At Your Doorstep: Online Food and Grocery Delivery Application

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Abstract: This Online Food and Grocery Delivery Application is developed to solve the problem of individuals that do not have their own vehicle or lack of time to buy their own food and grocery. It is an application that will help individuals to buy halal food and grocery in Parit Raja, Batu Pahat. The application has been developed based on prototyping-based methodology which is used to produce a two-phase prototype and finally developed into a complete application. Software technology that used to develop this application is Ionic Framework. This application will help individuals to buy food and grocery without having to step outside of the house. In overall, it can be an alternative for the individuals that are facing some difficulty to purchase halal foods and groceries on their own.

Keywords: Food, Grocery, Delivery Application, Ionic Framework

1. Introduction

E-commerce or electronic commerce is defined as the buying and selling of products over the Internet or any transaction that is completed individually through electronic measures. Over the past few decades, the Internet has developed into a massive global marketplace for the exchange of goods and services. In many developed countries, the Internet has been adopted as an important medium, offering a wide variety of products with twenty-four-hour availability and wide area coverage [1]. The impact of e-commerce is to reduce the inefficiencies for trading and increase productivity in terms of economies with competitors internationally.

For the people who do not have their own personal vehicle and those who cannot get out of the house to shop such as the disabled or elderly, they have difficulty going outside to buy their daily necessities and meals. Also, some people are so busy that they do not have enough time to shop every week to buy food or grocery. Going out for shopping or dining out consumes time as we need to take time to go to the market or restaurant, queue up for order and wait for the server. In this modern era, almost everyone has a smart device that can access the Internet. Therefore, when users download and use this application, it will overcome the demerits of the manual mess system and the old-fashioned queuing system.

Developing an online food and grocery delivery application are needed to make sure the specific target can be attained. The first objective is to design an online food and grocery delivery application that will order through the Internet. The second objective is to develop a designed online food and grocery delivery application for the residents that stay around Parit Raja, Batu Pahat. The last objective is to test the functionality and usability of the online food and grocery delivery application.

There are three users in this application, which is customer, delivery staff and administrators. The location scope of this project is in Parit Raja, Batu Pahat, Johor. There are eight modules in this proposed application which are user management module, place order module, searching module, wish list module, chatting module, mapping module, information management module and delivery module.

2. Literature Review

This section explained about the literature reviews that have been conducted for this project. The goal of this literature review is to understand the background and technology used for this application.

2.1 E-commerce

E-commerce is a platform that provides business through the Internet. The development of information technology eases the people to use the Internet to do the online business through e-commerce. The product is sold and purchased by the customers through the electronic device. To carry out the transactions of money online, the technology of e-commerce uses secure parameters to safeguard that the system is more safe and trusted [2]. E-commerce has become an important part in developing countries and it is a recent medium in Malaysia. It can help the productivity of the economy to be raised and become more efficient. E-commerce also provided convenience to the user to do the daily task such as bills payment [3]. With e-commerce, most of the things can be done by using the Internet.

2.2 Delivery System

Delivery is a distribution or action of service to deliver the product to the customer. There exist two different stages of delivery systems which are stage one and stage two [4]. Stage one is the simple delivery system that the delivery service is done by the restaurant themselves. Stage two of the delivery system is there is an agent or delivery staff to deliver the product to the customer. The restaurant of stage two does not have its own delivery service. The online delivery applications such as Foodpanda, Dahmakan and HappyFresh are stage two delivery systems.

2.3 Mobile Application

Traditional modes of business are eliminated by the mobile application and it becomes a popular and convenient pathway for marketing the product. Mobile application is a technology that is used to promote and sell service and product through the widespread use of the Internet [5]. There are three types of mobile application which are native mobile application, hybrid mobile application and web application [6]. The difference between native or hybrid mobile application and web application are the application of native or hybrid application can be installed and downloaded from the application store while the web application is only can display in the website.

2.4 Study of similar applications

The aim of this review is to know the functionalities and features provided by each application. Three existing applications which are Foodpanda, Dahmakan and HappyFresh have been selected to be discussed and compared with the proposed application in this section.

2.4.1 Foodpanda

Foodpanda is an online delivery food system that enables the user to order the food at a local restaurant [7]. It is a website or mobile application delivery platform which supports Android-based, iOS-based and web-based systems. There are many types of cuisine provided by Foodpanda such as halal food, desserts, Indian food, Japanese food and more.

2.4.2 Dahmakan

Dahmakan is a convenience online delivery food application that is provided in area Kuala Lumpur, Malaysia [8]. It is a website or mobile application delivery platform. The main feature is the application provides home cooked food which is healthy and tasty for the user. The user also will taste different cuisine because the menu will be changed and updated every day.

2.4.3 HappyFresh

HappyFresh is an online delivery grocery application that eases the user to order and deliver the grocery via website or mobile apps [9]. There are many categories given by HappyFresh such as household, dry and canned goods, meat and seafood, beauty, and personal care and even goods for pets. Therefore, the user will not waste time queuing up in the market or stuck in debilitating traffic.

2.5 Comparison of proposed application with existing applications

A comparison is being carried between existing applications and the proposed application based on some features. Table 1 shows the comparison between existing applications and the proposed application. The unique feature of the proposed application is this application can deliver food and grocery to the user in one delivery ship. It becomes more functional compared with the existing applications because it combines both food and grocery delivery. For the available delivery area, the existing application, Dahmakan will focus on the area of Kuala Lumpur. The proposed application will focus on the area of Parit Raja, Johor.

Table 1: Comparison between existing applications and proposed application

Features	Foodpanda	Dahmakan	HappyFresh	At Your Doorstep
Operating system	Android, iOS and web-based	Android, iOS and web-based	Android, iOS and web-based	Android and web-based
Delivery area	Not provide delivery service in Parit Raja, Johor.	Do not provide delivery service in Parit Raja, Johor.	Do not provide delivery service in Parit Raja, Johor.	Provide delivery service in Parit Raja, Johor.
Delivery food service	Available	Available	Not Available	Available
Delivery grocery service	Not Available	Not Available	Available	Available
Multiple restaurant /market to choose	Available	Not Available	Available	Available
Variety of menu	Not Available	Available	Not Available	Not Available
Ingredients/ recipe of food	Not Available	Available	Available	Not Available
Live chat	Available	Available	Not Available	Available

3. System Methodology

This section explained about the methodology that has been conducted for this project. The goal of this methodology is to understand the method and technology used for this application.

3.1 Prototyping-based Methodology

The prototyping-based model is one of the structured designs that choose as a step by step method to the system development life cycle (SDLC). The model starts with the initial planning and followed by three iterations of phases which are the analysis phase, design phase, and implementation phase. All these three phases are performed repeatedly in a cycle until the system is developed successfully [10].

The reason to choose this prototyping-based methodology is the process of this model will be repeated to maximize the functionality of the application and produce a final prototype. The prototype presents to the stakeholders and this will ensure that every prototype achieves the objectives and obtains the requirements of this application. The prototyping-based methodology can assist to improve the actual requirements of the application quickly [10] and helps the developer to adopt the technology easily due to repetition of the processes.

3.1.1 System Development Workflow

Prototype-based methodology contains four phases to develop the proposed application. The four phases are planning, analysis, design, and implementation. The specification of activities carried out for each phase is shown in Table 2.

Table 2: System development workflow of proposed application

Phase	Activities	Output
Planning	• Define the problem • Determine the objectives and scope • Produce the project schedule • Perform a literature review on existing applications	• Proposal • Gantt chart • Literature review
Analysis	• Conduct interview with stakeholders • Gather all the information • Define the system requirements • Analyze feasibility of the requirements	• Functional and non-functional requirement analysis • Data Flow Diagram • Activity diagram • Test plan
Design	• Design the application architecture and software • Design the wireframe • Design the user interface • Design and integrate the database • Prototype for design details	• Activity diagram • Entity Relationship Diagram • Data dictionary • User interfaces design • Database table
Implementation	• Construct software components • Convert design into the running code • Install the application • Testing and debugging the application	• Execute the proposed application

4. System Analysis and Design

This section explained about the system analysis and design that have been conducted for this project. System analysis and design are the phases of the System Development Life Cycle (SDLC). Information was collected for analysis to improve the existing application.

4.1 System Analysis

Analysis of the requirement is needed to determine and obtain the user's requirements for the application. This application will be clearly defined for development once the needs have been analyzed. Analysis of requirements created useful practical details that describe the system's functionalities and procedures. In this section, context diagram, Data Flow Diagram (DFD) and Entity Relationship Diagram (ERD) will be described in detail.

4.1.1 Context Diagram

Figure 1 shows the context diagram that represents the overall activities of online food and grocery delivery application. It determines the communication between the application and external entities. Customer, administrator, and delivery staff are three external entities in this application.
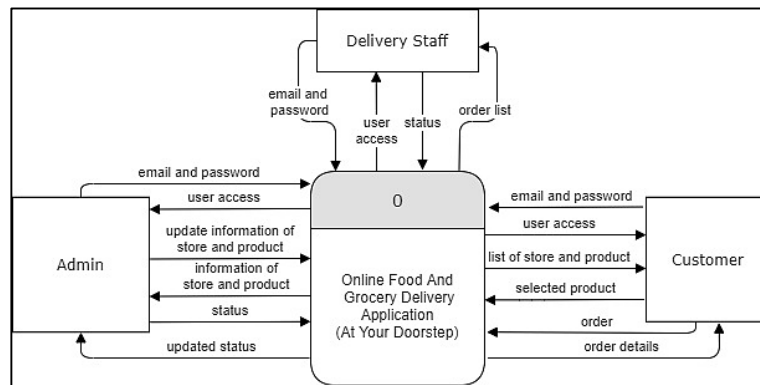
Figure 1: Context Diagram of the application

4.1.2 Level 0 Data Flow Diagram

Level 0 Data Flow Diagram breaks down the main activity of the system to some sub processes to analyses. Figure 2 shows the level 0 DFD with four main sub-processes of the application which are user login, place order, order confirmation, and manage information.
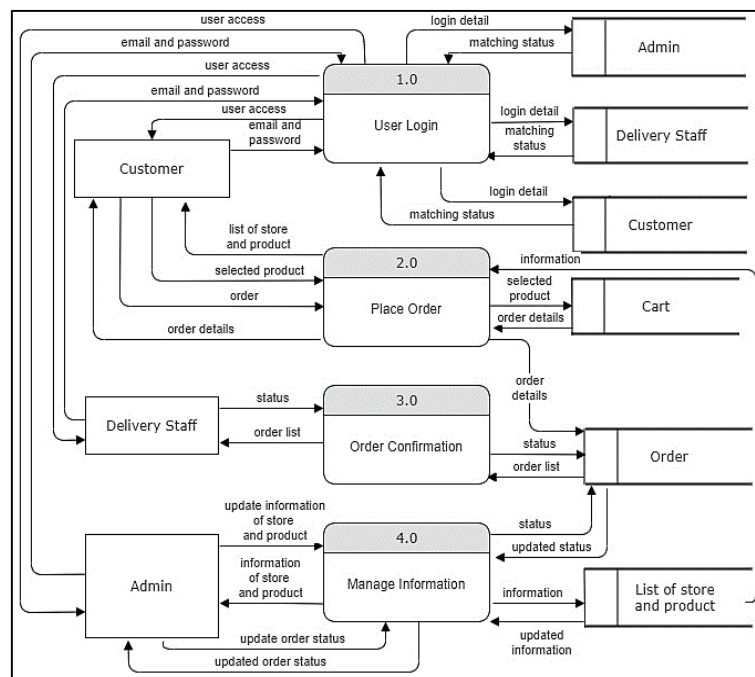

Figure 2: Level 0 Data Flow Diagram of the application

4.1.3 Entity Relationship Diagram (ERD)

Entity Relationship Diagram (ERD) is a database design used to show the relationship between all the entities that are involved in the database. The main components of an ERD are entity, attributes, and relationship. Figure 3 shows the ERD for online food and grocery delivery application.
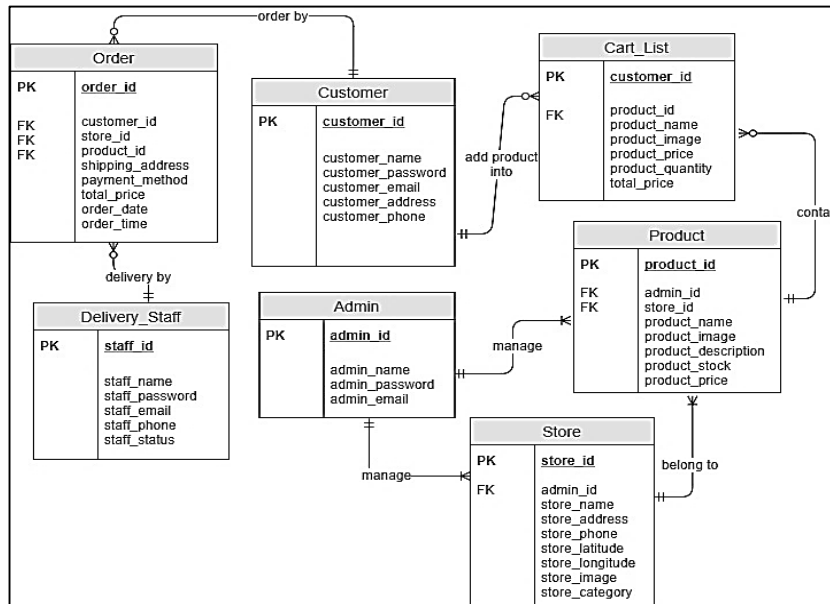

Figure 3: ERD of the application

5.   Implementation and Testing

This section briefed about the implementation and testing for the application. The system analysis and design of the proposed application has been implemented during the implantation and testing phases where all modules included in this application will represent in the form of screenshot images.

5.1 Implementation Phase

Implementation phase has been conducted to ensure this application is built in accordance with the system analysis and design of the proposed application. Figure 4 is the interface of the login module, register module and forgot password module. Login module allows customers to login into the application. Customer requires to fill in all the fields in the register module. Customers are required to fill in a specified email for resetting the password via sending a confirmation message in the forgot password module.
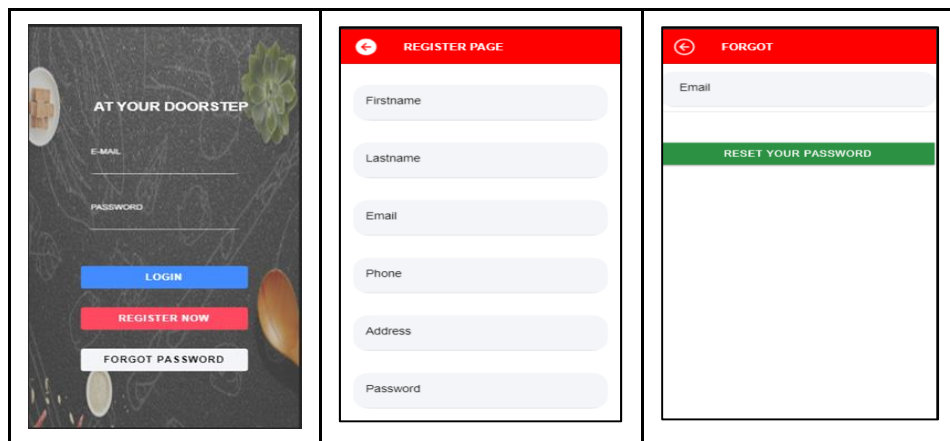

Figure 4: Interface of login module, register module and forgot password module

Figure 5 is the interface of homepage, my cart page and searching module. It will show the homepage after the customer login into the application successfully. Customers are able to know the total quantity of each product, price of each product, and the total price in my cart page. All the products will be displayed in this searching module. Customers can directly use the keyword to increase the speed of searching the item in the searching module.
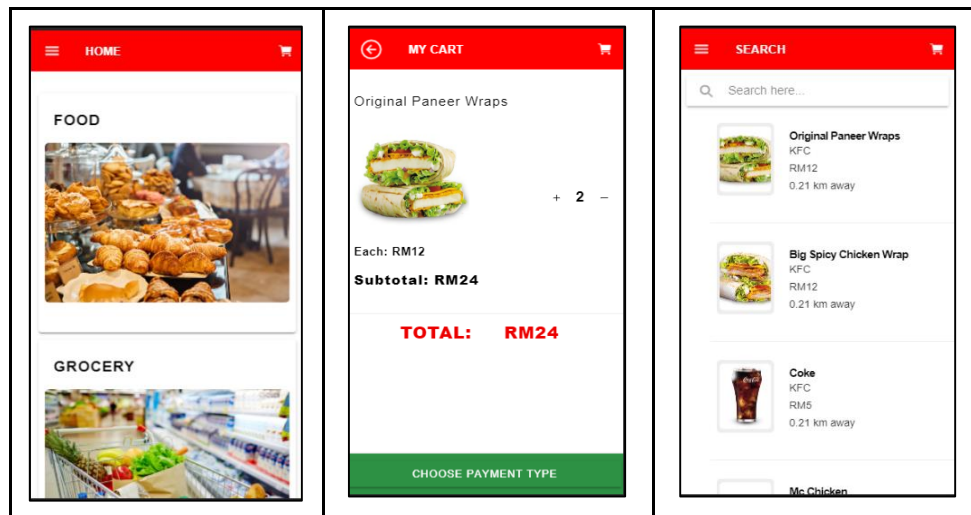

Figure 5: Interface of homepage, my cart page and searching module.

Figure 6 is the interface of wish list module, chatting module and mapping module. Customers can add and remove their favorites products in the wish list module. Customers can chat with the admin about the details of the product in the chatting module. Customers can know the location of the restaurant or the grocery store in the Google Map in the mapping module.
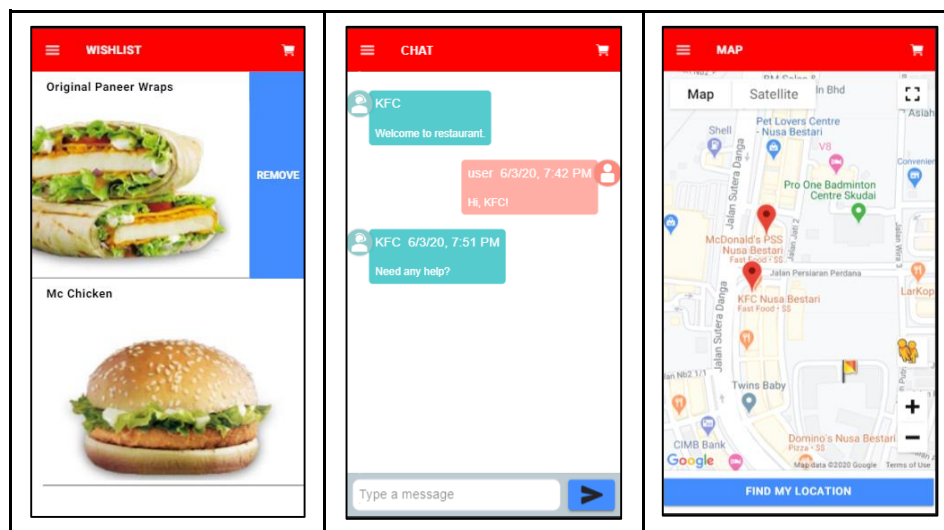

Figure 6: Interface of wish list module, chatting module and mapping module.

Figure 7 is the interface of information management module and delivery status module. Admin can manage information such as edit, delete, and update the name, image, price of each food and grocery in the information management module. Admin can change the status of the order form customer in the delivery status module. Admin can decide the order is on delivery, queued, delivered, or cancelled. Delivery staff can view the order in the delivery module and deliver all the items to the customer.
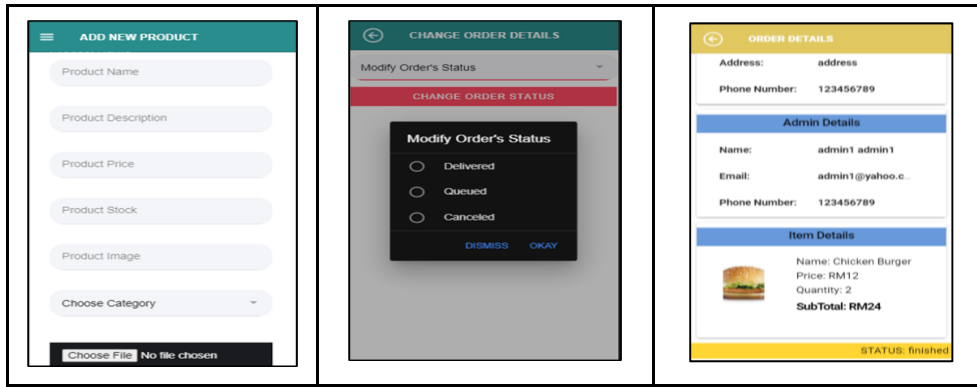
Figure 7: Interface of information management module, delivery status module and delivery module

5.2 Testing Phase

Testing phase has been conducted after the completion of implementation for this application. The purpose of the testing phase helps to test this application has operated successfully regarding the needs of users. System functional tests are crucial for an application where it helps to guarantee the application operates successfully and able to find out the errors and bugs within the application for purposes to improve in future works. Table 3 shows the result of the test plan of the application.

Table 3: The result of test plan of the application

Module	Test Case	Expected Result	Actual Result
Register	• All required fields are filled correctly. • Blank information is given but clicks the register button.	• Register process successfully and will direct to the homepage. • Register process unsuccessfully.	Pass
Login	• All required fields are filled with the correct email address and password. • Blank information is given but clicks the login button.	• Login process successfully and will direct to the homepage. • Login process unsuccessfully.	Pass
Forgot Password	• User can reset the password that the user had registered before.	• A reset password link is sent to the email address of the user to reset the password.	Pass
Place Order	• Customers are able to view the product, decide the quantity and total amount of the product.	• Product will be displayed correctly.	Pass
Searching	• Customers are able to search the product.	• Searched products will be displayed correctly.	Pass
Wish List	• Customer able to add and remove the product from the wish list page.	• The product will be added or removed from the wish list page.	Pass
Chatting	• Customers are able to chat with the admin.	• The message is displayed between the customer and the admin.	Pass
Mapping	• Customers are able to know the location of the restaurant and the grocery store on the map.	• The location of the restaurant and the grocery store will be displayed.	Pass
Information Management	• Admin able to add, delete and update the information of the store and product	• Information of the store and product is displayed correctly.	Pass
Delivery	• Delivery staff able to view the order and deliver to the customer.	• Information of the order will be displayed correctly to the delivery staff.	Pass

6. Conclusion

At the end of this project, it is expected that this delivery application will help the users to get the food and grocery easier without having to leave the house or office. Food and grocery delivery application is convenient to the busy lifestyle people in this digital world. People rely on online delivery applications because of its simplicity. The application is expected to solve the problem of the customer such as they do not have enough time or are unable to go out to buy the goods. This application creates accommodations for the consumer to make purchases of food and grocery directly to the specified address with the low delivery fees. In addition, it is hoped that this application will be one of the alternatives to users who do not have a vehicle or are too busy to buy food and grocery.

For the future works of the application, improvement can be done by enhancing the interface, functionalities, and performance of the application. The future works for online delivery food and grocery application included:

- Borrows any necessary equipment to deploy the application in another operating system since the application is developed in a cross-platform.
- Implement the booking function for the delivery staff to deliver the items to the customer.
- Implement the rating and review function in this application for the customer to give some comment about the delivery service.
- Implement the filter date function of the order for the admin.

Acknowledgement

References

[1]   Z. Yusof, F. Yusof, and Y. Yusof, "Determinants towards Food Delivery Service through E-Commerce in Pasir Gudang Area," Journal of Modern Education Review, vol. 6, pp. 622-631, 2016.

[2]   P. Jain, K. Jain, and P. K. Jain, "Electronic Commerce and Its Global Impact," Innovare Journal of Engineering and Technology, vol. 4, no. 3, pp. 1-6, 2016.

[3]   C. M. Z. C. Omar and T. Anas, "E-commerce in Malaysia: Development, implementation and challenges," International Review of Management and Business Research, vol. 3, no. 1, pp. 291-298, 2014.

[4]   B. Ahmed and R. Ahmed, "Evaluation of Supply Chain Based on SCOR Model Theory: A Case Study of FOODPANDA™," International Conference on Innovation and Emerging Trends in Business Management, IQRA University, Karachi, Pakistan, 2016.

[5]   J. Das, "Consumer perception towards 'online food ordering and delivery services': An empirical study," Journal of Management, vol. 5, no. 5, pp. 155-163, 2018.

[6]   S. Olson, J. Hunter, B. Horgen and K. Goers, Professional Cross-Platform Mobile Development in C#. USA: John Wiley & Sons, Inc. 2012.

[7]   Foodpanda, 2012. Available: Foodpanda, https://www.foodpanda.my. [Accessed October 8, 2019].

[8]   Dahmakan, 2014. Available: Dahmakan, https://dahmakan.com. [Accessed October 7, 2019].

[9]   HappyFresh, 2015. Available: HappyFresh, https://www.happyfresh.my. [Accessed October 10, 2019].

[10]   T. David, D. Alan and H.W. Barbara, System Analysis and Design with UML. USA: 4th Ed. Singapore: John Wiley & Sons, Inc. 2013.