

System Design and Development of Electrical Mall

Bowen Dong*, Rui Mi^a, Zhihua Cao^b, Xinling Liu^c

College of Management Science, Chengdu University of Technology, Chengdu 610059, China

^a827083318@qq.com, ^b873495667@qq.com, ^c2682228376@qq.com

*Correspondence: dbw@stu.cdut.edu.cn

Abstract

With the increasing demand for online shopping in People's Daily life, electronic shopping mall website is indispensable for online shopping. This website is mainly aimed at people's demand for electrical appliances to sell the corresponding electrical appliances by means of online transactions, and supporting products including after-sales and distribution services, reducing the operating costs relative to the physical stores, saving human, financial and other resources. This paper is divided into the following parts, based on the principle of asp. User registration based on ASP. NET membership. SQL statistics function, SQL Server pagination logic implementation. The expected results of the electrical store system are as follows: the addition of electrical items, the addition and deletion of shopping cart items, the fulfillment of orders for delivery, the inspection of the delivery status of electrical appliances according to the order number, and the management of electrical inventory. In the design and implementation of the process of continuous website modification, optimization, learning summary, to improve.

Keywords

ASP.NET; SQL Server; HTML; Repeater.

1. Introduction

With the popularization of computer and network, more and more businesses open online shops, showing consumers a fresh shopping world. In the United States, Japan and other countries and regions with a higher degree of information, online stores are developing rapidly. Some of America's biggest retailers, such as Wal-Mart, are jumping on the network business. Surveys show that American families are becoming more accustomed to shopping from the Internet at home.

In China, online shopping from scratch in only a few years. The real sense of online shopping, the payment of goods settled on the Internet, has been realized in China. Merchants invest in online shopping malls to make money. Bricks-and-mortar sales waste time and manpower, and limit the reach of the network and the variety of product outcomes. Therefore, safe, fast and convenient electronic payment means the main element of the healthy development of online shopping mall.

Online electrical shopping mall is to build a virtual shopping mall on the network[1]. It avoids the tedious process of choosing goods and makes your shopping process easy and fast, which is very suitable for the fast-paced life of modern people. At the same time, it can effectively control the operation cost of the mall, provide customers with a home-based supply service, and facilitate customers to understand the information of goods and after-sales service feedback. It provides a platform for merchants to publicize goods, facilitate the release of business information, commodity management and user management and other functions.

As far as home appliance industry is concerned, economically developed countries are obviously in the forefront of home appliance online shopping market. Many electronics retailers have long abandoned the traditional way of setting up shop in the city's high street and switched to online sales. Most foreign people pursue efficiency and fast pace of life, which is the main reason for the rapid development of online shopping market abroad. But more important is the perfection of the legal system, and more and more consumers trust online shopping. At the same time, foreign countries continue to use information technology, make full use of huge information resources, computer technology applied to the home appliance industry has been very mature.

In recent years, online sales in China have exploded, and online sales of home appliances have also shown rapid growth. With the joining of Suning, Jingdong and other mainstream enterprises, consumers have a stronger sense of trust in home appliances online shopping. At the same time, due to the ability to buy genuine goods from the Internet at a cheap price and distribution logistics services, home appliances online shopping is gradually accepted by a larger consumer group.

With the rapid development of online shopping appliances in China, some problems have been exposed. For the gradually growing trans-regional shopping of large household appliances, there began to be a corresponding lack of services, market chaos, the spread of copycat and other adverse concerns, the industrial chain is not sound, distribution overly dependent on the third party. Now the distribution of many household appliances still depends on the third party's logistics providers, which is bound to increase the cost and energy and resource investment of enterprises, and it is difficult to guarantee operating profits and performance. Enterprises for traditional channels of product price, promotion, advertising and other investment is still large, which is bound to make some online malls in the distribution of products, prices and other resources are less support. Then, the price and promotional advantages of the product can't be reflected, the operating profit and performance of the product can't be guaranteed.

In the future, home appliance online shopping will become the main way for mainstream consumer groups to choose when shopping, this aspect and trend is clear. Only from the early stage of development to the promotion and popularization, and finally break through the bottleneck of their own development, for many home appliance network channel providers, it takes time and experience accumulation and method exploration. China has made guidance for studying the business operation mode of various business applications on the Internet. Generally speaking, China's online electrical business is still in the formative period, growth space is still very large.

The main purpose of this system is to reduce the cost of customer service. It can organize the product pictures and related words in an orderly way, form an online commodity page for easy browsing, and complete the work of order submission and order management.

2. Problem Description and Basic Assumptions

We consider a system requirement. Customers need to register users and log in. They can list the commodities that meet the conditions by specifying keywords, which is searching commodities. Alternatively, you can view the details of specified commodities by browsing classified commodities by specified commodity category. Users also need to purchase goods through the system. The administrator needs to manage orders. They can browse the customer's order, view the order status and order details. For paid orders, they arrange shipment or cancellation, and cancelling paid orders requires a refund to the customer. They also need to manage appliances. They can add, modify, or delete items. Commodity includes the name, classification, description, weight, volume, price, stock quantity and other information of it.

There are three business departments involved. The newly purchased commodities of the supply department need to prepare relevant descriptions and add them to the catalogue of commodities in the mall. If a product is no longer on sale, it should be taken off the shelves. Customers view the goods, add to the cart, adjust the cart, determine whether to buy, confirm the freight, specify the delivery address, generate the order, select the payment method, complete the order payment,

generate the paid order. If no payment is made, the order remains in its initial state and the order in its initial state can be deleted. Customer service department will arrange shipment according to paid order. After delivery, the order becomes shipped.

3. Business Process Construction and Analysis

Organize the purchase of goods according to the business scope and business strategy determined by the mall. The newly purchased goods need to prepare relevant instructions and add them to the catalog of commodities in the mall, known as the shelf. If a product is no longer on sale, it should be taken off the shelves. Customers view the goods offered in the mall in various ways. They can add items to their shopping cart if they want to buy them. They can adjust the items in the cart to decide whether to buy or not, and can continue to browse the items. They confirm the freight according to the goods in the shopping cart, designates the delivery address, and generates the order. They select the payment method, completes the order payment, and generates the paid order. If no payment is made, the order remains in its initial state and the order in its initial state can be deleted. Customer service department will arrange shipment according to paid order. After delivery, the order becomes shipped. When the customer receives confirmation of the goods, the order becomes completed. Customers can fully understand the detailed information of goods, eliminate the information asymmetry problem of online shopping, the task is feasible.

The functional module construction is divided into five parts. They are the basic function part, the front desk shopping part, the customer background part, the administrator background part and the business background part.

The interface construction is divided into three parts. They are the page listing part, the page layout part, and the detailed page part. According to the function module part can be given the electrical mall page list, which are listed in Table 1.

Table 1. Page listing

Module	Page file	Page description
Front desk portal	Default.aspx	Home page
	Goods.aspx	Display details of goods
	ShoppingCart.aspx	View and manage shopping carts
User management	Login.aspx	User login or registration
Customer background	Default.aspx	Customer personal information check
	MyOrders.aspx	Browse to find your own order
	MyOrder.aspx	View order details
	MyAddress.aspx	View and manage customer shipping addresses
System administrator background	Default.aspx	System administrator home page
	Users.aspx	Browse all accounts
	UserAdd.aspx	Add non-customer user accounts
	Category.aspx	Browse and manage merchandise categories
	Stat.aspx	Allow statistics of commodity sales performance within a specified period
Business background	Goods.aspx	Find, browse or delete items
	Order.aspx	View order details
	Users.aspx	Customer user search

According to the system, we can determine use case building and analyze the objects. Visitors choose to register and the system returns a registration page. The system verifies the successful input of the visitors as prompted. After submitting the registration information, the system prompts you to register successfully and returns to the home page. Customers can list the commodities that meet the requirements and search for commodities by specifying keywords. Alternatively, you can view the details of specified commodities by browsing classified commodities by specified commodity category. Customers can add items to their shopping cart while browsing or viewing a list of items. You can also increase or decrease the number of items in your cart while browsing. The system calculates its own freight based on the weight of the item. An order can be generated if the customer decides to purchase an item in the shopping cart. Customers can browse their own orders, tracking the status of the order.

According to the previous requirement analysis and system design, the system adopts three layers architecture to achieve the purpose of high cohesion and low coupling. Users with different roles can perform different operations. A user can have multiple addresses, one of them is the default address. You can design product categories, which support only one level. A product category can have multiple products. Goods have title, photo, detailed description and other information, as well as the price, calculate the freight weight. There is also the evaluation of the product, which is used to record customers' comprehensive rating of the product. And shelf time and shelf removal markers to control the availability of goods. One user can place multiple orders. Order records the overall price of the order, shipping address, consignee and contact number, as well as order time, payment time, shipping time and receiving time, status information used to manage the order.

According to the system database, the system conceptual data model diagram is obtained, which are shown in Fig. 1[2].

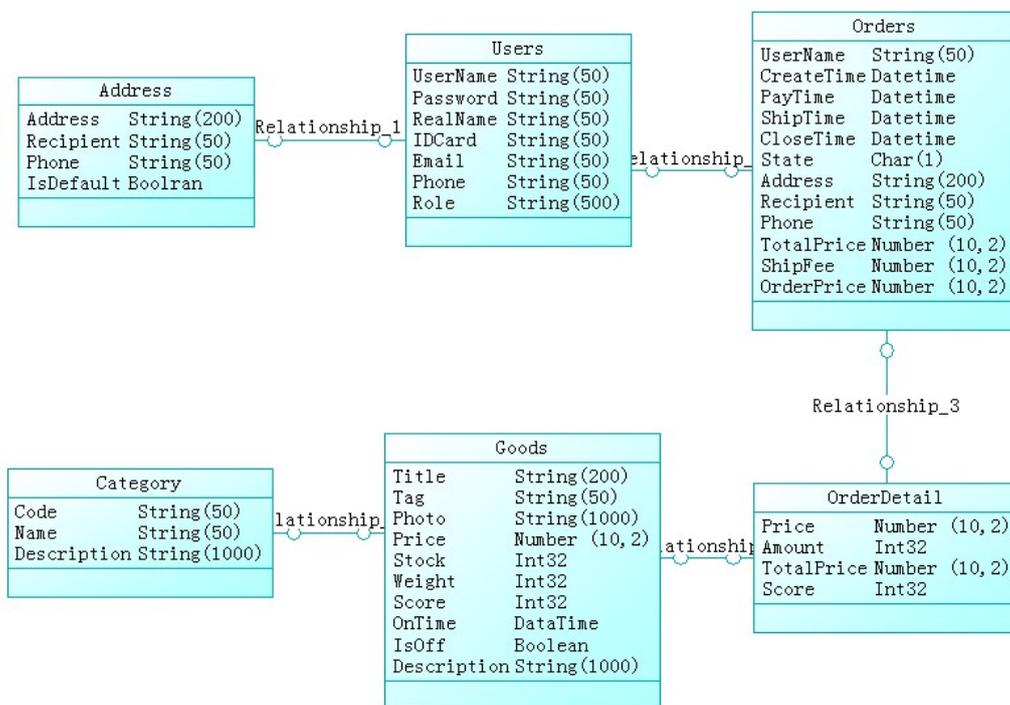


Fig. 1 Conceptual data model

According to the database relational model, save the basic information of all users in the system, which are listed in Table 2.

Table 2. User information

Field name	Instructions
User ID	User ID
User Name	Login user names cannot be the same for two personnel
Password	Login password
Real Name	Name and id card number
Email	E-mail
Phone	Contact phone number
Role	The role of a user determines the operation rights of the user

Record the delivery address, the user can choose from their own delivery address list when placing an order, which are listed in Table 3.

Table 3. Address of the user

Field name	Instructions
User ID	ID of the user to which the address belongs
Address	Detailed address
Recipient	The recipient
Phone	Contact phone number
Is Default	If multiple addresses exist, the address with the smallest ID is selected by default

Preserve the classification of goods sold in the mall, and only set the first-level commodity classification in the project of the mall, which are listed in Table 4.

Table 4. Classification of goods

Field name	Instructions
ID	Category ID
Code	Commodity classification code
Name	Classification name
Description	Description of Commodity classification

Save all commodity information in the mall, which are listed in Table 5.

Table 5. Commodity information

Field name	Instructions
Category ID	ID of a category to which an item belongs
Title	The title
Tag	Search keywords
Photo	The image file URL of the photo
Price	The unit price
Stock	Inventory quantity, default is 0
Weight	Unit weight, default 0, used to calculate freight
Score	Evaluation, 5 points, default 0 points
On Time	Shelf time, the default is the time to add the product
Is Off	Whether the shelves

Save orders issued by users for order management, which are listed in Table 6.

Table 6. Customer orders

Field name	Instructions
User ID	ID of the user that placed the order
User Name	User name to display the order owner
Create Time	Order Creation time
Close Time	Order closing time
Close Man	Order closing person
State	0 - for payment
Address	Detailed delivery address
Recipient	Name of consignee
Phone	Contact number of consignee
Total Price	Order details the sum of transaction prices of goods
Ship Fee	Freight calculated according to the value of the goods
Order Price	Total price of goods + freight

The database of the electrical appliance system is called Store, and the database folder is saved in the default database folder of SQL Server[3], using the method of single database file. The relational mode of electrical store can be directly converted into table structure, the data type into the type supported by DBMS[4], as well as primary key, foreign key, default value and other constraints definition.

The system architecture includes quick search function, quick operation function, main menu function, user role function, form authentication function, authority control function, database transaction function, registration event processing function. The interfaces involved master page, login registration page and so on.

The layout principle of the interface is a linear layout, the upper left corner shows the search for goods, the right side of the user information, shopping cart, for registration login, view my shopping cart. The left side of the main content area below has all categories, recommended products, which correspond to the front desk shopping function.

The function of the registration interface is to upload the user's name and password to the background to complete the registration of a new account. When registering, you should first determine whether the registered user name is duplicate.

On the login screen, you can enter the user's name and password and send them to the background. According to the user's name to distinguish user permissions and identities, so as to return different interface, to provide users to use. When you log in, you should first make sure that the login name and password are correct. At the same time get the frontend input data and the database of the user table inside the content of the comparison to see if it is correct. At the same time, the database returns additional information about the user, which is stored there. That should return the screen of the person with that permission. If the input is incorrect, an error message is returned to remind the user to reenter.

The administration main menu is divided into two levels and has an icon in front of the menu text. Two of the menus are implemented using nested lists. Administrator home page Displays basic system information and system statistics that administrators care about, such as the total number of electrical goods in the current system. With a three layers architecture, you first need to add services and methods to the first layer. These methods are then called on the page to get the statistics you need. Background Managed objects are displayed in a list. There are a large number of managed objects and the search function is provided. From top to bottom, in sequence, is finding the user area, toolbar, and user list. When the number of rows in the list is large, paging display is adopted. Too much data is displayed on one page, which will increase the burden of the system and make users confused. Therefore, paging is used for user management pages.

The menus in the service background need to dynamically determine the contents to be displayed based on user roles, and configure permissions for each file individually. Based on permission control requirements, arrange the pages with the same permission configuration to the same folder. Add a method to get a list of paged items in the data access layer. The search conditions include shelf time, commodity classification, keywords and shelf status. The first column in the custom list is the category name. The last column is the action button, which operates on the list. Editing the product page includes both new and modified functions. When modifying a product, the buyer opens the list to search for this product, and then clicks "Modify". After the modification is complete, the page for modifying other products will be closed. Adding goods usually requires adding more than one item at a time, and the buyer switches to the page of adding goods. After adding goods, if you need to continue adding, you should stay on the page of adding goods. Order processing includes order delivery, return, cancellation, confirmation and other processing, order management function is the core function of electrical mall. Order business process is the key in order management function. The same user usually has many orders and can specify exactly one order by order number.

Shopping cart is one of the core functions of online shopping mall. The main functions of shopping cart can be divided into three parts. First, add the items you intend to purchase to your cart. Secondly, view and adjust the current shopping cart. Finally, generate orders from the shopping cart. Each customer has his own shopping cart. Define the classes in the shopping cart that hold the item information and quantity. Add the cart item class definition file in the folder. Next add the definition file for the shopping cart class to the folder.

The system test adopts black box test, which regards the tested object as a black box. Testers take no account of the internal structure and processing of the program, and only test at the interface of the software. According to the requirement specification, add, delete and modify each function respectively to check whether the program meets the functional requirements. Black box testing is mainly used to discover whether there are incorrect or missing functional errors. On the interface,

whether it can correctly receive input data, can produce correct output information or not. Whether there is an error in accessing external information. Finally, test whether the performance meets the requirements.

4. Conclusion

This paper realizes the design and development of online electrical shopping mall. The system has online shopping, user registration and login, password retrieval, the administrator of goods, users, orders and some other functions of the management and maintenance of the basic functions. It can realize the idea of online shopping. It has also solved most of the problems through careful debugging and error elimination.

In the process of design, access to the relevant information, research in recent years the use of website development tools and technology. Through this paper, you can understand the use of various instructions and many objects used in the programming of dynamic web pages, such as input and output objects. When debugging the program, the tool points out the problem causes and relevant positions of the code, which improves the efficiency.

This system establishes two main functional parts contained under the main system, the user part and the administrator part. The basic maintenance and realization of an online electrical mall system are realized. However, due to the relatively small amount of data, the functions are relatively simple. There is still room for improvement, a long distance from a complete sense of the online mall, the mall interface design and planning more immature still need to strengthen.

References

- [1] Ranganathan C, Shetty A, Muthukumaran G (2004) E-Business Transformation at the Crossroads: Sears' Dilemma. *Journal of Information Technology* 19:117–129. <https://doi.org/10.1057/palgrave.jit.2000009>.
- [2] Singal AG, Lok AS, Feng Z, et al (2022) Conceptual Model for the Hepatocellular Carcinoma Screening Continuum: Current Status and Research Agenda. *Clinical Gastroenterology and Hepatology* 20:9–18. <https://doi.org/10.1016/j.cgh.2020.09.036>.
- [3] Antonopoulos P, Budovski A, Diaconu C, et al (2019) Socrates: The New SQL Server in the Cloud. In: *Proceedings of the 2019 International Conference on Management of Data*. ACM, Amsterdam Netherlands, pp 1743–1756.
- [4] Stonebraker M, Abadi DJ, Batkin A, et al (2018) C-store: a column-oriented DBMS. In: *Massachusetts Institute of Technology, Brodie ML (eds) Making Databases Work: the Pragmatic Wisdom of Michael Stonebraker*, 1st ed. Association for Computing Machinery, pp 491–518.