

RESTAURANT FINDER MOBILE APPLICATION

BY

TIEW KAI WEN

A REPORT

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

BACHELOR OF INFORMATION TECHNOLOGY (HONS)

INFORMATION SYSTEM ENGINEERING

Faculty of Information and Communication Technology

(Kampar Campus)

JAN 2019

UNIVERSITI TUNKU ABDUL RAHMAN

REPORT STATUS DECLARATION FORM

Title: RESTAURANT FINDER MOBILE APPLICATION

Academic Session: JANUARY 2019

I TIEW KAI WEN
(CAPITAL LETTER)

declare that I allow this Final Year Project Report to be kept in
Universiti Tunku Abdul Rahman Library subject to the regulations as follows:

1. The dissertation is a property of the Library.
2. The Library is allowed to make copies of this dissertation for academic purposes.

Verified by,

(Author's signature)

(Supervisor's signature)

Address:

Supervisor's name

Date: _____

Date: _____

RESTAURANT FINDER MOBILE APPLICATION

By

Tiew Kai Wen

A REPORT

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

BACHELOR OF INFORMATION TECHNOLOGY (HONS)

INFORMATION SYSTEM ENGINEERING

Faculty of Information and Communication Technology

(Kampar Campus)

JAN 2019

DECLARATION OF ORIGINALITY

I declare that this report entitled “**RESTAURANT FINDER MOBILE APPLICATION**” is my own work except as cited in the references. The report has not been accepted for any degree and is not being submitted concurrently in candidature for any degree or other award.

Signature : _____

Name : TIEW KAI WEN

Date : _____

ACKNOWLEDGEMENTS

First and foremost, I would like to express my deep gratitude to my project supervisor, Miss Yap Seok Gee who support me on this interesting, intuitive and challenging topic for my final year project. She had guided me throughout the whole project period. Whenever I am encountering difficulties in the project development, she is always there for providing encouragement, motivation, useful idea, advice and feedback as well with great patience. I could not asked for a better supervisor in my university life.

Besides that, I would like to present very special thanks to my project moderator Mr Lim Jit Theam who give me an opportunity to express and present my final year project idea. I am so much appreciate his effort in evaluating the quality of my final year project and providing valuable feedback for me to achieve a better improvement.

In addition, I would like to thank my academic advisor Dr Mobashar Rehman who willing to scarify his precious time to advise me every time when I am facing difficulties no matter on academic, extracurricular and personal issues as well. He is the one who always tracking on my academic performance and provides useful information on how to study well in order to achieve better result.

Last but not least, I wish to thank my parent who raise me and guide me to become a better person. I am so much appreciate them for providing me an opportunities to pursue a higher education in UTAR and provides me encouragement whenever I am about to give up. I may not be able to finish my final year project without their support.

ABSTRACT

This application aims to solve the problem of indecisive minded people to make their decision for their daily meal. Based on past studies, people are found hard to make a decision given with various alternative options (Dhar 1997.). Making decisions on daily meals mean significant effort for them. There is various type of restaurants in the market and all of these restaurants having a list of food items. Restaurants are one of the parties that contribute the most on generating options for indecisive people. Reviewing all option and make a decision will be a time-consuming act for them. All their needs is a restaurant finder mobile application that provides suggestion on food item based on their user preference. Even though existing restaurant finder app can provide indecisive minded people with food information, the apps still do not solve the problem of the indecisive minded people. This is because the existing application generates more option for their user to choose from, it is not convenient for them as it needs extra effort to make a decision. The proposed application will be developed to provide a solution to solve the problem of indecisive minded people. The proposed application will provide a suggestion of food item by sorting out options with series of a customized filter. Firebase Firestore and Google Maps Service are used in this project. Agile methodology will be used to fit this mobile application development lifecycle.

TABLE OF CONTENTS

TITLE PAGE	i
DECLARATION OF ORIGINALITY	ii
ACKNOWLEDGEMENTS	iii
ABSTRACT	iv
TABLE OF CONTENTS	vi
LIST OF FIGURES	x
LIST OF TABLES	xi

CHAPTER 1 INTRODUCTION	1
1.1 Project Background	1
1.2 Problem Statement & Motivation	2
1.2.1 Problem Statement	2
1.2.2 Motivation	3
1.3 Project Scope	4
1.4 Project Objective	5
1.5 Impact and Achievement of the Project	6
CHAPTER 2 LITERATURE REVIEW	7
2.1 Reviewing Similar Solution in the Market	7
2.1.1 OpenRice (Malaysia)	7
2.1.2 Foodpanda	8
2.1.4 Summary of reviewed Apps	9
2.2 Software and Languages for App Development in Modules	10
2.2.1 UI Design & User Experience	10
2.2.2 Language for App Development	10
2.2.3 Database for Data Warehousing	11
2.2.4 Map Service for Location Tracking	12

CHAPTER 3 SYSTEM DESIGN	14
3.1 Site Map	14
3.2 Use Case1 Diagram	16
3.2.1 Login Module	16
3.2.2 Food Recommendation Module	16
3.2.3 Restaurant Module	17
3.2.4 FoodChoice Module	17
3.3 Flow Chart	18
3.3.1 Signup Flow Chart	18
3.3.2 Get Food Recommendation Flow Chart	19
3.3.3 Create New Food Choice Flow Chart	20
3.3.4 Create New Restaurant Flow Chart	21
3.4 System Wireframe	22
3.4.1 Login Screen	22
3.4.2 User Home Page	23
3.4.3 Food Suggestion Layout	24
3.4.4 Restaurant Listing Layout	25
3.4.5 Admin Panel	26
3.4.6 Add New FoodChoice	27
3.4.8 FoodChoice Listing	28
3.4.9 Add New Restaurant	29
CHAPTER 4 METHODOLOGY & REQUIREMENT	30
4.1 Design Specification	30
4.1.1 Methodologies and General Work Procedures	30
4.2 Requirement	33
4.2.1 User Requirement	33
4.2.2 System Requirement	35
4.2.3 System Performance Definition	36
CHAPTER 5 IMPLEMENTATION & TESTING	37
5.1 System Implementation	37
5.1.1 Application Development tools	37

5.1.2 System Database	38
5.1.3 Authentication	39
5.1.4 Other Library and Plugin used for Development	40
5.1.5 FoodChoice Recommendation Module	41
5.2. System Testing	45
5.2.1 Verification Plan	45
5.2.2 User Acceptance Testing (UAT)	46
CHAPTER 6 CONCLUSION	48
6.1 Project Review, Discussions and Conclusion	48
6.1.1 Project Achievement	48
6.1.2 Problems Encountered	49
6.2 Future Work	50
REFERENCE	51
APPENDIX A SCREENSHOT APPLICATION	A-1
1.0 Screenshot of Reviewed Apps	A-1
2.0 Review of UI Design & User Experience	A-2
APPENDIX B WEEKLY REPORT	B-1

LIST OF FIGURES

Figure Number	Title	Page
Figure 3.1	System Site Map	14
Figure 3.2	Use Case Diagram	16
Figure 3.3.1	Account Signup Flowchart	18
Figure 3.3.2	Get Food Recommendation flowchart	19
Figure 3.3.3	Create New Food Choice flowchart	20
Figure 3.3.4	Create New Restaurant flowchart	21
Figure 3.4.1a	Login Screen	22
Figure 3.4.1b	Login Screen	22
Figure 3.4.2	User Home Page	23
Figure 3.4.3	Food Suggestion Layout	24
Figure 3.4.4	Restaurant Listing Layout	25
Figure 3.4.5	Admin Panel Layout	26
Figure 3.4.7	Add New FoodChoice Layout	27
Figure 3.4.8	FoodChoice Listing Layout	28
Figure 3.4.9	Add New Restaurant Layout	29
Figure 4.1	Agile Process Flow	30

LIST OF TABLES

Table Number	Title	Page
Table 2.1	OpenRice	8
Table 2.2	Foodpanda	9
Table 2.3	Java vs PHP	11
Table 2.4	Couchbase vs Firebase	12
Table 2.5	Google Maps vs MapQuest	13
Table 4.2.1	User's Connectivity Requirements	35
Table 4.2.2	User's Hardware Requirements	35
Table 5.1.1	Development Software	37
Table 5.1.2	Development Hardware	38
Table 5.2.1	Login Page (Mobile Number) Test Case	43
Table 5.2.2	Login Page (Facebook Login) Test Case	44
Table 5.2.3	Sign Up Page Test Case	44
Table 5.2.4	Home Page Test Case	45
Table 5.2.5	Add New FoodChoice Test Case	46
Table 5.2.6	Add New Restaurant Test Case	47

CHAPTER 1 INTRODUCTION

This chapter will briefly introduce about what is the proposed application of this project.

1.1 Project Background

A psychologist named Abraham Maslow had introduced a motivational theory in year 1943 to list the fundamental of human needs. According to the psychology theory of Maslow (1943), there are five stages of human needs which arranged in hierarchical form. The five stages are physiological, safety, love/belonging, esteem and self-actualization. Physiological needs is located at the bottom of the pyramid and it is the main physical requirements for a human to survive. For example, food, air, water, shelter, sleep, etc. (Mcleod 2018). This physiological needs is the main component that had to be discussed in the project.

An adult needs to take a minimum 3 meals in a day to carry out its daily activities. Based on the statistics from Six Fundamental Human Needs We Need to Meet to Live Our Best Lives (2018), a human requires a variety of nutrients which includes carbohydrates, protein, fat for the body to function in normal condition and most of the nutrients are originated from food. Thus, food is very important for every single human. Humans will be motivated to seek for food when they are hungry. Humans can choose to satisfy their hungriness through own cooking or eating out at the restaurant. However, many adults especially young adults choose to eat out not only due the inability in cooking but many of them do not have time to cook on their own. According to the statistics of the year 2014, more than 64% of Malaysians will choose to eat at least one outside meal per day. (Tan 2014). Most of them thinks that cooking takes lots of their time and it is tiring after work. So, restaurants play an important role to help the humans to solve their 3 daily meals.

Since nowadays there are a high demand of eating out, thus there is an increasing amount of supply which is restaurants to the market. An increasing amount of restaurant creating more varieties of choices for people to choose which restaurant to settle their meals. Studies showed that humans would be difficult to do their final decision if they are given various alternative options (Dhar 1997.). Since human take a

minimum 3 meals a day, they might keep repeating or rotating those few choices of the meal. This is common phenomena of a normal human for being afraid when they are trying new things with doubtful risk (Patalano and Wengrovitz 2007). People tend to have indecisive mind when they are trying to choose a restaurant from a variety of choices. This problem can be solved with a set of categorization and listed them in a food directory. For its extensibility, this kind of food directory should be able to access it anytime anywhere. Thus, people can refer to the food directory during the time they need to decide their meal.

1.2 Problem Statement & Motivation

1.2.1 Problem Statement

Humans having problems with an indecisive mind when they had to choose what to eat for their daily meals. As a result, having an indecisive mind will consume a lot of time when making a decision. Based on a past survey, there is only a leader out of a group people which always be the one who is responsible to make the decision (Black 1948). This concludes that leader of a group will usually decide the venue for their meal. The others will just follow what had been suggested since they are lazy to decide on the place to eat. As a result, fulfilling humans' physiological need takes a lot of efforts and time to complete.

Working adults especially office workers normally have one hour of lunch time per working day which is stipulated by their companies. However, apart from the one company workers start their lunch time at a specified time, there are also other companies would have the same lunch hour. Thus, almost every restaurant will be in full of customers. They might have to wait for a quite some time before getting a place or table to order their food. Although the office workers can choose to change another place to eat, but there is still a higher chance that the restaurant is also packed with customers. If there is a method that enables the office workers to know in advance whether the restaurant is packed with customers or not, this can greatly save the time that might consumed unnecessarily. The workers can now have enough time to eat their lunch and will also reach their office punctually before their lunch hour ends.

1.2.2 Motivation

The motivation of this project is to solve the problem of indecisive mind of humans to decide where to settle their meal. In order to maximize the usability and the effectiveness of this project, a mobile application is the most suitable solution for this issue. According to the past studies, almost every human in this world will carry their smartphone for the whole day (Tian, Shi, and Yang 2009). Most of them will put their smartphone in the pocket or at a distance not more than 1 meter regardless they are sitting or even sleeping. Thus, in my opinion, developing a Mobile Application will provide a more realistic access to the solution anytime anywhere.

There are a lot of mobile application that carries the objectives of ‘Restaurant Finder’ in the current market. For example, Foodpanda, UberEATS, and OpenRice are the famous mobile applications which have many active users and are listed in Google play store. These mobile apps had done a great job in categorization and had listed all the food item with pictures for users to browse through but none of them actually give a solution for those who have an indecisive mind. Those restaurant finder mobile apps further increasing the difficulty for indecisive minded users to make their decision since those apps create more option for them to choose. On the other hand, these applications cannot tell a realistic information about the condition of the selected restaurant. Thus, users are unable to know when the peak hour of the restaurant is. They had to find it out themselves through online but some restaurant does not publish their details online. The users will find it difficult to know about the details or condition of the restaurant.

1.3 Project Scope

The direction of this project will be as a mobile-based application and are targeted to run on the Android platform. The project will be done in several phases. The first phase of the application will mainly target on the whole Kampar area which is located in Perak. This application is made to specialize target users who want to search for a restaurant to settle their meal. Besides, it also targets user that are indecisive when choosing a meal and are willing to accept the suggestion provided in the mobile apps. This application assumes that all users are indecisive and willing to use this application. This project will study the behavior pattern of users from their past decisions which can help to improve the suggestion for the indecisive users. This project has a basic rating module that will record users' preferences. The rating system helps the computer to provide a better suggestion for the users. The aim of this project is to target user preference and calculate an algorithm for improving the suggestion of the meal.

Unlike other restaurant finder mobile apps, this application does not include a list of restaurant directory with their food menu. Each restaurant will be limited to list its food item based on the current food choice listed in the server database. The application is able to provide a different filter to provide better assistance to solve the decision making of the users. These filter will include stored user preference, user's location, rating score, and restaurant population prediction.

This project covers the system food choice for the user to browse through but it does not cover a full restaurant directory with food item. By using the application, users are able to learn the prediction of the restaurant population. This project does not cover a navigation module to the restaurant on the final application.

1.4 Project Objective

- 1. To help indecisive user to improve the effort of decision making on daily meal choice.**

In order to improve the effort of decision making, computer calculation will be implemented into the suggestion result. The aim of this application is to help indecisive people to decide their meal choice in an easier way. Despite knowing several restaurants located nearby, those meal seeker can understand and decide on the food choice clearly. In short, the user will have a clear view of what to eat by following the suggestion given by the system.

- 2. Enable user to search for a restaurant with filters.**

In general, this project will suggest food choices filtered by a preset algorithm to help people with an indecisive mind to make their meal choice. Users can further filter with the rating of the restaurant. The system will show the estimated time for the food to sell out input by the restaurant owner.

- 3. To provide a predicted population of selected restaurant before heading to the restaurant.**

The application tries to shorten the time for completing each meal by decreasing the time taken to queue in a crowded restaurant. By estimating the population in the restaurant, users can have a clear mind that which restaurant should be avoided as it might be crowded. Based on food choice suggested by the system, users can avoid spending much time on browsing through food choice and also will decrease the amount of time consumed for making decision on what to eat. As a result, users have more time to enjoy their food without worrying time constraint.

1.5 Impact and Achievement of the Project

The proposed mobile Apps will help users avoid and skip the effort to browse through all of the menus in the typical food directory application that listed by each restaurant. Existing application in the market provides great food directories that show many available choices of food, but these do not solve the problem of the user with an indecisive mind. This is because those existing restaurant finder app just provides detailed info about each restaurant and their food item. Thus, this will indirectly creating more choices for users to make their decision. In the end, user's problems cannot be solved and more choice have to be filtered by them. By using the proposed mobile application, users will be suggested with customized choice based on user preference. Thus, users will have a clear mind on which to choose. As a result, users can save time when deciding a meal by putting lesser effort with the proposed mobile application.

CHAPTER 2 LITERATURE REVIEW

This chapter will talk about research made on the current market including reviewing similar application and all supporting aid when developing the project.

2.1 Reviewing Similar Solution in the Market

By doing some research on Google Play Store, there are some Mobile Applications that is currently sharing the similar concept of this proposal idea in the market. These available Mobile Apps will be reviewed and discussed. All application that reviewed and discussed in this part of the report are all based on Malaysia. This will eliminate the issue of culture difference in the research and providing not accurate data for the final decision. There are several mobile application providing solutions such as meal delivery and restaurant's table booking for their user.

2.1.1 OpenRice (Malaysia)

OpenRice is a mobile application which targeted on IOS and Android platform. This App is first started in Hong Kong and starting providing its service later in Malaysia. OpenRice allows the user to search a restaurant from its database with restaurant type or keywords. The app also allows searching by type of food such as cuisine and dishes and even sort by listed prices. (Refer to Figure 1.A.1 & 1.A.2 in Appendix 1.0 for App Screenshots)

Comment on OpenRice

OpenRice is a platform which started their business early and means they have a huge advantage in the current market. They know what their user want and provide good services to their user. Their biggest strength is that they have a good marketing team which held many campaigns to increase their user size. Basically, OpenRice is created as a food directory for the user to browse through. OpenRice act as a 'social media' for a restaurant where all meal info and restaurant are listed in the APP.

App Summary:	
Name :	OpenRice
Supported Platform :	Android & IOS
App Type :	Restaurant Directory ,Restaurant Locater , Blog , Booking
Extra Features :	-Search Method : Prices, Landmarks, Keywords, , Areas, Dishes, Restaurant Type , Cuisine, Districts - Having a separate App Only for restaurant.

Table 2.1 OpenRice

2.1.2 Foodpanda

Foodpanda is a mobile application which targeted on IOS and Android platform. This App is based in KL and Petaling Jaya and having a choice of more than 180 participating restaurants. This App providing its service as a food delivery service in Malaysia. Foodpanda allows the user to order a meal on the app and delivery to user doorstep by entering the address or using GPS location. It is able to track the real-time location of the order. (Refer to Figure 1.B.1&1.B.2 in Appendix 1.0 for App Screenshots)

Comment on Foodpanda

Foodpanda is a platform which started its business in Malaysia and now expand to Hong Kong. Their main service is to act as a middleman and helps the user to take away food from a restaurant nearby and deliver to the user doorstep. All item and menu are listed in their APP so that user can choose from and have a deliveryman standby to deliver the meal to the user doorstep. Basically, Foodpanda can be work as a food directory but it consists not only normal restaurant but including hawker stall in some hawker center.

App Summary:	
Name :	foodpanda - Local Food Delivery
Supported Platform :	Android & IOS
App Type :	Restaurant Directory ,Meal Delivery , Blog , Booking
Extra Features :	• Able to track User Location for delivery destination • Able to track order location

Table 2.2 Foodpanda

2.1.4 Summary of reviewed Apps

There are many more other solutions available in the market and two out of them are chosen for review. Based on the review, these two Apps have a common function which was having a wide list of restaurant directories and food menu for a user to browse through. By having this directory, the restaurant owners can promote their restaurant together with their menu. User or customer can benefit from this as the user can also give a rating on the restaurant for another user to have a piece of extra information before choosing the specified restaurant. The solution of the two App provided can be broken down into two types which are Restaurant Seat/Table Booking and Meal Delivery Service. Based on research, these two types of solution are popular among apps with the tag on 'Restaurant Finder'. However, based on the problem statement, these Apps do not and cannot solve the main problem of indecisive when deciding on meal choice efficiently. All the three reviewed Apps had suggested many types of Cuisine or Dishes but these application indirectly add more option for user to choose rather than eliminating it.

2.2 Software and Languages for App Development in Modules

2.2.1 UI Design & User Experience

User Interface (UI) and User Experience have been a huge topic on application and web development. A good UI can grab user attention while maintain the relationship between user. For User Interface, few mobile apps had reviewed to have a better UI design idea.

(i) Waze – GPS, Maps, Traffic Alerts & Live Navigation

Waze is a Navigation app which design its UI with a world map aid with menu and small function icon. This kind of design emphasize the map to let user have a clear view on navigation map. (Refer to Figure 2.A.1 & 2.A.2 in Appendix 1.0 for App Screenshots)

(ii) oBike-Stationless Bike Sharing

oBike provides bicycle renting service which use its App to locate or unlock its bike. The user has to use the App in order to use their service. oBike'app has a clean design that using the map as background and hide menu which presents a better and clean design. (Refer to Figure 2.B.1 & 2.B.2 in Appendix 1.0 for App Screenshots)

2.2.2 Language for App Development

(i) Java

Java is one of the famous programming language preferred by most of the programmers. Java is known as the main coding language for enterprise-level applications. Most of Google's Android apps released in the Google Play store are written in Java. Java is object-oriented programming for easy development and flexibility. Java is based on C++ but it is simpler than C++. Java is a free and open-source language with rich API and SDK. Java will be a good choice for the language of Android Apps.

(ii) PHP

PHP which is known as “Hypertext Preprocessor” is the main use for scripting language, especially for web application development. PHP coding can be embedded into HTML for an extension when developing a web app. This why PHP is widely used to develop a web-based application which targets for all platform with the web browser.

Summary and Comparison

#	Java	PHP
Advantage	• Widely used to develop Android based application • Better performance and security. • Rich of API and SDK • Object-oriented language and easy to understand	• Mainly for web application development. • Strong library support • Extremely simple for a newcomer
Disadvantage	• It is not available on all platforms.	• Not designed for creation of huge applications

Table 2.3 Java vs PHP

2.2.3 Database for Data Warehousing

Based on research, there are two types of the database for Application development which is SQL and NoSQL. SQL is a relational database which stores record as rows in a table while NoSQL is a non-relational database which stores the record in a single document in JSON or XML. In this case, the real-time database service is more suitable for a proposed solution.

(i) Firebase

Firebase is introduced by Google and updated to a newer version in I/O 2016. Firebase is providing solution for Mobile like IOS and Android and web application. Firebase use only one SDK and one console for managing application including web, IOS and Android. The Firebase SDK supports programming in Java, Swift, JavaScript/Node.js, JavaScript, Objective-C, and C++

(ii) Couchbase (Lite)

The structure of Couchbase Lite is document-oriented. All Couchbase's data is stored to its server as JSON files. It could have numerous attachments in each file. Usually, binary data will be stored at first, then it will loaded respectively from the file itself. It provides secure access and background synchronization between all clients. Couchbase offer their service across multiple platforms including Android and IOS.

Summary and Comparison

#	Couchbase Lite Database	Firebase Realtime Database
Advantage	• Having Real-time synchronization. • Having Security for reading and writing data. • The conflict resolution can be customized. • No data amount restrictions.	• Having Real-time synchronization. • It synchronizes only data that user requests. • Having Security for reading and writing data. • Free for small projects. • Easy to start.
Disadvantage	• It is not easy to start. • Needs of Application Server	• Having data amount restrictions • Unable to customize conflict resolution • Not suitable for big project

Table 2.4 Couchbase vs Firebase

2.2.4 Map Service for Location Tracking

(i) Google Maps

Google Maps is clean and simple, and the site's homepage presents with a single search box interface. Google Maps on mobile have more than 79 million unique each month and the amount of web browser version will be much greater from this. A variety of Google Maps APIs is able to found on the internet. Those API provide detail documentation for developer to refer. One of the most beneficial parts is that Google has a large scale of company location data for the developer to get used of it. It is very suitable to develop an App which needs to involve many local companies.

(ii) MapQuest

MapQuest is another solution which provides location service. MapQuest offers two versions of a platform which are paid version and Open Data. The paid version includes a MapQuest Enterprise Edition license. There will be a free version platform open to all developer. The MapQuest developer site includes complete documentation on how it works and provide with a map builder as well as other developer tools.

Summary and Comparison

#	Google Maps Service	MapQuest
Advantage	• Able to search in many ways including landmarks. • Robust handling of misspellings • Faster location locating • Having large data information on Malaysian restaurant.	• Developer site includes well-designed documentation. • Open Data
Disadvantage	• Will be an expensive solution	• Not familiar in Malaysia • Map size cannot be controlled.

Table 2.5 Google Maps vs MapQuest

CHAPTER 3 SYSTEM DESIGN

This chapter will talk about the system design that how the application was develop in detail. Diagrams, flow chart and wireframe will be include in this chapter to further explain how the application work.

3.1 Site Map

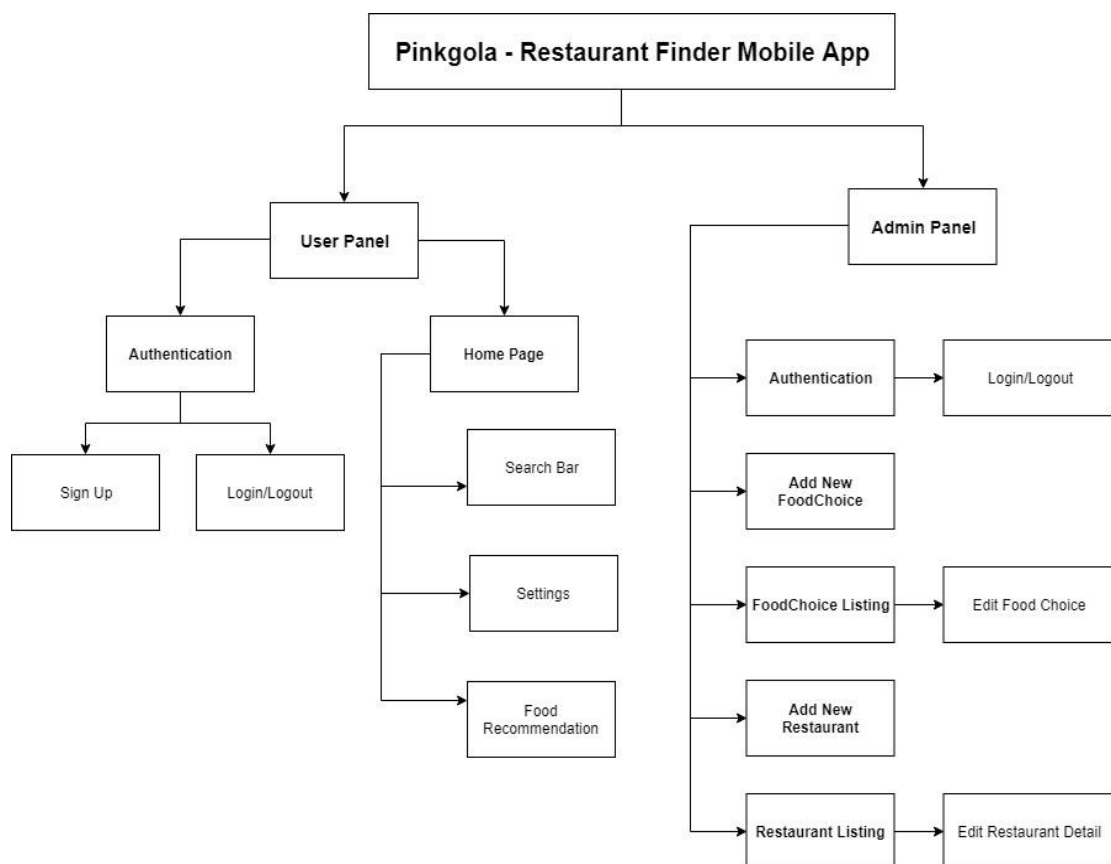


Figure 3.1 System Site Map

Figure 3.1 shown the site map diagram of the proposed mobile Apps. This diagram shows contents available on the user interface. This sitemap is in a hierarchical form and navigates from top to down. The system consists of two major views which are user panel and admin panel.

Starting from the user panel, this is the page that the user can interact with. User panel consists of several menu and page such as authentication page and system home page. Authentication page includes user login and user sign up layout. All user have to register themselves in order to use the application. Users have to sign up a new account using their mobile number or Facebook. After completing the registration procedure, the user is requested to fill in a few personalization question form. It is required for the food suggestion module to work for the first time. All of the registration processes should be complete on the very first login only.

The system will show and land on the user home page, this is where the user can interact with the application. User home page consists of a Google Maps view at the background and floating with a search bar, setting icon and food recommendation trigger button. The search bar will enable users to search for a restaurant by inputting keywords like restaurant name or food item. All search result will show in a list from the other page. The setting icon will lead the user to make some configuration in setting layout. Food recommendation is the very main function of this application as it will trigger the system to generate a list of food choice for the user. All result are generated on the background and the user might need to wait for the result came out.

Admin panel is for the administrator to add a new food choice and create a new restaurant data. Admin has to log in to the admin panel to access to admin function. On the admin panel, the admin will have few buttons to interact with the system. Adding a new food choice button will land the admin on a form layout for admin to input data. Admin is able to view all food choice listing by the food choice layout. Adding a new restaurant will be similar to adding food choice. There is a restaurant listing layout in the admin panel.

3.2 Use Case Diagram

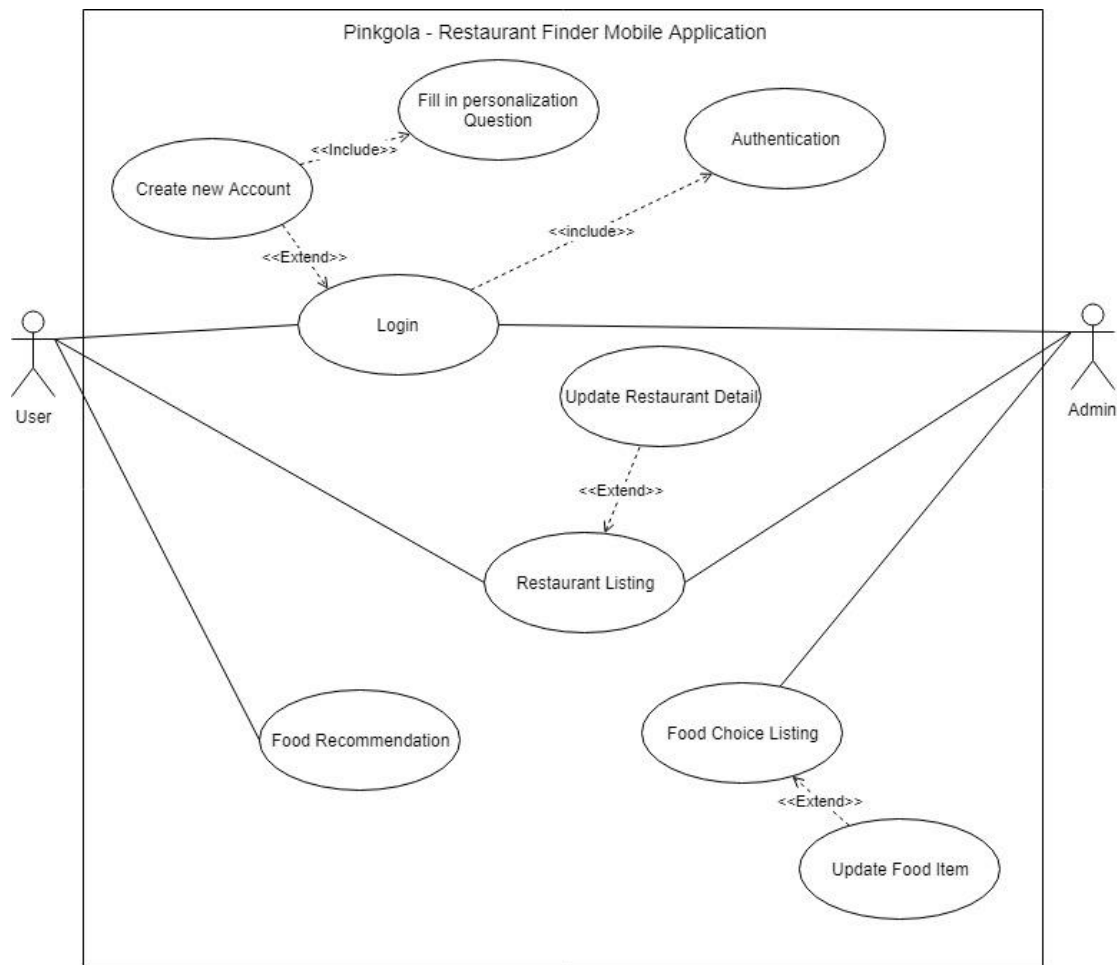


Figure 3.2 Use Case Diagram

Figure 3.2 is a use case diagram of the proposed mobile application. This diagram shows a few function of the application. The actor of the application include user and admin.

3.2.1 Login Module

This module includes authentication which system will verify user by their login id. The new user will have to register themselves by creating a new account. After creating an account, system will land user to fill in their personalization question.

3.2.2 Food Recommendation Module

This module includes all the system major function which recommends a list of food choice for the user to choose from. In order for this module to work, the system will pull user preference data to match with food choice item.

3.2.3 Restaurant Module

There are two perspectives for this module which user and admin can access to the restaurant list with the limit. The user is able to search for restaurant in the list, study the restaurant detail including the operating hour and address. Admin able to create new restaurant and update the detail of every restaurant.

3.2.4 FoodChoice Module

Admin able to create and update food choice in the admin panel while the user may only access to the food choice detail when the system recommend it in the suggestion list. All food choice data will be pulled into the food recommendation module for generating data.

3.3 Flow Chart

On this section, few flow chart will be shown to further explain the major system flow of the application.

3.3.1 Signup Flow Chart

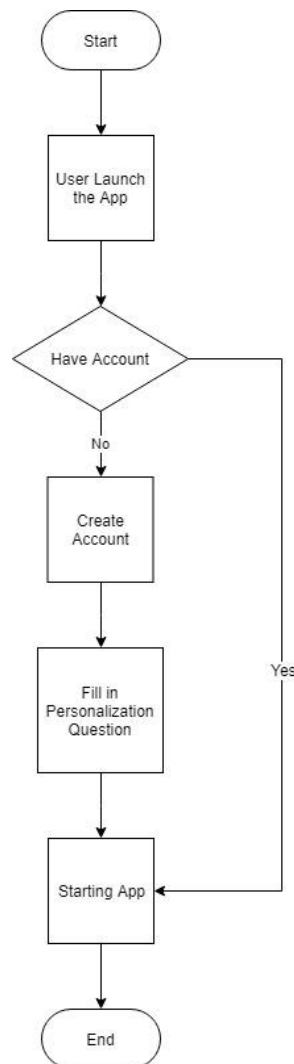


Figure 3.3.1 Account Signup Flowchart

Figure 3.2.1 is a flowchart that shows the flow of the user signup a new account. First, the system will validate the user when the app launch. If the user having a valid account, the user will start the application normally. If the user do not have a valid account, the system will require the user to create a new account. After creating a new account, the user will need to fill in personalization question before landing to the home page.

3.3.2 Get Food Recommendation Flow Chart

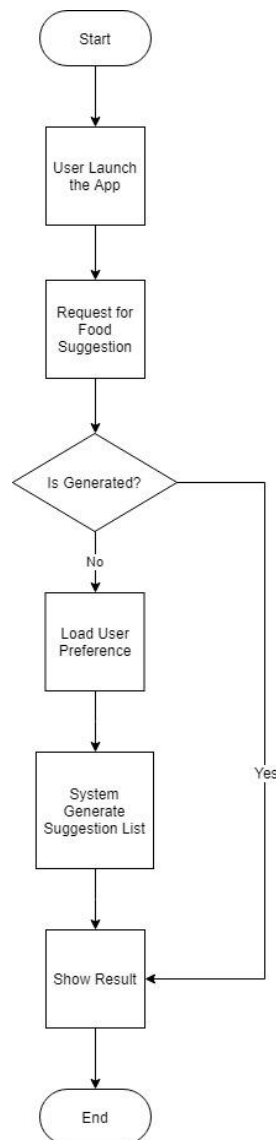


Figure 3.3.2 Get Food Recommendation flowchart

Figure 3.2.2 is a flowchart that shows the flow of the user request for food recommendation. When user launches the application, the system will land user on the home page. The user will need to click on the food suggestion button to trigger the event. The system will first check if the user had done this process before in a specific timeframe. If a result is generated previously, the system will skip all the process and display the generated result. When the user triggers the recommendation event, the system will take the user's stored user preference data into the generator module and generate a suggestion based on the user preference inputted. The system will show result when the generation complete.

3.3.3 Create New Food Choice Flow Chart

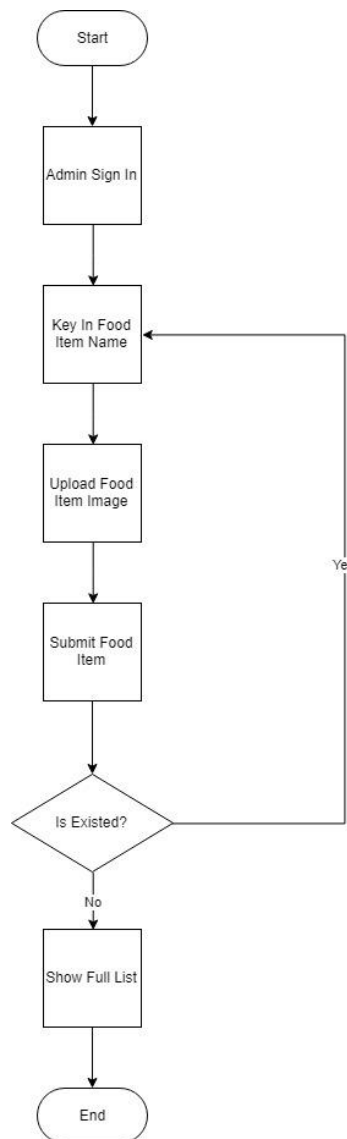


Figure 3.3.3 Create New Food Choice flowchart

Figure 3.2.3 is a flowchart that shows the flow of how admin creates a new food choice. After admin login, the admin can add new food choice by selecting create new food choice button on the admin panel. The admin will need to input the name of the food item and upload an image of the food item. After completing filling up all detail, admin can submit the food item into the system database. Before uploading the food item, the system will check if the food item existed in the system database. A full list of the food choice will show when upload completed.

3.3.4 Create New Restaurant Flow Chart

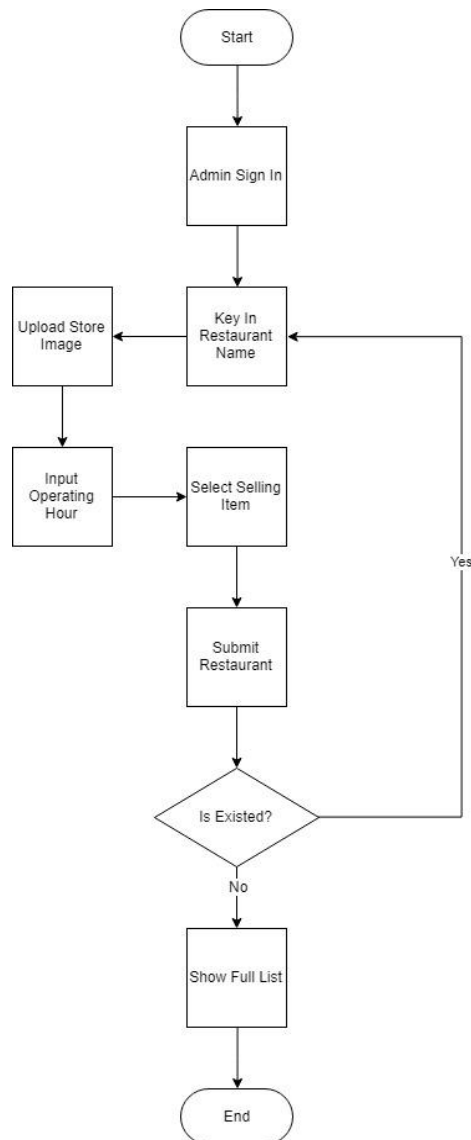


Figure 3.3.4 Create New Restaurant flowchart

Figure 3.2.3 is a flowchart that shows the flow of how the admin adds a new restaurant. After admin login, the admin can add new restaurant by selecting create new restaurant button on the admin panel. The admin will need to input the name of the restaurant and upload the store image of the restaurant. Admin required fill in the operating hour of the restaurant. After completing filling up all detail, admin can submit the restaurant into the system database. Before uploading the restaurant detail, the system will check if the restaurant existed in the system database. A full list of the restaurant will show when upload completed.

3.4 System Wireframe

This subsection will include system screenshot and a simple user manual of the proposed application.

3.4.1 Login Screen

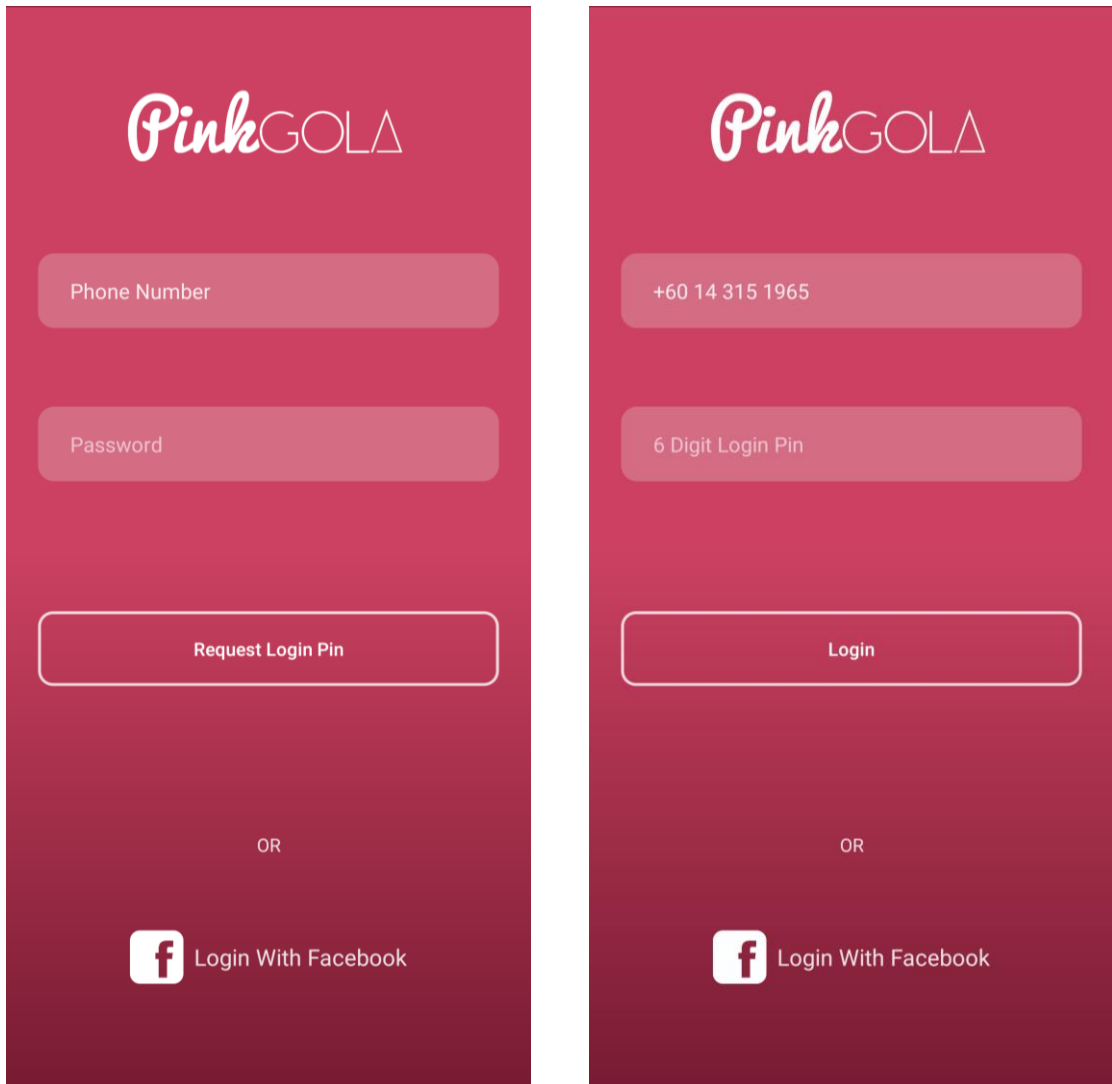


Figure 3.4.1a & Figure 3.4.1b Login Screen

Figure 3.4.1a & Figure 3.4.1b is the login screen of the application. Figure 3.4.1a shows that the user can log in with their phone number and Facebook to login into the application. Figure 3.4.1b shows that the user has to enter a 6 digit login pin that sends via SMS to them to proceed the login process. This will ensure the securities of the application and avoiding user having multiple accounts.

3.4.2 User Home Page

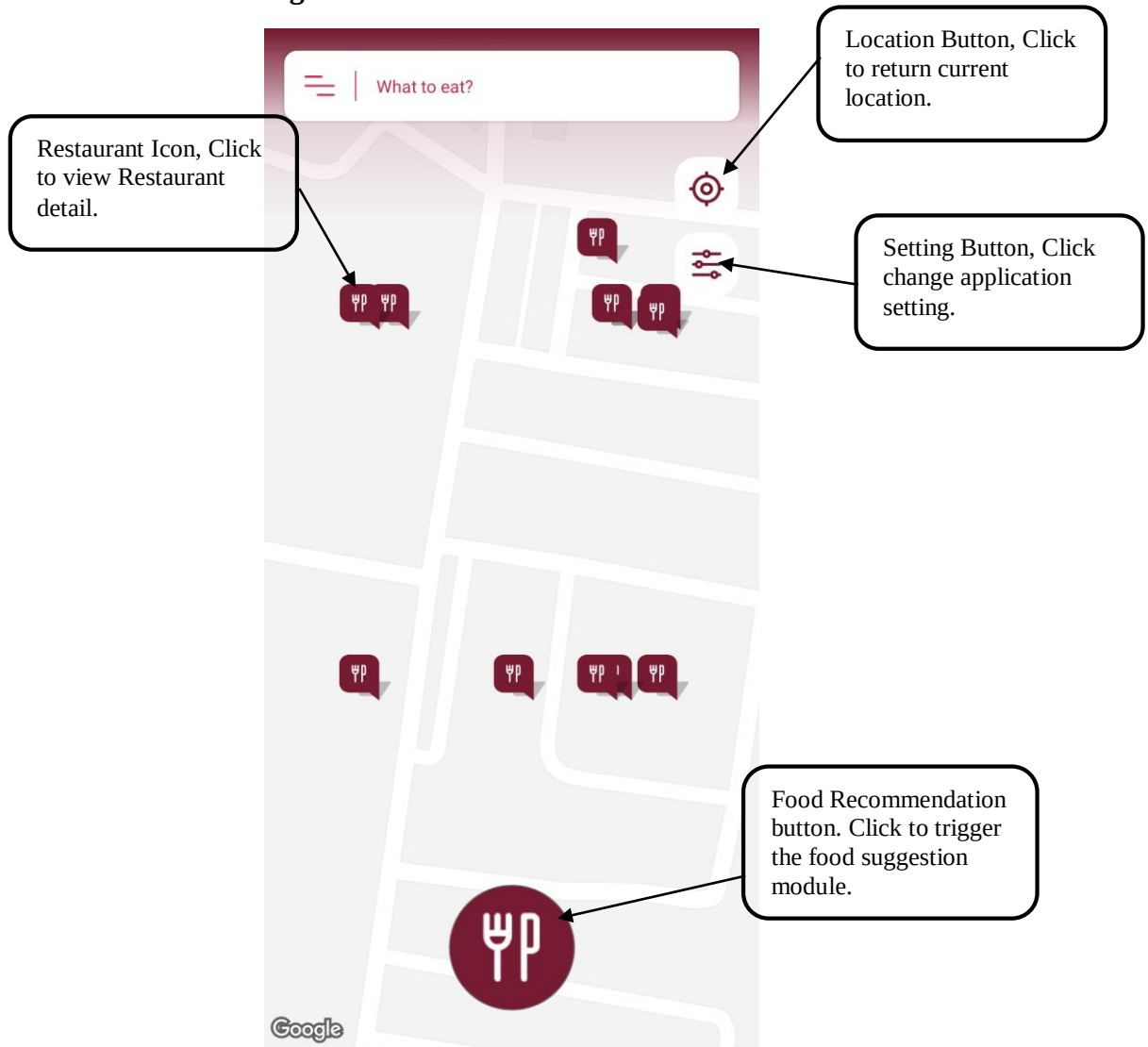


Figure 3.4.2 User Home page

Figure 3.4.2 is a screenshot of user home page. Every user will bring to this page when the app launch. User can utilize the search bar to search for a restaurant.

3.4.3 Food Suggestion Layout

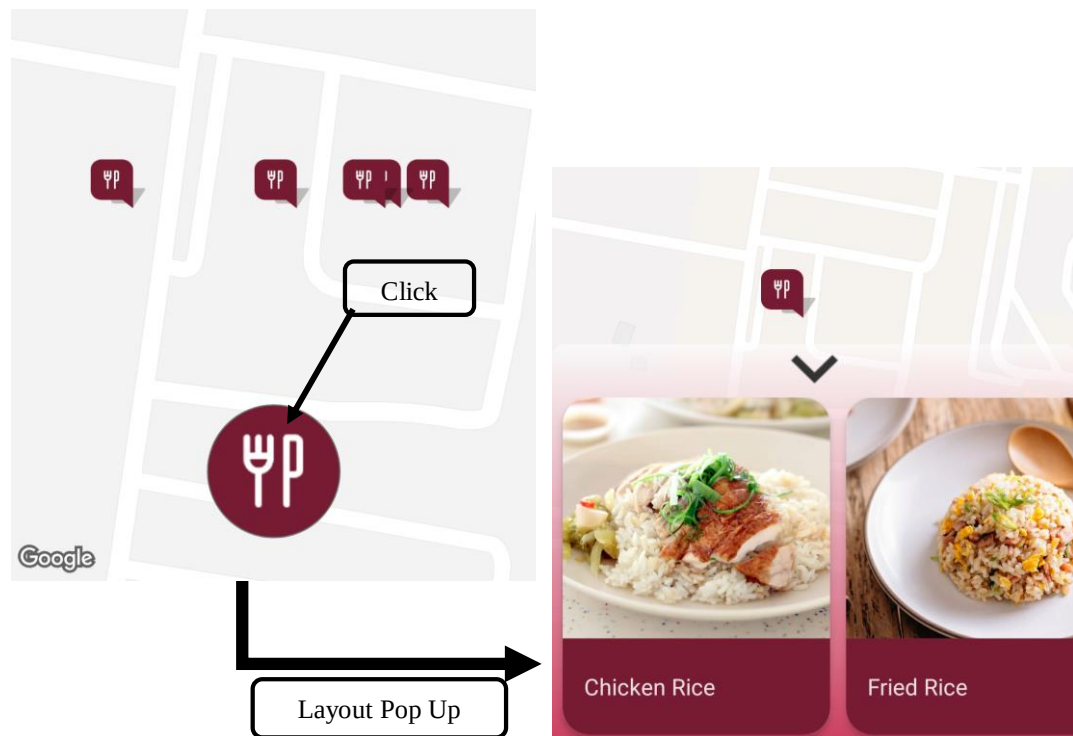


Figure 3.4.3 Food Suggestion Layout

Figure 3.4.3 show the process to get food suggestion. By clicking on the button, the system will run food suggestion module in the background and show the result as the above figure.

3.4.4 Restaurant Listing Layout

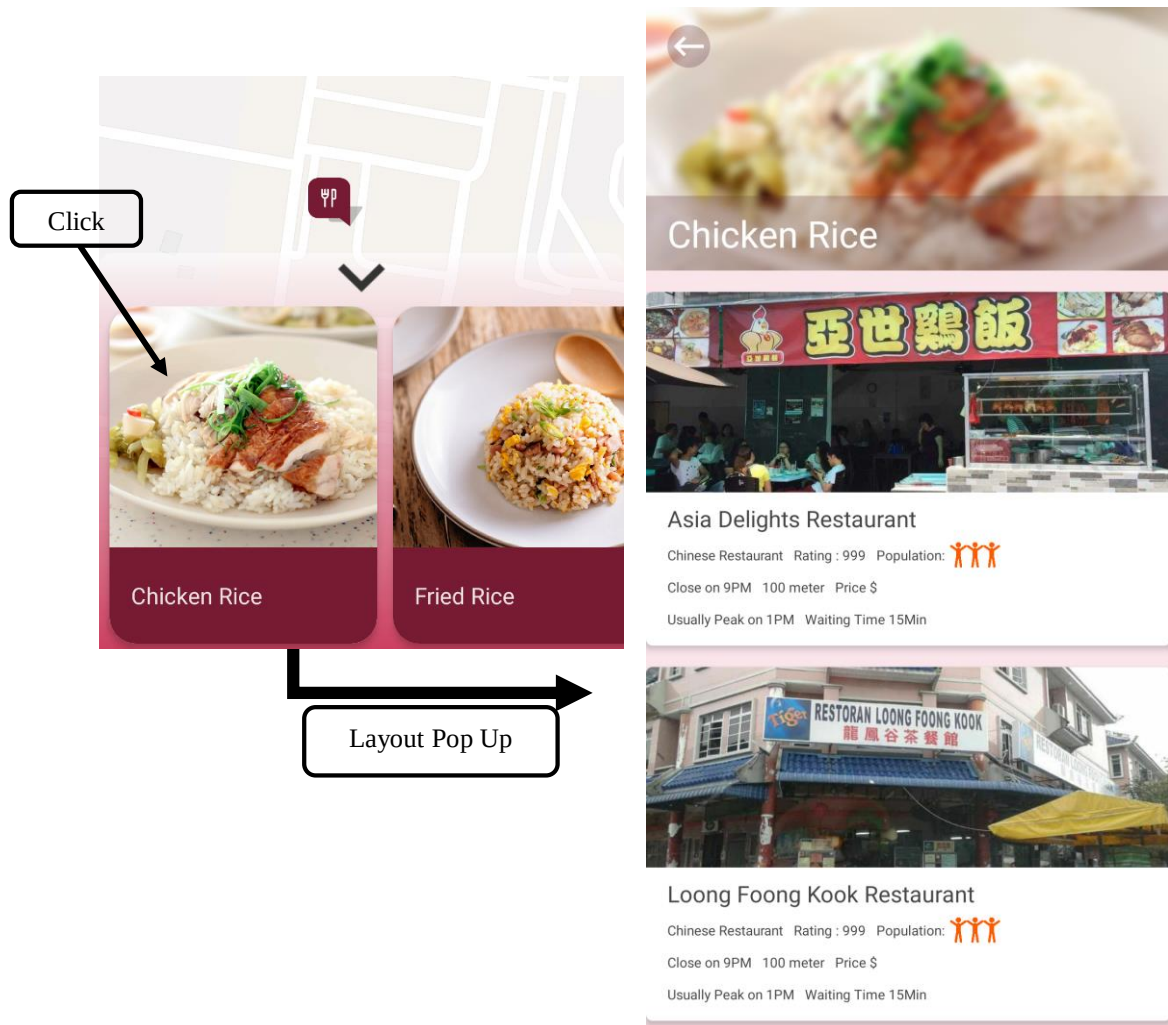


Figure 3.4.4 Restaurant Listing Layout

Figure 3.4.4 shows the listing of the restaurant selling chicken rice. By clicking on the food choice, the system shows all the restaurant that currently selling the selected food choice. The restaurant listing shows the restaurant detail including the price range, rating, distance of the restaurant from the user location. The listing also shows the expected population of the restaurant. This will aid the user to choose a place to have their meal.

3.4.5 Admin Panel

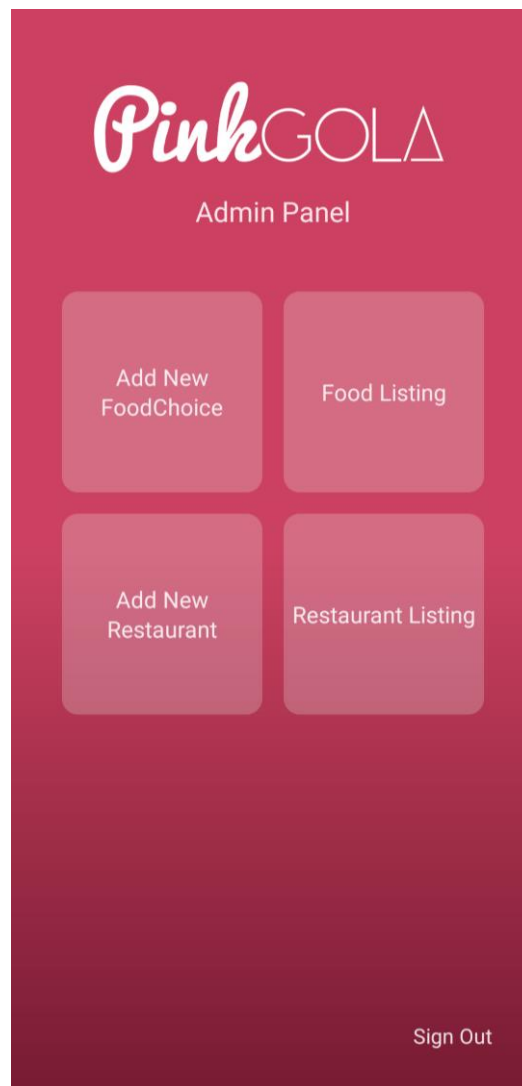
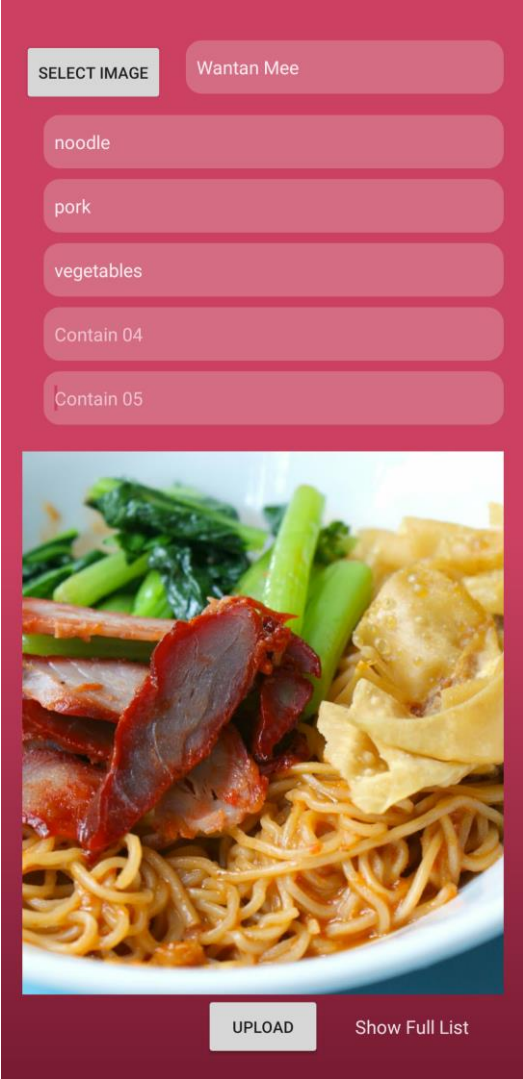


Figure 3.4.5 Admin panel layout

Figure 3.4.5 is a screenshot of the admin panel. Only admin will password can access to this layout. In this admin panel layout, admin can add new food choice or restaurant.

3.4.6 Add New FoodChoice



SELECT IMAGE

Wantan Mee

noodle

pork

vegetables

Contain 04

Contain 05

UPLOAD

Show Full List

Figure 3.4.7 Add New FoodChoice Layout

Figure 3.4.7 show the layout for admin to add new food choice. Admin need to enter the necessary detail and upload the food item image.

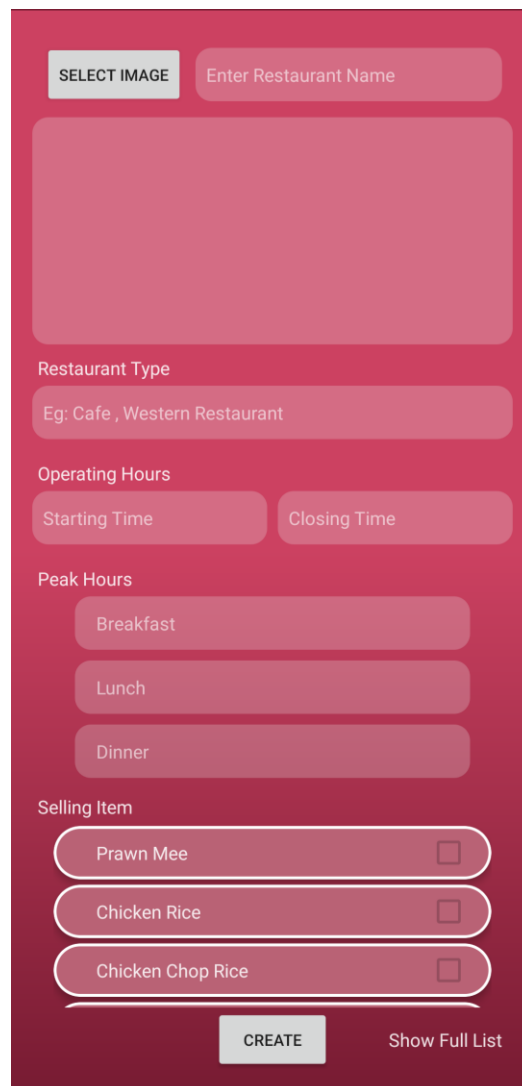
3.4.8 FoodChoice Listing



Figure 3.4.8 FoodChoice Listing Layout

Figure 3.4.8 shown the full layout of the FoodChoice. Admin able to edit and delete the food item in this layout.

3.4.9 Add New Restaurant



The form is titled "Add New Restaurant" and is set against a dark red background. It contains several input fields and buttons. At the top, there is a "SELECT IMAGE" button and a text input field labeled "Enter Restaurant Name". Below this is a large rectangular area for the restaurant image. The "Restaurant Type" section has a text input field with the example "Eg: Cafe , Western Restaurant". The "Operating Hours" section includes two text input fields: "Starting Time" and "Closing Time". The "Peak Hours" section has three stacked text input fields labeled "Breakfast", "Lunch", and "Dinner". The "Selling Item" section features three stacked text input fields: "Prawn Mee", "Chicken Rice", and "Chicken Chop Rice", each with a checkbox to its right. At the bottom, there is a "CREATE" button and a "Show Full List" link.

Figure 3.4.9 Add New Restaurant Layout

Figure 3.4.9 show the layout for admin to add new restaurant. Admin need to enter the necessary detail and upload the store image. Admin requested to check the selling item in the bottom of the form. There are the full list of FoodChoice in the database.

CHAPTER 4 METHODOLOGY & REQUIREMENT

This chapter will include a complete explanation of the proposed method for the main objective of this project.

4.1 Design Specification

This subtitle will include a methodology applied to this project and development tools used. In a simple word, a general approach made to show how the final project output.

4.1.1 Methodologies and General Work Procedures

There are a lot of methodologies available in the current market but most suitable for this project is agile methodology. This is mainly because agile development separates the whole development process into phases. This method will help the project to cope with all changes that suitable in the market. The greatest advantage is that any error found during the middle of the project can be fixed. Besides, an agile development welcomes any involvement with the customer and work with all developer. Each phases are made with testing for its stability including the quality of the project. The methodology is the best for mobile application development as a typical mobile app development lifecycle are shorter comparing with web application or a desktop application.

Typical agile process flow have six phases. The process flow are concept, inception, iteration and it follow up with release, production, and retirement. The major phase of this development process will be the iteration phase. This iteration phase includes the communication with the developers and the customer.

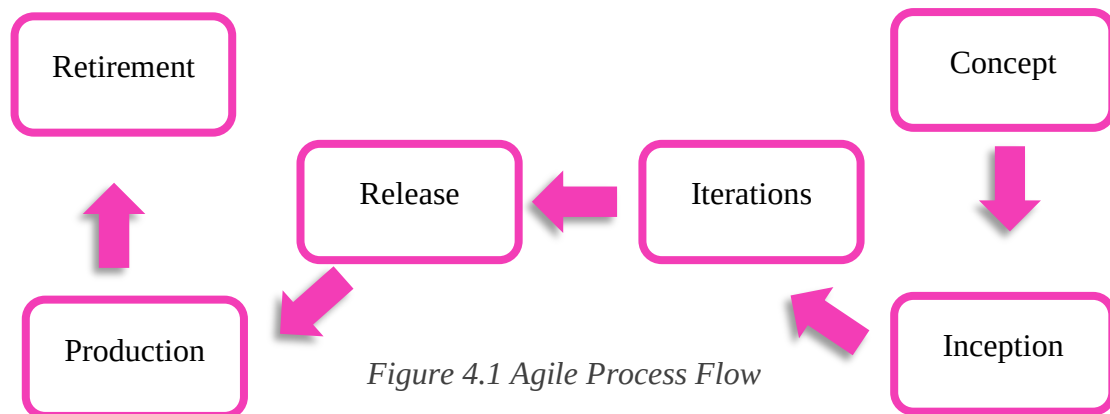


Figure 4.1 Agile Process Flow

➤ **Concept Phase**

1. Aware the problem of indecisive mind on making decision for daily meal.
2. Study the human behavior and review the cause and effect.
3. Analyze current available solution in the market.
4. Draft and plan a better solution from what had existing in the market.

Deliverable: A proposal of proposed mobile Apps was produced.

➤ **Inception Phase**

1. Various module divided from proposed project.
2. Schedule each module with suitable work duration.
3. Visualize each modules with Diagram and Site map.
4. Getting user involvement on system design.

Deliverable: Diagrams such as UML diagram, use case will be drawn.

➤ **Iteration Phase**

1. Allocate each modules based on the module priority.
2. Given chance for user to do testing on module and gather new feedback to improve the application.
3. Wireframe drawn to visualize the whole application.
4. Developing proposed application using Android Studio IDE and Firebase.

Deliverable: Get prepare and start up the software development.

➤ **Release Phase**

1. Perform testing on each module and ensure performance quality.
2. Integrate all module and ensure integration quality.
3. Ensure error free on the application.
4. Involve user on application usability testing.

Deliverable: Perform testing on application and finalize the documentation.

➤ **Production Phase**

1. Ensure all module work properly and maintain in good condition.
2. Conduct a demonstration for the application.

Deliverable: Release the completed application.

4.2 Requirement

This sub-chapter will gather all kind of requirement to complete the application development. The requirement includes user requirement, tools, and hardware requirement. The proposed application will have three major roles which are the users, restaurant owner, and administrator. In the first phase of the system development, there will be only users and administrator. Restaurant owner role will be added in during the second phase of the system development. User interface and admin interface will be built into a single application. In short, the administrator will be the backend of the first phase of the system while the normal user will be the end user of the application.

4.2.1 User Requirement

Global Used Module

I. Authentication Module

- a. User can register using phone number or Facebook Account. (User)
- b. TAC Verification on phone number registration. (User)
- c. Provide hidden portal to log into admin panel. (Admin)

II. Location Services and Maps Module

- a. The system able to track user location.
- b. The system able to search for nearby restaurant. (User)
- c. The system able to upload user location to server from time to time. (User)
- d. The application able to track user location at background for population prediction. (User)
- e. The system able admin to pin point restaurant location for new restaurant registration. (Admin)

Main System Module for User

- I. User Account Module
 - a. Show user Facebook profile picture if user link to their Facebook.
 - b. Allow system to learn user behavior.
 - c. Allow user to save food choice as favorite.
 - d. Allow user to add in extra user preferences to system.

- II. Restaurant Profile Module
 - a. Show restaurant's profile with restaurant location and picture.
 - b. Show restaurant's current expected population.
 - c. Show restaurant's rating.
 - d. Show restaurant's peak hour and operation hour.

- III. Option Filtering Module
 - a. User have a UI to choose basic personal info. (Eg. race, allergic, etc.)
 - b. System able to filter option based on basic personal info.
 - c. System able to filter option based on user's current location.
 - d. System able to filter option based on expected restaurant population.
 - e. System able to show predicted food availability based on searching time.

Main System Module for Administrator

I. FoodChoice Module

- a. Allow admin to add in new food choice into system.
- b. Allow admin to edit the existing food choice.

II. Restaurant Profile Module

- a. Allow admin to add a new restaurant into system.
- b. Allow admin to edit exiting restaurant.
- c. Allow admin to specify selling item of the restaurant based on available FoodChoice in the system database
- d. Allow admin to enter restaurant peak hour and operating hour into the system.

4.2.2 System Requirement

A) User Connectivity Requirements

Description	Requirement
Internet connection	YES
GPS	YES
Bluetooth	NO

Table 4.2.1 User's Connectivity Requirements

B) User Hardware Requirements

Description	Minimum Requirement
CPU	2.0 GHz or higher
RAM	2GB or higher
Internal storage	1GB

Table 4.2.2 User's Hardware Requirements

4.2.3 System Performance Definition

Since the proposed mobile Apps will be mainly working with the user's current location, the improvement in accuracy and conserving battery is the main concern for this Apps. Speeding up the allocation speed will further speed up the process for the system to filter all restaurant by location. There is 2 major location provider for the user's location which is GPS and network. GPS provider provides location data with satellites technology. This process will cost some time to get a location to fix. Network provider will determine the location of the user based on the cell tower or any WiFi access point which this provider need to retrieve the result from a network lookup. These location providers can speed up the location determination process and provide an accurate result to the user.

In order to provide a better choice for the user, the proposed mobile Apps will include a user behavior study module. This module will help with the filtering module of the system to suggest a food item which is not being picked before during the past few days. As humans need to take 3 meal a day, the amount of study is huge compared with what user input when they first register the Apps. This module will try not to suggest a repeated meal that the user had in the past few days.

CHAPTER 5 IMPLEMENTATION & TESTING

The chapter will briefly talk about how the application being develop. This chapter will explain all the development tools and plugin used. A test plan is created to test the application before application deliver.

5.1 System Implementation

This subchapter will further explain how the system is developed. A list of library with usage explanation will be include in this subchapter

5.1.1 Application Development tools

This subsection will include the development tools that used for the project.

A) Development Software

	Software / Web application	Functions
1.	Android Studio IDE	a) Use for develop Android application b) Use for build project APK installer of the mobile application.
2.	Firebase	a) Act as the real time database for the proposed application. b) Use as a cloud storage to store images
3.	Draw.io	a) Use to draw the UML, use case, and flowchart.

Table 5.1.1 Development Software

B) Development Hardware

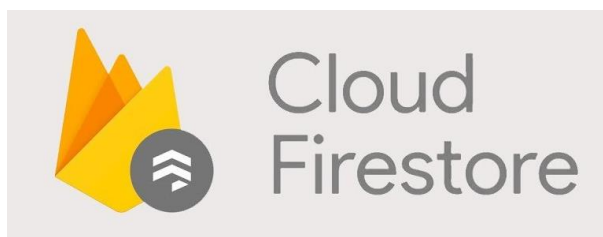
	Hardware	Description
1.	Mobile Device	Any android mobile phone with Android 5.0 and above. Used for testing and demonstration.
2.	WorkStation	Any Computer system running latest Windows 10 Operating System. Used mainly for develop the proposed project.

Table 5.1.2 Development Hardware

5.1.2 System Database

The database of the proposed application is based on Google's Firebase. Firebase is a No-SQL cloud solution that store data in collection and document. It is very suitable to use it as the application database since the application needs to cater many use case which is not suitable to have a structural database like SQL database. Firebase Firestore provides real-time feedback which very useful for the application to grab data which needed to be in real time.

A. Firebase Firestore



Firebase Firestore provides a real-time update that enables the system to grab the data needed in real-time. Firestore used to store all of user account data, restaurant account data including FoodChoice data.

B. Firebase Cloud Storage



Firebase Cloud Storage provides the place for storing large file such as images and documents. In the application, Cloud Storage used to store all the images of FoodChoice and restaurant store images.

5.1.3 Authentication

Authentication is a very important function of the application as it differentiates every user that use the application. The application uses the mobile number as the login ID and it authenticates with 6 digit login pin that sent to user mobile number via SMS service. Facebook Login also implemented in this application to ease user and provide a better user experience.

A. Facebook Login



The user is able to sign in with their Facebook account after the account registration. The user is still required to enter their mobile number for the first time to record user phone number. The user will be requested to fill in personalization question to enable the account to work as usual.

B. Firebase Authentication



Firebase Authentication is a plug-in included when the project access on Firebase. Firebase Authentication enables the system to differentiate user with unique user ID. Database are able to make query based on use ID.

5.1.4 Other Library and Plugin used for Development

This subsection will introduce some android library that used in the system application.

I. Picasso

- A powerful image downloading and caching library for Android.
- Used to import image from database into Image View

II. Google Maps API

- Provide Google Maps for marker illustration.
- Used to enable map on home screen to work.

III. Google Location Services

- Detect user location using GPS or internet network.
- Used to get user location to allocate user in the map.

IV. Search Engine

- Search for keyword and generate result.
- Used on search bar to search for restaurant.

5.1.5 FoodChoice Recommendation Module

This subsection will explain how the module run in background when user trigger the module. There will be few data input for this module and a scenario to explain the flow of the recommendation.

Data Input Types

1) FoodChoice

```
public class FoodChoice {  
    private String foodTitle;  
    private String imageUri;  
    private ArrayList<String> contains;
```

Sample Data: [Chicken Rice, {chicken, rice}]

[Fried Rice, {rice, vegetables, meat}]

[Wantan Mee, {noodles, pork, vegetables}]

[Prawn Mee, {noodles, prawn, seafood, meat}]

2) Restaurant

```
public class Restaurants {  
    private String name;  
    private String imageUri;  
    private String type;  
    private OperationTime operationTime;  
    private int likeCount;  
    private int population;  
    private int price;  
    private ArrayList<String> foodItem;
```

Sample Data:

Restaurant 1

Name: Asia Delights Restaurant

Restaurant Type: Chinese Restaurant

Operation Time: Opening Time – 9AM, Closing Time – 9AM,

Lunch peak time – 1PM, Dinner peak time – 7PM

Like: 999

Population: 3/5

Price: 2/5

Selling Food Item: {Chicken Rice, Fried Rice, Prawn Mee}

Basic Food Recommendation Rule

1. Avoid recommend same FoodChoice from previous recommend list. [Eg. Fried Rice]
2. Avoid recommend same food type with previous meal. [Eg. Noodle, Rice]
3. Avoid repeating same FoodChoice in 3 days.
4. Consider user's favored FoodChoice in generating the food list.
5. Take system time as factor. [Eg. Some FoodChoice might not serve after normal meal time.]
6. Take user current location as factor.
7. Take consider the suitability of FoodChoice on meal period. [Eg. Breakfast and Lunch/Dinner]
8. Only recommend FoodChoice that are available on system database.

Module Explanation

When user triggers the food recommendation module, system will pull data from User's Account. User's account will record users past behavior such as daily meal selection, favorite food.

The system will capture what user have chosen each day (based on FoodChoice) and request user to enter data if data is not updated. By studying how online ads work, the module implement able to record what user have click and how long they took to review each FoodChoice.

Chapter 5 : Implementation & Testing

Scenario

A user had use the application for the past one week at least ones meal has trigger the recommendation module. Following shown the user behavior:

Day 1:

Lunch – Chicken Rice

Dinner – Ban Mee

Day 5:

Lunch – Claypot Noodle

Dinner – N/A

Day 2:

Lunch – N/A

Dinner – Wantan Mee

Day 6:

Lunch – N/A

Dinner – Prawn Mee

Day 3:

Lunch – N/A

Dinner – Bak Kut Teh

Day 7:

Lunch – Fried Rice

Dinner – N/A

Day 4:

Lunch – Chicken Chop Rice

Dinner – Ban Mee

*N/A = not using the application / FoodChoice does not support yet

*Consider user do not take Breakfast out door

System pull data from database and analyze the data.

Result as following:

Yesterday: Fried Rice {rice, meat, vegetables}

Past 3 day: Fried Rice {rice, meat, vegetables}, Prawn Mee {noodle, prawn, seafood, meat}, Claypot Noodle {noodle, meat, vegetables}

Past 7 day: [Rice x 4, Noodle x 6], [Chicken x 2, Pork x 2, other x 5]

System Conclusion

System learn that the user had a fried rice on last meal and the food is a rice kind FoodChoice. Based on basic recommendation rule, system will likely not recommend all FoodChoice that contain rice. This rule try to avoid user to have the same kind of food every meal. Based on this scenario, the 3 day data will override the basic rule to recommend rice type FoodChoice because the user had 2 time noodle for the past 3 day. This result is supported by 7 days data. System consider user likely will have interest on rice type FoodChoice of the next meal.

The default setting of the module will recommend user with a list of 3 FoodChoice. The first slot of FoodChoice will mainly contain what user most chosen option. The first option may not consider the user's location factor. The second slot of FoodChoice will mainly recommend a FoodChoice that consider the meat type on the past meal data. The last slot of FoodChoice will mainly recommend a FoodChoice that less chosen option which the option have similar contain that user preferred choice.

As a result, the system will recommend Chicken Rice, Claypot Chicken Rice and Wantan Mee to the user.

5.2. System Testing

5.2.1 Verification Plan

In this system testing, a verification plan was prepared to perform user testing. The verification plan include authentication module, food recommendation module, add new FoodChoice and add new restaurant.

The first test will manly test on authentication module. The purpose of the test is to make sure every authentication process do not go wrong. User need to ensure mobile number entered are correct and able to receive 6 digit login code.

The second test will mainly test on the process of user getting their recommendation. The purpose of the test is to ensure user will get a non-repeated result. User will get a restaurant list that show all restaurant detail including restaurant name, operating hour and expected population of the restaurant.

The third test will mainly tested add new FoodChoice module on admin panel. Admin need to ensure picture able to upload and detail can be shown in the final listing

.

The last test will mainly tested on add now restaurant module on admin panel. The purpose of this testing is to confirm the flow and the creating process are able to complete. Admin need to ensure picture and restaurant detail are correct in the listing.

5.2.2 User Acceptance Testing (UAT)

In all of the testing, 5 users are invited to perform UAT. These users will act as user and admin for the whole test.

I. Authentication Module

Login Page (Mobile Number method)

Conditions	Steps to Take	Expected Results	Actual Results (P/F)
New user	1. Fill in mobile number and password. 2. Click request login pin.	Page shows: 1. Show entered number. 2. Request input for 6 Digit Login Pin 3. Receive 6 digit login pin via SMS. - User enter the login pin and direct user to Sign up page	Testing 1: Pass Testing 2: Pass Testing 3: Pass Testing 4: Pass Testing 5: Pass
Exiting user	1. Fill in mobile number and password. 2. Click request login pin.	Page shows: 1. Show entered number. 2. Request input for 6 Digit Login Pin 3. Receive 6 digit login pin via SMS.	Testing 1: Pass Testing 2: Pass Testing 3: Pass Testing 4: Pass Testing 5: Pass

Table 5.2.1 Login Page (Mobile Number) Test case

Login Page (Facebook Login Method)

Conditions	Steps to Take	Expected Results	Actual Results (P/F)
New user	1. User complete Facebook sign in process 2. Fill in mobile number and password. 3. Click request login pin.	Page shows: 1. Show entered number. 2. Request input for 6 Digit Login Pin 3. Receive 6 digit login pin via SMS. - User enter the login pin and direct user to Sign up page	Testing 1: Pass Testing 2: Pass Testing 3: Pass Testing 4: Pass Testing 5: Pass
Existing user	1. User complete Facebook sign in process.	Direct User to system home page	Testing 1: Pass Testing 2: Pass Testing 3: Pass Testing 4: Pass Testing 5: Pass

Table 5.2.2 Login Page (Facebook Login) Test case

First Time Sign Up Page

Conditions	Steps to Take	Expected Results	Actual Results (P/F)
Mobile Number Method / Facebook Login	1. User fill in account detail. 2. Direct user to answer personalization question.	Direct user to system home page	Testing 1: Pass Testing 2: Pass Testing 3: Pass Testing 4: Pass Testing 5: Pass

Table 5.2.3 Sign Up Page Test case

II. Food Recommendation Module

Home Page

Conditions	Steps to Take	Expected Results	Actual Results (P/F)
Connected to Internet	1. Click on food suggestion button.	System loads food suggestion and shows food suggestion layout.	Testing 1: Pass Testing 2: Pass Testing 3: Pass Testing 4: Pass Testing 5: Pass
Disconnected from Internet	1. Click on food suggestion button.	Show disconnected from Internet toast message.	Testing 1: Pass Testing 2: Pass Testing 3: Pass Testing 4: Pass Testing 5: Pass

Table 5.2.4 Home Page Test case

III. New FoodChoice Module

Add New FoodChoice Page

Conditions	Steps to Take	Expected Results	Actual Results (P/F)
New item	1. Enter food title. 2. Select food image. 3. Enter food detail. 4. Press upload button.	Show upload successful toast message.	Testing 1: Pass Testing 2: Pass Testing 3: Pass Testing 4: Pass Testing 5: Pass
Existing item	1. Enter food title. 2. Select food image. 3. Enter food detail. 4. Press upload button.	Show upload unsuccessful toast message.	Testing 1: Pass Testing 2: Pass Testing 3: Pass Testing 4: Pass Testing 5: Pass

Table 5.2.5 Add New FoodChoice Page Test case

IV. New Restaurant Module

Add New Restaurant Page

Conditions	Steps to Take	Expected Results	Actual Results (P/F)
New restaurant	1. Enter restaurant name. 2. Select store image. 3. Enter restaurant detail. 4. Select selling food choice. 5. Press create button.	Show upload successful toast message.	Testing 1: Pass Testing 2: Pass Testing 3: Pass Testing 4: Pass Testing 5: Pass
Existing restaurant	1. Enter restaurant name. 2. Select store image. 3. Enter restaurant detail. 4. Select selling food choice. 5. Press create button.	Show upload unsuccessful toast message.	Testing 1: Pass Testing 2: Pass Testing 3: Pass Testing 4: Pass Testing 5: Pass

Table 5.2.6 Add New Restaurant Test case

CHAPTER 6 CONCLUSION

This chapter will make a conclusion about how the project done and the contribution of the mobile application.

6.1 Project Review, Discussions and Conclusion

In conclusion, most people having an indecisive problem when deciding on their daily meals. This is because human are found difficult to do their final decision when there too many option to choose from. Most of the people are not confident to try new thing and make them to repeat their chosen option. Moreover, deciding each meal daily can be very time-consuming. Online food directory or a restaurant finder mobile application can be one of the solutions for indecisive minded people to choose their meal. All of the online food directories in the current market provides a detail food information which allocates nearby their location. Even though existing restaurant finder app can provide their users with food information, the apps still do not solve the problem of the indecisive minded people. This is because the existing application generates more option for their user to choose from, it is not convenient for them as it needs extra effort to make a decision.

6.1.1 Project Achievement

This restaurant finder mobile application had achieved the first objective which is to help indecisive user to improve the effort of decision making on daily meal choice. The application had become one of the solution for all indecisive people when choosing their meal. The proposed application help users to make the decision by suggesting food or restaurant based on user's preference. The system work on multiple filter which include user's current location, users past behaviour and estimated restaurant population to suggest a suitable option for aiding users with decision making. By using the proposed application, users will save their effort to think of a food choice for their daily meals and indirectly saves their time.

The proposed application had achieved the second objective which is enable user to search for a restaurant with filters. The search filter includes detecting user location, contains of each food item and restaurant name. The system will compare user current location with all the restaurant in the registered database and sort it with the distance of the user. The result will show a list of restaurant which starting from the nearest restaurant. User can add filter such as rice, noodle, chicken and many more to sort out the restaurant list. User is able to search the restaurant with restaurant name using the search bar.

The proposed application had achieved the third objective which is to provide a predicted population of the selected restaurant before heading to the restaurant. This function is achieved over the restaurant population report module and the prediction of the restaurant peak time. The user is able to report a population condition of a restaurant and the system will record it with the timestamp. The reported population will be further analysed with restaurant expected peak hour and filter out the expired report with the timestamp.

3.1.2 Problems Encountered

The major problem for this application is to recommend a food choice based on user past behaviour and preference. There is no similar library or solution for this function. A self-created solution successfully solved the issues. The search engine is also another issue for the application. The search engine is also considered as one of the problems of the application. The search engine must enable the user to search with tags and library had found to solve the problem.

6.2 Future Work

- I. The application will include separate restaurant module with log in and sign up function to improve the extension of the application. Each restaurant will have a restaurant profile with username and password. Each of the profile can be edited from time to time.
- II. The application will offer more FoodChoice in the next update and enable restaurant owner to suggest a creation. The current system only works with 15 FoodChoice from this release.
- III. The application will allow user to make comments on the restaurant they visit. User can include images in their comment.
- IV. The application will build in other platform such as IOS and Web.

REFERENCE

- Agarwal, R. 2014, SQL or NoSQL: Which is a better database for app development - Algoworks. 4 November 2014. *Algoworks: Blog*. Available from: <<http://www.algoworks.com/blog/sql-or-nosql-which-is-better-database-for-app-development/>>. [22 November 2017].
- Bayt.com 2013, *Why do we use java for creating Android application?* Available from: <<https://www.bayt.com/en/specialties/q/4553/why-do-we-use-java-for-creating-android-application/>>. [23 November 2017].
- Black, D 1948, 'On the rationale of group decision-making', *Journal of Political Economy*, vol. 56, no. 1, pp. 23-34.
- Chew, N. 2015, *Top 5 Malaysian Food Apps*. Available from: <<http://www.mobile88.com/news/feature/top-5-malaysian-food-apps/>>. [23 November 2017].
- Couchbase.com. n.d., *Couchbase Mobile*. Available from: <<https://www.couchbase.com/products/mobile>>. [23 November 2017].
- Crisp Insights. 2016, *Reasons Not To Use Firebase*. Available from: <<https://crisp.chat/blog/why-you-should-never-use-firebase-realtime-database/>>. [23 November 2017].
- Dhar, R 1997, 'Consumer Preference for a No-Choice Option', *Journal of Consumer Research*, vol. 24, no. 2, pp. 215-231.
- dzone.com. 2014, *Java vs. Other Programming Languages: Does Java Come Out on Top?* Available from: <<https://dzone.com/articles/java-vs-other-programming>>. [21 November 2017].
- Fischhoff, B 2010, 'Judgment and decision making', *Wiley Interdisciplinary Reviews: Cognitive Science*, vol. 1, no. 5, pp. 724-735.

- Leyden, T. 2014, What is Couchbase Mobile and why should you care? 21 May 2014. *Seven Story Rabbit Hole*. Available from: <<http://tleyden.github.io/blog/2014/05/21/what-is-couchbase-mobile-and-why-should-you-care/>>. [22 November 2017].
- Maslow, A.H 1943, 'A theory of human motivation'. *Psychological Review*, vol. 50, no. 4, pp. 370–96.
- Mcleod, S. 2018, *Maslow's Hierarchy of Needs*. Available from: <<https://www.simplypsychology.org/maslow.html>> [7 April 2019].
- Novemsky, N, Dhar, R, Schwarz, N & Simonson, I 2007, 'Preference Fluency in Choice', *Journal of Marketing Research*, vol. 44, no. 3, pp. 347-356.
- Null, C. 2010, *Which Online Mapping Service Is Best?* Available from: <https://www.pcworld.com/article/206702/best_online_mapping_service.html?page=2>. [23 November 2017].
- Patalano, A & Wengrovitz, S 2007, 'Indecisiveness and response to risk in deciding when to decide', *Journal of Behavioral Decision Making*, vol. 20, no. 4, pp. 405-424.
- Quora.com. 2017, *7 Answers - What is the difference between couchbase and mongodb?*. Available from: <<https://www.quora.com/What-is-the-difference-between-couchbase-and-mongodb>>. [20 November 2017].
- Roukounaki, K. 2014, Five popular databases for mobile. 10 September 2014. *DE: Blog*. Available from: <<https://www.developereconomics.com/five-popular-databases-for-mobile>>. [24 November 2017].
- Rozdoun. 2017, Web, Native or Hybrid? All you confused to ask your contractor about. 19 October 2017. *Mobile Technologies Trends*. Available from: <http://rozdoun.com/blog_articles/items/web-native-hybrid-all-you-confused-to-ask-your-contractor-about.html>. [24 November 2017].

- Six *fundamental human needs, our best lives*, 2018. Available from: <<https://www.forbes.com/sites/quora/2018/02/05/six-fundamental-human-needs-we-need-to-meet-to-live-our-best-lives/#209742e2344a>>. [7 April 2019].
- Skachkova, K. & Tymchenko, A. 2017, *Firebase and Couchbase usage — Feel the Difference*. 17 January 2017. *Technologies Trends*. Available from: <http://rozdoum.com/blog_articles/items/firebase-vs-couchbase-feel-the-difference.html>. [22 November 2017].
- Tan, C. 2014, 'More Malaysians eat out nowadays but are we eating enough healthy food?', *The Star Online* 3 August. Available from <<https://www.thestar.com.my/news/nation/2014/08/03/food-always-on-our-minds-more-malaysians-eat-out-nowadays-but-are-we-eating-enough-healthy-food/>>. [7 April 2019].
- Tian, L, Shi, J & Yang, Z 2009, 'Why does half the world's population have a mobile phone? An examination of consumers' attitudes toward mobile phones'. *CyberPsychology & Behavior*, vol. 12, no. 5, pp. 513-516.
- Wagner, J. 2015, *Top 10 Mapping APIs: Google Maps, Microsoft Bing Maps and MapQuest*. Available from: <<https://www.programmableweb.com/news/top-10-mapping-apis-google-maps-microsoft-bing-maps-and-mapquest/analysis/2015/02/23>>. [22 November 2017].

APPENDIX A SCREENSHOT APPLICATION

1.0 Screenshot of Reviewed Apps

(A) OpenRice (Malaysia)

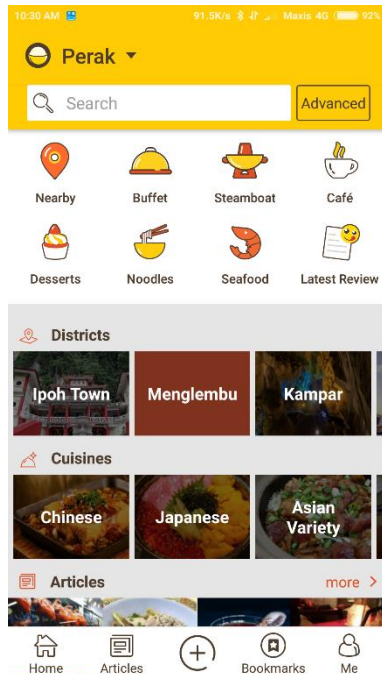


Figure 1.A.1

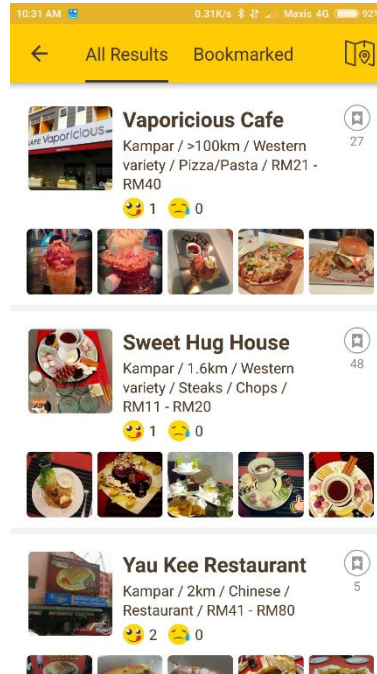


Figure 1.A.2

(B) Foodpanda

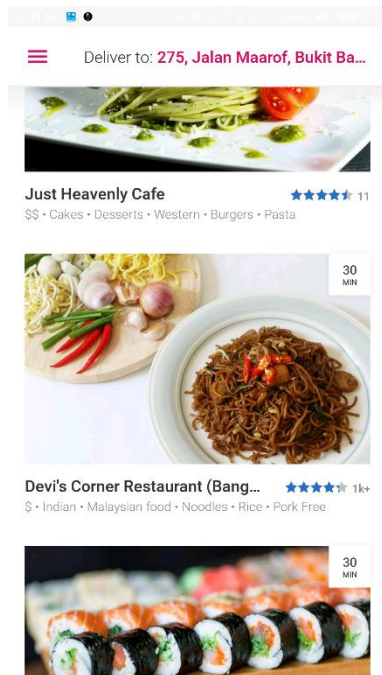


Figure 1.B.1

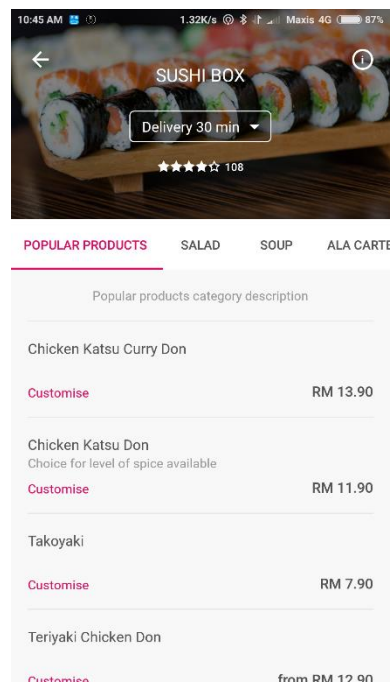


Figure 1.B.2

2.0 Review of UI Design & User Experience

(A) Waze - GPS, Maps, Traffic Alerts & Live Navigation



Figure 2.A.1

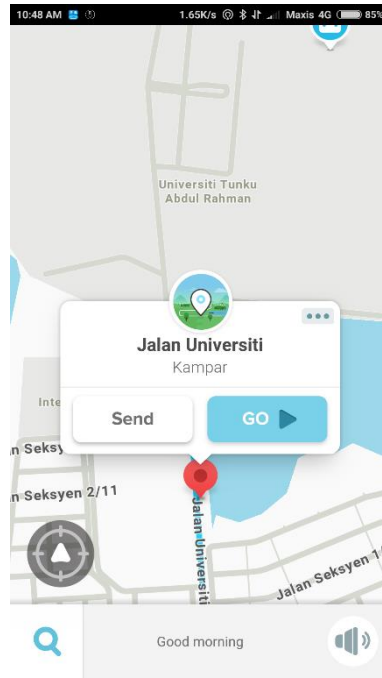


Figure 2.A.2

(B) oBike-Stationless Bike Sharing

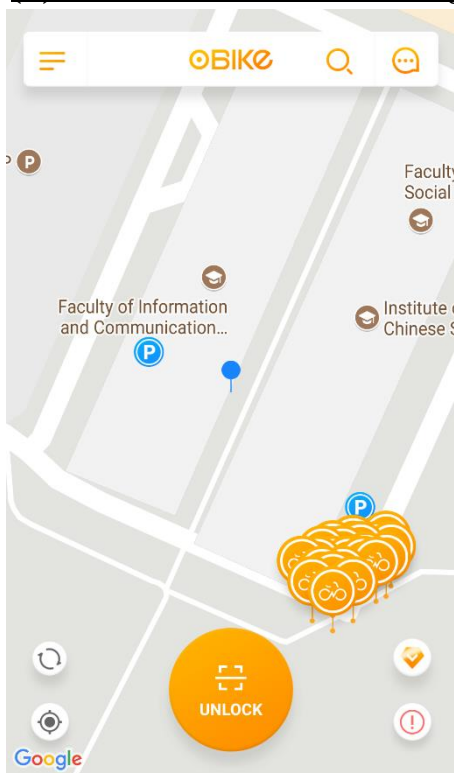


Figure 2.B.1

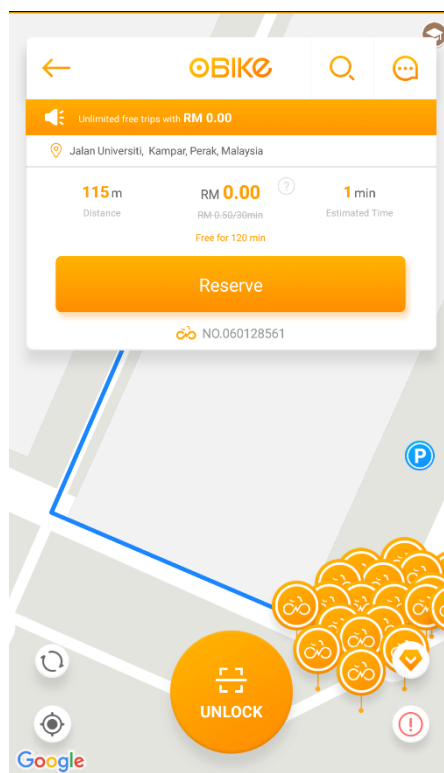


Figure 2.B.2

APPENDIX B WEEKLY REPORT

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T2Y4	Study week no.: 3
Student Name & ID: TIEW KAI WEN 14ACB02934	
Supervisor: MISS YAP SEOK GEE	
Project Title: RESTAURANT FINDER MOBILE APPLICATION	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Previous work from Project 1

2. WORK TO BE DONE

Research on Google Maps services

3. PROBLEMS ENCOUNTERED

Android Studio keep crashing on current device

4. SELF EVALUATION OF THE PROGRESS

Normal , reinstall Android Studio and java plugin

Supervisor's signature

Student's signature

B-1

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T2Y4	Study week no.: 3
Student Name & ID: TIEW KAI WEN 14ACB02934	
Supervisor: MISS YAP SEOK GEE	
Project Title: RESTAURANT FINDER MOBILE APPLICATION	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Previous work from Project 1

2. WORK TO BE DONE

Research on Google Maps services

3. PROBLEMS ENCOUNTERED

Android Studio keep crashing on current device

4. SELF EVALUATION OF THE PROGRESS

Normal , reinstall Android Studio and java plugin

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T2Y4	Study week no.: 3
Student Name & ID: TIEW KAI WEN 14ACB02934	
Supervisor: MISS YAP SEOK GEE	
Project Title: RESTAURANT FINDER MOBILE APPLICATION	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Previous work from Project 1

2. WORK TO BE DONE

Research on Google Maps services

3. PROBLEMS ENCOUNTERED

Android Studio keep crashing on current device

4. SELF EVALUATION OF THE PROGRESS

Normal , reinstall Android Studio and java plugin

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T2Y4	Study week no.: 4
Student Name & ID: TIEW KAI WEN 14ACB02934	
Supervisor: MISS YAP SEOK GEE	
Project Title: RESTAURANT FINDER MOBILE APPLICATION	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Apply Google Maps SDK on the project and research on Firebase Firestore.

2. WORK TO BE DONE

Planning system database, looking forward to group data in the most efficiency way.

3. PROBLEMS ENCOUNTERED

No

4. SELF EVALUATION OF THE PROGRESS

Normal, speed up on planning the suggestion algorithm.

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T2Y4	Study week no.: 6
Student Name & ID: TIEW KAI WEN 14ACB02934	
Supervisor: MISS YAP SEOK GEE	
Project Title: RESTAURANT FINDER MOBILE APPLICATION	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Learn to store data in Firebase

2. WORK TO BE DONE

Drawing system wireframe

3. PROBLEMS ENCOUNTERED

Lack of UI idea because of new idea came to mind

4. SELF EVALUATION OF THE PROGRESS

Moderate progress due to busy schedule

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T2Y4	Study week no.: 7
Student Name & ID: TIEW KAI WEN 14ACB02934	
Supervisor: MISS YAP SEOK GEE	
Project Title: RESTAURANT FINDER MOBILE APPLICATION	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Drawing simple Wireframe of the project and decide the theme color of the application.

2. WORK TO BE DONE

Start creating User Interface.

3. PROBLEMS ENCOUNTERED

Finding solution to add onClickListener in Recycle View

4. SELF EVALUATION OF THE PROGRESS

Moderate progress

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T2Y4	Study week no.: 9
Student Name & ID: TIEW KAI WEN 14ACB02934	
Supervisor: MISS YAP SEOK GEE	
Project Title: RESTAURANT FINDER MOBILE APPLICATION	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Complete designing half of the system layout and manage to attach onClickListener on recycle layout

2. WORK TO BE DONE

Starting to work on report.

3. PROBLEMS ENCOUNTERED

Found that search engine is hard to implement into the project.

4. SELF EVALUATION OF THE PROGRESS

Moderate progress

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T2Y4	Study week no.: 10
Student Name & ID: TIEW KAI WEN 14ACB02934	
Supervisor: MISS YAP SEOK GEE	
Project Title: RESTAURANT FINDER MOBILE APPLICATION	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Drawing simple Wireframe of the project and decide the theme color of the application.

2. WORK TO BE DONE

Start creating User Interface.

3. PROBLEMS ENCOUNTERED

Finding solution to add onClickListener in Recycle View

4. SELF EVALUATION OF THE PROGRESS

Moderate progress

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T2Y4	Study week no.: 11
Student Name & ID: TIEW KAI WEN 14ACB02934	
Supervisor: MISS YAP SEOK GEE	
Project Title: RESTAURANT FINDER MOBILE APPLICATION	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Fixing system bug and continue coding on other module of the application

2. WORK TO BE DONE

Completion of the project and system testing.

3. PROBLEMS ENCOUNTERED

Problem with system layout on smaller screen's device

4. SELF EVALUATION OF THE PROGRESS

Moderate progress

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: T2Y4	Study week no.: 12
Student Name & ID: TIEW KAI WEN 14ACB02934	
Supervisor: MISS YAP SEOK GEE	
Project Title: RESTAURANT FINDER MOBILE APPLICATION	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

Completion of system testing

2. WORK TO BE DONE

Finalize on project report

3. PROBLEMS ENCOUNTERED

Formatting issue related to page number and header

4. SELF EVALUATION OF THE PROGRESS

Moderate progress and lacking of time.

Supervisor's signature

Student's signature

Feedback Studio - Google Chrome
 https://ev.turnitin.com/app/carta/en_us/?lang=en_us&to=1107309957&s=&u=1072695210&student_user=1

feedback studio Kai Wen Tiew Restaurant Finder Mobile Application

RESTAURANT FINDER MOBILE APPLICATION

BY

TIEW KAI WEN

A REPORT
 SUBMITTED TO
 Universiti Tunku Abdul Rahman
 in partial fulfillment of the requirements
 for the degree of
 BACHELOR OF INFORMATION TECHNOLOGY (HONS)
 INFORMATION SYSTEM ENGINEERING
 Faculty of Information and Communication Technology
 (Kampar Campus)

JAN 2019

1

Match Overview

2%

1	eprints.utar.edu.my	1%	>
2	docplayer.net	<1%	>
3	Submitted to Argosy U...	<1%	>
4	fgcu.digital.fvc.org	<1%	>
5	www.arup.com.au	<1%	>
6	Submitted to University...	<1%	>
7	play.google.com	<1%	>

BIS (Hons) Information Systems Engineering
 Faculty of Information and Communication Technology (Kampar Campus), UTAR.

Restaurant Finder Mobile Application

ORIGINALITY REPORT

2%	2%	0%	1%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	eprints.utar.edu.my Internet Source	1%
2	docplayer.net Internet Source	<1%
3	Submitted to Argosy University Student Paper	<1%
4	fgcu.digital.flvc.org Internet Source	<1%
5	www.arup.com.au Internet Source	<1%
6	Submitted to University of Greenwich Student Paper	<1%
7	play.google.com Internet Source	<1%

Exclude quotes

On

Exclude matches

Off

Exclude bibliography

On

Universiti Tunku Abdul Rahman			
Form Title : Supervisor's Comments on Originality Report Generated by Turnitin for Submission of Final Year Project Report (for Undergraduate Programmes)			
Form Number: FM-IAD-005	Rev No.: 0	Effective Date: 01/10/2013	Page No.: 1 of 1



**FACULTY OF INFORMATION AND COMMUNICATION
TECHNOLOGY**

Full Name(s) of Candidate(s)	TIEW KAI WEN
ID Number(s)	14ACB02934
Programme / Course	INFORMATION SYSTEM ENGINEERING - IA
Title of Final Year Project	RESTAURANT FINDER MOBILE APPLICATION

Similarity	Supervisor's Comments (Compulsory if parameters of originality exceeds the limits approved by UTAR)
Overall similarity index: <u> 2 </u> % Similarity by source Internet Sources: <u> 2 </u> % Publications: <u> 0 </u> % Student Papers: <u> 1 </u> %	
Number of individual sources listed of more than 3% similarity: <u> 0 </u>	
Parameters of originality required and limits approved by UTAR are as Follows: (i) Overall similarity index is 20% and below, and (ii) Matching of individual sources listed must be less than 3% each, and (iii) Matching texts in continuous block must not exceed 8 words <i>Note: Parameters (i) – (ii) shall exclude quotes, bibliography and text matches which are less than 8 words.</i>	

Note Supervisor/Candidate(s) is/are required to provide softcopy of full set of the originality report to Faculty/Institute

Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.

Signature of Supervisor

Signature of Co-Supervisor

Name:

Name:

Date:

Date:



UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF INFORMATION & COMMUNICATION TECHNOLOGY (KAMPAR CAMPUS)

CHECKLIST FOR FYP2 THESIS SUBMISSION

Student Id	14ACB02934
Student Name	TIEW KAI WEN
Supervisor Name	MISS YAP SEOK GEE

TICK (✓)	DOCUMENT ITEMS
	Your report must include all the items below. Put a tick on the left column after you have checked your report with respect to the corresponding item.
	Front Cover
	Signed Report Status Declaration Form
	Title Page
	Signed form of the Declaration of Originality
	Acknowledgement
	Abstract
	Table of Contents
	List of Figures (if applicable)
	List of Tables (if applicable)
	List of Symbols (if applicable)
	List of Abbreviations (if applicable)
	Chapters / Content
	Bibliography (or References)
	All references in bibliography are cited in the thesis, especially in the chapter of literature review
	Appendices (if applicable)
	Poster
	Signed Turnitin Report (Plagiarism Check Result - Form Number: FM-IAD-005)

I, the author, have checked and confirmed all the items listed in the table are included in my report. (Signature of Student) Date:	Supervisor verification. Report with incorrect format can get 5 mark (1 grade) reduction. (Signature of Supervisor) Date:
---	---