EATEE Mobile Based Food Delivery System

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Abstract—In Malaysia, food delivery service is a very common service provided by Malaysian beside transport service. Beside restaurant, people who do not have a restaurant also offer food delivery service. Nowadays, there are many food delivery systems that are available in Malaysia. For example, FoodPanda Food Delivery & Takeout, Mammam Deliveries and KFC Delivery. However, there is no current food delivery system that allow people who do not have a restaurant to promote the service. Thus, EATEE Food Delivery System is developed as a system that allows people who own and do not own a restaurant to commercialise the service to the public. The system uses HTML development language together with Ionic framework. EATEE is a mobile-based system that support cross-platform devices. EATEE is available in every area around Malaysia. The system will save the effort of the food delivery service provider to promote and manage the service. Throughout the application development, the background of the food delivery service in Malaysia is analysed and gathered as the requirements of EATEE. The requirements are then designed and followed in development phase. The system is then tested to verify whether the system meets the requirements or not. The system is completed as soon as the testing phase result shows that the system meets the requirements and is deliverable.

Keywords: mobile application, food delivery service, runner service

I. INTRODUCTION

Due to the rising cost of living in Malaysia, Malaysians face financial difficulties. To solve these financial problems, Malaysian needs to gain side income. However, part-time job opportunities are hardly available. Services such as runner and delivery are considered as a side income opportunity. Food delivery service (FDS) is one of the services considered by Malaysian to earn side income. Social media is a platform where Malaysian advertises the services.

However, it is not easy to manage an FDS. Most of the FDS Provider (FDSP) accepts orders 1-2 days early to avoid left-out order. It is time-consuming to arrange the delivery process based on the address. Moreover, paper is used as a medium to manage the customer’s data. The problem of using paper in managing data is that the data can be misinterpreted due to the handwriting and the probability of paper lost is high. Thus, a system to manage food delivery service is proposed.

II. RELATED WORK

A. Foodpanda Food Delivery & Takeout

FoodPanda is the famous global online food delivery which available in more than 20 countries [1]. The system is available in form of the web and mobile application. FoodPanda allows any restaurant to collaborate and use FoodPanda as a third-party platform that connects the restaurant and the customer. The collaborated restaurant may use delivery service provided by FoodPanda. FoodPanda also allows people to earn side income by becoming a rider and work with FoodPanda.

To make an order, the customer will need to enter location on the site and place the order by selecting a menu from a list of restaurants that are available. FoodPanda provides a live status update that allows the customer to track the food ordered. FoodPanda also allows the customer to customise dishes with sauce and toppings, just like buying from a restaurant.
The customer can select the desired type of cuisine by filtering the result [2].

However, FoodPanda availability coverage is very limited. FoodPanda is only available in the popular cities in Malaysia (Kuala Lumpur and Penang). Besides, as FoodPanda is only a third-party platform that connects customer to the partnered restaurants, there is no management system for the restaurants provided. FoodPanda only provides restaurants with a platform to promote the restaurant’s delivery service.

B. Mammam Deliveries

Mammam Deliveries (M) Sdn Bhd is a company that set up an own kitchen and prepare many king of local food (Malay, Chinese and Indian Food, Thai and vegetarian dishes. Unlike FoodPanda, Mammam Deliveries does not act as a third-party platform. Mammam Deliveries rules the entire business chain in food delivery service which is taking the order, prepare the food and carry out the delivery. Mammam Deliveries is available at Selangor and the central kitchen is located at Petaling Jaya.

To make an order, the customer can call the company number +603 7772 7781 or order online through the web or mobile system. The estimated time which is 60-90 minutes will be informed to the customer. Mammam Deliveries is only available for food delivery at 9.30 am to 9.30 pm. Mammam Deliveries also provide a function where the customer can place orders in advance [3]. Figure 2.4 shows order interface of Mammam.

Despite the good quality of the Mammam Deliveries system and services, Mammam is only available at Selangor. Besides, Mammam Deliveries only inform an estimated time taken for the food to be delivered (90 minutes) to the customer doorstep. There is no live status update provided by Mammam Deliveries system.

C. KFC Delivery

Usually a food delivery system is only available at popular cities in Malaysia such as Penang and Malaysia. Fast food restaurant is the only choice of food delivery service that is available in many areas and is one of the most famous fast food restaurant. In Malaysia, KFC Delivery system is only available as a web-based system. KFC branches are also available in few rural areas in Malaysia and the price is affordable.

To make an order, customers can make a phone call at 1300-222-888 or visit KFC delivery website [4]. Customer will need to enter an address so that, KFC can check the delivery area. Next, KFC headquarters office will then check if the address is valid and if the delivery service is available in the customer area. Then, the customer can select items from the menu and choose to pay online or pay cash. An order confirmation will be sent to the email address registered or via a phone call to confirm that KFC has received the order. The runner will then deliver the food. An estimated time will be shown to the customer. Customer will be given an order id which can be used to check the order status.

However, KFC delivery service is not available at all KFC branches. Plus, the menu for delivery is very limited. Not all of KFC menu is applicable to order by using delivery service. Not to mention, KFC is a fast food restaurant and fast food is not a healthy choice of food. Consuming too many fast foods can lead to disease as it contains high cholesterol which is the main cause of many diseases such as high blood pressure, diabetes and heart disease.

D. KFC Delivery

To find out the weakness of the current system, the chosen existing system is compared and the difference is analysed. The criteria to be analysed are the intended users, devices supported by the system, and the availability area. The features of the system are also analysed and compared to the other system. Table 1 shows the comparison between FoodPanda, Mammam Deliveries, KFC Delivery and EATEE.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>FoodPanda &amp; Takeout</th>
<th>Mammam Deliveries</th>
<th>KFC Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intended Users</td>
<td>Best restaurants in popular cities</td>
<td>Mammam Deliveries (M) Sdn Bhd</td>
<td>KFC Fast Food Restaurants</td>
</tr>
<tr>
<td>Devices Supported</td>
<td>Hybrid and cross-platform devices</td>
<td>Hybrid and cross-platform devices</td>
<td>Web-based (Malaysia)</td>
</tr>
<tr>
<td>Area</td>
<td>Popular cities in Malaysia</td>
<td>Selangor</td>
<td>Near KFC branches (limited)</td>
</tr>
<tr>
<td>Make an order</td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>View Order Status</td>
<td>Available</td>
<td>Not Available</td>
<td>Available</td>
</tr>
<tr>
<td>Manage Menu</td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Manage Order</td>
<td>Not Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Update Order Status</td>
<td>Available</td>
<td>Not Available</td>
<td>Available</td>
</tr>
<tr>
<td>Manage Customer</td>
<td>Not Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Manage Delivery</td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Variety Menu</td>
<td>Available</td>
<td>Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>
Features that are available in every system are make an order, manage menu and manage delivery. Thus, the three features are considered as the main features of EATEE and has the highest priority in the requirements list. FoodPanda is only connecting the restaurant and the customer. The restaurant usually owns a system that controls the order. Thus, FoodPanda has no features that allows the restaurant manager to manage order and customer. Mammam Deliveries only display the estimate time the order to be delivered to the customer. As KFC is a fast food restaurant, it only provides a limited list of menu.

III. METHODOLOGY

After considering the requirements and the features of EATEE, Agile Kanban Methodology seems to be the most suitable methodology for EATEE development. Since EATEE is to be developed as an open application where everyone can use, the users are from many background. The users may have lack of knowledge of Information System. Compared to waterfall, agile methodology allow developer to always interact with user and change the requirement. This allow the developer to validate the usability of EATEE. [5] has mentioned that Agile Kanban Methodology is more appropriate to be used in developing a system that have a working process that need to be improved. Even though an Agile Methodology may consume times due to the requirement changing, an Agile Methodology seems more beneficial in terms of developing an application that will be used by the public.

There are seven phases in Kanban Methodology which are product backlog, requirements analysis, design, development, testing, deployment and done [5]. To implement Kanban Methodology, a Kanban board is used containing seven column of phases of development. Constraints of developing EATEE is will also be identified on the Kanban board. The constraints is the WIP limitation of the development process that is placed on the Kanban board. The WIP shows the maximum number of tasks that can be done during phase of the process. In the next section, the results of every phase will be discuss.

IV. RESULTS

The project flow is following the chosen software development methodology which is Agile Kanban Methodology.

A. Product Backlog

First, the project gone through the product backlog phase where the main features of the system to be developed is listed based on the problem statement. The aim of the project is to ease the FDSP to manage and advertise their service. Thus, a total of five product backlogs were identified.

First, the customer to find the available FDS in the area. Next, the FDSP to promote the service in a platform only. No need to go through every social media. The FDSP should be able to manage the service systematically. The FDSP also can manage the customer without having to save every customer contact number. The runner can manage the delivery process systematically.

B. Requirement Analysis

The requirements is gathered by using questionnaire, observation and comparing existing system method. A total of 28 requirements were identified. Two types of business flow of the FDS were identified. Figure 1 and Figure 2 shows the business flow of FDS.

The different between the two business flow is that the first business flow is when the FDSP open order for a short period and arrange the order before delivering the order while in second business flow, the FDSP always open order and deliver whenever an order received. The second business flow is usually followed by a large business of FDS while the first business flow is followed by a smaller business of FDS. This is because, the first business flow allows the FDSP to arrange the order and buy groceries to produce the food based on the total order received.

To illustrate the interaction between the actors (FDSP, runner and user) and the system, a use case diagram is designed. Figure 3 shows the use diagram.

Referring to the use case diagram, a total of six use cases were identified which are register, login, manage menu, make an order, manage order and manage delivery. The FDSP and runner actors are...
inherited from user describe that the FDSP and runner may act as a user who should be able to register, login and make an order through the system. The FDSP is allowed to manage menu and manage order while runner is allowed to manage delivery by using the system. For every use cases, a use case specification diagram, activity diagram and sequence are designed to briefly illustrate how the use case flow is.

C. Design

Next, in design phase, few Unified Modelling Language (UML) diagrams are designed to represent the system. Figure 4 shows the system architecture diagram of the system.

To separate the front-end and the back-end of the system, Model View Controller (MVC) architecture is used [6]. As EATEE is a public system or in other words, a system that is used by public, the system may need changes in future. MVC architecture allows the developer to modify the code easily as the front-end and the back-end are separated.

Entity Relationship Diagram is also designed to visualize the relationship between each tables in the database. [7] has mentioned that Entity relationship diagram is a graphical representation of an information system that depicts the relationships among each table in the database of the system. Figure 5 shows the entity relationship diagram of the system.
To ease the development process, the interface of the system to be developed is designed to be followed in development phase. Figure 6 shows the designed user interface of the Login Page of the system.

The chosen colour theme of EATEE is red. Red is commonly used by the restaurants in the logo as red is known as a colour that stimulate metabolism and make people hungry. As EATEE is a food delivery system, red is chosen as the colour theme.

D. Development

The front-end of the system is designed by using HTML, CSS and Sass language with Ionic as the framework while the backend is developed by using Typescript language with AngularJS as the framework. The system uses Firebase Real Time Database to store the data. The code is similar to HTML language except for the fact that it has ‘ion’ in some of the HTML mark-up as it uses Ionic framework.
E. Testing

For this project, the system testing is implemented by using Black-box testing and User Acceptance Testing. Black-box testing is also known as behavioural testing as it only tested the internal structure, design and implementation of the system [9]. Black Box Testing is conducted when a use case is successfully developed. Table 2 shows the results of the testing.

Table 2: Results of Black Box Testing

<table>
<thead>
<tr>
<th>Issues</th>
<th>Solutions</th>
<th>Date Resolved</th>
</tr>
</thead>
<tbody>
<tr>
<td>User can register even when the full name, phone number and gender is not filled</td>
<td>The input is controlled in Register.ts. The system will check if the input entered is not null.</td>
<td>8th March 2018</td>
</tr>
<tr>
<td>The system displays an error message if the user did not upload a profile picture. Even so, the user can still register.</td>
<td>A variable profilePic is declared in Register.ts with a null value. When a user upload an image, the profilePic value is set as the link of the image. When register, the profilePic value is checked. If profilePic value is not null, the user can register</td>
<td>2nd April 2018</td>
</tr>
</tbody>
</table>

Manage menu and register use case consist of the create operations. It creates a new user data and menu data and stored it into the database. Throughout the Black Box Testing, issues arise at the two use cases. Firebase authentication has provided the input validation for login purpose. In make an order use case, the user need to select the quantity and address from the dropdown list.

To identify whether EATEE is acceptable by the target user or not, User Acceptance Testing is conducted. User Acceptance Testing is a testing that identify whether the solution works for the user [10]. Table 2 shows the result of the User Acceptance Testing.

Table 2: Results of User Acceptance Testing

<table>
<thead>
<tr>
<th>Issues</th>
<th>Solutions</th>
<th>Date Resolved</th>
</tr>
</thead>
<tbody>
<tr>
<td>When the user make an order of few foods of different FDSP, the list of order were duplicated for one of the FDSP.</td>
<td>Allow the user to make an order from one FDSP only.</td>
<td>6th May 2018</td>
</tr>
<tr>
<td>When the user update the menu details, the updated menu details are not saved into the database. It still display the old details of the menu.</td>
<td>Check and change the code for the update menu part.</td>
<td>5th May 2018</td>
</tr>
</tbody>
</table>
There is no message displayed to the user to confirm that the user wants to delete the menu.

An error message is displayed when there is no runner available in the area. The user cannot reselect runner for the order.

Add a confirmation message to display the confirmation message.

Check and update the select runner code in select-runner.ts.

5th May 2018

7th May 2018

Some of the tester gave suggestions and ideas to make the system better. The suggestions given are considered as the future enhancement of EATEE.

F. Done

When a requirement is successfully tested, it will be placed in ‘Done’ column. When the system meets all requirements gathered in requirement analysis phase, the system is the considered as a publishable system.

V. DISCUSSION

The objective to engineer requirements of EATEE has successfully completed. The requirements is gathered based on the existing system, questionnaires distributed to the target user and observation made to an FDSP. Agile Kanban Methodology has been used as the software development methodology of EATEE. The requirements gathered are successfully analysed and designed to ease the development process.

The system is successfully developed by following the requirements and diagrams designed in design phase. While conducting User Acceptance Testing, the tester who are the target users of the system gave few comments on how to improve the system. Most of the target FDSP users suggested to allow the FDSP to select runner when registering as FDSP user. This will ease the FDSP selecting runner for delivery and avoid issues regarding runner availability when selecting runner for delivery. All of the comments given are considered and listed as future enhancement of the system.

A. Project Challenges and Limitation

Usually, in software development project, engineering the requirements is the most challenging task to be conducted. Same goes to this project as the project need the writer to understand the FDS and runner business from the basic. Thus, the writer need to communicate with the FDSP and runner to understand the business management. However, most of the FDSP and runner are afraid that it is a scam and chose to not volunteer. Thus, there are lack of volunteer from FDSP and runner.

While developing EATEE, there are few changes in the requirements of EATEE. Using Agile Methodology, changes in requirements are expected and encouraged as it will help the developer to develop EATEE to ease the FDS and runner service management. Suggestions and ideas made to change the requirements is first placed in ‘Product Backlog’ column and prioritized. The high requirement changes is first followed.

B. Future Enhancement

EATEE is a public mobile application which can be used by anyone. The users’ knowledge is differing from the developer’s knowledge. Throughout the system testing phase, the tester has given few comments and suggestions to improve the system. To improve the system in future, the comments and suggestions from the tester is considered for the future enhancement.

The user may want to self-pick-up the order made. A tester suggested to add a button that allow the user to specify that the customer want to self-pick-up the order. A target FDSP user agreed to the suggestion made as the FDSP provide some time to allow the customer to pick up order at the FDSP’s home.

To help the user choose the FDSP, a feature to make a review to the other users will be develop. The user can also give the other user a rate of one to five star. The rate and review made will help the other user to notice the FDSP. Thus, the FDSP will take the business seriously to satisfy the customer. The user with a low rate will be considered to be block.

Online payment will also be considering to be implement in EATEE. A payment gateway will be chosen to be implement to EATEE. The user may choose to pay the order by cash or using online payment.

An FDSP suggested to allow the FDSP to select one to many runners when registering as the FDSP of the system. This is to help the FDSP in case there is no runner available when the FDSP need to select runner to deliver the order. This will also act like a contract between the FDSP and the runner.

A web-based EATEE system is considered to be develop. The web-based system will consist of manage menu, make order and manage order use case. This is because some user may find that computer is more comfortable compare to mobile phone.
VI. CONCLUSION

In conclusion, the project successfully meets the project objectives to achieve the goal of the project. In another word, the system is successfully developed to ease the FDSP advertise and manage the service. Plus, the system also allows the runner to manage delivery and user to make an order. System testing has successfully implemented to identify errors or bugs that may appears while developing the system.

REFERENCES


