E-Commerce on-line Catering Reserving and Ordering System Based on Mobile Intelligent Terminal

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***Abstract*—In order to improve the operational efficiency of restaurant and catering enterprises by using modern information technology, this paper develops an E-commerce on-line catering reserving and ordering system based on mobile intelligent terminal, which is based on Android platform. The system integrates with wireless communications, artificial intelligence, and database technologies and achieves many functions, such as reserving, ordering, evaluation, recommending, restaurants navigation, scheduling, information displaying, and ordering records management, etc. The system has realized customer-focused, personalized, and high quality catering reserving and ordering service and has been used in several restaurant in Beijing.**

Keywords - mobile intelligent terminal; online catering reserving and ordering; Android platform; wireless communication network

I. INTRODUCTION

Facing from intense competition of similar production and service, the managers of catering industry, like restaurant and restaurant, try to find new management ideas and approachs. They consider measures to improve operation efficency, cut the cost and enhance users' approval and experience level by adapting modern information technology[1-2]. The modern catering industry needs a new marketing service mode of e-business reserving and ordering, which can realize the process of reserving seat, ordering food, making recipe and buying bill rapidly, efficiently, conveniently and accurately[3]. Then a type of fashionable, avant-garde and completely self-service consumption entertainment is provided and is the first choice of consumers and dealers.

The e-commerce on-line catering reserving and ordering system based on intelligent terminal adapts mobile communication technology and intelligent terminal platform to replace the traditional food ordering. The system brings a new management idea and service approach, which standardizes the operating procedures, improves the service efficiency and quality. Also the system helps to realize the maximization of enterprise value while also allowing the lowest cost, which enhances the enterprise market competitiveness and profitability, strengthens its competitive advantage of the catering industry.

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Compared with traditional PDA catering ordering system[4], our e-commerce catering reserving and ordering system has features of better exploitability, faster upgrade and better user experience. The system can realize fast, convenient, free catering reserving and ordering, receipt making and bill buying process. The self-service catering reserving and ordering with intelligent terminal helps decrease the service staff number, low the personnel cost and achieve busy but not disordered goal in pear operation hours. At the same time, dishes information and prices can be added, removed and updated with electronic menu at any time; also better introduction information can be added conveniently. The intelligent mobile phone terminal based on android system[5] simplifies the catering reserving and ordering with customized and flexible features, and improves user experiences a lot.

II. SSYTEM GOALS

The e-commerce on-line catering reserving and ordering system based on mobile intelligent terminal supports the functions like on-line catering reserving, ordering, comment and recommendation. We made research on the domestic and overseas status and trend on the e-commerce reserving and ordering mode based on mobile intelligent terminal[6], tried to find out and analyze the key factors which affect the marketing mode of e-commerce reserving and ordering, such as user terminal, technology service and logistics network[7]. Thus an advanced, complete, convenient and practical on-line catering reserving and ordering system which integrates catering reserving and ordering, comment and navigation functions was developed, providing the service of autonomous catering reserving and ordering at any time.

III. SYSTEM CONTENTS

A. *Intelligent terminal subsystem*

The system include user catering reserving and ordering module, dish comment, dish recommendation, restaurant navigation and user registration. The customers use the android terminal to reserve and order catering, leave messages, query information and make comments.

1)Reserving and ordering module: Customers can select the dishes wanted based on the dish category and list, input the dish count, taste demand and other requirements. The module

realizes the videos transmission of dishes production and waiting time displaying in real time.

2)Dish recommendation module: With the algorithm of dish recommendation, the module produces the recommended menu automatically with reference to customer input data like customer count, native place, consumer price.

3)Dish comment module: The module introduces the dish comment system of star level and a comment model is constructed based on the standard. When the customers complete their catering, they can make comments on overall impression and every dish with star level.

4)Restaurant navigation module: The module provides service like restaurant location query, information introduction, the routine planning and navigation.

5)User registration module: The terminal users can be waiters or customers.

B. Back-end management subsystem

The subsystem includes modules of dish dispatching, dish information and order record displaying, user management. Managers of restaurants can log into the website of the server to manage the information like dishes and users information.

1)Dish dispatching module: Produce a reasonable cooking list based on the order time, dish category and specified dish of all orders.

2)Dish information module: Provide the dish information management functions and the restaurant managers can update dish information at any time.

3)Order record module: Provide the order log and the restaurant managers can make decisions on the historical consumption records.

4)User management module: Provide rebate and discount to customers on their accumulated consumption points.

IV. SYSTEM APPROACH

The e-commerce on-line catering reserving and ordering system was developed on the basis of android platform and SDK, with Eclipse IDE in the wireless communication environment.

For intelligent terminal subsystem, technologies like wireless communication, artificial intelligence, database technology are adapted to realize functions, such as catering reserving and ordering, dish comment, dish recommendation, restaurant navigation. And the sub-system provides well-rounded, personalized, customer-oriented high quality service.

For back-end management sub-system, the intelligent dispatching algorithm and database technology are adapted to realize dish scheduling, dish information displaying, receipts managing, and user managing et al. functions.

V. SYSTEM REALIZATION

The functions of the system are descripted in Figure 1, and the logic hierarchy of the system is descripted in Figure 2.

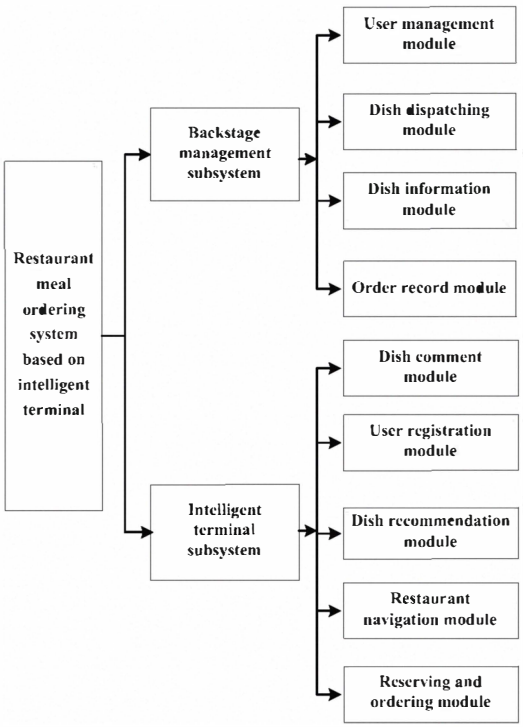

Figure 1. System functions

A. Management program of server

In the server side, we use the B/S framework, which includes browser side and server side. Management program of server side is a remote management system based on

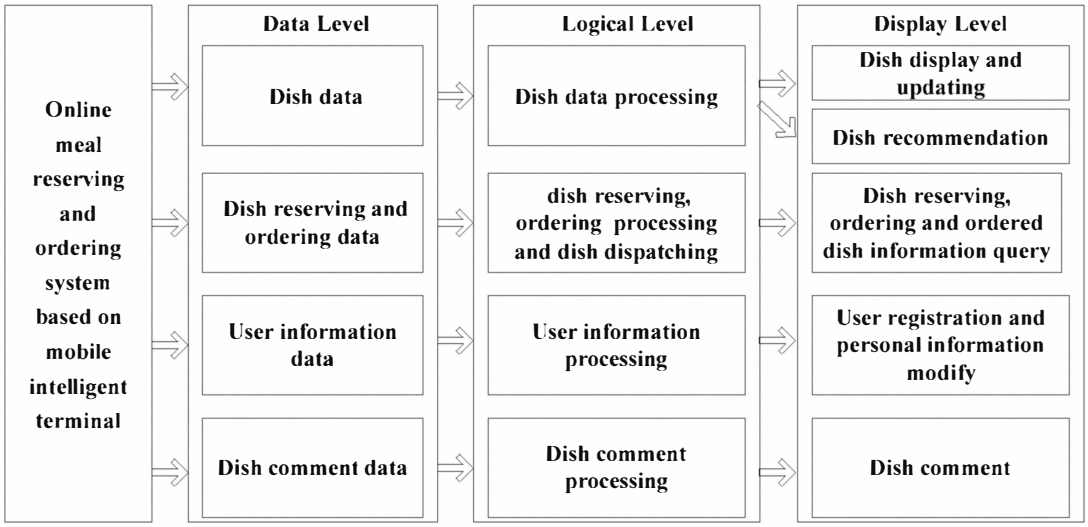

Figure 2. System logic hierarchy

Apache + JSP + MySQL. Users can log on the system using the browser with the server address, and thus can have permission to view, modify and delete files stored on remote database. Through the browser, the management side can add, delete, modify dishes in the server, and provide the corresponding video. In addition, the management side can settle accounts, print receipts and other business operations.

B. Management program of client side based on mobile terminal

This system is developed in Android platform. It connects to the Internet through Wifi, and realizes instant messaging between Android client side and PC client side through server. The client side is responsible for initiating the communication process. In the process of instant communication, the client is responsible for creating a connection request to the server, and the server and client can communicate safely and conveniently when the connection is successful established. Through database synchronizing, the server can provide data to the database of client side. After analyzing the demands of the server carefully, the server side needs to accomplish data synchronization function. The system responds to client requests using Servlet technologies, and returns data stream to the client side, which is based on the XML language specification.

C. Realization of each function module

1)Reserving and ordering module

The dish information and customers' orders are stored on the database of Android system, and the information keeps on both server side and customer side. Thus, when the dish information is changed in the background side, the information of terminal is updated accordingly. The customer side can obtain dish information from database and display them in the terminal, so that the customers can order dish conveniently. Through the touch screen of terminal, when the customers touch certain dish, the detail information of dish is displayed, such as dish introduction, cooking process, and nutrition facts. The customer can also order dish through the touch screen of system.

2)Dish recommendation module

Using combined recommendation algorithm, this system can recommend suitable dishes, which depends on dinners' number, dining price and dinners' taste. First, we use the weighted recommended technology to produce a rough recommended result. For example, customers often pay greater attention to the prices, so the weight on consumer prices is higher. Using content-based recommendation algorithm, the system can analyze the match degree of the recommendation result based on the dish level, ordering heat, the number of diners, customer tastes. Then, it uses collaborative filtering recommendation technology to make more accurate recommendations further.

3)Dish comment module

As to the dishes evaluation function, the system imports a complete evaluation framework in the management system. Customers can either conduct an overall evaluation of the restaurant, including the facilities and services, or conduct a specific evaluation of the restaurant, as well as evaluation for each dish, including the use of materials, technique, style, quality, taste and so on. The system makes specific improvements according to the customer rating, and customer evaluation is also directly affects the assessment of the dish level.

4)Restaurant navigation module

The client side determines the location of mobile phones according to the GPS module of mobile phone or the information of base station. In the process of obtaining the location of client side, the system use GPS to locate priority, search out the restaurant position based on input, and add the position into bottom layer of the figure, which inherits the base class named Mulch. According to the restaurant name obtained in client side, the system uses the search interface, and obtain the location result through the method of implementing the

listener rewriting, to display the search results in the cover object layer. The system also realizes the search and navigation services by implementing the listener rewriting to get the results of driving route.

5)Dish dispatching module

We divide current orders into different classes based on dishes types, such as cold dishes, hot dishes, soups, etc. The system defines a certain priority for certain types of dishes. For example, the priority of cold dishes is higher than the hot dishes. Then, combined with the ordering time, the system can sort the dishes records according to the ordering sequence.

VI. CONCLUSIONS

Based on mobile intelligent terminal, this paper discussed the mode of on-line catering reserving and ordering and developed an on-line ordering system based on the mobile terminal. The system can provide multiple services model based on mobile intelligent terminal to support on-line catering ordering, dish selection, dish reviews and so on. The innovation of this system is the use of smart mobile terminals, which integrates technologies such as wireless communications, dishes recommending, on-line reserving and ordering, dishes scheduling, and restaurants navigation evaluation. The system can achieve customer focused restaurant services with full range, personalization, and high quality services, and can promote electronic commerce on-line reserving and ordering model. The system has been developed completely, and has been used at some restaurants.

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