SSM-based Intelligent WeChat Applet for Pick-up

Zijie Huang, Hongzhou Zhao*, Jianhui Lin, Minling Liu, Huanxin Zheng
Faculty of Mathematics and Computer Science, Guangdong Ocean University, Zhanjiang, Guangdong, 524000, China

*Corresponding author’s e-mail: zhaohongzhou@stu.gdou.edu.cn

Abstract. With the booming of e-commerce, the courier industry has grown rapidly. Students, as the main force of online shopping, make colleges and universities become the gathering place of express delivery, and the campus express service emerges as the times require. Nowadays, campus courier service is not complete. There are many problems such as scattered courier sites, distance between courier sites and dormitories, conflict between students' courier collection time and class time, and long courier collection cycle, which makes teachers and students have strong need for courier pick-up. In this paper, we design an SSM-based intelligent WeChat applet to meet the need of students and teachers, which improves college courier services, enhances the quality of campus life; and solves the last mile problem of the courier service on campus.

1. Introduction
"Flying Rabbit" is an intelligent WeChat applet with SSM [1] as the backstage technical support, aiming to solve the problem of the last mile of campus express delivery through express pick-up service. The applet adopts SSM combined with MYSQL database, Redis non-relational database so that the applet service can withstand a large number of concurrent visits. It also uses the current popular front-end technology to ensure that the users can enjoy a good vision and operational experience.

"Flying Rabbit" has five functional modules, which are namely real name authentication, order process, publishing and receiving orders, inviting friends and contacting customer service. Meanwhile, the system sets up two user roles: ordinary user and rider. The module of real name authentication is used to bind user's identity information. Ordinary users only need to bind WeChat ID that they can use any module except order receiving module in the applet. If ordinary users want to use the order receiving module, they need to submit their identity certificate and student certificate to the background to register as a rider. Only after passing the review of the background can they have the authority of the order receiving module. The order operation module contains two sub-modules: "in progress order" and "history order". Users can view and modify the details of all their orders through these two modules. The main function of the order publishing module is that ordinary users fill in orders according to the express delivery specifications and basic personal information and then publish them to the order receiving hall. The receiving order module has the function of receiving order hall and receiving order. The riders can view the detailed information of the orders to be received and select the receiving order in the receiving order hall. The inviting friend module can share the small program. Contact customer service module can provide timely feedback and suggestions to the customer service online. The system's architecture and functions are described in detail in the second part of this article.

The rest of this article is as follows. The second part of this article describes the system function in detail. The third part introduces the system design in detail. The fourth part lists some key technologies. The fifth part makes a conclusion.
2. System functions

Figure 1. System functions diagram.

2.1. Real name authentication
For the first time, users need to bind their WeChat account to complete the authentication of ordinary users. If users want to use the order receiving function, they need to submit their identity information and school, upload their ID card and student ID photo, so that the backend staff can authenticate and record the registered users. When the user selects the school, he/she can only receive and send orders within the scope of the school. After successful submission of registration information and data, the user will automatically jump to the authentication page. According to the progress of identity verification, there are three types of authentication status: unaudited, under audit and authenticated. When the user is successfully authenticated, he can get the authority to place and receive orders.

2.2. Order operation
There are five status of the customer's order: cancelled, pending, in progress, pending confirmation of receipt and completed. Rider's orders have three statuses: in progress, delivery confirmed and completed. Orders posted by the customer may be cancelled by the customer on their own before being taken. When a customer's order is picked up by a rider, the order status will be changed to In Progress on both the customer's and the rider's side. After the rider has picked up the goods to the specified location, the order status will be changed to Pending Confirmation of Receipt. If the order is not confirmed for a long time, the system will automatically help the user to confirm the receipt.
2.3. Order posting and receiving
After logging in, the user can publish the order information on the home page, mainly including pick-up address, recipient, contact information, express type, pick-up code, etc. Users can view the details of orders issued under "Orders in progress" on the "Mine" page. Users can only become riders after real name authentication, and riders can view all orders in the order square. Orders have pickup address, delivery address and commission, but customer's personal information will not appear. Only the rider can see the customer's name and contact information after taking the order, and the rider can receive the order according to their actual situation. The rider needs to wait for the customer's confirmation of receipt to get the commission after the delivery is confirmed.

2.4. Inviting friends
By clicking on "Inviting Friends", you can see the "share" button. This button helps users to share content and services with friends more smoothly. This applet also helps users to block their personal information because we capture the user's screen image as a picture during the forwarding process.

2.5. Customer service
By clicking on "Contact Customer Service", you will be able to access a customer service session. When a user sends a message in a customer service session or an event is pushed by some specific user action, the WeChat server sends the message or event packet to the URL filled in by the developer, or to a specified cloud function if cloud development is used (see Message Push for details). After receiving the request, developers can use the send customer service message interface to reply asynchronously. After the user is accessed by the customer service, and before the customer service closes the session, the messages sent by the user will be directly forwarded to the customer service system. When the customer service is not closed for more than 30 minutes, the WeChat server will automatically stop forwarding to the customer service and send the message back to the URL filled in by the developer.

3. System design

3.1. System architecture
The system uses the "WeChat applet and server architecture". According to the "model-view-controller" design pattern [2,3,4], the system is divided into three layers, namely the control layer, the business layer and the persistence layer. The specific architecture is shown in Figure 2:
3.2. Database design

A total of 5 database tables are set up in this system. The `user_info` table is used to record user information. The `photo_storage` table is used to store real-name authentication information with the user. The `order_info` table is used to record the order corresponding to the user. The `order_type` table is used to record the order status value, and the `salary` table is used to record the amount of each order and whether the order is completed or not.

3.3. Class diagram

A total of 5 database tables are set up in this system. The `user_info` table is used to record user information. The `photo_storage` table is used to store real-name authentication information with the user. The `order_info` table is used to record the order corresponding to the user. The `order_type` table is used to record the order status value, and the `salary` table is used to record the amount of each order and whether the order is completed or not.
We designed 4 entity classes based on the design of system functions and 5 database tables. These entity classes implement the basic methods of manipulating database, such as addition, deletion, modification, and query, and provide support for the complex logic of each business of the applet.

4. Key technologies

4.1. WeChat applet
The entire client system is based on the WeChat applet. The WeChat applet provides its own unique framework design tag language WXML and style language WXSS [5]. It also provides a JavaScript-based logic layer framework and a connection between the view layer and the logic layer. The WeChat applet also provides many quick API that have been packaged. The system uses interfaces such as wx.login (user login), wx.request (send request), wx.createCameraContext (request camera), etc., which improves the development efficiency of the system.

4.2. Jquery
We use the jquery framework, which is used in the real name authentication and approval page in the background, and conveniently realizes event processing and ajax interaction. Jquery is a fast and concise JavaScript framework [6]. JavaScript commonly uses function code, to provide a simple JavaScript design mode and optimize HTML document operation, event processing, animation design and Ajax interaction. It simplifies the interaction between the user and the browser, and improves the performance and development efficiency of the system.

4.3. Bootstrap
In the real name authentication page in the background, bootstrap components and framework are used to make the interface more concise and beautiful. Bootstrap is a concise, intuitive and powerful front-end development framework based on HTML, CSS, and JavaScript, making Web development faster. Bootstrap provides a basic structure with a grid system, link styles, and backgrounds. It contains more than a dozen reusable components for creating images, drop-down menus, navigation, warning boxes, pop-up boxes, etc. Bootstrap also includes more than a dozen custom jQuery plug-ins, which allows us to include all the plug-ins directly, or include these plug-ins one by one.

4.4. SSM
It adopts SpringBoot, Spring MVC and Mybatis as the server-side application framework, and uses MySQL relational database as the data storage tool [7,8,9]. SpringBoot has an inversion of control (IOC)[10] feature. IOC is designed to facilitate project maintenance and testing, reduce the coupling between programs, and open the cache configuration at the same time, so that data that does not be changed frequently (such as personal information data) is stored in the cache, relieving the pressure on the database. The Spring MVC framework in the system uses the model-view-controller method to separate the business logic, data and the applet interface. The controller layer obtains the framework from the persistence layer by calling the service layer method. The result returned by Mybatis to the database operation ultimately responds to the WeChat applet page.

5. Summary
We successfully designed a small program for campus express delivery for universities. The system contains server, rider, and user end. The system has complete functions, which solves the problem of long time and long distance for take express delivery on campus, and regulates the express delivery industry on campus to ensure the safety of express delivery. In addition, the project also increases the number of work-study positions for students and provides them with on-the-job training. Compared with the existing small program for express delivery, our program has more advantages. For example, the interface is more concise and beautiful, the resources of college students are integrated, and the express chain is extended. Therefore, it can solve the existing problem of campus express delivery service, and
provide campus express service with higher quality. The system has high practical value and is to be put into the market.

References

[1] Zhang, H., Pan, J., Zhexing, K. E., & Bimei, X. U. (2018). Micro generation campus service platform based on wechat applet. Office Informatization, 2018, 23(23): 26-28.

[2] Zhang, L., Wang, Y. (2018) Research on MVC Model Based on SpringBoot MicroServices Architecture[J]. Journal of Anhui electronic information Career Technical College, 17(4):1-9.

[3] Wibowo AT, Siddharthan A., Lin C., Masthoff J. (2017) Matrix factorization for package recommendation, Proceedings of the RecSys Workshop on Recommendation in Complex Scenarios.

[4] Liu, D & Lin, C. (2014) Sherlock: a Semi-Automatic Quiz Generation System using Linked Data. International Semantic Web Conference (Posters & Demos), 9-12.

[5] Wu, S., Quan, X., Yu, Z., Hou, B., Computing, S. O., & University, X. N. (2018). Study on the development of WeChat applets. Wireless Internet Technology.

[6] Zhang, X., & Tao, W. (2017). Research on Optimizing Response Websites by Using Bootstrap + JQuery. China Computer & Communication, 2017(11):72-74.

[7] Yang, L. I. (2016). Design and Implementation of SSM in Web Application Development. Computer Technology and Development, 2016, 26(12):190-194.

[8] Lin C., Liu D., Pang W., Wang Z. (2015) Sherlock: A semi-automatic framework for quiz generation using a hybrid semantic similarity measure, Cognitive computation 7 (6), 667-679.

[9] Liu K., Lin C., Qiao B. (2008) A multi-agent system for intelligent pervasive spaces, IEEE International Conference on Service Operations and Logistics, and Informatics.

[10] Fangchao, Y. E., Zhang, S., & Chuankai, L. I. (2019). Design and implementation of waste recycling mall system based on SpringBoot. Intelligent Computer and Applications, 2019, 9(05):84-86.