Design and Implementation of Campus Express Delivery on WeChat Public Platform

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Abstract: *Express delivery has long been inseparable from the residents' lives. In densely populated areas, courier delivery has become a problem. This article starts at author's university, and investigates the specific difficulties encountered by university students, such as time and effort, uneven distribution of resources, and the remote location of express delivery and delivery centers. This thesis analyzes and explores, according to the current situation, proposes the program based on the WeChat Official Account Admin Platform and the micro site campus express delivery agency platform. Users can publish detailed information on behalf of express delivery through this platform, and can also receive other users' orders through this platform to help other users pick up express delivery, and receive the payment that needs to be paid on behalf of the user after delivery. The platform is divided into two parts: WeChat Official Account Admin Platform and micro site. The micro site partially implements the functions of standardized registration and login, delivery and receipt of express orders, and changes to order status. As part of the WeChat Official Account Admin Platform, it mainly achieves user's attention and then actively responds. The user responds to keywords and obtains corresponding information, guides the user to complete the express picking task more efficiently, and helps the platform's promotion and application. The WeChat Official Account Admin Platform uses the Sina Sae server, which is developed using the php scripting language. The micro site uses html and javascript languages, and the mysql database is developed to implement the corresponding functions of the campus express delivery agency. The test shows that the platform has a good user experience and can effectively and reasonably allocate limited resources on campus to improve the efficiency of college students in picking up express delivery.*

Keywords: *Express delivery; WeChat Public Platform; Micro-site; Web*

1. Introduction

1.1. Research background

In recent years, the rapid development of the domestic e-commerce industry has promoted the rapid development of the logistics industry. With the further development and improvement of the logistics and e-commerce industry, in a population resident gathering area, the last step of "online ordering and express delivery" has become a part hindering the development of express service quality. The last step of express delivery has the characteristics of concentrated and accurate service objects and large service volume in a short period of time. In this regard, the errand-running economy has quietly developed. Most of the errand-running industries serve the same city, and errand-runners are full-time errand-runners. In order to expand their business volume, most errand-running companies extend their business to all aspects of people's daily lives. However, there are many problems in the errand industry, such as the large distribution range, the unclear customer population, the low efficiency of popular customers, the single distribution method and limited efficiency, and the rising labor costs, which have prevented a good business cycle model from being formed, and resources have not been well received. With good integration, the service cost is difficult to control, and its limited publicity and promotion cannot be well matched with its popular positioning.

1.2. The purpose and significance of the research

Starting from this school, the author found some problems in the process of express delivery according to the observation and research on weekdays, combined with my own experience.

When receiving express delivery, there is a large flow of people in a short period of time, and it takes

a long time to find express delivered and express delivery, while other times appear deserted. Due to the large number of students and the large number of express delivery in the school, and the limited space of the express delivery center, in order to make full use of the space and make all express delivery orderly placed, the aisle space between express delivery racks is narrow, so that when there are many people, it is necessary to find the express delivery speed. Slow and inefficient. In addition, different college students have different free time. Most of the time students are in class, and the school's express delivery center is located near the cafeteria, many students choose to go to collect express delivery at meal time, forming a large amount of express delivery in a short period of time. In addition, there are few express delivery windows, long queues, and long queues also affect the efficiency of finding courier students. The precious time of college students is wasted in the process of picking up the courier.

The author investigated the existing express delivery of similar O2O errand service platforms, most of which use specialized riders as errand runners to engage in specialized errand services. Most of these platforms have a wide range of services, but the platform service manpower is limited. Among college students the degree of application is limited, and it cannot meet the needs of small-scale and high-traffic places like universities, nor can it reduce the flow of people in express delivery centers.

Accordingly, the author conceives and designs the campus mutual aid platform.

Internally, through this platform, the college students who help to replace it can help other students to replace it within their ability while taking their own express or convenient free time, and earn a small part of the remuneration; students who need to replace can use a small part of the money. , reduce the waste of time and energy. A college student can be both the publisher of the substitute order and the order receiver, following the principle of mutual assistance and mutual benefit. Orders can be picked up by one person for multiple couriers, so that some couriers are collected at staggered peaks, which can alleviate the problem of large traffic in a short period of time and low efficiency of courier collection in the express delivery center. In addition, college students can also replace the platform through express delivery to increase the communication between students in the same school, providing the possibility to meet more friends.

Externally, most of the errand platforms on the market are oriented towards social groups. Substitutes are the staff of the platform, and customers are the users who need to be replaced. The whole is a one-way service process for the platform to serve customers. The author hopes that through the design and implementation of this platform, with relatively high-quality college students as the carrier, to explore a low-cost model of two-way replacement of two-way service and mutual assistance in a small range, and to help rationally allocate limited resources. If this model is successfully explored in this school, it can also be promoted in universities with similar problems to provide them with mutually beneficial services.

2. Demand analysis of campus express delivery platform

2.1. System target

The campus express delivery system is to provide a platform for express delivery information to receive and publish, the specific goals of this system design are as follows:

(1) The system provides users who need to replace them with a function of publishing express and receiving information;

(2) Display the express information that needs to replace the user to other users;

(3) The user can pick up the courier to take the order through the displayed courier information;

(4) The user who receives the order can communicate with the user who issues the order according to the information provided to complete the task of express delivery;

(5) Users can view the status and other detailed information of all tasks related to themselves;

(6) In the case of providing platform functions, effectively protect the privacy and interests of users.

2.2. System Feasibility Analysis

All systems and functions need to be assessed for feasibility before design implementation, and not all problems can be solved with existing resources. Before development, it is necessary to conduct a system feasibility analysis to obtain a feasible solution for the development of the system, which consists

of the following three points:

2.2.1. Technical feasibility analysis

The micro-site is developed using HTML and JavaScript front-end technologies, with high technica

l maturity and strong scalability. The PHP scripting language used in the development of the WeChat public platform is used to assist the execution of express delivery tasks. The development functions are relatively few, the language itself has good compatibility, and the development difficulty is low[1];

2.2.2. Economic feasibility analysis

The backend of the Wechat website and WeChat public platform will be deployed in Sina SAE. The cost of Sina SAE is calculated by Yundou. After registration and real-name authentication, a part of Yundou will be given to users for free trial time. Costs are lower. The part of the WeChat public platform needs to call the relevant permissions of the interface, and this part plays an auxiliary role and does not need too many functions. It only needs a subscription number that does not require authentication, so there is no overhead. The system can also be refined later to make it profitable[3];

2.2.3. Operational feasibility analysis

This system was developed for college students. Some pages of the micro website are clear and clear, and the operation logic is simple; WeChat, as the mobile instant messaging service application with the largest number of users in China, is prompted by operation when following or replying, which is user-friendly and user-friendly. change[2].

From the feasibility analysis of the above three aspects, it can be seen that the development goal of the system is feasible.

2.3. Functional Requirement

The campus express delivery platform is divided into two parts: the micro website part. Students can publish the information that they need to collect express delivery through the micro website, and they can also check the information of other users, complete the replacement task by taking orders, and get the payment from the other party. Certain remuneration; in the WeChat public platform section, students can search and follow the WeChat public account, reply to messages according to the prompts, obtain relevant information, and assist in completing the express delivery task. According to these requirements, the platform completes specific functions.

Requirements modeling is an important method of requirements analysis, which helps developers analyze and clarify ideas and reach a consensus. Use case diagrams are often used to describe the relationship between them, so as to visualize the functionality of the project to customers. According to the preparation standard of the use case, carry out detailed modeling according to the requirements mentioned above. The role here is the user. The user may be either a demander who replaces the express delivery or a task completer who replaces the express delivery. The same user has both functions. The detailed modeling is carried out below, as shown in Figure 1 below.
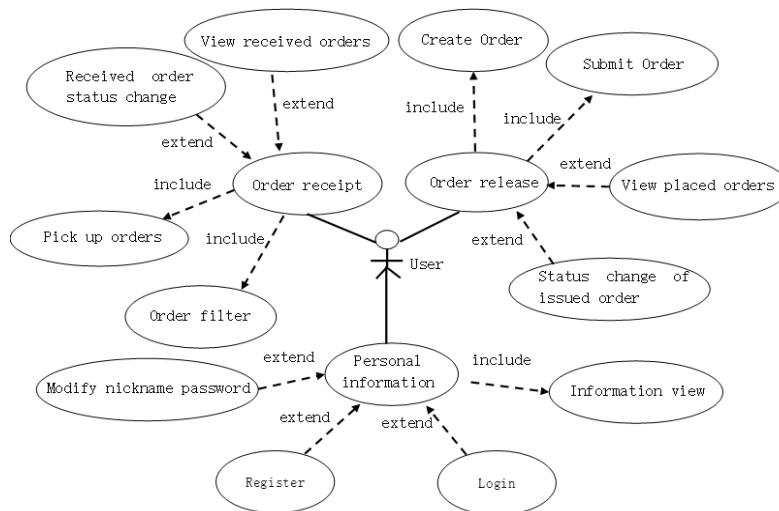

Figure 1: Demand analysis modeling.

From Figure 1, it can be clearly seen that as a user, the specific functions include three functions: personal information, order publishing, and order receiving. The function of publishing orders includes creating orders and submitting orders. The extended functions include viewing the issued orders and status changes of the issued orders. The order receiving functions include order filtering and receiving orders. The extended functions include viewing received orders and status changes of received orders. The information function is the user's own private fill-in information.

3. Platform Design

3.1. Platform Architecture Design

According to the previous demand analysis and design goals, the overall functional framework of the campus express delivery platform is designed. The system is divided into two parts. The campus express delivery platform takes the micro website as the main body, and the WeChat public platform serves as the auxiliary medium. The micro website part is divided into four parts: all orders, my order, order release and personal information. The WeChat public platform provides map, time, and website information on demand, as shown in Figure 2.
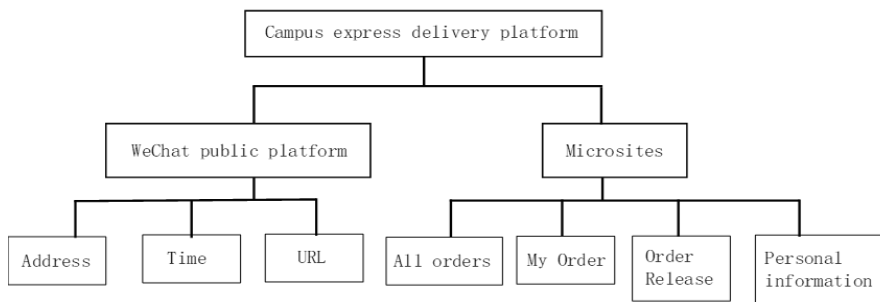

Figure 2: Platform Architecture Design.

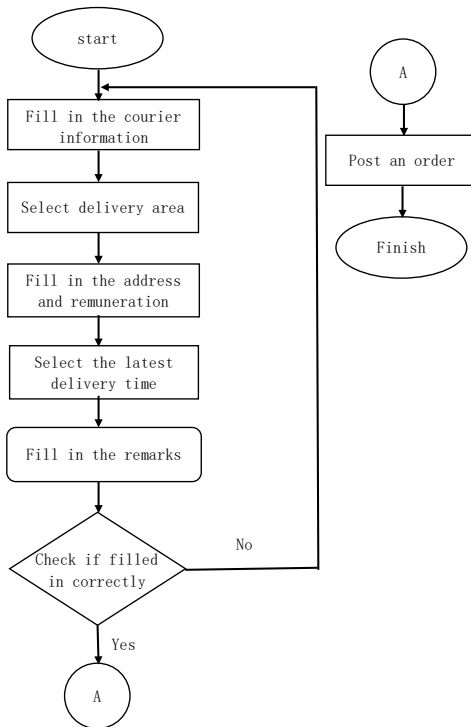### 3.2. Main features of the microsite

3.2.1. Post an order

Figure 3: Order release flow chart.

After logging in to the registered micro-website, the user clicks to place an order, and then fills in the pickup number, consignee, and courier company as required, selects the delivery area, fills in the detailed delivery address information, remuneration, and selects the latest delivery date, Time, fill in the remarks as needed, you can add pictures in the remarks, and finally click Publish. The system will verify the filled content. If the verification fails, it will prompt the corresponding contents in turn until all the fillings are correct; if the verification is passed, it will prompt the publication to be successful, and automatically jump to all the order pages. You can see the just-released order, as well as other released orders, as shown in Figure 3.

3.2.2. Receive order

The user can view the published and unaccepted orders on the All Orders page, select the order of interest based on the brief information provided in the list, and click to view more detailed information about the order. If it meets the user's requirements, Click Accept the order and select Fill in the remarks of the order recipient and submit to confirm the order; if it does not meet the user's requirements, the user can go back and choose again. After confirming the order, it will automatically jump to the My Order page, where you can find the order you just placed, and you can view more specific information such as the contact information of the user who issued the order. As shown in Figure 4 below.
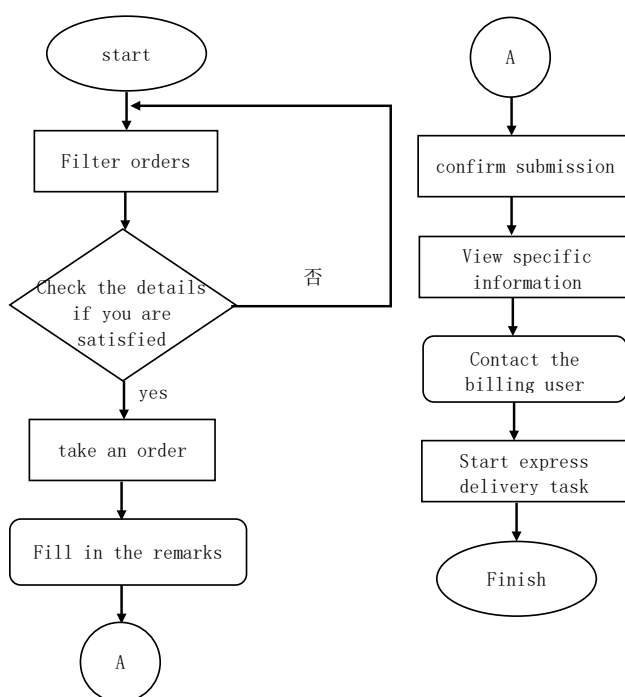

Figure 4: Order receiving flow chart.

3.2.3. Complete order

The user who issued the order can view the details of the posted order on the "I Published" page. If the status shows that the order has been received, the user who issued the order can view the contact information of the user who received the order, and can take the initiative to contact the user who received the order. After receiving the courier, the user who issued the order can click the Confirm Receipt button, the status of the order is changed to Received, and then pay the corresponding promised remuneration to the user who receives the order according to the order. After the user receives the remuneration, click Confirm on the order details page. After the payment is received, the status changes to Completed, and the express delivery task is completed. The process of this function is relatively simple, and the flow chart will not be shown here.

3.2.4. Actively cancel

The user who issued the order can actively cancel the order when the order is in the following two states:

(1) Unaccepted order status;

(2) In the state of receiving the order but not receiving the goods, take the initiative to get in touch

with the user who received the order, and obtain the consent of the user who received the order.

In the above two cases, the user who issued the order clicks on cancel automatically on the order details page, and the system will pop up a prompt "If there is already a classmate who has taken the order, please take the initiative to contact the order taker", and the user can choose to continue to cancel or not to cancel temporarily. If you click continue to cancel, the order will be closed and the status will be changed to active cancellation; if you click not to cancel, the system will return to the original interface for the user to make a new selection, as shown in Figure 5.
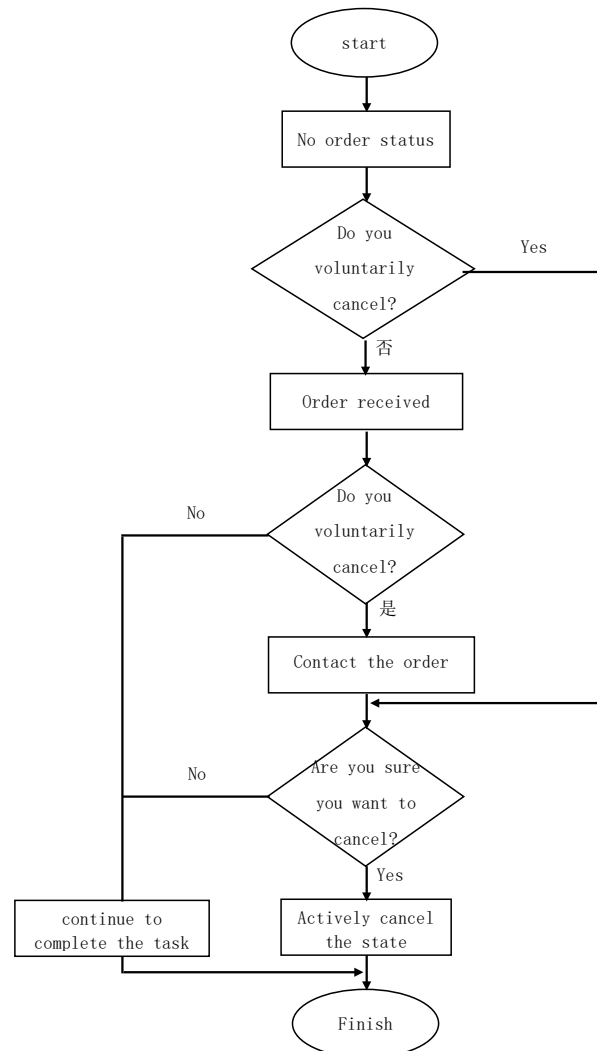

Figure 5: Active cancellation flow chart.

3.2.5. Timeout cancel

When the order is less than half an hour before the latest delivery time and the order is not received, the system will automatically cancel the order, and the order status will be changed to overtime cancellation. The user who placed the order can check the status of the order in My Post.

3.3. Database Design

3.3.1. Relational database design

In order to prevent data redundancy, update exceptions, insert exceptions, and delete exceptions, the design of relational databases needs to be standardized. The conceptual design of the platform database is displayed by the model of E-R diagram. According to the demand analysis, there are two entities in the platform, namely users and orders. There are two kinds of connections between these two entities, which are the order-issuing module and the order-receiving module.

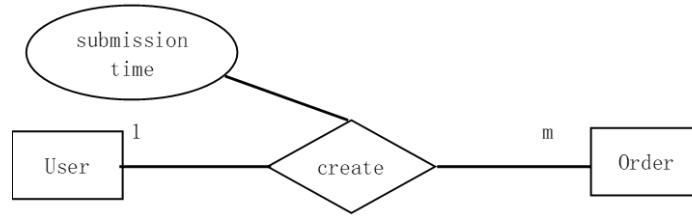The E-R diagram of the billing module is shown in Figure 6.

Figure 6: E-R diagram of billing module.

The E-R diagram of the order receiving module is shown in Figure 7.
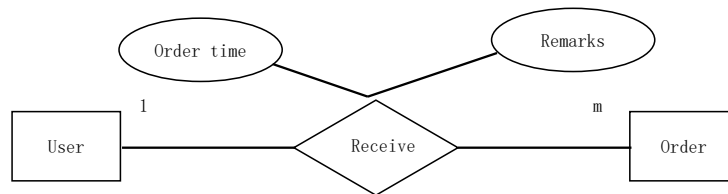

Figure 7: E-R diagram of order receiving module.

Since the attributes of the two entities are too many, the attributes of the entities are listed separately. The user entity and its attributes in the E-R diagram are shown in Figure 8.
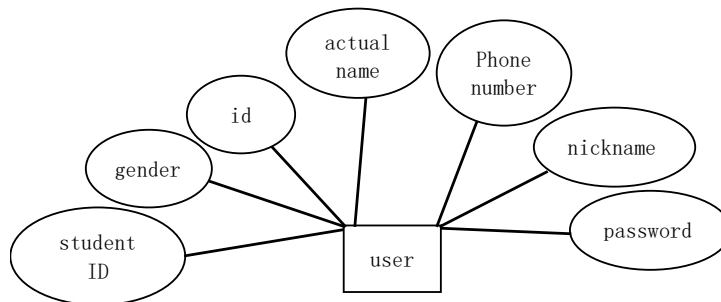

Figure 8: User entities and attributes.

The order entity and its attributes in the E-R diagram are shown in Figure 9.
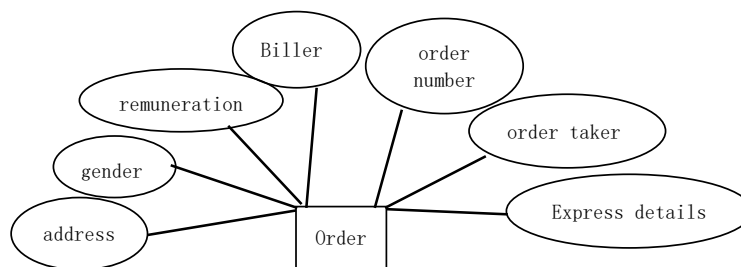
Figure 9: Order entity and attributes.

3.3.2. Database table design

According to the analysis and design of the E-R diagram of the database above, the author will design the database tables in more detail next, and discuss how to design each data table in detail. The amount of data on this platform is limited, and the data tables to be created are limited, so MySQL, which is relatively lightweight and easy to use, is used as the database resource in the background.

The User user information table is used to place the specific information filled in by the user when registering. The id is the primary key of the table, which is automatically generated by the system. Other specific information is shown in Table 1.

Table 1: User user information table.

Column Name	Type of Data	Length	Primary Key	Allow Empty	Remark
id	int	11	yes	no	Numbering
username	varchar	50	no	no	Nick name
passwd	varchar	50	no	no	Password
tel	varchar	50	no	no	Phone number
sex	varchar	20	no	no	Gender
birth	varchar	20	no	no	Birthday
img	varchar	200	no	no	Avatar
sid	varchar	10	no	no	Student ID
realname	varchar	50	no	no	Actual Name

Due to the properties of the order, in order to store the information, the author divides the entity of the order into two tables in the database for storage. Other attributes of orders under the status of order takers, such as orders received.

Ubill order base table, where id is the order number, which is automatically generated by the system, and uid is the number of the issuer. This attribute refers to the outer code of the coded id in the User user information table, as shown in Table 2.

The final sentence of a caption must end with a period.

Table 2: Ubill order basis table.

Column Name	Type of Data	Length	Primary Key	Allow Empty	Remark
id	Int	11	yes	no	Tracking Number
price	varchar	100	no	no	Fee Price
uid	Int	11	no	no	Issuer Id
ndate	varchar	255	no	no	Submission Time
wname	varchar	50	no	no	Receiver
way	varchar	50	no	no	Express Merchants
waynum	Int	8	no	yes	Pick up Number
type	varchar	50	no	no	Delivery Area
address	varchar	255	no	no	Delivery Address
note	varchar	500	no	yes	Billing Notes
noteimg	varchar	200	no	yes	Remarks
statecn	varchar	50	no	no	Order Status

Sbill order extension table, express order number id and order receiver sid are the main codes of this table, refer to the express order number id attribute of Ubill order basic table and the outer code of the code id in the User information table respectively, the detailed information table 3 shown.

The final sentence of a caption must end with a period.

Table 3: Sbill order extension table.

Column Name	Type of Data	Length	Primary Key	Allow Empty	Remark
id	Int	11	yes	no	Tracking Number
sid	Int	11	yes	no	Order Taker Id
sdate	varchar	255	no	no	Order Time
snote	varchar	500	no	yes	Order Remarks
enddate	varchar	255	no	yes	End Time

4. Platform implementation

4.1. Micro-channel public platform

Some functions of the WeChat public platform are few. The author uses the example of the official WeChat developer as a reference template, and mainly completes the functions of actively replying after following and passively returning the information required by users according to the keywords replaced

by users.

Before development, you need to apply for an account on the WeChat public platform and the cloud server of Sina SAE. The author first registered the SAE SAE server, then created a new application in it, selected the development language as PHP, the operating environment as the standard environment, the language version as 5.3, the SVN code management method, filled in the domain name, and finally created the application and created the version, so it was successful created a SAE application with a registration-free domain name URL. Then the author registers a new WeChat official account as a developer, selects the appropriate official account type, and fills in the basic introduction of the platform. After completing the registration, on the basic configuration page, fill in the server address, that is, the newly created free account on Sina SAE. Record the domain name URL, fill in the token as weixin, select the message encryption and decryption method as plaintext, automatically generate message encryption and decryption keys, and enable the server. So far, the configuration of the server and WeChat public platform is completed. The type of WeChat official account and whether it is certified will affect the interface permissions of the WeChat official platform. Developers can query the interface permissions they have[1].

After editing the code, upload it to the application previously created by Sina SAE, and the function can be realized on the WeChat public platform.

4.1.1. Access Token

To access the WeChat public platform, you need to obtain the unique credential Access Token for the API call, which can use AppID and AppSecret in developer mode. Get the interface using the https protocol: https://api.weixin.qq.com/cgi-bin/token?grant_type=client _credential&

appid=".$appid."&secret=".$appsecret;

Since the Access Token has a validity period of 7200s, repeated calls will be covered, and the WeChat public platform stipulates that there is only a limit of 2000 calls per day, so the Access Token needs to be stored. Database, refetch if time expires.

4.1.2. Verify signature

The fields involved in the signature include random strings, valid jsapi_tickets, timestamps, and the URL of the current web page, sorted according to the ASCII code of the field names from small to large, and then spliced into a string.

4.1.3. Follow the reply function

When a user searches for and follows the account in WeChat, the platform background will monitor the follow event, and after following the account, the system will automatically send a text message to the user.

4.1.4. Passive reply function

All messages are in the corresponding XML data format. The user can reply to the text according to the prompt. If a match is detected, the corresponding text or picture will be replied; if no match is detected, the reply "This instruction does not exist" and the prompt information to guide the user's operation will be replied. Developers can use the Access Token to upload the corresponding pictures or other multimedia files to the WeChat server in the online interface debugging tool of the WeChat public platform, and the server will return a json data packet, which contains the media_id field, and the user can use this field to send to the user. multimedia files.

4.2. Express on behalf of the micro-site

Users can enter the micro website of express delivery through the WeChat public platform. The micro website is developed using HTML and JavaScript, and adopts the page adaptive method, mainly using the mobile terminal as the main operating medium, adding Swiper, which is currently widely used in mobile webpage touch content sliding js plug-in, to improve the operation experience of mobile terminal users.

The main functions implemented by the micro website will be described below. In addition to the following six main functions, on the personal information page, users can view the personal information filled in during registration, change the password, log out and log in again, etc.

4.2.1. Log in register

The user will jump to the login page when opening the micro-site. If the user has already registered, he can enter the mobile phone number and password to log in.

In the background logic of login, it mainly includes whether the input box is empty, the correct judgment of the mobile phone number and password, and the judgment of whether the mobile phone number and password need to be remembered. The jump code is similar to the registration, which will be mentioned later.

If the user has not registered the website, the user can click Register to perform the registration operation. The registration items include avatar, mobile phone number, password, student ID, real name, user nickname, birthday, and gender. Each item is required, click cancel. You can return to the user login page, click submit to check the filled items. if the check is correct, it will prompt that the registration is successful and automatically return to the user login page, if the check is incorrect, a corresponding prompt will pop up.

4.2.2. Release of the order

After logging in, you will enter the main page of the micro website. The tabs below are the homepage of all orders, my order, and personal information. Click Publish in the upper right corner to publish and create a new order. Users need to fill in the corresponding items. Click on the release to check the corresponding item. If the check is correct, it will be released successfully, and you will see the order released by yourself on the home page and My Orders.

The logic judgment of the backstage of the order includes the 4-digit pickup number that must be entered, the remuneration must not be less than 5 yuan, more than 50 yuan, and the latest delivery time can only be selected within 1~72 hours after the current time. Other information must be filled in except for the remarks.

4.2.3. Show order details

The order details display exists in two parts, namely the order details clicked on the homepage, and the order details display in My Orders. Since the user's privacy needs to be protected before the order is not received, the content displayed on the order details page is also varied. The same, in addition to the orderer, order receiver and courier details, there is also the judgment of the order status.

4.2.4. Orders

On the order details page on the home page, click on the order, and the system will determine whether it is the order issuer. If so, it cannot accept the order, and will prompt the user "Your own order cannot be submitted"; if not, you can fill in the order receiver's Remark the information, and click Submit for final confirmation. After receiving the order, the ordering user can also view the information of the ordering user on the details page of My Order, and the two parties can contact each other.

4.2.5. Normal change of order status

After the order receiving user delivers the express to the ordering user, the ordering user can click on the details page of the order on the "My Order" page, click "Received", and the order status will be changed to "Received". At this point, after receiving the remuneration paid by the ordering user, the user who receives the order clicks Confirm Payment on the order details page of My Order, and the order status shows that it has been completed, that is, the express delivery task is completed.

All state changes call the changeBillState order state change function. "Completed" is the transaction state of the order that is completely closed.

4.2.6. Actively cancel

The user who placed the order can actively cancel the order when the order has not been received or the order has been received. After clicking Cancel when the order has not been received, the system will prompt the user "Are you sure to cancel?"; After clicking Cancel when the order has been received, the system will prompt the user "Please negotiate with the students who received the order and then confirm whether to cancel!". The user can choose not to cancel temporarily or continue to cancel. After clicking continue to cancel, the order will be closed, and the code below the prompt page shows the generation of the pop-up window and the order cancellation operation, the changeBillState function is still called for the change of the order status.

5. Conclusion

5.1. Goals achieved by the system

Through the testing and improvement of the platform, the platform has successfully completed the requirements and various functions in the design, so that the functions of the micro-site and the WeChat public platform can be better connected, with an easy-to-operate user interface and a good response speed. Correctly handle or avoid errors caused by the user's operation, and can correctly guide users to solve their errors. The design and implementation of this platform can improve the efficiency of students picking up express delivery, improve the interaction between students, and provide convenience for college students' life and studies.

5.2. Design flaws

Due to the limited time, energy and ability of the author, the actual deployment and application launch of this platform did not meet expectations, and only completed the basic functions required. The platform still needs to be processed and improved in many aspects during the actual application process. A good user experience also requires the addition of more functions. For example, the platform needs to add an independent chat function. After receiving an order, users can communicate through the platform, not only limited to telephone communication. The chat record can be used as the basis for processing orders after sales. If there are more interface permissions of the WeChat public platform, the platform needs to add WeChat payment function and message reminder functions such as order timeout and order acceptance. The platform also needs to establish a complete user integrity evaluation system and after-sales punishment system, and regulate and prevent illegal acts in the process of express delivery. If I have the opportunity and energy, I hope that in the days to come, I can improve the lack of the platform, so that the platform can meet the requirements of online deployment.

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