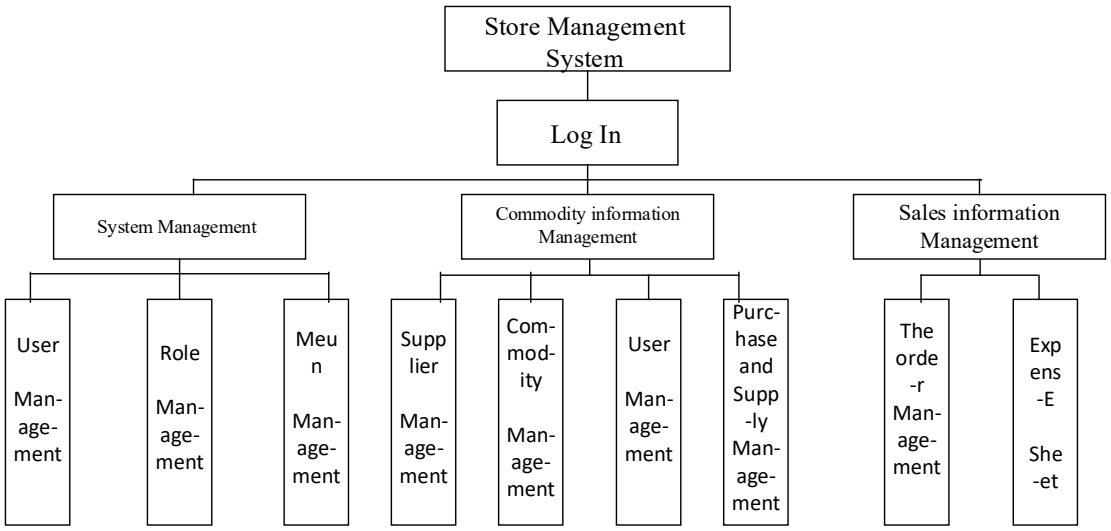

Figure 6. System function structure diagram

4.3. Database Conceptual Structure Design

The conceptual structure design needs to abstract the user's needs into an information structure according to the demand analysis. The model exists objectively and can truly reflect the connection between things. The design of this model is beneficial to developers to analyze more logically. The user's requirements are also easy to modify when the requirements change. Usually, the E-R model is used to describe the conceptual model, so that the analysis of the requirements is more intuitive and easy to understand [11]. The E-R model diagram of the system is as follows:

Product Information E-R Model:

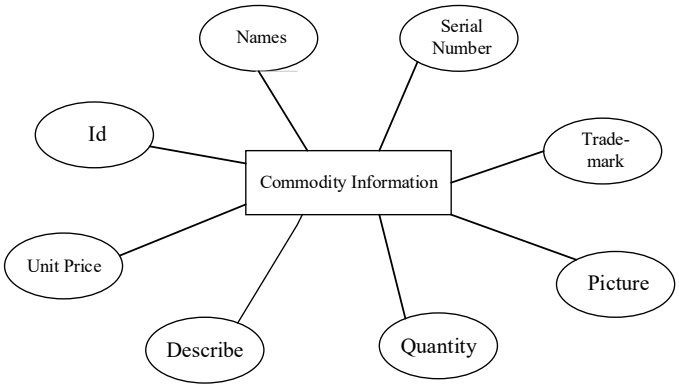

Figure 7. Entity map of commodity information

User Information E-R Model:

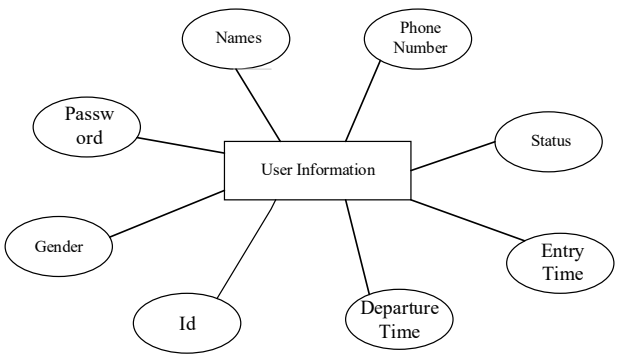

Figure 8. Entity diagram of user information

ISSN: 2688-8645

Sales order information E-R model:

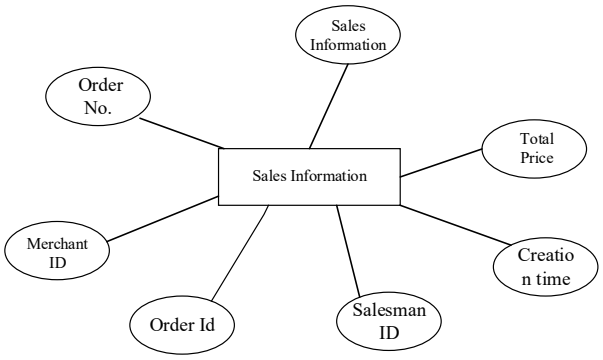

Figure 9. Sales single information entity diagram

Procurement Form Information E-R Model:

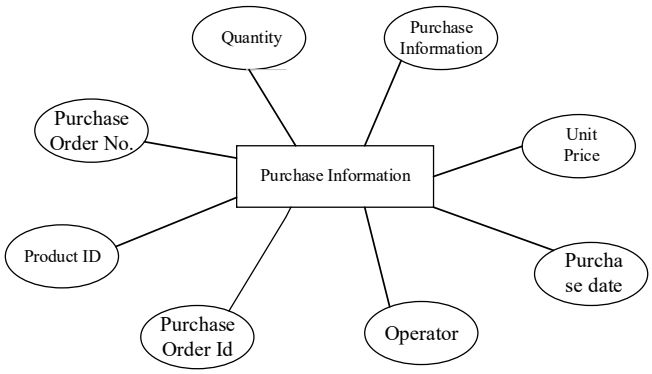

Figure 10. Purchase form information entity diagram

4.4. Database Logical Structure Design

Table 1. Product Information Sheet

Field Name	Data Type	Primary Key / Allow NULL	Field Notes
goodsid	INT	Primary Key	Product id
sku	VARCHAR(150)	Not Null	Commodity Number
name	VARCHAR(50)	Not Null	Commodity Name
brand	VARCHAR(50)	Not Null	Brand
price	Double(10)	Not Null	Price
picture	VARCHAR(155)	Not Null	Picture
goodsdesc	TEXT	Not Null	Commodity Description
num	INT	Not Null	Number

The database logical structure design needs to convert each model into a relationship according to the E-R model in the above conceptual structure design, each entity is a table, and the attributes are the fields of the corresponding table, then the system needs 8 tables to describe the system entity in.

ISSN: 2688-8645

Table 2. User information Sheet

Field Name	Data Type	Primary Key / Allow NULL	Field Notes
userid	INTEGER	Primary Key	User Id
username	VARCHAR(20)	Not Null	User Name
userpassword	VARCHAR(32)	Not Null	User Password
gender	CHAR(11)	Not Null	Gender
usephone	VARCHAR(11)	Not Null	Use Phone
startdate	DATE	Not Null	Entry Time
leavedate	DATE	Noy Null	Departure Time
status	CHAR	Not Null	Status

Table 3. Sales Information Sheet

Field Name	Data Type	Primary Key / Allow NULL	Field Notes
oid	INT	Primary Key	Order Id
oidentify	VARCHAR(255)	Not Null	Order No.
goodsid	INT	Not Null	Goods Id
num	INT	Not Null	Number
totalprice	DOUBLE	Not Null	Total Price
time	DATE TIME	Not Null	Creation Time
userid	INT	Not Null	Seller Id

Table 4. Purchase information sheet

Field Name	Data Type	Primary Key / Allow NULL	Field Notes
id	INT	Primary Key	Purchase Id
stockid	VARCHAR(255)	Not Null	Puechase No.
goodsid	INT	Not Null	Goods Id
num	INT	Not Null	Number
comid	INT	Not Null	Merchant ID
price	DOUBLE	Not Null	Price
date	DATE	Not Null	Purchase Date
username	VARCHAR(20)	Not Null	Operator

ISSN: 2688-8645

5. Store Management System Function Realization

5.1. User Login Entry

(1) Function description

When a user wants to enter the system, login verification is the only method, fill in the corresponding user name and password, the background will query the database and return the success or failure information, through the login can be authenticated to verify whether the user has permission to enter the system.

(2) Implementation process

When the login button is clicked, the click event of the button will be triggered. First, the front-end page uses the verification method in jquery to verify whether the entered user name and password are empty. If the input is empty, the page will prompt on the right side of the input box that this item is must lose. If it is not empty, the user name and password will be passed to the background, the background will first encrypt the password with MD5, and then compare the user name and encrypted password with the user information in the database, if the comparison is successful, it will be sent to the front page. Returns successful information, and the front-end page jumps to the corresponding page according to the information. If the comparison is unsuccessful, the failure information will be returned to the front-end page, and the front-end page will prompt the user name or password to be incorrect, requiring the user to re-enter.

5.2. Main Page Describe

(1) Through the management of users, roles, and menus, RBAC is used to realize that different users have different roles, different roles have different menus, and the page elements that can be seen are also different.

(2) Implementation process

After logging in, look up the roles owned by the user according to the user id, and then query the menu owned by the current user according to the role id, implement the RBAC menu query by business assembly, and convert the queried menu type into the type required by the front-end page, using The url field is used for access path control, and the menu owned by the user is displayed on the main page.

5.3. System Management

(1) Function description

The system management module mainly manages users, roles, and menus, and performs basic addition, deletion, modification, and search operations on them. It can assign some existing roles to users, and assign some existing menus to roles. Reduce the coupling between users, roles, and menus, facilitate management, and control the roles that users belong to after logging in and the menu items they can see

(2) Implementation process

The first is that user query can go to the database for conditional query based on name, gender, phone number, and status, and return to the corresponding front page to find all qualified users. You can assign a role to a user. First, delete all roles owned by the user according to the user id, and then reassign the role to the user according to the array of roles assigned to the user received by the backend.

The second is the role query, which directly queries all role information in the database and returns the corresponding front page. You can assign menus to roles. Similar to assigning roles, you need to delete all the original menus of the role and assign new menus to them.

ISSN: 2688-8645

The last is the menu query. All menus are found in the database and returned, and all menus are converted into tree structures. Every time a menu in the tree structure is clicked, all submenus of the menu will be queried in the database, and the queried menu will be queried. All submenus and this menu are displayed on the right side of the menu tree structure.

5.4. Commodity Information Management

(1) Function description

Commodity information management is the comprehensive management of commodities in the warehouse, including commodity management, supplier management, procurement management, and purchase order management. Commodity management is to view and modify all commodities; supplier management is to manage the information of all suppliers; purchase management is to add new commodities, and the inventory in commodity management will change, when the inventory is less than or equal to 2 When the inventory is displayed in red, it indicates that the inventory is insufficient; the purchase order management is the management of recording the purchase of each commodity;

(2) Implementation process

Commodity management, enter the required query conditions: the code of the commodity, the name of the commodity, the brand name of the commodity, and then the background will search the commodity table according to the query conditions, and then all qualified commodities will be returned to the front page. Purchasing management, click the purchasing management menu to jump to the corresponding product adding page, fill in the corresponding product information, the background will add the information of the product in the product table, and at the same time, a purchase information will be added to the purchasing information table.

5.5. Sales Information Management

(1) Function description

When adding in a sales order, first query the product information, and after checking, you need to modify the inventory of the product in the product table according to the number of products sold in the sales order, and then return information on whether it is successful. The sales order query only needs to query all the orders in the database and return it. In the cost table, the sales volume of the top ten products in the past three months is displayed in the form of a bar chart.

In the cost list, the top ten products by sales volume in the past three months are displayed in the form of a bar chart by querying the database, which is convenient for enterprise managers to analyze the sales of products. The interface is shown in the figure:

(2) Implementation process

To add a sales order, you need to fill in the product number and quantity. After submitting, the information will be improved in the business, such as: adding time, adding personnel, and total product price, and then adding it in the database sales information table, and at the same time, modifying the product Inventory of the item in the table.

In the cost list, you only need to query the database for the top ten products by sales in the past three months and return to the front-end page. The front-end page is displayed with the highcharts plug-in.

6. Summarize

After a few months, the store management system project finally completed all the development processes from scratch. This process is long and arduous. Although I usually learn a lot from books, I still find it difficult to use it. After several months of unremitting efforts, I searched online and searched textbooks again and again. The design of this project has greatly improved my ability to use my brain. The use of various technologies is intricate, and various

ISSN: 2688-8645

programming ideas are also worthy of my in-depth study. Various design patterns also require me to dig deeper, and I have experienced the fun of programming. I also have a deeper understanding of programming.

At the same time, during this process, I also noticed my own shortcomings. Only the knowledge in books is only on paper after all, and practice is the last word, and I also have a deeper understanding of "what you learn on paper is shallow in the end". It will also be a wake-up call for my future work.

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