

E-ADVERTISING IN A SMART COMMUNITY WITH AR
TECHNOLOGY

BY KEE SHAW JYE

A PROPOSAL

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

BACHELOR OF COMPUTER SCIENCE (HONS)

Faculty of Information and Communication Technology (Perak Campus)

MAY 2018

REPORT STATUS DECLARATION FORM

Title: _____

Academic Session: _____

I _____
(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: _____

E-ADVERTISING IN A SMART COMMUNITY WITH AR
TECHNOLOGY

BY KEE SHAW JYE

A PROPOSAL

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

BACHELOR OF COMPUTER SCIENCE (HONS)

Faculty of Information and Communication Technology (Perak Campus)

MAY 2018

iii

DECLARATION OF ORIGINALITY

I declare that this report entitled **E-Advertising in a smart community with AR Technology** 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 : _____

Date : _____

ACKNOWLEDGEMENTS

I would like to express my sincere thanks and appreciation to my supervisor, Dr Cheng Wai Khuan who has given me this bright opportunity to engage in this E-Advertising in a smart community with AR technology project. It is my first step to establish a career in application system development. A million thanks to you.

Finally, I must say thanks to my parents and my family for their love, support and continuous encouragement throughout the course.

ABSTRACT

This project is a mobile application with Augmented Reality Technology that is created for two purposes. First, it is created to help businesses to promote their restaurant and the second purpose is to help people to find out any restaurant nearby that are having promotion. The elements of AR in this module further improve the interactivity between user and system. User is able to view the restaurant nearby by using AR integrated in the mobile camera.

After studying and analyzing existing system, the collection of user preferences can be further improve. Other than this, the functionality of the system also can be further expand to attract the user. Those systems that are similar in nature are studied and compare. A solution is derived from the extensive research done and the prototypes will be made based on the solution and improved upon during different development phases.

Concisely, this project will enable the businesses to promote their restaurant and the people to get restaurant nearby by using AR on their mobile device.

TABLE OF CONTENTS

TITLE	I
REPORT STATUS DECLARATION FORM	II
TITLE	III
DECLARATION OF ORIGINALITY	IV
ACKNOWLEDGEMENTS.....	V
ABSTRACT	VI
TABLE OF CONTENTS	VII
LIST OF FIGURES	IX
LIST OF TABLES.....	X
LIST OF ABBREVIATIONS.....	XI
CHAPTER 1: INTRODUCTION.....	12
1.1 PROBLEM STATEMENT.....	12
1.2 BACKGROUND AND MOTIVATION.....	12
1.3 OBJECTIVES	13
1.4 PROPOSED APPROACH/ STUDY.....	13
1.5 ACHIEVEMENT HIGHLIGHT	14
CHAPTER 2: LITERATURE REVIEW.....	16
2.1 REVIEW OF EXISTING SYSTEM.....	16
2.2 CRITICAL REMARKS	25
2.3 COMPARISON ANALYSIS.....	27
CHAPTER 3: SYSTEM DESIGN.....	28
3.1 USER REQUIREMENT	28
3.2 USE-CASE DIAGRAM	29
3.3 ACTIVITY DIAGRAM.....	30
3.4 SEQUENCE DIAGRAM.....	31
3.5 ER DIAGRAM	32
3.6 CLUSTERING ALGORITHM.....	33
3.7 AVOID STACKING OF POI	34
CHAPTER 4: METHODOLOGY AND TOOLS.....	35
4.1 PROJECT METHODOLOGY	35
4.2 TOOLS TO USE	37
CHAPATER 5: IMPLEMENTATION AND TESTING	38
5.1 USE CASE TESTING	38

CHAPTER 6: CONCLUSION.....	49
REFERENCES.....	51
APPENDIX A: POSTER OF E-ADVERTISING IN A SMART COMMUNITY WITH AN AR TECHNOLOGY.....	54
APPENDIX B: SCREENSHOTS OF E-ADVERTISING IN A SMART COMMUNITY WITH AN AR TECHNOLOGY	55
APPENDIX C: TURNITIN PLAGIARISM CHECK SUMMARY AND RESULT	58
APPENDIX D: FYP2 CHECKLIST	59

LIST OF FIGURES

FIGURE 2.1 - LAYAR POSTER.....	16
FIGURE 2.2 - LAYAR APPLICATION.....	17
FIGURE 2.3 - YELP POSTER.....	19
FIGURE 2.4 – YELP MONOCLE	20
FIGURE 2.5 – WIKITUDE POSTER	22
FIGURE 2.6 – WIKITUDE MOBILE APPS.....	23
FIGURE 3.1 USE-CASE DIAGRAM OF E-ADVERTISING SYSTEM	29
FIGURE 3.2 ACTIVITY DIAGRAM OF E-ADVERTISING SYSTEM.....	30
FIGURE 3.3 SEQUENCE DIAGRAM OF E-ADVERTISING SYSTEM.....	31
FIGURE 3.4 ENTITY-RELATIONSHIP DIAGRAM OF E-ADVERTISING SYSTEM....	32
FIGURE 3.5 CLUSTERING ALGORITHM.....	33
FIGURE 3.6 AVOID STACKING OF POI.....	34
FIGURE 4.1 PHASED DEVELOPMENT METHODOLOGY	35
FIGURE 5.1.1 LOGIN, REGISTRATION, RESET PASSWORD.....	38
FIGURE 5.1.2 AUGMENTED REALITY.....	40
FIGURE 5.1.3 CATEGORY, RESTAURANT DETAILS.....	42
FIGURE 5.1.4 CHECK IN, REVIEW	44
FIGURE 5.1.5 ADD RESTAURANT.....	45
FIGURE 5.1.6 BUSINESS ANALYSIS, PROMOTION ANALYSIS	47

LIST OF TABLES

TABLE 5.1.1 USE CASE TESTING FOR LOGIN	38
TABLE 5.1.2 USE CASE TESTING FOR REGISTER	39
TABLE 5.1.3 USE CASE TESTING FOR RESET PASSWORD.....	39
TABLE 5.1.4 USE CASE TESTING FOR VIEW RESTAURANT.....	40
TABLE 5.1.5 USE CASE TESTING FOR INTERESTED PROMOTION	41
TABLE 5.1.6 USE CASE TESTING FOR BOOKMARK.....	42
TABLE 5.1.7 USE CASE TESTING FOR CHECK IN.....	43
TABLE 5.1.8 USE CASE TESTING FOR REVIEW	44
TABLE 5.1.9 USE CASE TESTING FOR ADD RESTAURANT	45
TABLE 5.1.10 USE CASE TESTING FOR EDIT RESTAURANT.....	46
TABLE 5.1.11 USE CASE TESTING FOR BUSINESS ANALYSIS.....	47
TABLE 5.1.12 USE CASE TESTING FOR PROMOTION ANALYSIS.....	48

LIST OF ABBREVIATIONS

<i>3D</i>	Three-dimensional
<i>AR</i>	Augmented Reality
<i>VR</i>	Virtual Reality
<i>API</i>	Application Program Interface
<i>iOS</i>	iPhone Operating System
<i>RAD</i>	Rapid Application Development
<i>GPS</i>	Global Positioning System
<i>SDK</i>	Software Development Kit

CHAPTER 1: INTRODUCTION

1.1 Problem Statement

Nowadays, many restaurants spend so much of money on advertising. They print pamphlet and distribute to people, or print banner and hang it on the roadside. But most of the people do not pay attention on it, so it is useless and waste of resources. Other than this, the advertising tactic is not attractive to the people and not interactive at all. Most of the people threw the pamphlet without even looked at it and do not attracted to the advertising banner on the roadside. Furthermore, it is very inconvenient for people to visit the restaurant to know the promotion details.

Therefore, due to these problems, I have developed a mobile app with AR technology that is more attracting and interactive to the people. This mobile app could help people to find out which restaurant that is having promotion and it will display the details of the restaurant. Besides that, it is digitized and does not waste any resources at all.

1.2 Background and Motivation

Advertising is often businesses who wish to promote their product or service. They tried to inform and influence people who receive them. Advertising is communicated thru different mass media. On this hand, we could see that there are many way to advertise but are they really effective and attracted for people?

Nowadays, techonology has become more advanced and attracted to people. It has already become a very important and useful thing for us. Most of the people need technologies to accomplish their daily task. Besides, technologies have brought more pros than cons and they are very useful for us. Since, nowadays people are more attracted

Chapter 1: Introduction

to the technology, therefore advertise through a new technology should be very effective and attracted to people.

There is a new technology that is called Augmented Reality (AR). Augmented Reality is combines the virtual reality with the real world whereas Virtual Reality is created by a virtual and imaginary environment. Augmented Reality apps has been quickly growing in this past few years and it is very attracted to people.

The Augmented Reality for Advertising mobile application is an application that allows user to find out the shop nearby that are having promotion. This application allows the user to see the promotion details of the shop and the review of the shop. Therefore, users are able to check the promotion details before going to the shop. Other that this, this application is useful for businesses too because it can helps businesses to advertise.

1.3 Objectives

1. This project is to develop an Augmented Reality system that could show out entire details of the advertisement.
2. This project is to enable an Augmented Reality system to find out nearby restaurant that are having promotion

1.4 Proposed approach/ study

The proposed approach is to develop a mobile application that allows user to find out any restaurant nearby that are having promotion. This mobile application is built by Android Studio for normal activity, Wikitude for AR technology and Firebase for store data. Besides, this mobile application is develop in phased development

1.5 Achievement Highlight

The system is able to find out any restaurants nearby that are having promotion thru the AR Camera. The system will display the restaurant details and the promotion photos for the user in the AR platform. User is able to bookmark the restaurant he is interested and check in the restaurant he went. Besides, the restaurants could be filtered by category.

Moreover, the system has implemented a clustering algorithm. This algorithm is to avoid the stacking of the restaurant markers. The algorithm will calculate the angle of every restaurant marker and cluster the restaurants that have the same angle. The system will display a clustered marker with the amount of restaurants. Besides, user is able to uncluster the clustered marker and then the system will display the markers with different altitude so that it will not be stack.

Other than AR platform, user is able to see the restaurants he bookmarked, checked in and viewed in the Android platform. User is able to do a review for those restaurants he checked in to give feedback to the restaurant. User is also able to see which restaurant has the most check in and view so that he can know which restaurant is the most popular and the best. The reviews that made by user will be display it on their own profile.

For business admin, he is able to add any of his restaurant, the details and the promotion photo in the system. He is also able to see the business analysis that analyzed by the system. The system will analyze the amount of users checked in and viewed the restaurant. Then, it will generate the data in the table and graph for the business admin. For the promotion photos, the system will also analyses which promotion has the most interested.

Chapter 1: Introduction

Lastly, there is a system admin for this system. The system will analyses how many user and business admin are using the system and generate the data in the graph and table for system admin.

CHAPTER 2: LITERATURE REVIEW

2.1 Review of Existing System

These are the similar existing system that I had analysis. Some of existing systems have the same purpose and function to this project. Other than this, I also reviewed the pros and cons of the existing system.

2.1.1 Layar

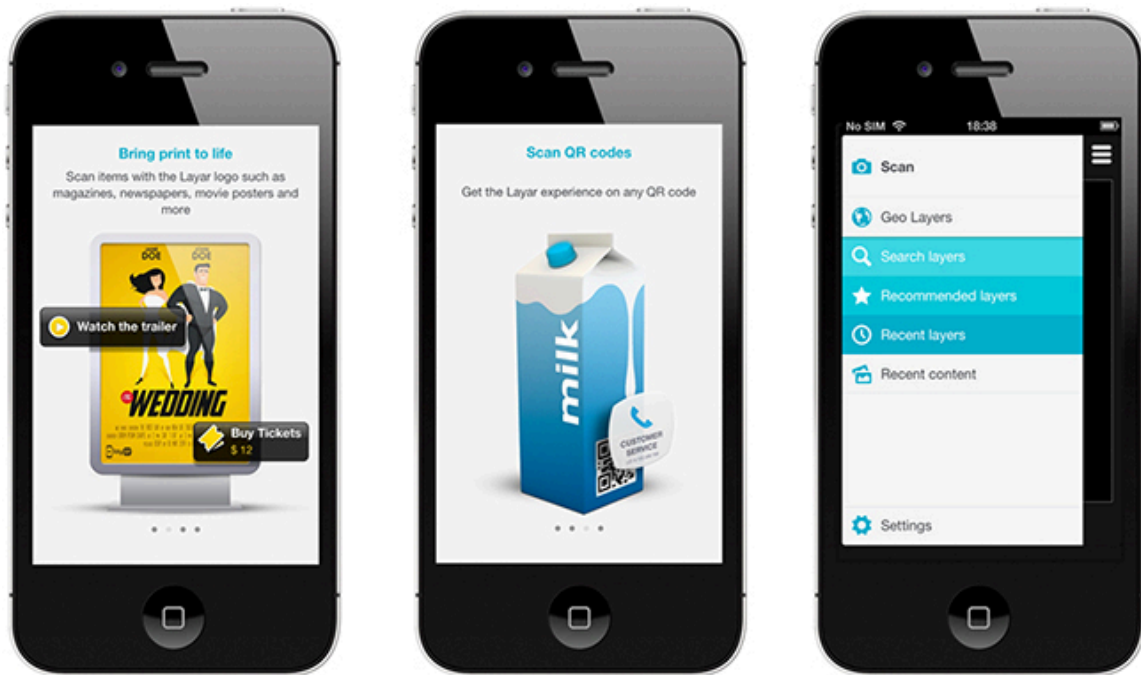


Figure 2.1 - Layar poster

Layar was founded in 2009 and it is the first AR apps that hit the market. It is created in Netherlands. Today, Layar has become the global leader in Augmented Reality and Interactive Print. This helped to bridge the gap between the print and digital worlds. Besides, Layar has collaborated with many top brand companies and the Layar application has been downloaded more than 46 million times.

Layar is a mobile application that combines your camera with your GPS location. You are able to find something that around you through this mobile app. GPS-enabled gadgets with data applications become remarkable marketing. It has the ability to convey the majority of the data to somebody toward the minute from claiming need same time they would close-by your benefits of the business will be a momentous chance.

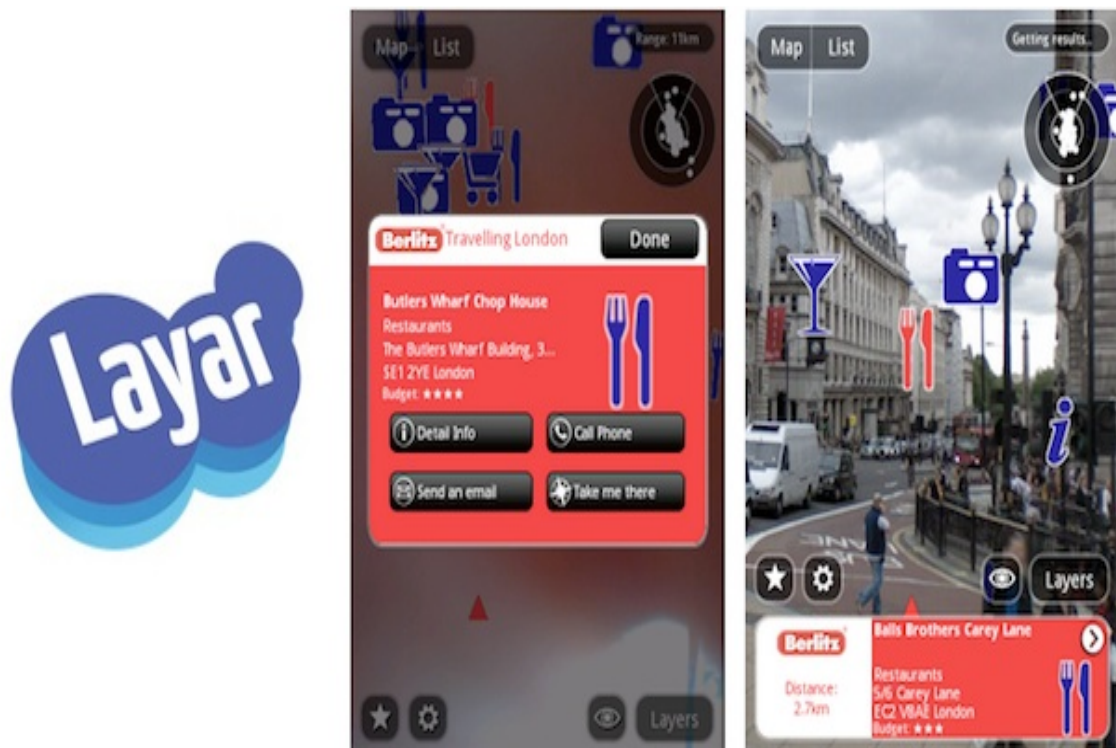


Figure 2.2 - Layar application

Pros

- Allow user to login thru Facebook
- Allow user to search layer by name, category or keyword
- Provide recommended layers
- Able to show in map view
- Allow user to filter the range of the distance
- Allow user to share it out

Chapter 2: Literature Review

- Able to take photo of the scene
- Provide direction to the place
- Provide detail info of the place
- Allow user to clear data
- It is a free apps

Cons

- The range of the distance is small
- Not many people using
- Unable to delete account

Suggested way to improve

- Increase the range of the distance to search more layers
- Promote the apps
- Create an option for user to delete their account

2.1.2 Yelp

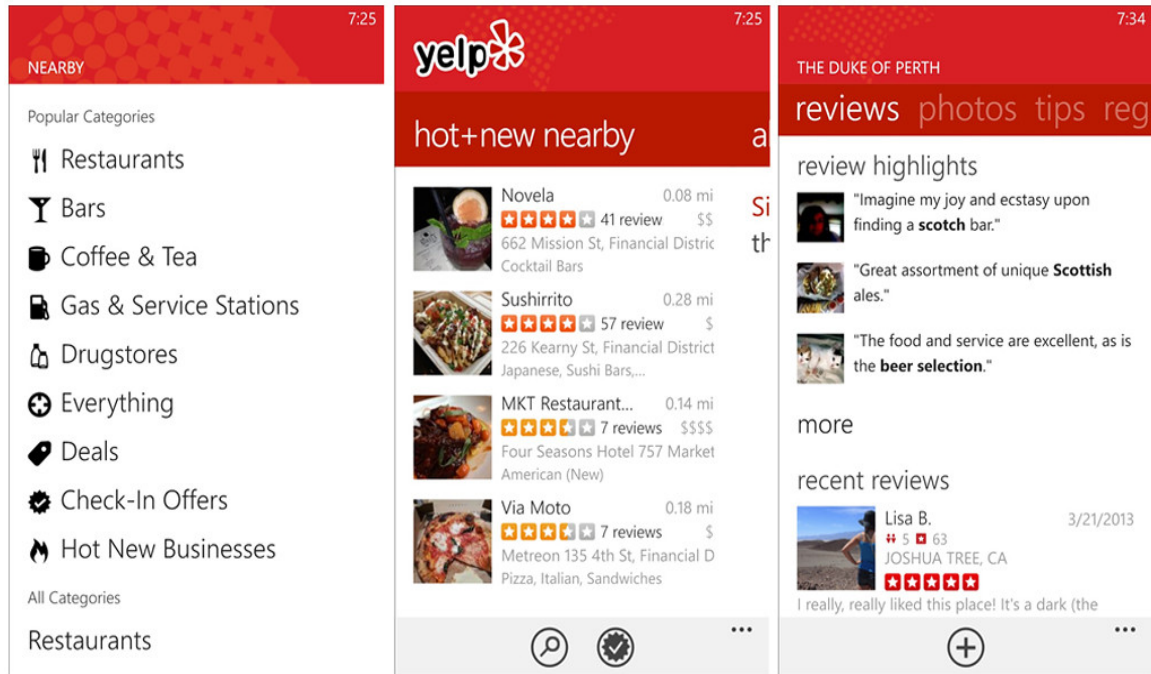


Figure 2.3 - Yelp poster

Yelp was founded in 2004 and its headquarter is in San Francisco, California. Yelp had a monthly average of 74 million unique visitors who visited the apps. It is a business and social networking mobile application. Yelp sells ads to businesses to earn money and pays advertisers couldn't change their reviews.

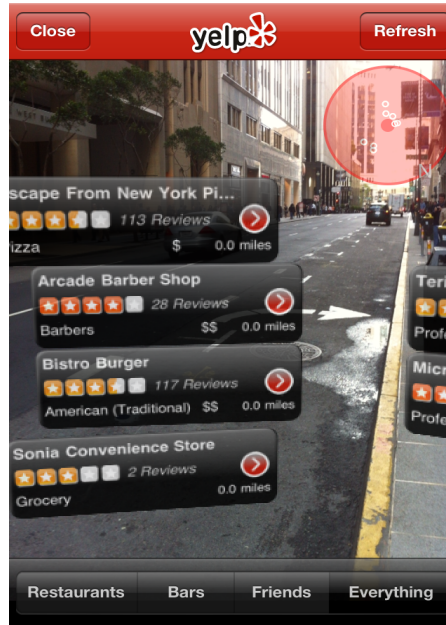


Figure 2.4 – Yelp Monocle

Besides, Yelp has a special feature that is Yelp Monocle. Yelp Monocle is a 3D layer and this technology pulls graphic from your phone display and into your environment with Augmented Reality. You could move your phone 360 degrees and turn around to find everything nearby you. Furthermore, you can filter your search result by price, distance, rating and more.

Pros

- Allow user to login thru Facebook
- Able to show in map view
- Allow user to filter layer by category
- Provide direction to the place
- Provide detail info of the place
- Allow user to rate the place
- Allow user to bookmark the place
- Allow user to upload photo for the place
- Allow user to check in the place
- It is a free apps
- Allow user to refresh

Chapter 2: Literature Review

Cons

- Only able to filter by the given categories
- Unable to search specific place
- Unable to filter the range of distance

Suggested way to improve

- Add more categories for user to filter
- Add search bar for user to search the specific place
- Add a filter distance function for user to search further place

2.1.3 Wikitude



Figure 2.5 – Wikitude poster

Wikitude is a mobile Augmented Reality technology provider and it was found in 2008. It is provide for tablets, smartphone, and so on. Wikitude has grown to be the world’s leading independent AR platform. Besides, Wikitude restructured its proposition by propelling the Wikitude SDK, and the development framework is able to utilise geolocation technologies, image recognition and tracking .

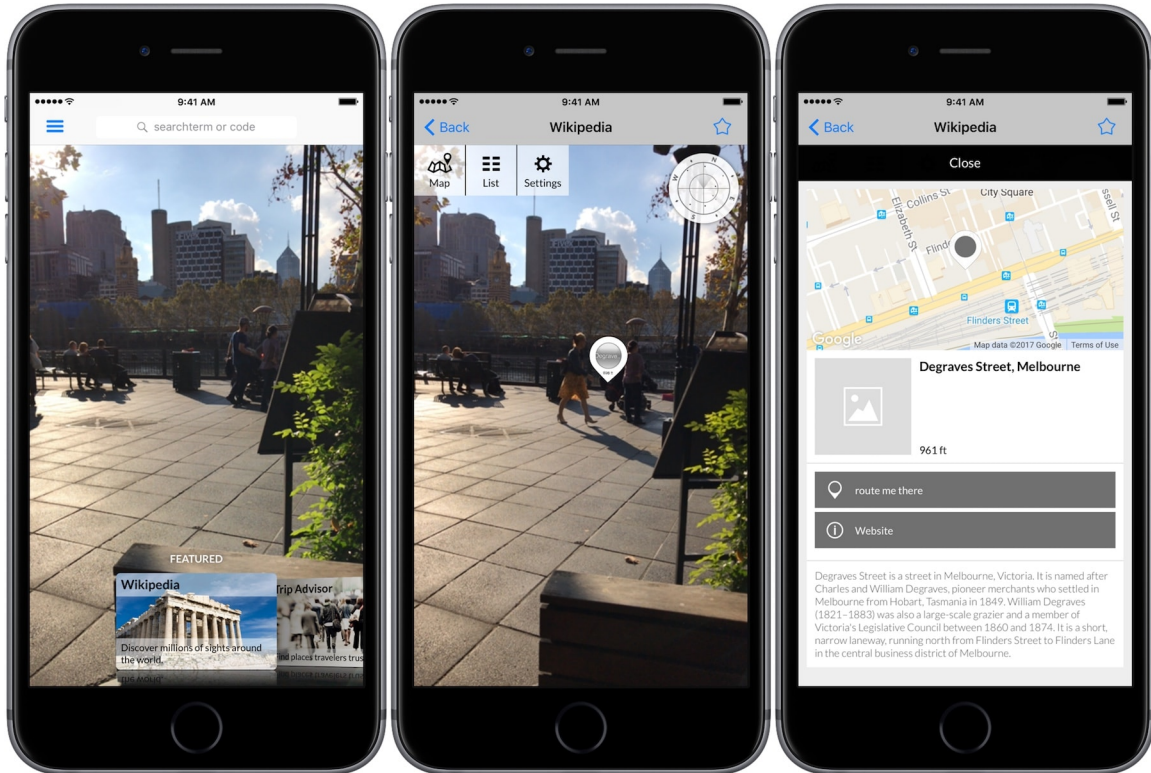


Figure 2.6 – Wikitude mobile apps

Wikitude is also an Augmented Reality mobile application. It allows user to find something that is in Wikipedia or find hotels and similiar accommodations through Trip Advisor. Furthermore, Wikitude has built in some AR games such as bubble tap and swat the fly. Besides, it has the ability to mark and share your favorite spot via Facebook are merely an added bonus.

Pros

- Allow to user to search by keyword or category
- Able to show in map view
- Able to list out all the places nearby
- Able to filter the range of distance
- Provide detail info of the place
- Allow user to bookmark the place

Chapter 2: Literature Review

Cons

- Does not provide direction to the place
- The detail info of the place is insufficient

Suggested way to improve

- Provide direction of the place
- Provide more detail info of the place

2.2 Critical Remarks

2.2.1 System Comparison

Table 2.1 – Comparison of features between Layar, Yelp and Wikitude

System \ Features	Layar	Yelp	Wikitude
Create Account	✓	✓	
Search Bar	✓		✓
Direction	✓	✓	
Review	✓	✓	
Map View	✓	✓	✓
Share	✓	✓	
Add Photo		✓	
Check In		✓	
Bookmark		✓	✓
Game			✓

2.2.2 Criteria Explanation

TABLE 2.2 – EXPLANATION OF FEATURES COMPARED IN TABLE 2.1

Create Account	Create an account for the apps
Search Bar	Provide search bar for user to search place
Direction	Provide the direction from the user location to the place
Review	Able to review and rate the place
Map View	Provide map view between the place and user location
Share	Able to share the place information thru any social media apps
Add Photo	Able to upload some related photo for the place
Check In	Able to check in the place thru the apps
Bookmark	Able to bookmark the place you search
Game	Able to play AR game in the apps

2.3 Comparison Analysis

Layar allows user to search layer by name or category. Besides, Layar will also recommends user other layers and displays the recent layers. Layar provides the direction to the place and it also has a map view. There are some disadvantages for Layar, Layar doesn't allow user to check in the place or bookmark the place but it allows user to share it after login. User is able to login thru Facebook.

Yelp has more features compared with Layar and Wikitude. Yelp allows user to check in the place and bookmark the place. Other than these, user is allows to add photo and gives review to the place but there is no search bar in Yelp. Therefore, user couldn't search any places by name, but user is able to filter the place by given categories. Yelp also provides the direction to the place and it also has a map view.

Wikitude has only a few features. User is not allows to create account in Wikitude, therefore user couldn't share, check in, review or add photo to the place. But user is allows to bookmark the place. Besides that, Wikitude doesn't provide direction the place but it provides map view for user. Wikitude has a feature that Yelp and Layar don't have which is game. User is allows to play game in Wikitude.

CHAPTER 3: SYSTEM DESIGN

3.1 User Requirement

1. User shall be able to register and login to the system.
2. User shall be able to view the restaurant nearby.
3. User shall be able to view the details of restaurant and the promotion of the restaurant.
4. User shall be able to bookmark or delete bookmark the restaurant.
5. User shall be able to check in the restaurant.
6. User shall be able to view the restaurant that he/she recently viewed.
7. User shall be able to view the most popular restaurant in this month.
8. User shall be able to delete entire bookmark, check in or recently view list.
9. User shall be able to review the restaurant.
10. User shall be able to view his/her last check in restaurant.
11. User shall be able to view what he/she has reviewed.
12. User shall be able to click the interested button on the promotion he interested.
13. Administrator shall be able to add restaurant to the system.
14. Administrator shall be able to update the restaurant details or promotion.
15. Administrator shall be able to delete the review of his/her restaurant.
16. Administrator shall be able to see the business analysis of his restaurant.
17. Administrator shall be able to see the analysis of the promotion.

3.2 Use-case diagram

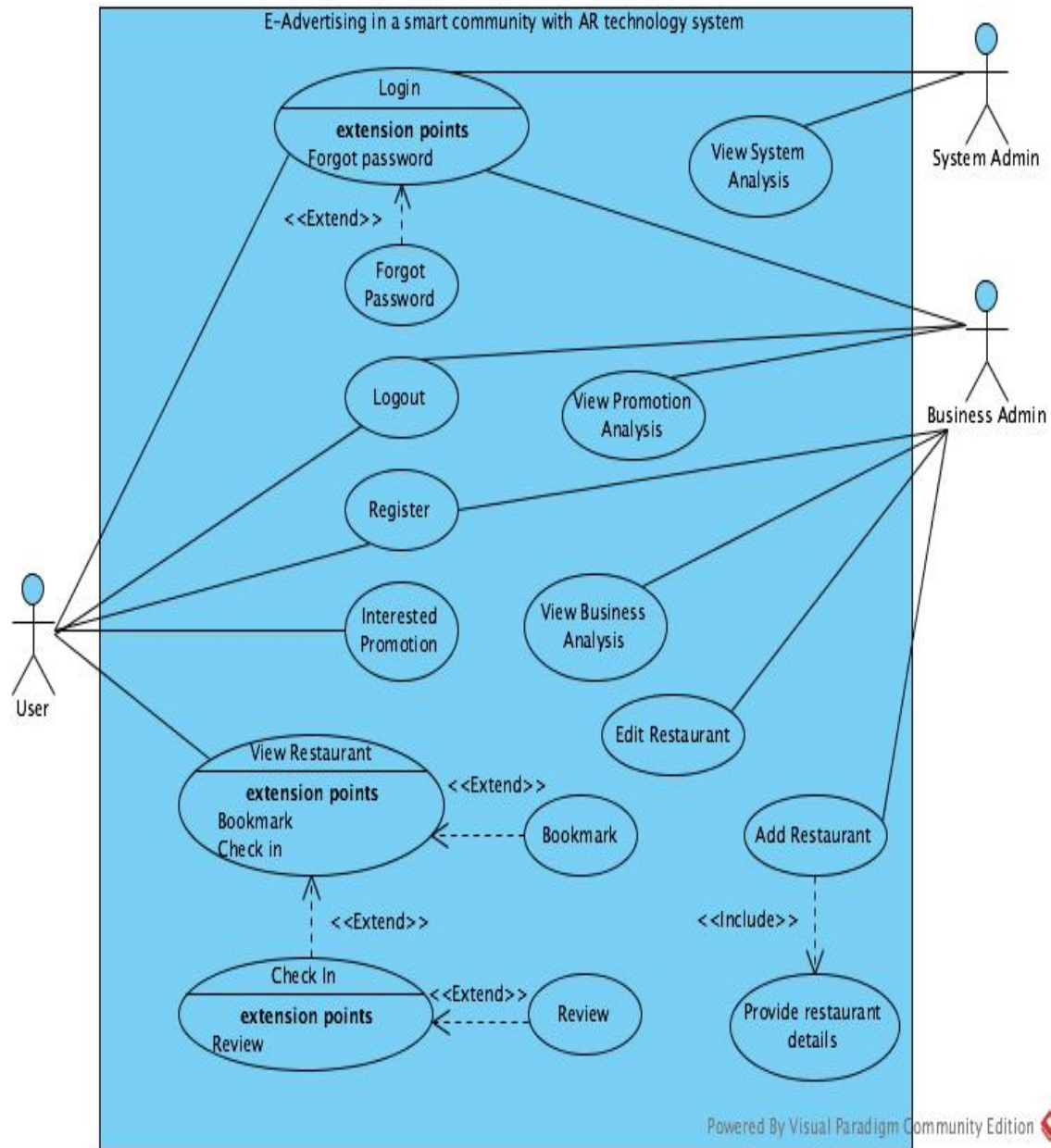
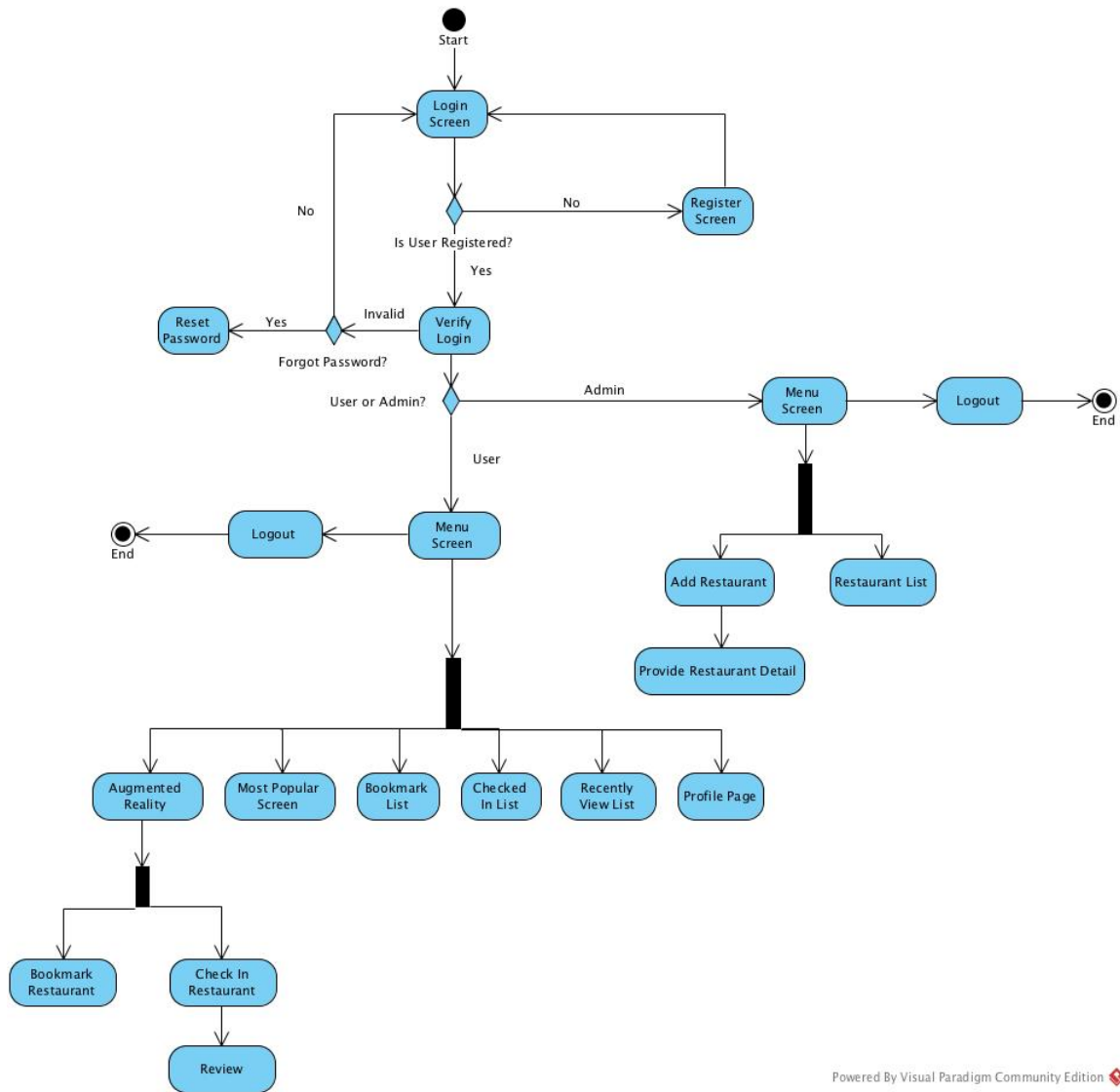


Figure 3.1 Use-case diagram of E-Advertising System

3.3 Activity diagram



Powered By Visual Paradigm Community Edition

Figure 3.2 Activity diagram of E-Advertising System

3.4 Sequence diagram

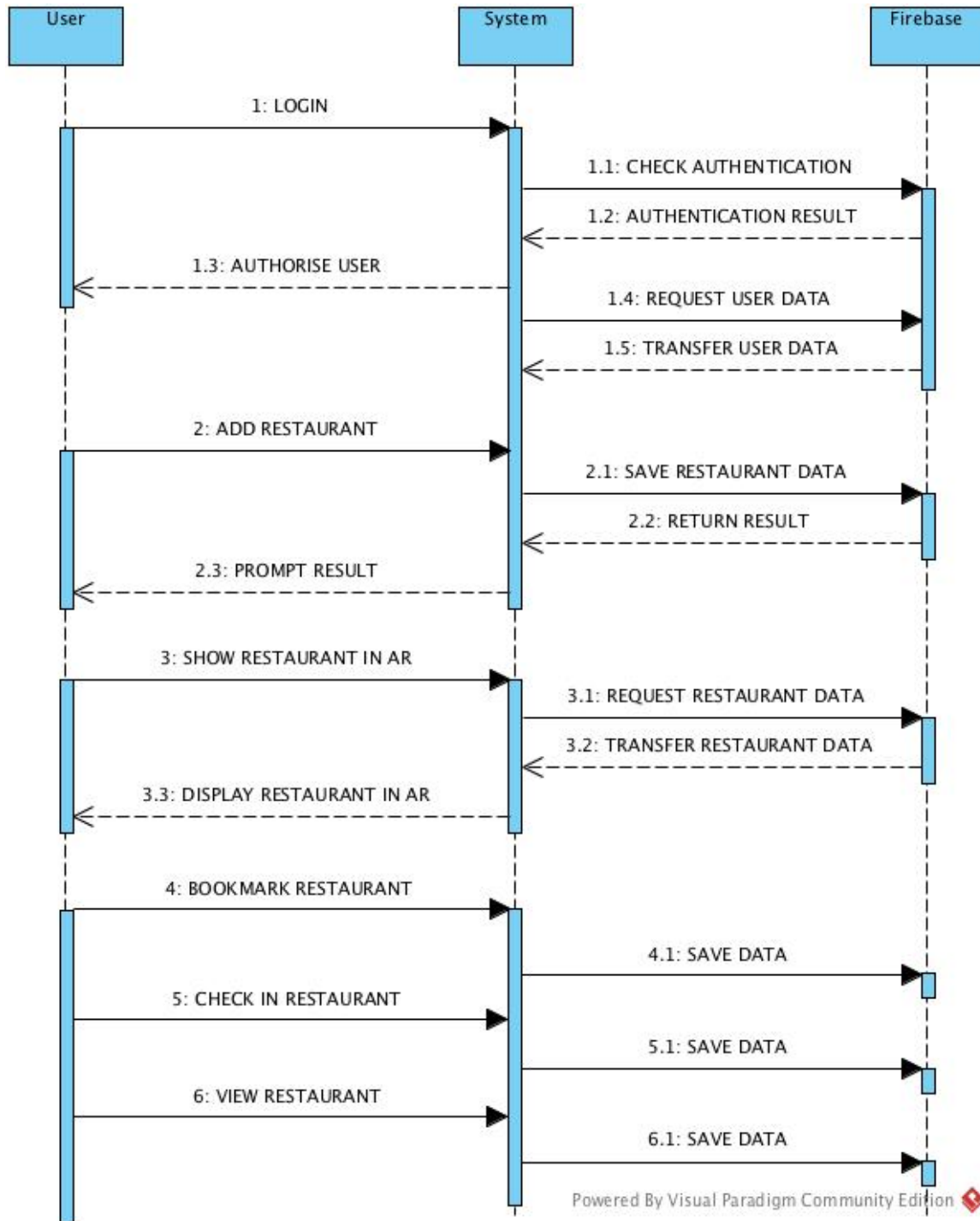


Figure 3.3 Sequence diagram of E-Advertising System

3.5 ER diagram

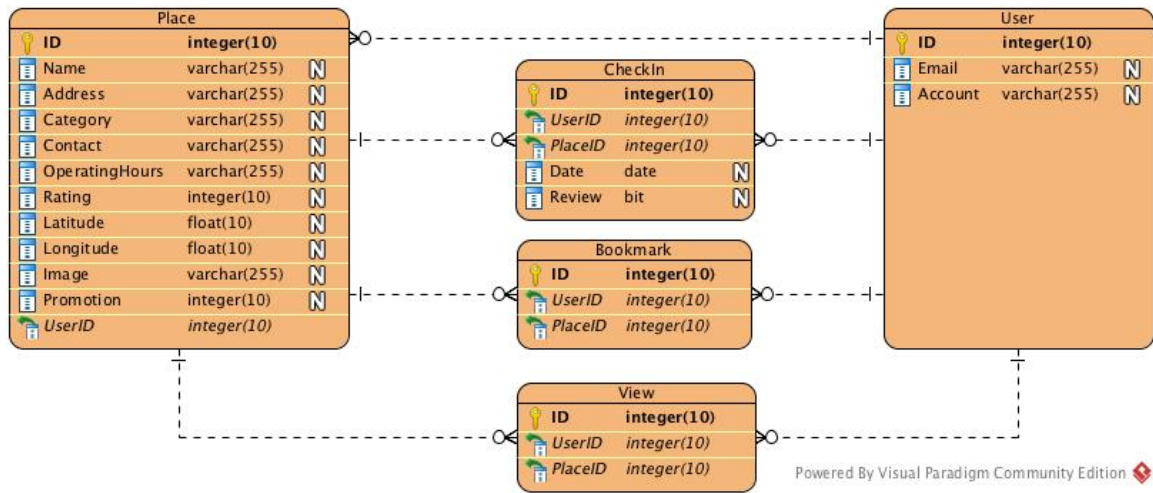


Figure 3.4 Entity-Relationship diagram of E-Advertising System

3.6 Clustering Algorithm



Figure 3.5 Clustering Algorithm

This algorithm is implemented to avoid the stacking of marker, so that the user is able to see every marker clearly in the AR camera. Firstly, it will calculate the angle between the user location and the restaurant location.

angleBetween: function(lat1, lon1, lat2, lon2){};

Those restaurants that have the same angle will be clustered into an array and type it as cluster whereas those restaurants that are not clustered will also be stored into an array but type it as poi.

createClusteredPlaces: function(clusterAngle, usrLocation, placesArray) {}

Besides, the array position will be the angle of the clustered restaurant. Then, the algorithm will loop the array with 360 degrees and return the result.

3.7 Avoid Stacking of Poi

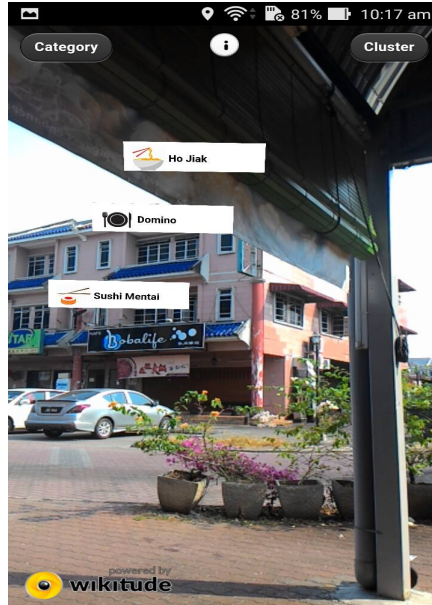


Figure 3.6 Avoid Stacking of Poi

If there are many restaurants at the same angle, the marker of the restaurant will be stacked. So, the system will use the clustering algorithm to calculate the angle. If the restaurants have the same angle then it will set it with different altitude. If the restaurant is nearer then the marker size is bigger.

CHAPTER 4: METHODOLOGY AND TOOLS

4.1 Project Methodology

Rapid Application Development has three methodologies, which is Phased Development, Prototyping and Throw-away prototyping. Phased Development is the methodology to develop this project. It is an approach for developing information system. This methodology breaks system into a set of version and each version is built logically and sequentially. According to Tech-Faq (2016) the most fundamental functions go into the first version and the next version is built once the preceding version is completed. Finally, all the versions developed are tailored together to form a complete system.

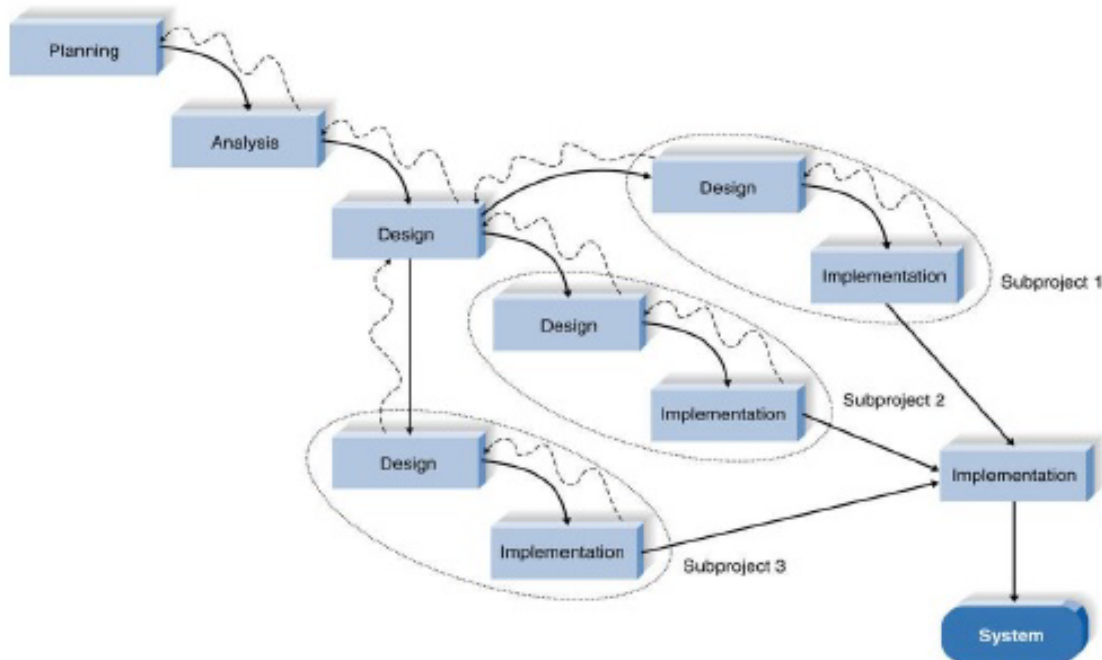


Figure 4.1- Phased Development Methodology

Before the planning phase, I have did some research about the project background and the tools will be use in the project. I was trying to understand how to implement those tools on the project and seek for guidance from senior. After this, I only started the first phase.

Chapter 4: Methodology and Tools

The first phase is planning phase. During this phase, the system requirements are clearly defined. I have gathered some issues of advertising, the way businesses advertise are not effective and not attracted to people. Therefore, I planned to develop this system to solve these issues. At the overall analysis stage, I have reviewed some several existing system that is similar to the system that I planned to develop. First, I found out the pros and cons of the existing system and then suggest the way that can improve for the existing system. Next, compared the existing systems to see which one is the best among them. In the process of developing towards the final version of the system, a series of analysis, design and implementation is done depending on the number of versions of the system.

For the first version, the analysis phase concluded that the fundamental features such as display shop nearby and display promotion details of the shop are to be included. Then, the design phase involves design system flow and determines the network infrastructure needs. Last, the implementation stage translates everything that concluded in analysis phase and design phase into coding. Once the first version is accepted, then the second version begins.

For the second version, the analysis phase involves add on some interactive or attractive features such as allows user to review or rate the visited place and make reservation online. Then, the design phase involves user interface design. Last, the implement stage translates everything that concluded in analysis phase and design phase into coding. Once the second is accepted, then the third version begins.

For the third version, the analysis phase improves previous version and add on some features that do not exist in existing system. Then, the design phase tried to use different type of data to test the program. Last, in the implement phase, all concluded thing in analysis phase and design phase are translated into coding. After the final version is accepted, the final product is finished.

4.2 Tools to use

Android Studio

Android Studio is software that provides tools for building mobile application

Wikitude SDK

Wikitude is an Augmented Reality SDK.

Firebase

Firebase is used as the project back-end database

Window 8

Window 8 is an operating system developed by Microsoft

Visual Paradigm

Visual Paradigm is software that used to organize ideas, document, processes and system

Chapter 5: Implementation and Testing

5.1 Use case testing

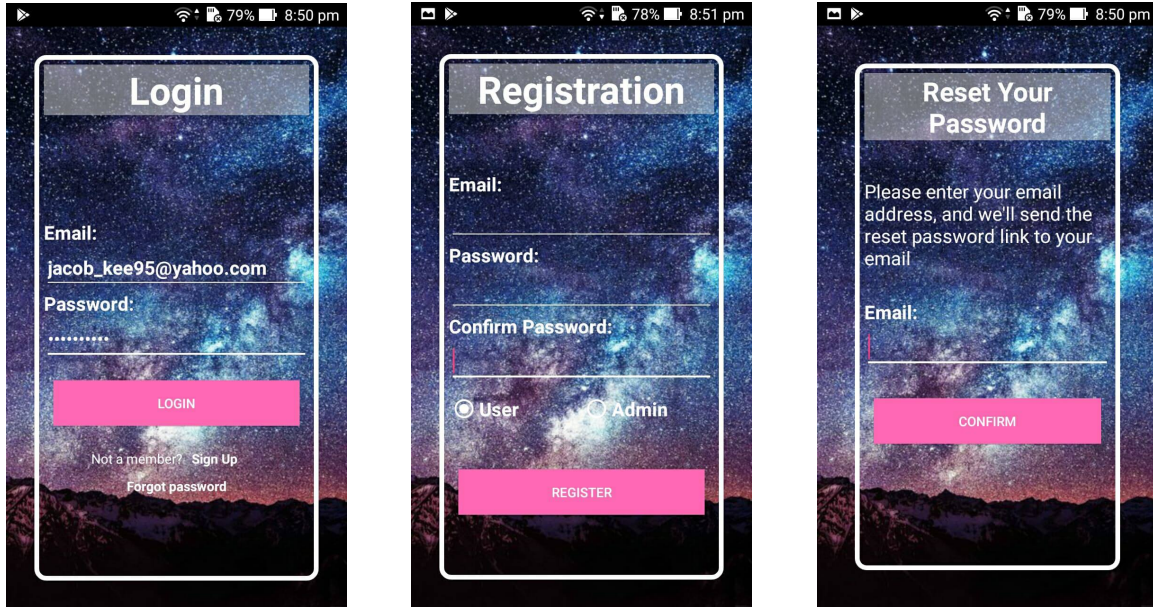


Figure 5.1.1 Login, Registration, Reset Password

Use Case ID	UC001	
Feature	F001 Login	
Purpose	To allow user to login to an account	
Actor	User, Business admin	
Trigger	User starts the application	
Precondition	System is connected to the internet	
Scenario	Step	Action
Main Flow	1	User enters valid email address
	2	User enters valid password
	3	User clicks login button
	4	System verifies the email address and password
	5	User enters the main menu if account is valid
Alternate Flow – Invalid email address or password	1	User enters invalid email address
	2	System display error message “Wrong email address or password”
	3	User enters invalid password
	4	System display error message “Wrong email address or password”

Table 5.1.1 Use Case Testing for Login

Use Case ID	UC002	
Feature	F002 Register	
Purpose	To allow user to register to an account	
Actor	User, Business admin	
Trigger	User starts the application	
Precondition	System is connected to the internet	
Scenario	Step	Action
Main Flow	1	User enters email address
	2	User enters password
	3	User re-enters password
	4	User chooses the role
	5	User clicks the register button
	6	System verifies email address and password
	7	User enters the login menu
Alternate Flow – Invalid email address or password	1	User enters repeated email address
	2	System display error message “Email address is used”
	3	User enters different password
	4	System display error message “Password is not matched”

Table 5.1.2 Use Case Testing for Register

Use Case ID	UC003	
Feature	F003 Reset Password	
Purpose	To allow user to reset the password of the account	
Actor	User, Business admin	
Trigger	User starts the application	
Precondition	System is connected to the internet	
Scenario	Step	Action
Main Flow	1	User enters email address
	2	User clicks confirm reset password
	3	System sends a reset password link to the email
	4	User clicks the link and reset password
Alternate Flow – Invalid email address	1	User enters invalid email address
	2	System display error message “Email address is invalid”

Table 5.1.3 Use Case Testing for Reset Password

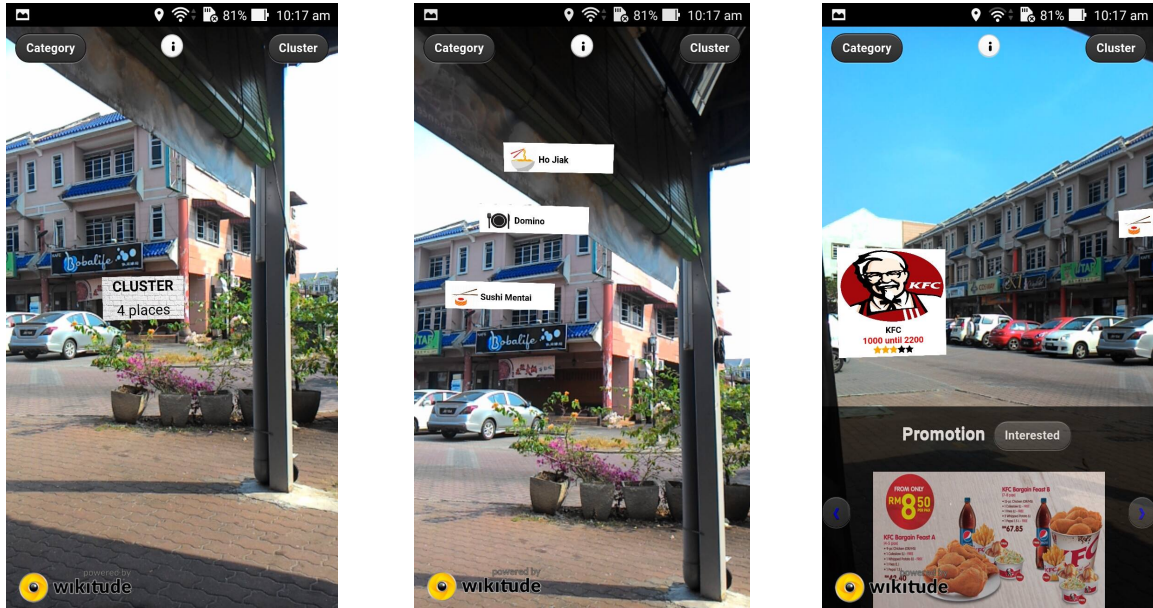


Figure 5.1.2 Augmented Reality

Use Case ID	UC004	
Feature	F004 View Restaurant	
Purpose	To allow user to find out any restaurants nearby that are having promotion thru the AR camera	
Actor	User	
Trigger	User clicked the Augmented Reality menu button	
Precondition	System is connected to the internet and user is login successfully	
Scenario	Step	Action
Main Flow	1	User clicks the Augmented Reality menu button
	2	System shows the restaurant markers in the AR camera
	3	User clicks the clustered markers to uncluster its
	4	User clicks the restaurant markers to get more restaurant details

Table 5.1.4 Use Case Testing for View Restaurant

Use Case ID	UC005	
Feature	F005 Interested Promotion	
Purpose	To allow user to click interested button to the promotion that he is interested	
Actor	User	
Trigger	User clicked the interested promotion button	
Precondition	System is connected to the internet and user is login successfully	
Scenario	Step	Action
Main Flow	1	User clicks the interested promotion button
	2	System will display a message "Interested"
	3	System will collect the data and save it to the database

Table 5.1.5 Use Case Testing for Interested Promotion

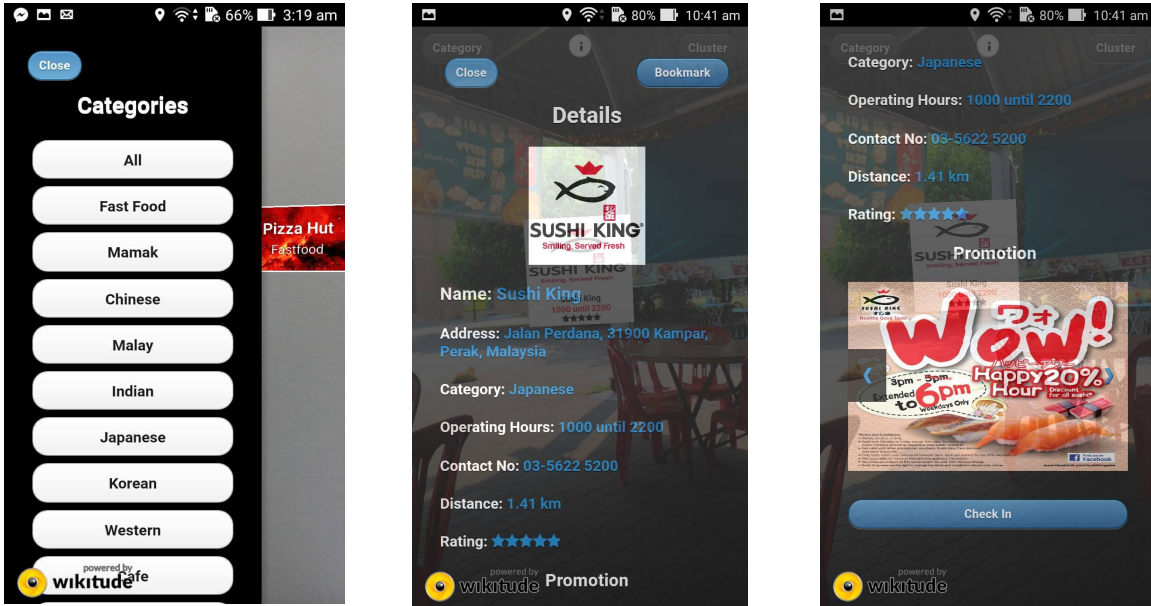


Figure 5.1.3 Category, Restaurant Details

Use Case ID	UC006	
Feature	F006 Bookmark	
Purpose	To allow user to bookmark the restaurant he likes	
Actor	User	
Trigger	User clicked the bookmark button	
Precondition	System is connected to the internet and user is login successfully	
Scenario	Step	Action
Main Flow	1	User clicks the bookmark button
	2	System will collect the data and save it to the database

Table 5.1.6 Use Case Testing for Bookmark

Use Case ID	UC007	
Feature	F007 Check In	
Purpose	To allow user to check in the restaurant he went	
Actor	User	
Trigger	User clicked the check in button	
Precondition	System is connected to the internet and user is login successfully	
Scenario	Step	Action
Main Flow	1	User clicks the check in button
	2	System will display a message "You have checked in this place"

Table 5.1.7 Use Case Testing for Check In

Chapter 5: Implementation and Testing

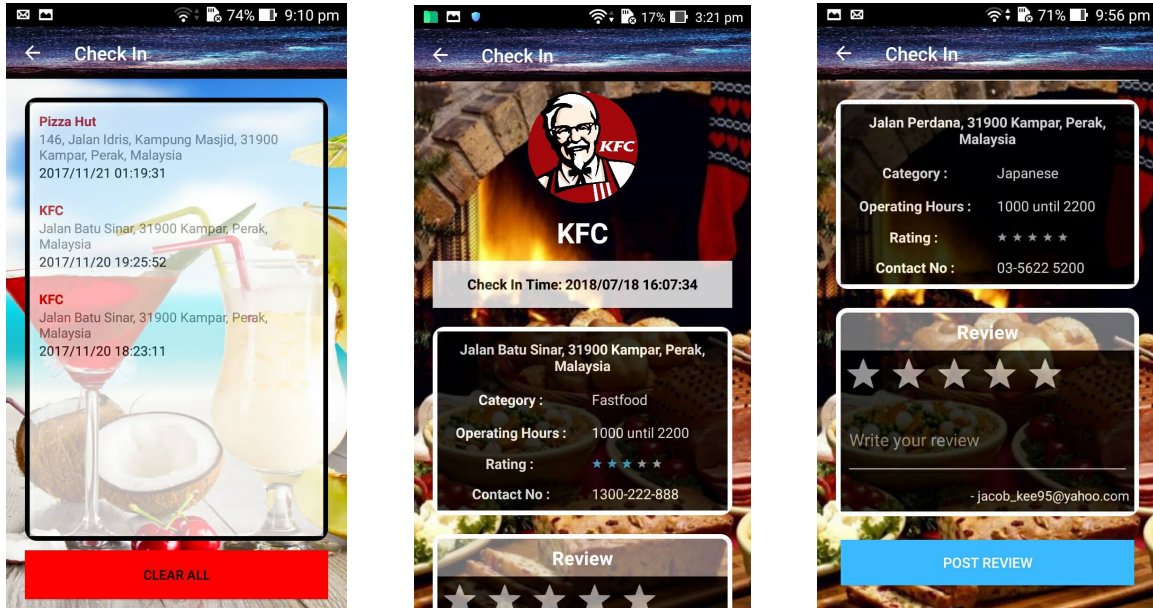


Figure 5.1.4 Check In, Review

Use Case ID	UC008	
Feature	F008 Review	
Purpose	To allow user to do a review for the restaurant he checked in	
Actor	User	
Trigger	User clicked the review button	
Precondition	System is connected to the internet and user is login successfully	
Scenario	Step	Action
Main Flow	1	User chooses the restaurant
	2	User do a review
	3	User clicks the post review button
	4	System will display a message "Post successfully"

Table 5.1.8 Use Case Testing for Review

Chapter 5: Implementation and Testing

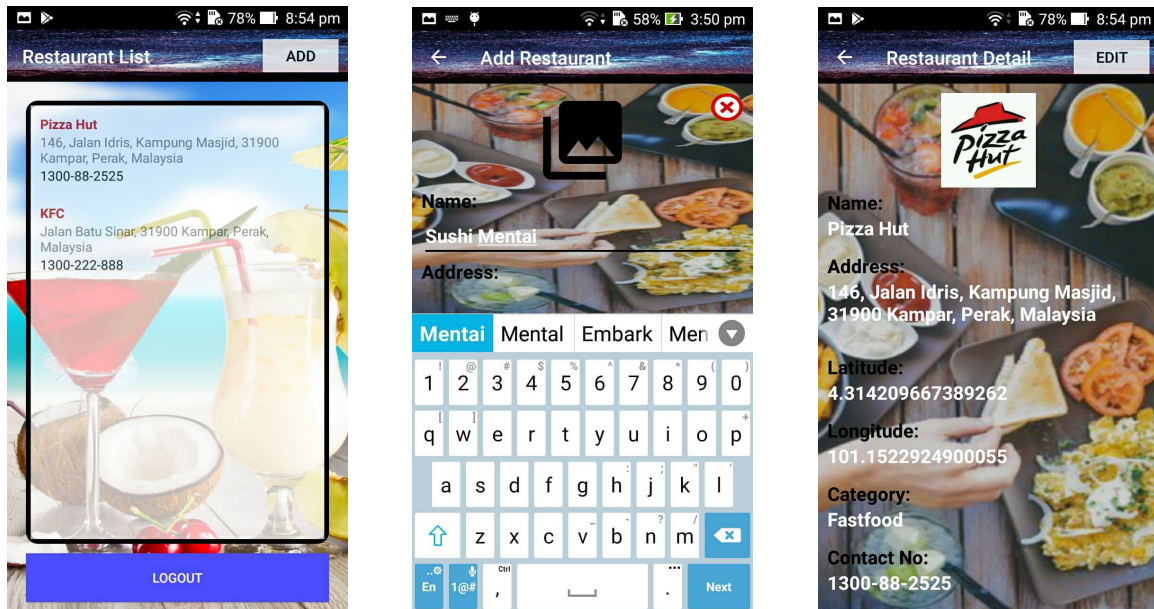


Figure 5.1.5 Add Restaurant

Use Case ID	UC009	
Feature	F009 Add Restaurant	
Purpose	To allow business admin to add restaurant	
Actor	Business Admin	
Trigger	Business admin clicked the add button	
Precondition	System is connected to the internet and business admin is login successfully	
Scenario	Step	Action
Main Flow	1	Business admin clicks the add button
	2	Business admin fills in the restaurant details
	3	Business admin clicks the save button
	4	System will display a message "Add restaurant successfully"
Alternate Flow – Invalid details	1	Business admin fills in the invalid restaurant details
	2	System will display an error message

Table 5.1.9 Use Case Testing for Add Restaurant

Use Case ID	UC010	
Feature	F010 Edit Restaurant	
Purpose	To allow business admin to edit restaurant	
Actor	Business Admin	
Trigger	Business admin clicked the edit button	
Precondition	System is connected to the internet and business admin is login successfully	
Scenario	Step	Action
Main Flow	1	Business admin clicks the edit button
	2	Business admin edits the restaurant details
	3	Business admin clicks the save button
	4	System will display a message "Edit restaurant successfully"

Table 5.1.10 Use Case Testing for Edit Restaurant

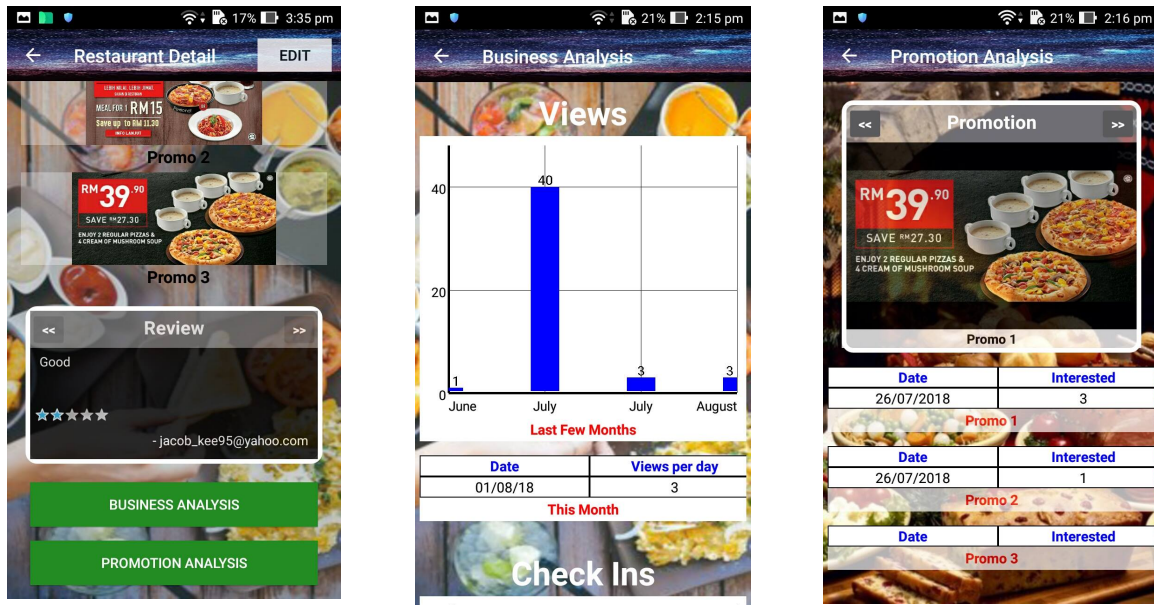


Figure 5.1.6 Business Analysis, Promotion Analysis

Use Case ID	UC011	
Feature	F011 Business Analysis	
Purpose	To allow business admin to see the business analysis	
Actor	Business Admin	
Trigger	Business admin clicked the business analysis button	
Precondition	System is connected to the internet and business admin is login successfully	
Scenario	Step	Action
Main Flow	1	Business admin clicks the business analysis button
	2	System will display the view and check in data in table and graph

Table 5.1.11 Use Case Testing for Business Analysis

Use Case ID	UC012	
Feature	F012 Promotion Analysis	
Purpose	To allow business admin to see the promotion analysis	
Actor	Business Admin	
Trigger	Business admin clicked the promotion analysis button	
Precondition	System is connected to the internet and business admin is login successfully	
Scenario	Step	Action
Main Flow	1	Business admin clicks the promotion analysis button
	2	System will display the promotion data in table

Table 5.1.12 Use Case Testing for Promotion Analysis

CHAPTER 6: CONCLUSION

This project is aim to provide a system that could help restaurant to promote their product in the more efficient way. It is because many restaurants spent a lot of money on advertisement to promote their product but those ways they used are not efficient at all. They tried to print pamphlets and distribute to customers, print banners and hang its on the roadside but the number of people would see the pamphlet and banner is very little. It is because the ways are not interactive at all but waste money instead. Therefore, I develop a system that could solve these problems.

I have developed a mobile application with AR technology. This system is able find out any restaurants nearby that are having promotion in the AR camera. It can also display the entire restaurant details and the promotion. Therefore, at one glance, user could see everything in the AR camera. It is very interactive and user friendly. User just has to click the restaurant marker and the system will display the entire restaurant details for the user. Other than this, user is able to move to AR camera to find out more restaurants nearby. User is able to click interested button on the promotion he like and also can bookmark the restaurant he is interested. Those data will be collected and the system will analyze it for the business admin.

Moreover, user is able to check his recently view, check in and bookmark restaurants. User is able to do a review to the restaurant they checked in and the restaurant could know the feedback and make an improvement. Besides, the system will show the user which restaurant is the most popular such as the restaurant has the most view and most check in. User could also check their profile to check the review he did and how many places he checked in or bookmarked. The view, check in and bookmark list is able to deleted by user.

In the AR platform, user is able to filter the restaurant markers by category so that he can choose what he interested easily. Those markers will be show with the restaurant

Chapter 6: Conclusion

name and the category icon. After clicked in, it will display the restaurant details and the promotion photos. In FYP2, I have implemented a clustering algorithm to solve the stacking of poi problem. The clustering algorithm will calculate the angle between user location and the restaurant location. Then, those restaurants that have the same angle will be stored into an array, and the array position is the angle of the restaurant. Those restaurants that are clustered will be typed as clustered whereas those restaurants that are not clustered will be typed as poi. After this, the cluster algorithm will loop the array 360 degrees and return the results. If the clustered marker is clicked, the markers will be unclustered and show the restaurant markers with different altitudes.

For the business admin, I am very sure that this system is much better than the old ways they promoted their product. It is because this system is not only could help them to promote their products, it also provide business analysis data. The system will calculate the view and check in per day and generate the data into graph and table. The graph will show the views per month and the table will show the views per day. Other than this, the system will also calculate which promotion has the most interested. Therefore, business admin could use these data to improve their business. Additionally, there is a system admin for this system. The system admin is able to know the amount of user and business admin are using the system. System admin is also able to know how many peoples are using this system per day.

In conclusion, this system has reached the objective and even has more useful function. It is very useful for user and business admin. User could find out the restaurant they want easily and business admin could promote their product in a more interactive way.

References

REFERENCES

AdvertisingAge (n.d) Advertising and Marketing Industry New [online] Available at: <http://adage.com/channel/advertising/47> [Accessed 10 Aug 2017]

ClickZ (2016) Why in-app ads may be the future of mobile advertising [online] Available at: <https://www.clickz.com/why-in-app-ads-may-be-the-future-of-mobile-advertising/90711/> [Accessed 10 Aug 2017]

Kevin Bonsor (2017) How Augmented Reality Work [online] Available at: <http://computer.howstuffworks.com/augmented-reality.htm> [Accessed 10 Aug 2017]

Augmented Reality (2017) Best Augmented Reality Apps [online] Available at: <https://www.digitaltrends.com/mobile/best-augmented-reality-apps/> [Accessed 11 Aug 2017]

Augment Reality Apps (n.d) Augment Reality Apps [online] Available at: <http://www.augment.com/augmented-reality-apps/> [Accessed 11 Aug 2017]

Layar (n.d) Layar features [online] Available at: <https://www.layar.com> [Accessed 11 Aug 2017]

Yelp (n.d) Yelp features [online] Available at: <https://www.yelp.com/sf> [Accessed 11 Aug 2017]

Wikitude (n.d) Wikitude features [online] Available at: <https://www.wikitude.com/app/> [Accessed 11 Aug 2017]

References

Java (n.d) Java Programming Language [online] Available at:

https://en.wikibooks.org/wiki/Java_Programming [Accessed 12 Aug 2017]

Android Studio (n.d) Android Studio for beginner [online] Available at:

<http://www.androidauthority.com/android-studio-tutorial-beginners-637572/> [Accessed 12 Aug 2017]

Wikitude (n.d) Wikitude SDK [online] Available at:

<https://www.wikitude.com/documentation/> [Accessed 13 Aug 2017]

Firebase (n.d) Firebase Database [online] Available at: <https://firebase.google.com>

[Accessed 14 Aug 2017]

Priyanka Varma (2016) What is Firebase [online] Available at:

<https://www.quora.com/What-is-firebase> [Accessed 14 Aug 2017]

Android Authority (2017) 10 Best Augmented Reality Apps for Android [online]

Available at: <http://www.androidauthority.com/best-augmented-reality-apps-and-ar-apps-for-android-584616/> [Accessed 15 Aug 2017]

Mallow (2017) The Future Of Mobile Apps – Augmented Reality [online] Available at:

<http://blog.mallow-tech.com/tag/ar-apps/> [Accessed 15 Aug 2017]

Tom's Guide (2017) Best Augmented Reality Apps [online] Available at:

<https://www.tomsguide.com/us/pictures-story/657-best-augmented-reality-apps.html>

[Accessed 15 Aug 2017]

Verizon (2017) 5 Best Augmented Reality [online] Available at:

<https://www.verizonwireless.com/articles/5-best-augmented-reality-apps/> [Accessed 15 Aug 2017]

References

Chinpin (2017) Top 10 Best Augmented Reality Apps – The Future is Now [online] Available at: <https://www.chipin.com/best-augmented-reality-apps/> [Accessed 15 Aug 2017]

Forbes (2017) Augmented Reality Is Coming To Banner Ads [online] Available at: <https://www.forbes.com/sites/parmyolson/2017/05/08/augmented-reality-banner-ads-blippar/#5fcb4f4445d9> [Accessed 15 Aug 2017]

Catchoom (2017) 15 Cool Augmented Reality Advertising Campaign [online] Available at: <http://blog.catchoom.com/blog/15-cool-augmented-reality-advertising-campaigns> [Accessed 15 Aug 2017]

AppReal (2017) 10 Real World Examples of AR Marketing Success [online] Available at: <https://appreal-vr.com/blog/10-augmented-reality-marketing-examples/> [Accessed 15 Aug 2017]

Tech - Faq (2016) SDLC Methodology [online] Available at: <http://www.tech-faq.com/sdlc-methodology.html> [Accessed 15 Apr 2017]

Appendix A: Poster of E-Advertising in a smart community with an AR technology

UTAR Faculty Of Information and Communication Technology
UNIVERSITI TUNKU ABDUL RAHMAN

E-ADVERTISING IN A SMART COMMUNITY WITH AUGMENTED REALITY TECHNOLOGY

Introduction

Nowadays, businesses spent a lot of money on advertising. They are tried to promote their product or service to inform and influence people who receive them. But the way they advertise is not attractive to people at all. Since technology has become more advanced and attracted to people. Therefore, I was planning to develop a system that is able to help businesses to promote their product through mobile device with AR technology. It will be a very interactive and attractive system.

Objective & Scope

Objective:

1. This project is to develop an Augmented Reality system that could show out entire details of the advertisement.
2. This project is to enable an Augmented Reality system to find out nearby restaurant that are having promotion

Scope:
This project is only cover at Kampar area and it is also only for restaurant

Methodology

1. Developed using Android Studio
2. Wikitude SDK for Augmented Reality
3. Firebase for back-end database

Conclusion

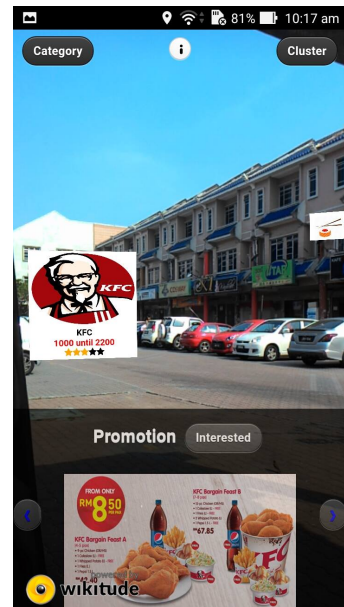
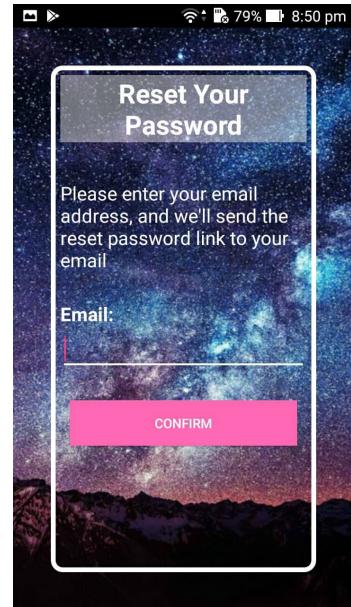
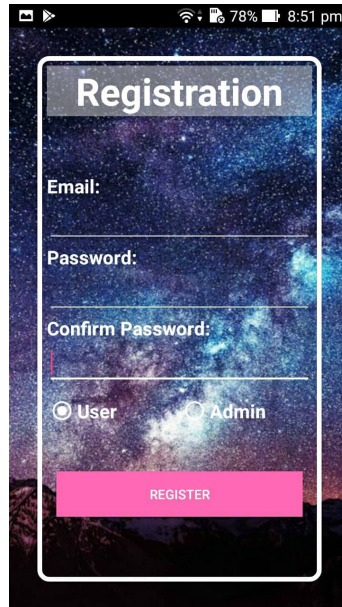
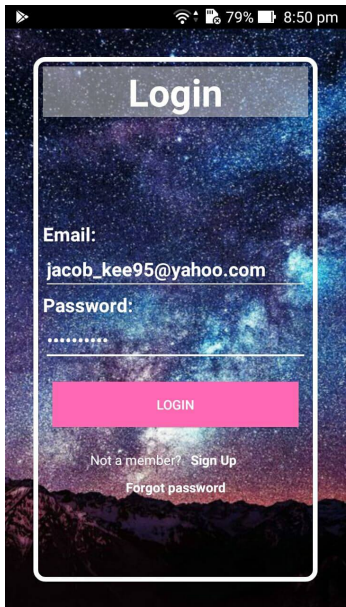
This project is able to help businesses to promote their product, it is also strives to provide user to find out any restaurant nearby that is having promotion through AR technology .

Design

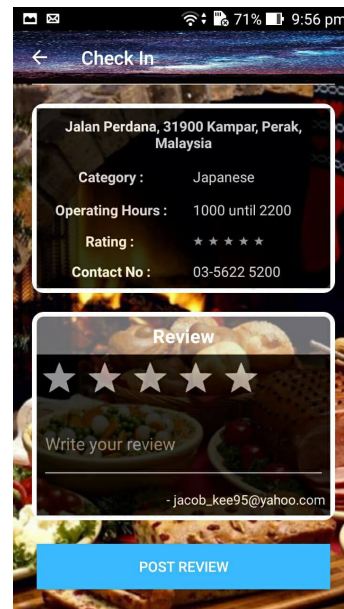
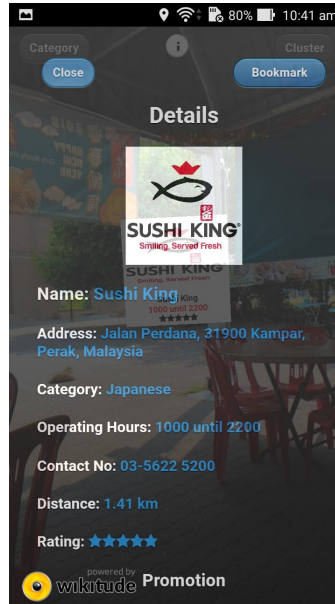
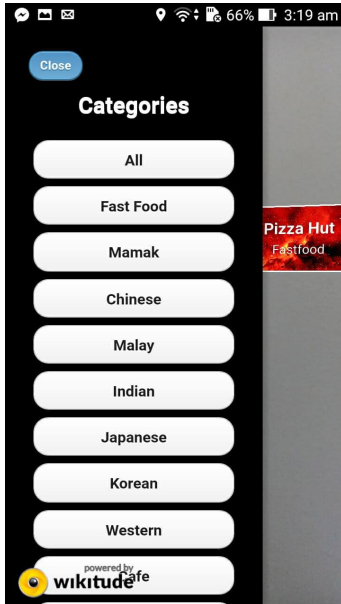
The Design section displays five mobile app screenshots showing the user interface for finding and viewing restaurant details, including a search screen, a restaurant profile for Pizza Hut, a list of nearby restaurants, a detailed view of a restaurant, and a confirmation screen.

By: Kee Shaw Jye
Supervisor: Dr.Cheng Wai Khuen

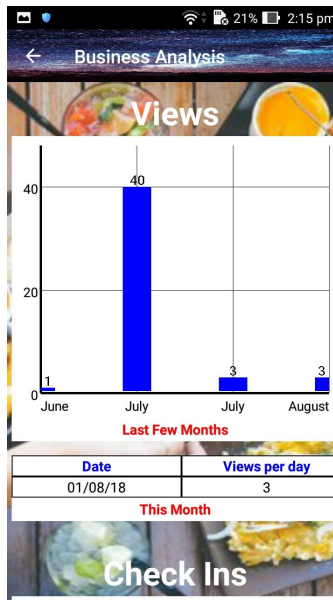
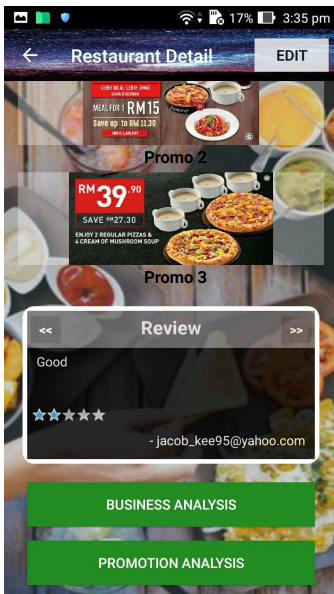
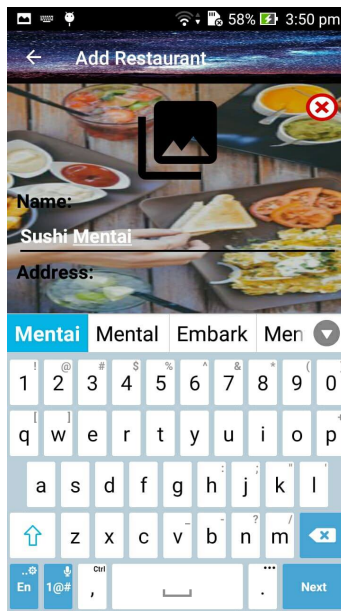
Appendix B: Screenshots of E-Advertising in a smart community with an AR technology



Appendix



Appendix



Promotion Analysis

Promo 1

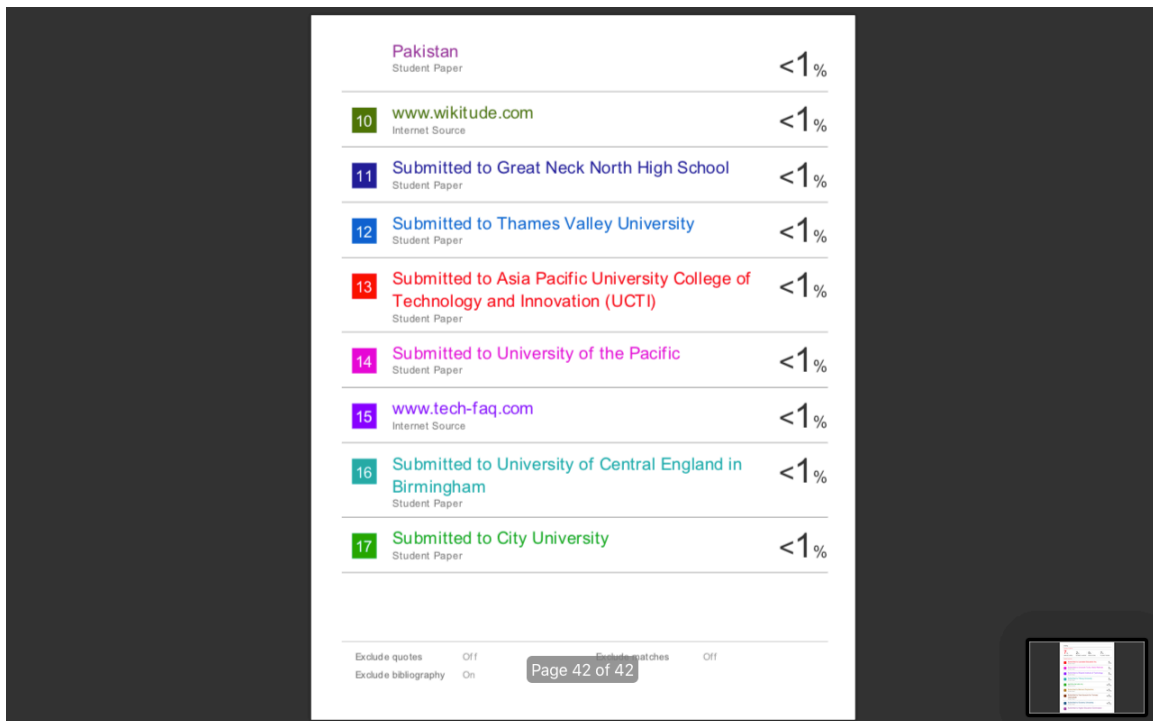
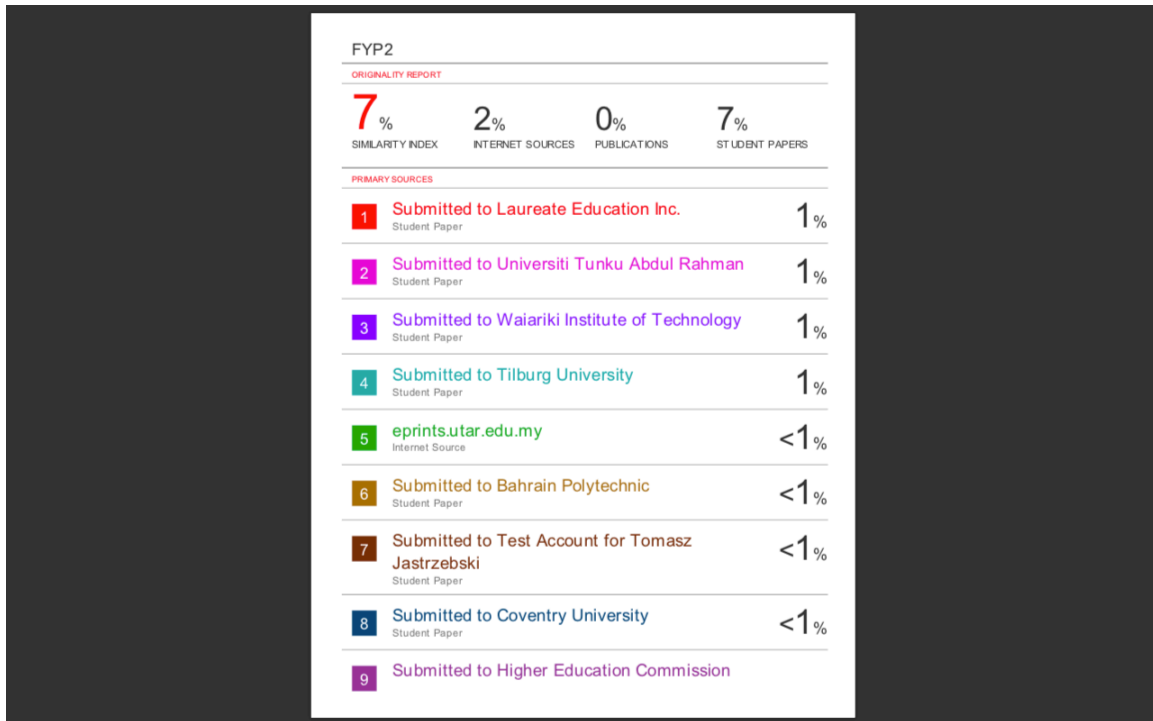
Date	Interested
26/07/2018	3

Promo 2

Date	Interested
26/07/2018	1

Promo 3

Appendix C: Turnitin Plagiarism Check Summary and Result



Appendix D: FYP2 Checklist



UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF INFORMATION & COMMUNICATION TECHNOLOGY (KAMPAR CAMPUS)

CHECKLIST FOR FYP2 THESIS SUBMISSION

Student Id	
Student Name	
Supervisor Name	

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)

*Include this form (checklist) in the thesis (Bind together as the last page)

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:
--	--