The Development of Mobile Shopping System
Based on Android Platform

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Abstract. This paper introduces the development of mobile shopping system in the Eclipse
development environment using Android mobile development technology. The development of this
system is of great significance to enhance users' shopping experience, facilitate people's life, meet the
increasing demand of mobile customers and improve the competitiveness of enterprises.

Introduction

With the rapid development of the internet technology, mobile development technology and
e-commerce, a large number of online shopping systems have emerged. The mobile shopping system
based on the mobile intelligent platform, at the same time, has also appeared in the daily life. The
mobile shopping system brings about a new experience of easy shopping and satisfies the public
demand for convenience. Based on the analysis of the Android mobile intelligent platform, this paper
introduces a mobile shopping system using the Android development technology. Its purpose is to
upgrade users' shopping experience so as to meet the increasing mobile customer demand for
convenience and enhance the competitiveness of enterprises.

Related Technologies

An Introduction of the Android Platform [1, 2]

Android is an open source mobile operating system based on Linux platform developed by Google. It
is the first truly open smart-phone operating system built for mobile terminals. The Android SDK
provides tools and API interfaces for Android application development using the Java language on
the Android platform.

Android architecture includes application layer, application framework layer, system runtime
library layer and Linux core layer. The application layer contains many core applications within the
Android platform. These applications are written by Java language. All Android applications that run
on a virtual machine belong to the application layer.

Typically a complete Android application consists of four components: Activity, Broadcast
Receiver, Service and Content Provider. (1) Activity is a user interface. It is responsible for
interaction with users. Android applications typically consists of one or more Activity components.
They are stored in the Activity stack and follow the principle of "first in last out" to switch to each
other. Users can actually interpret each Activity as a mobile page. (2) Broadcast Receiver has the
ability to monitor other components in Android. (3) Service runs in the background and generally
does not need to interact with users. It has an independent life cycle. (4) Content Provider is a
standard that Android offers to exchange data between different applications. However, not all
Android applications must have the four components above. It can be formed from one or more of
the above. When decided to use the above components to build Android applications, it needs to be
registered in the Android Manifest.xml. This is a XML configuration file that is required for each
Android application. The user can declare the application components, their features and requirements in this file.

**An Introduction to Eclipse Development Tool [3]**

Eclipse is a development platform developed by IBM. It typically builds a development environment through plug-ins and widely used in the development of the Java language. Eclipse has an extensible framework that has obvious advantages in deploying and managing software life cycle aspects. With free open source features and developers easily accessible it has received more and more attention. Eclipse tends to be developed by the Java language and Android applications are developed using the Java language, so it's also fairly easy to develop Android application development in Eclipse.

It needs to install the ADT and the Android SDK for Android application development in Eclipse integration environment. It provide developers with the API libraries and development tools. Developers can use the SDK to programming, testing and debugging. The combination of Android SDK and ADT with Eclipse IDE is needed in real development. ADT is an Android developer tool that can be easily understood as a tool plug-in for Android under Eclipse.

**The Design of the Mobile Shopping System [4, 5]**

An Mobile shopping system is divided into server and mobile client based on the Android platform. The server uses the MVC design pattern to design. The system is divided into model layer, logic layer and presentation layer. Mobile client software is developed on the Android development platform, which is developed in Java language. It uses Web Service to communicate with server-side software.

**Overall Module Structure of the System**

This system consists of the mobile client software at the front desk and backstage administrator software. Main function modules include register and login module, commodity display module, search module, shopping cart management module and administrator module. The system overall module structure is shown in Figure 1.

![Figure 1. Overall module structure of the system.](image)

Mobile client users must register and login at first. After the success of the login he can access to the home page for commodity options and click “buy” button into the shopping cart page. Then he can fill in the number of required to purchase goods and delete don't need to buy goods. When click “generate order” button he can enter the page of settlement. In the settlement page he can fill in shipping address, consignee contact phone number as well as the choice of payment. After the completion of the pay it returns to the shopping cart page and the shopping cart is empty. In my order page, it can view all the orders of the corresponding users, including the order date and the details of the order. Users can evaluate on the order.

The administrator background is mainly used for shopping system administrators to carry out the management of goods, orders and users. The administrator can manage the password, add the
administrator account and modify shelves or from the shelves of goods. When the client user generated an order, the administrator can receive the corresponding order. Every order list all has delivery options. The administrator can ship corresponding orders. The administrator can carry out management by the Web browser on the PC side.

**Functions of Each Module**

(1) The register and login module is mainly used for user registration and login. The user can only use the system to purchase the goods after registration and login. (2) The commodity display module will display all kinds of products in the supermarket. The products will be classified so as to be viewed by users. (3) The commodity search module mainly provides users with the function of searching for products. So that users can quickly find the goods they want to purchase. (4) Shopping cart management module. When the user adds the purchase goods to the shopping cart, the goods can be added to the shopping cart for settlement, and the quantity of added goods can be managed. (5) The administrator module is used for management the supermarket goods, order and user. When goods have stock, the administrator can be goods shelves to commodity display module. When the goods have no inventory, goods could be pulled from the shelves. At the same time, the function module is also used to confirm the user's order. The orders submitted by the user will be pushed to the administrator to be confirmed and delivered by the administrator.

**The Design of Database**

The system includes six table structures. They are user table, order form, manager table, commodity table, shopping table and order details table. The system uses database of MYSQL. The operation of access data is completed by the server, and the server is accessed database through JDBC. Mobile client invokes the Web Service and interact with the server through the SOAP protocol. The server can carry out the corresponding processing and returned the processing result to the client after receiving the command call.

**The Implementation of the Mobile Shopping System based on Android Platform**

**The Implementation of the Mobile Client Module [5, 6, 7]**

The mobile shopping system consists of one or more activities. Each of activities corresponds to a mobile phone page. The src package in the system is used to store Java code files. The res package is different from the src package. It is used to hold all the resources, including XML layout files, image files, and files that hold key-value pairs. In Java code, all resources can be invoked through the variable in the R.java file. It facilitates the modification and extension of the program. The implementation of main module is as follow.

(1) Realization of commodity display. When all commodity information displays in the commodity display page, users can click on the corresponding commodity checkbox to make the choice of goods. The lower right corner of the display page has a button to settle accounts. When a user selects goods to purchase, he can click “settlement” button into the shopping cart page.

The layout file used by the commodity display page is goodslist.xml. It shows the information including the picture, name, unit price and inventory of the item. All of the commodity information is invoked by the mobile client to the Web Service, which is accessed from the server to the client. This effect is achieved by using the ListView because it is presented as a list in the presentation of the product. First, create a messagelist.xml layout file that has the control you need to display the information. To set up an adapter ImageSimpleAdapter for the ListView control in the goodslist.xml file, the adapter can bind the corresponding controls for the data. When click the check button, it can add the selected items and related information to a List and display it in the shopping cart page.

(2) Implementation of search page. Because there are so many goods in the supermarket, it can take a long time for a user to browse. The search page provides users with a convenient and quick way to
find and add to their shopping cart. The search page mainly includes an edit box, a search button, a list of search results and a button to add a shopping cart.

The client gets the name of the item to be found by the user and it is passed to the server by Web Service. The server looks up the commodity table in the database according to the obtained commodity name. If the look up succeeds, it returns the corresponding commodity information to the client, and the client receives it and displays it on the page as a list. If the look up is unsuccessful, the corresponding status code is returned, and the client indicates that the corresponding item is not found.

The method used to find the database is a fuzzy query. That is, when the name of the item in the data table contains the product name entered by the user, the corresponding commodity information will be returned.

(3) Implementation of shopping cart page. When the user chooses the item to purchase and clicks the settlement button, if the user has logged in, he will go directly to the shopping cart page. It can jump to the login page if the user is not logged in. The shopping cart page will list the products selected by the user. Click on the corresponding items to fill in the purchase quantity, and the goods can be deleted according to the corresponding products.

Data in the shopping cart is stored in the table of shopping s in the database. All the operation of the product data is by calling the Web Service to complete. When click “menu” button, it pops up four buttons at the bottom of the shopping cart page. Respectively, to continue shopping, empty the shopping cart, generate orders and exit or login again.

To set up a listener event for each button, click on “continue shopping” button to jump to the product browsing interface to continue shopping. When you click “empty cart” button, all items in the cart will be deleted. If the user has already decided to purchase the item in the shopping cart, then click “generate order”, and the page will jump to the settlement payment page. Click exit or relogin button to exit and log back in.

The Implementation of the Administrator's Module [8]

The implementation of the administrator background module uses JavaEE technology and MYSQL database to implement business logic processing and data access. The administrator enters the background management system using the Web browser on the PC side. It completes login after entering the login user name and password.

(1) Implementation of user management module. The user management module mainly includes two parts of user management and user input. In the user management page it will show all the user's information, including username, password, phone number and address. If the administrator found that users of this system is not reasonable operation, he can delete the user information and make them unable to login this system. The user input page is mainly used by the administrator to add new users. When adding new users, the user needs to fill in the user name, password, phone and address. If all of the information you fill out is not conflicting with existing data in the database, he can add success.

User management page can get all users information from the users table in the database. In the end of user information, there is “delete” button to delete the corresponding user information. After click the button the corresponding user id to the server, the server receives the user id and delete the corresponding user information from the database.

User entry page is done by the server. After the server access request parameters, it insert in the user table of the database. The insert page show success after administrator adds new users successful.

(2)Implementation of commodity management module. The administrator can use this module to manage the goods. It includes the merchandise and the next item. Information on all items is listed on the management page, including the name of the item, the price and the remaining quantity. At the end of each record, there is also “delete” button for the administrator to remove the item from the shelves. The product entry page is mainly used for administrators to put new products on the shelves. When new products need to be put on shelves, they need to fill in the commodity name, price, inventory and picture information of the goods to be uploaded.
In the commodity management page, all commodity information is obtained from the database. So the query operation can be performed directly on the database through the JSP page. Goods entry by the server, due at the time of entry goods need to upload the pictures of goods, so the goods need to upload to generate a URL. It needs to restrict the format of the picture and the size of the picture. Finally, the server inserts all the data into the commodity table in the database and displays the display page on the client's display page.

(3) Implementation of order management module. When the user generates an order on the client side, the administrator can view the corresponding order information in the order management page in the management background in order to facilitate the management and delivery of the order. The order management page displays the user, time, consumption amount, delivery and user evaluation of the order.

The order management page needs to get the corresponding data from the order table in the database, so the user can query the database directly in the JSP page. After the user submits the generated order, its initial state is not to deliver goods. When the administrator to the order for shipment just click each button at the end of the order delivery. Whether the database update the delivery status is implemented by the server-side. The service side will update the delivery status in the database after get the id of the corresponding order. Use JavaScript to pass the parameters when clicking the button.

Conclusion

With the accelerating process of informatisation, China witnesses the prevalence of smart-phones in people’s life and a growing number of customers intend to consume on the mobile intelligent platform. This system combines the mobile platform with the merits of online shopping system in order to provide users with a new and convenient way of shopping with promising market prospect. It is tested that this mobile shopping system has the characteristics of friendly user interface, strong maneuverability and simple layout.

References


