

# Design of multi-language trading system of ethnic characteristic agricultural products based on android

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**Abstract.** Under the current situation where Internet technology develops rapidly, mobile E-commerce technology has brought great convenience to our life. Now, the graphical user interface (GUI) of most E-commerce platforms only supports Chinese. Thus, the development of Android client of E-commerce that supports ethnic languages owns a great prospect. The principle that combines front end design and database technology is adopted in this paper to construct the Android client system of E-commerce platforms that supports ethnic languages, which realizes the displaying, browsing, querying, searching, trading and other functions of ethnic characteristic agricultural products on android platforms.

## 1 Introduction

In recent years, E-commerce has been applied broadly with rapid development. Conducting trades through mobile devices has become a trend and ethnic characteristic agricultural products are more and more popular. Android is a software platform and operating system based on Linux core that is broadly applied to fields like smart phones and tablet PC due to its unique openness<sup>[1-3]</sup>. It is a currently challenging problem that how to realize the trading of ethnic characteristic agricultural products on Android mobile devices.

Now, there are two solutions to multi-language display on browsing interface. (1) The static method: a set of page files for each language is prepared, respectively, either through file suffixes to identify different languages or through sub-directories to identify different languages<sup>[4]</sup>. (2) The dynamic method: all the page files are dynamic rather than static. A unified language variable is adopted to indicate the language requiring output and different values are gifted with the different languages that users choose so as to realize the output of different languages under different language environment<sup>[4]</sup>. However, the server processing time of dynamic multi-language page technology and the time cost of calling database are large with low security, which brings vulnerability to attack, quite difficult maintenance and worse expansible<sup>[5]</sup>. Thus, the static multi-language technology is adopted for this platform to realize the ethnic language display on Android platforms.

As for the current situation that there are few E-commerce platforms that support ethnic languages in China to the disadvantage of online shopping of the minority, in this paper, in addition to satisfying the specification on network communication protocol of E-commerce platforms, the E-commerce platform of ethnic characteristic agricultural products based on Android is designed and realized. The design and realization process of the E-commerce platform of ethnic characteristic agricultural products based on Android is particularly introduced and the design method for database and the realization technology of multi-language platforms are elaborated. Finally, the functions and operating principles of each module are demonstrated in detail.



## 2 Framework Design of System Platform

The design of E-commerce platform of ethnic characteristic agricultural products based on Android mainly includes two parts: (1) the design of Android client (2) the design of database server. The detailed research contents are listed as below:

### 2.1 The design of Android client

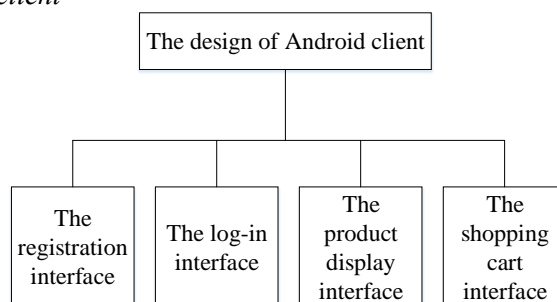


Figure 1: the Function Block Diagram of Client

As shown in the Figure 1, the major functions of Android client contain: the registration interface, the log-in interface, the product display interface and the shopping cart interface. The registration interface is the first step for users to conduct online trading, mainly for registering individual users and verifying personal information so as to facilitate the next direct log-in. The log-in interface is mainly used to detect the legitimacy of user information, provide the function of password retrieve for users and provide users with the function of language switching so as to facilitate the use of people in the minority areas. The product display interface is mainly used to display the information of characteristic agricultural products, including their name, price, reference pictures and so on. The main functions of the shopping cart interface are adding and deleting the products in the shopping cart. It can call the product display interface to display product details, skip to the payment interface and dock with the third party to accomplish the payment function.

Taking the product display module as the example, when users successfully log in, it automatically skips to the product display interface as shown as the Figure 2 and the product language display interface in Tibetan language is shown as the Figure 3.



Figure 2 the product display interface



Figure 3 the product display interface in Tibetan language

ListView technology is adopted in this platform to design the display interface, which realizes scroll display of the interface for users' convenient use. Hyperlink is designed for each picture or product name, enabling adding it to the shopping cart to conduct the third party online payment after single click.

## 2.2 The database server

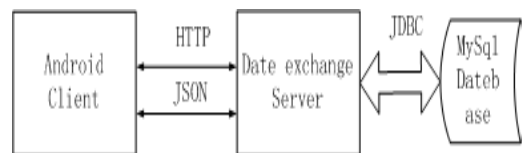


Figure 4 the database server

As shown in the Figure 4, the design of database server mainly includes the SQLite design of local database and the MySQL design of online database. The local database is mainly used to store the client cache information data while the online database is mainly used to store the data like user, product and product trading <sup>[6]</sup>.

## 3 The Realization of System Technology

### 3.1 Technical Route Scheme

The technical route scheme of E-commerce platforms of ethnic characteristic agricultural products based on Android is shown as Figure 5:

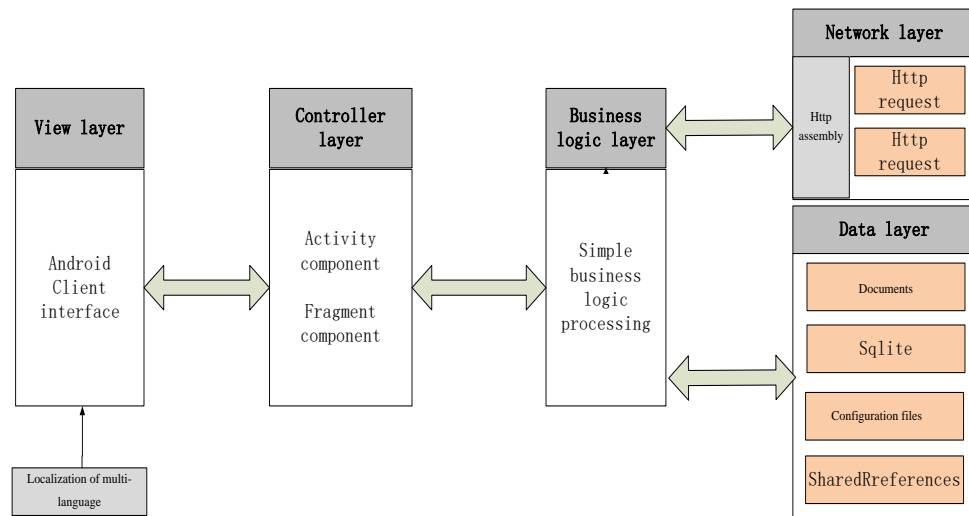


Figure 5 the Technical Route Scheme

**View layer:** displays the user interface; directly contacts with users; corresponds to users' operation and delivers operation events to Controller. XML technology is adopted in this layer to accomplish the design of APP UI interface.

**Controller layer:** is also known as View Controller including Activity and Fragment assembly. Upon receiving operation events in View, after simple logic judgment, Activity and Fragment transmit requests through business logic agency to detailed business logic class for processing. Controller is able to receive the business requests from the business layer and make response.

**Business logic layer:** the agency mode is adopted to process the request orders from View and return the data processing results to Controller. It is able to conduct data interaction with the data layer and the network layer.

**System information layer:** includes the data layer and the network layer. There are four kinds of client data access: network data, files, sqite database, and SharedRreferences. Network data sends acquisition of network requests to server through network assembly with cache mechanisms. Files are mainly used to store picture resources. Sqlite database stores some data for local use, such as the personal information of receiving users. In essence, SharedRreferences is stored on the client in the form of XML files for storing information like users' accounts and log-in status.

### 3.2 Interactive Technique of Android Client and Database Server

HTTP protocol may be the most frequently-used and important communication protocol that Internet uses. More and more Android applications need to have access to online resources via HTTP protocol. Android client and database server conduct communication via HTTP protocol.

JSON (JavaScript Object Notation) is one of the most popular lightweight data interchange formats now. In the analysis process, firstly, a set of data in JavaScript targets are transformed in string form. Secondly, the string can be delivered among functions or be delivered to server-side programs from Android client device in the asynchronous interactive program <sup>[7]</sup>. With the technology applied, the data interaction between Android client and database server-side is realized.

The data interaction procedure between Android client and database server-side: firstly, the data requests of client are sent to Web server by HTTP protocol; secondly, the data requests are packed into JSON format by server-side; thirdly, the analytic results are returned to Android client via HTTP protocol; finally, the received data is displayed on the interface in appropriate form after analysis by client <sup>[7]</sup>.

### 3.3 Payment Service Technology

Secure payment service assembly is installed onto the local Android operation system, in which MobileSecurePayer class packs the calling of secure payment; MobileSecurePayHelper class realizes

the detection, update, downloading and installment of secure payment plug-in units; PartnerConfig class realizes the configuration of merchant account information; ResultChecker class returns to the analytic processing of results via AlixPay<sup>[8]</sup>.

#### 4 Database Design

SQLite is a lightweight embedded database with open source complying with ACID Relational Database Management System as well as an SQL database engine characterized by supporting event processing, zero configuration, self-packaging, low resource occupation and so on. Different from other database management systems, SQLite is characterized by simple installment and fast operation. Under most cases, as long as the existence of SQLite database binary file is ensured, operations likes establishing, docking and using database are available. In this system, SQLite is mainly used for storage of local client data. Through establishing a SQLiteOpenHelper of helper class, the getReadableDatabase method is called to initialize SQLite database. Then, SQL statement spatial data tables like create table admin(ID integer primary key autoincrement, name varchar(20)) are executed via SQLiteDatabase.

MySQL is a relational database management system with open source, which saves designs into different relational tables, increasing the database reading rate and improving the using flexibility. When using MySQL database, firstly, the registerDriver(new Driver()) method is called via DriverManager class to register database driver. The getConnection() method is called to dock MySQL database. The createStatement() method is called via Connection class to acquire transmitter objects with which SQL statements are executed to create products database including 5 fields, the product number, English name of the product, Tibetan name of the product, price and picture, respectively. SQL command is create table products(Id int(4) not null integer primary key autoincrement,name varchar(40) not null, price double(6,2) default null, price blob). The product data table is shown as Table 1.









Id	Name	Price	Picture
001	Lily dry	60.00 ¥/kg	
002	Fresh ginger	35.80 ¥/kg	
003	Juicy peach gum	20.00 ¥/kg	
004	Wild lotus root	39.88 ¥/kg	
005	Fungus	43.9 ¥/kg	
006	Mangosteen	28.00 ¥/kg	
007	Arugula	27.8 ¥/kg	
008	Chestnut	28.00/kg	

Table 1: the Table Design of MySQL Database

User table is established based on the specific system requirement to record users' personal information. User trading table user\_sales is established to record users' trading condition; product

sales table products\_sell for sales performance of characteristic agricultural products and user order table user\_indent for users' order condition.

## 5 Conclusion

The design of current E-commerce Android client is researched in this paper. Aiming at the current situation that the Android applications supporting ethnic language display in China are not capable of satisfying the minority users' online shopping, the display of ethnic languages on E-commerce Android client is realized.

At present, the Android client E-commerce platform has passed the machine test. The results show steady operating performance, better fluency and strong practicability. Through the platform, Chinese users and the minority users both accomplish the online shopping procedure, which to some extent solves the difficulty of the minority users' online shopping.

Due to the limited time and energy, only the displays of Tibetan, Chinese and English are realized in the system now and the displays of other ethnic languages have not been realized yet. A number of functions in the system are not perfect with some deficiencies. In future, further researches will be conducted to realize the display of ethnic languages like Mongolian and Uygur and extend the universality of the proposed system.

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