Design and Implementation of Online Ordering System Based on SpringBoot

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Abstract: With the rapid development of the economy, knowledge, information and networks have become the hallmarks of the times, driving traditional catering towards information-based and intelligent transformation. Modern catering industry has introduced online ordering systems, which not only enhance service efficiency and quality, but also strengthen enterprise management. Theme restaurants should establish core competitiveness through appropriate marketing strategies and computer-managed ordering systems. This system is designed based on the Java language, and the main development content includes web page design, database design, account management and authorization, and functional modules. The system is developed using SpringBoot and MyBatis frameworks, with the front end using HTML and JavaScript, and the backend using ApacheShiro and Tomcat server, and the database is MySQL, achieving structured online ordering management.

Keyword: Online Ordering System; Core Competitiveness; Springboot; Mysql; Information-Based Transformation

1. Introduction

With the rapid development of the internet economy, the networked management mode of enterprises is constantly upgrading, and automation and intelligent management have gradually become important directions for enterprise development. Catering enterprises provide online ordering services for meals, which not only improves the service quality of catering enterprises, expands their popularity, but also provides users with convenient and fast services. The online ordering system [1] developed based on SpringBoot adopts the B/S (Browser/Server) architecture, providing an efficient solution for the front and back desk management of restaurants. At the front desk, customers can freely choose their seats, place orders, and enjoy a convenient service experience; In the backend, managers can efficiently manage store information, view sales data in real-time, and adjust business strategies based on sales reports. This system not only optimizes the service level of the restaurant, but also reduces operating costs. By providing efficient and smooth ordering services, restaurants can better win customer trust and achieve greater economic benefits.

2. System Function Analysis

The restaurant's ordering system consists of two main modules: front-end for customer interaction and back-end for management. The front-end is customer-focused, offering an intuitive interface for table selection, menu browsing, order placement, and search features, enhancing the dining experience by allowing customers to find and order dishes easily. The back-end is designed for various management roles, such as managers, waiters, cashiers, and chefs, each with distinct permissions. Managers can oversee sales, modify menus, and manage inventory; waiters track orders to provide timely service; cashiers handle payment efficiently, and chefs access detailed order information to expedite food preparation. This division of responsibilities and role-based permissions boosts the restaurant's operational efficiency, providing a seamless experience for both customers and staff, as shown in Figure 1:

3. Introduction to Key Technologies

This online ordering system adopts the technology of SpringBoot + SpringMVC + MyBatis. Among them, the backend is mainly developed using Java language, as Java is a typical static object-oriented programming language that allows programmers to complete complex program design with a concise approach. The implementation of the frontend page is mainly based on languages such as HTML and JavaScript, and MySQL is used as the database management system for this system. IntelliJ IDEA223.1 is used as the compilation and development software. All of the above languages, software, and technologies are fully adapted to the development needs of this system.

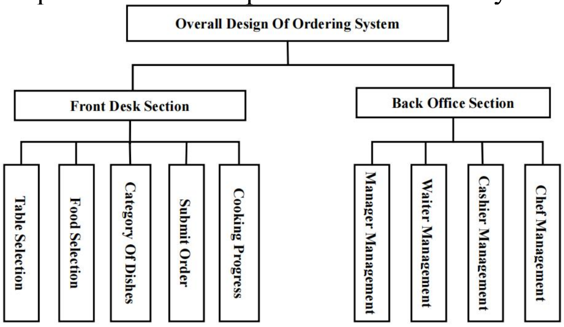


Figure 1. System Function Module Diagram3.1 MVC [2] Pattern

MVC is a typical software design pattern widely used in web application development. The MVC architecture consists of three core components: Model, View, and Controller. These three parts are separated and independent in the MVC architecture, which not only clarifies the roles of each part, but also reduces the coupling between modules and the repetitive writing of code, which is conducive to unit testing, improves software quality, and enhances the maintainability and scalability of the entire system. (The relationship diagram between the three is shown in Figure 2.

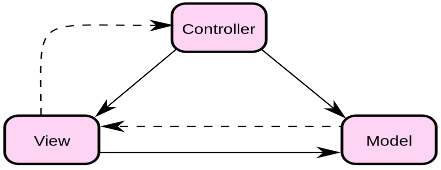


Figure 2. Model-View-Controller Pattern Diagram

3.2 SpringBoot [3] Framework

Spring Boot is an extension to the Spring Framework that simplifies the process of configuring and deploying Spring based applications. Spring Boot is designed to allow developers to get new Spring applications up and running quickly, reducing the complexity of building projects. It provides a wide range of default configurations (the idea that convention trumps configuration) while allowing developers to easily override and adjust these configurations. The core features of Spring Boot include embedded server support (such as Tomcat, Jetty, or Undertow), autoconfiguration, health checking, externalized configurations, and natural support for microservices architectures. This makes it well suited for building enterprise-class applications and microservices.

3.3 MySQL[4]

MySQL is a widely used open-source relational database management system (RDBMS) that uses SQL (Structured Query Language) as its data access language. It is based on a client-server model, where the server runs the MySQL software and manages access to the database, and the client performs data operations by sending requests to the server. MySQL is used by many websites and applications around the world, including many large and high-traffic websites.

4. Implementation of Main System Functions [5]

4.1 Front Desk Function Design

The front-end functional modules mainly aimed at customers include dish selection function, seat selection, payment order confirmation and other functions

4.1.1 Table selection function

The seat selection function is one of the most important features presented to customers by this system. It provides customers with seat choices. Customers can browse empty seats, unfilled seats, and seats with customers on the client homepage. These seats are displayed to customers in the form of numbers and colors. After customers click on the seat selection, they can enter the menu selection page, as shown in Figure 3.

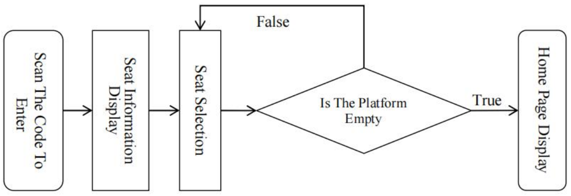


Figure 3. Part of the Background Music Code

4.1.2 Dish display function

As shown in Figure 4, one of the most important functions of the system is the dish display function. It provides customers with an online based menu selection portal, where they can browse the platform's recommended dishes on the client's homepage. These dishes are displayed in horizontal or vertical format, showing their prices, names, etc. After clicking on the dish, customers can enter the detailed introduction of the dish. On the details page, customers can learn about the dish's introduction details and add them to their order.

4.1.3 Order management function

As shown in Figure 5, the order management function is a functional entrance designed to provide customers with convenient order management. In this entrance, users can add or delete orders generated by dishes. Each order will be displayed in the form of a card, and the order status (pending/completed), creation time, order dish list, and total order price will also be displayed on the card.

4.2 Backend Function Design

4.2.1 Employee login and registration function

Before the employee enters the client, the system will confirm whether the employee is a company employee. Its judgment logic is whether the system has saved the employee's account information when the employee uses the client program. If the account information entered by the employee has been confirmed by the backend server, the account will be logged into the system. If it cannot pass the verification, a password error will appear and appear on the login page. The employee can choose to log in again or forget the password, as shown in Figure 6.

4.2.2 Waiter management function

After the waiter enters the client, the system will upload the customer's order information to the waiter management platform. Based on this platform, the waiter can grasp the customer's order and timely upload the dishes completed by the chef to the customer. For certain dishes that cannot be cooked due to lack of ingredients or other reasons, the waiter can provide timely feedback to the customer. At the same time, the waiter can also check the selected table of the customer in a timely manner to see if there are other customers or uncleaned tables, and provide feedback information to the customer. And hand over the dishes made by the chef to the customers. As shown in Figure 7 and Figure 8.

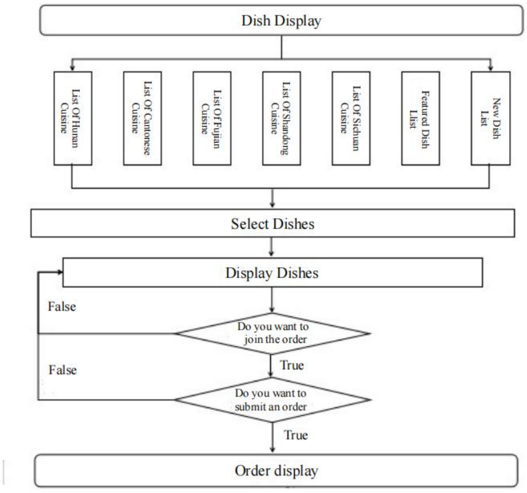


Figure 4. Process Diagram for Displaying Dishes

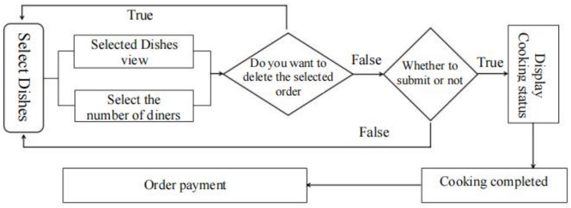


Figure 5. Order Management Flowchart

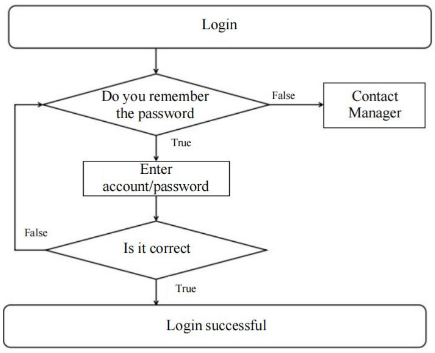
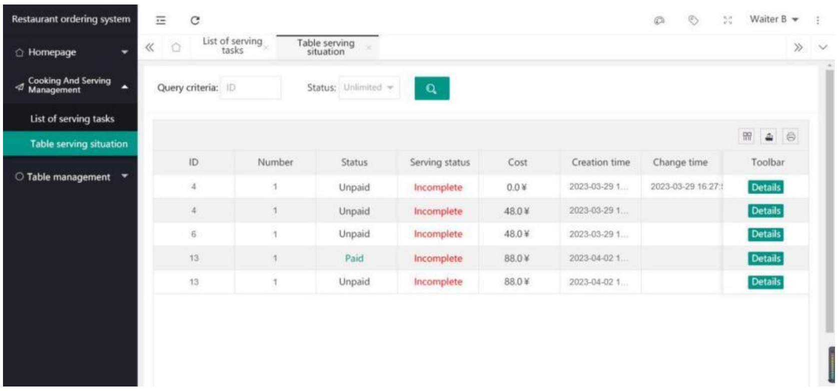


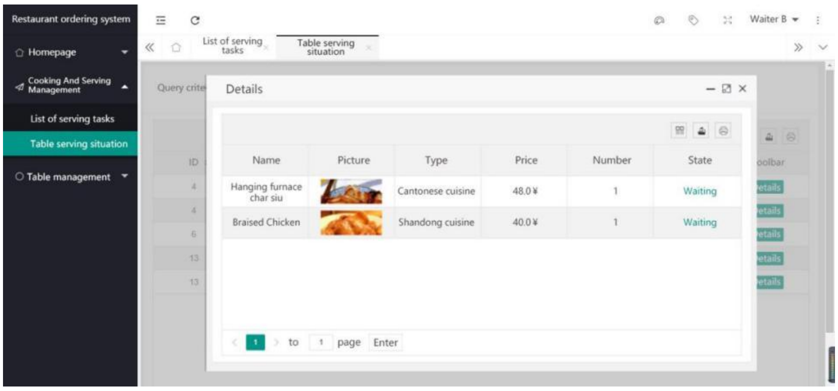
Figure 6. Employee Login and Registration Function



Query criteria: ID Status: Unlimited

ID	Number	Status	Serving status	Cost	Creation time	Change time	Toolbar
4	1	Unpaid	Incomplete	0.0 ¥	2023-03-29 1...	2023-03-29 16:27:	Details
4	1	Unpaid	Incomplete	48.0 ¥	2023-03-29 1...		Details
6	1	Unpaid	Incomplete	48.0 ¥	2023-03-29 1...		Details
13	1	Paid	Incomplete	88.0 ¥	2023-04-02 1...		Details
13	1	Unpaid	Incomplete	88.0 ¥	2023-04-02 1...		Details

Figure 7. Table Serving Status List



Details

Name	Picture	Type	Price	Number	State
Hanging furnace char siu		Cantonese cuisine	48.0 ¥	1	Waiting
Braised Chicken		Shandong cuisine	40.0 ¥	1	Waiting

Figure 8. Table Serving Situation Details View

4.2.3 Cashier management function

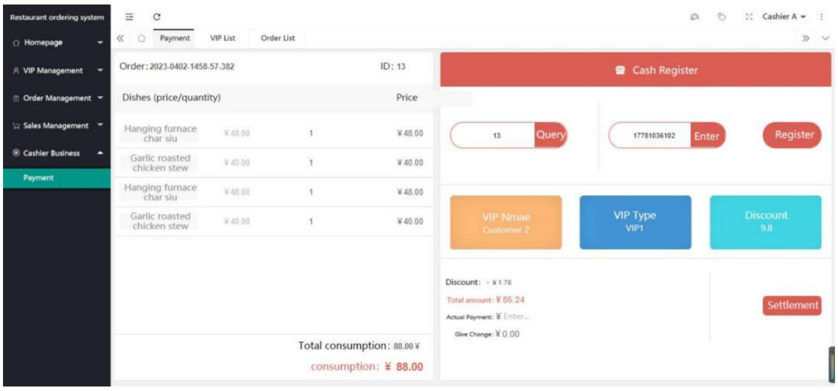
After the cashier enters the client, the system will upload the customer's order information to the cashier management platform. Based on this platform, the cashier can promptly process the customer's order amount and provide feedback to the customer requesting payment. After the customer makes the payment, the payment status of the customer can be displayed, as shown in the Figure 9:

4.2.4 Chef management function

After the chef enters the client, the system will upload the customer's order information to the chef management platform. Based on this platform, the chef can promptly process the customer's dish requirements and provide feedback to the waiter, who will then hand them over to the customer.As shown in the Figure10:

4.2.5 Manager management function

After the manager enters the client, the system will provide feedback on customer evaluations of dishes and employee suggestions for work to the manager management platform. The cashier management platform will also transfer the amount to the manager management platform's account. Based on this platform, the manager can timely understand the relevant information of customers, employees, and even daily income. As shown in the Figure 11.



Order: 2023-0402-1458-57-382 ID: 13

Dishes (price/quantity)			Price
Hanging furnace char siu	¥ 48.00	1	¥ 48.00
Garlic roasted chicken stew	¥ 40.00	1	¥ 40.00
Hanging furnace char siu	¥ 48.00	1	¥ 48.00
Garlic roasted chicken stew	¥ 40.00	1	¥ 40.00

Total consumption: 88.00 ¥

consumption: ¥ 88.00

13

17781036102

VIP Nmae
Customer 2

VIP Type
VIP1

Discount
9.8

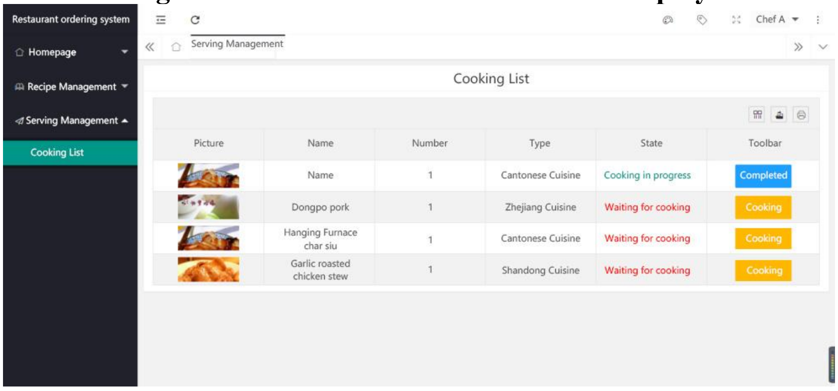
Discount: - ¥ 1.76

Total amount: ¥ 86.24

Actual Payment: ¥ Enter...

Give Change: ¥ 0.00

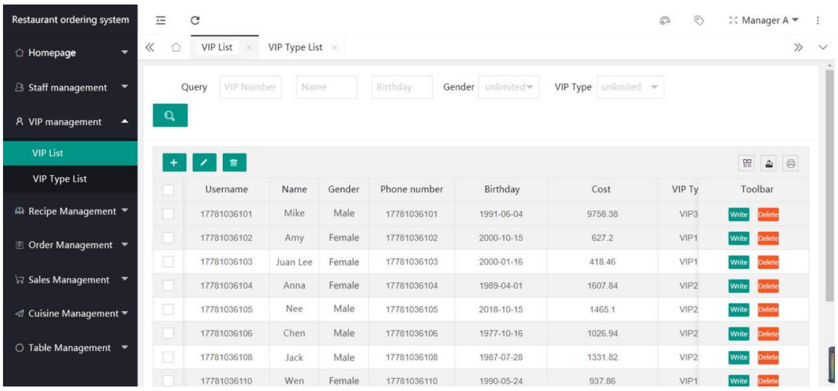
Figure 9. Transaction Detailed Record Display



Cooking List

Picture	Name	Number	Type	State	Toolbar
	Name	1	Cantonese Cuisine	Cooking in progress	Completed
	Dongpo pork	1	Zhejiang Cuisine	Waiting for cooking	Cooking
	Hanging Furnace char siu	1	Cantonese Cuisine	Waiting for cooking	Cooking
	Garlic roasted chicken stew	1	Shandong Cuisine	Waiting for cooking	Cooking

Figure 10. Order List Display



	Username	Name	Gender	Phone number	Birthday	Cost	VIP Ty	Toolbar
□	17781036101	Mike	Male	17781036101	1991-06-04	9758.38	VIP3	Write Delete
□	17781036102	Amy	Female	17781036102	2000-10-15	627.2	VIP1	Write Delete
□	17781036103	Juan Lee	Female	17781036103	2000-01-16	418.46	VIP1	Write Delete
□	17781036104	Anna	Female	17781036104	1989-04-01	1607.84	VIP2	Write Delete
□	17781036105	Nee	Male	17781036105	2018-10-15	1465.1	VIP2	Write Delete
□	17781036106	Chen	Male	17781036106	1977-10-16	1026.94	VIP2	Write Delete
□	17781036108	Jack	Male	17781036108	1987-07-28	1331.82	VIP2	Write Delete
□	17781036110	Wen	Female	17781036110	1990-05-24	937.86	VIP1	Write Delete

Figure 11. Manager Viewing Member Information

5. System Test

In order to ensure high-quality operation of the system [6], identify defects in the system, find solutions, and reduce user losses, it is necessary to test the entire system [7]. Table 1 and Table 2 provides a detailed list of the test contents.

Table 1. System Test

Example name	System front — end page testing	
Example number	001	Designer: Wenjuan Shao
Test target	Can the front-end system open and display relevant functions	
step	Operation description	Desired result
1	Click on the website to enter the main interface	Successfully entered the main interface
2	Click the seat button	Tip "Seat selection information"
3	Click on 'To be Cleaned'	Pop up "Non idle state cannot be cleared"
4	Click on the 'Dining' button	Pop up "Non idle state cannot be cleared"
5	Click on the type of dish	Display dish information
6	Click the add menu button	The words' another one 'turn red
7	Click the zoom in button	Enlarge related pages
8	Click the exit button	Page exit
9	Click on order submission	Successfully submitted order

Table 2. System Test

Example name	System backend page testing	
Example number	002	Designer: Wenjuan Shao
Test target	Can the backend system open and display relevant functions	
step	Operation description	Desired result
1	Click on the 'Type of dish' button	Display dish types
2	Click to forget password	Pop up relevant registration information
3	After successful login, click to view the order	Display relevant customer order information
4	Click on personal information	Normal personal information
5	Click on customer information	Display customer information
6	Click on dish information	Display dish information
7	Click on the add, delete, modify, and search buttons	Can perform related operations
8	Click the exit button	Page exit

6. Summary

There is no other country in the world with a catering industry like China, which has a long history of thousands of years and such a large scale. This online ordering system, developed with SpringBoot, streamlines the ordering process for customers while reducing time and costs for restaurants. It offers a user-friendly interface, enabling customers to easily view tables, browse menus, and place orders. The system features a front-end for customer use and a back-end for efficient restaurant management, supporting order tracking, inventory, and sales data. Designed for usability and efficiency, it uses a compact third-party framework to minimize storage and resource needs. The front-end integrates HTML, JavaScript, and Layui for a responsive interface, while the back-end employs SpringBoot and MyBatis for efficient data processing, with MySQL ensuring reliable data storage. Overall, the system provides a convenient ordering management solution for restaurants through systematic management, modular managemen, and structured management design. It not only enhances customers' ordering experience, but also makes the daily operation of restaurants smoother and more efficient.

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