Event sharing in a smart campus with augmented reality technology

BY

HOW XUN ZHEN

A REPORT

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

BACHELOR OF COMPUTER SCIENCES (HONS)

Faculty of Information and Communication Technology
(Kampar Campus)

MAY 2018

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DECLARATION OF ORIGINALITY

I declare that this report entitled **Event sharing in a smart campus with augmented reality 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.

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Name   :   _____

Date   :   _____

ACKNOWLEDGEMENTS

I would like to express my special thanks of gratitude to my supervisor, Dr Cheng Wai Khuen who has given me this opportunity to involve in this project which helped me to polish my programming skills to be prepared for the future. Not only that, his word of wisdom also aided me to focus on my objectives of the project and at the same time to

Secondly, I must say thanks to my parents and family members who that has unconditionally provided their aid and support to me during hard times.

And lastly, I would like be thankful to those friends and course mate who had supported me during this entire period.

ABSTRACT

This project seeks to create a platform which gathers the entire current on-going or future

llows user to

discover and interact with the event marker they see by implementing the augmented reality technology within the system. Element of AR that resides in the project aims to enhance the interactivity between the user and the system which at the same time provide

After months of study, research and analyzing other existing system. A list of user preference and functionality is gathered and can be further enhance to fit the current developing system. All of these user preference and functionality that is gathered from other system which is similar in nature will be combined with additional adjustment to form the current system. By using phased developing approach, the prototype of the system will be made and improved upon different release.

Overall this project will allow students to quickly get in touch with the event that they are most likely to have interest in it which indirectly improve the chances of them participating it. This may results in UTAR becoming a well-known university for students are actively involved themselves in gaining soft skills.

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LIST OF ABBREVIATIONS

AR   Augmented Reality

VR   Virtual Reality

IOS   Iphone Operating System

OS   Operating System

RAM   Random Access Memory

UTAR   University Tunku Abdul Rahman

ATM   Automated Teller Machine

2D   Two-dimensional

RAD   Rapid Application Development

POI   Point of Interest

Chapter 1: Introduction

1.1 Motivation and Problem Statement

In University Tunku Abdul Rahman (UTAR) which is one of the most event rich University in Malaysia, we does not have mobile application or even a platform that connects all the on-going and upcoming event together in a organized view which allow student to discover event in ease. Following up to the previous problem, event organizer has to advertise their event   blindly which the common approach is by distributing flyers to the students without proper selection of their target. This has results in paper wastage which is unparalleled with the effectiveness in promoting the event. In addition to the major problem mentioned above, student may miss out on events that they most

advertising activities so happened to missed them.

The entire above problem might be solved by developing a mobile application which allows students to discover the event with their preferences as filter and recommend the events accordingly. This application at the same times aids
equip student with other skills that enhance their contributions to their career and society.

Chapter 1: Introduction

1.2 Background information

Flyer, poster, banner, all of these tools that help to promote an event is starting to

most not econ-friendly at the same time. O'Quinn says the root of the problem with flyer waste is that people have to opt-out of receiving them, instead of opting in Natasha Pace (@NatashaPace) <u>November 28, 2016</u>. Many solutions such as eco-friendly flyers have been made but are not effective because the real problem is that user has no interest at all in the event itself. Currently in University Tunku Abdul Rahman (UTAR), similar problem persist where students are annoyed to flyers which they have been given. Hence, event organiser must be smart in selecting their audience of interest when advertising their event.

On the other hand, augmented reality (AR) is a technology that involves the integration of digital information with real world environment in real time. Mobile AR is a new and expanding area, and there are many research opportunities in the mobile AR field. (Chao, J.T., Pan, L., & Parker, K.R., 2014). Unlike virtual reality (VR) which displayed only computer generated environment, AR displays the exact environment that

experience.

By combining the idea and augmented reality technology above give the idea to develop a mobile application which is able to utilize the augmented reality features to display the organised data of all the events happening around the student.
reactions to AR mobile campus exploration experiences are assessed based on three facets: functionality, personal satisfaction, and effectiveness of learning (Te-Lien, Chou, 2014).This application will pinpoint the location of all events and display accordingly to user preferences in augmented reality view. Furthermore, student is able to interact with the object of interest they see in augmented reality view such as giving a positive

1.3 Project Objective

- To create an augmented reality system that can solve the following problems:
    - Paper wastage while doing advertising
    - Confusion occurs when multiple event took place at the same time
    - Flyers and poster being not effective
    - Event sharing is not smart
- To create an interactive augmented reality feature into the proposed system
- To create an smart augmented reality mobile application that will collect and display data according to user preferences

1.4 Proposed approach/Study

The proposed approach is to build a mobile application with Android Studio integrated with augmented reality technology by Wikitude which enable user to discover event in two ways, which is through the traditional 2D or the new 3D (augmented reality). Firebase will be used as the database which stores the data for this project. This mobile application will be developing in phased development approach which a prototype will be release from time to time until a satisfying prototype is achieved.

Chapter 1: Introduction

1.5 Achievement Highlight

This system are able to provide user a better, comfortable, organized and intelligence platform to discover the event within the UTAR campus. By using the AR feature in the system, users are able to quickly locate their event of interest with our cords the interaction of the user with the system from time to time and suggests the user the event that he/she might have interest On the other hand, the AR feature helps especially for the freshman to locate a location of an event easily as the event is shown in the direction of the camera that the user is facing. By using the AR

the 2D map. Thirdly, our system allows user to filter the event they wanted to see in one click. This feature further accelerates the process for user to determine whether there is an event that is suitable for them. Lastly, user can able to review, comments or show interest in an event to show they support or dissatisfactory towards an event.

From the perspective of an event organizer, this system can provide them the statistic of a certain time range (For example, past event) which can be used as a reference or a guideline for the future by generating an activity report for them. The current activity report will included the number of views, number of interested, gender, average age, graph of clicks over days and clicks over hours. By using the data gathered, the event organizers are able to plan their next move accordingly. As for the event with most view, an animation is added to the marker of the event which helps to attract attention of the user to click in.

Chapter 2: Literature Review

2.1 Review Description

This section gathered and describes the features or functionalities of mobile application that is similar to the upcoming system that is going to be developed.

2.2 Review of Existing System

2.2.1 Layar
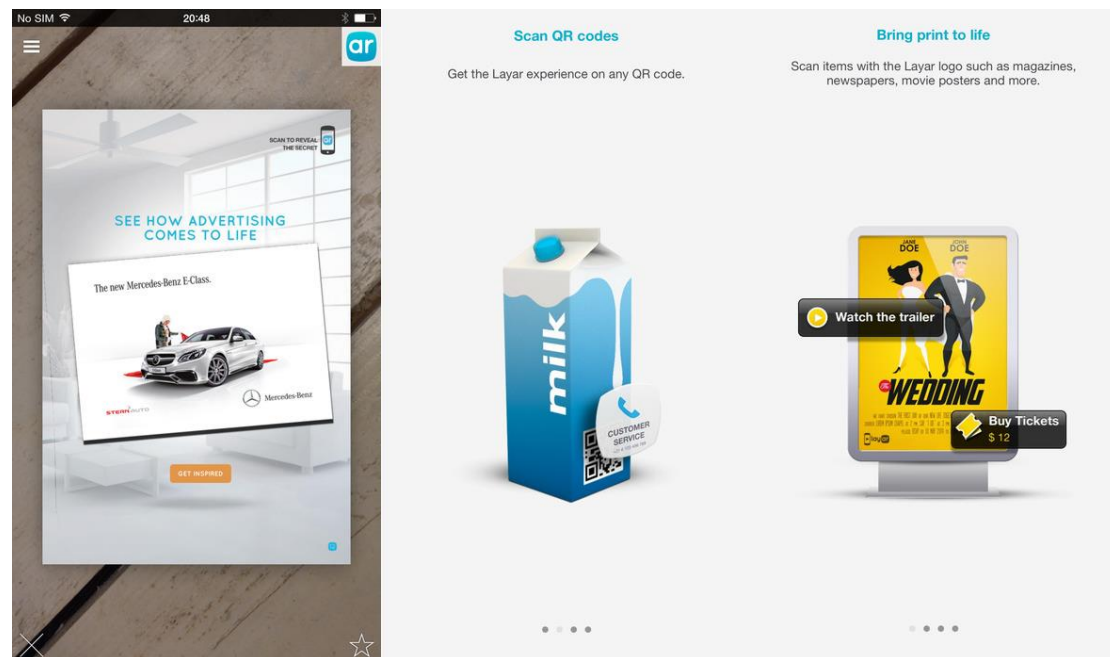
Figure 2.2.1a – A series of poster of Layar

Layar is a mobile application that brings augmented reality into daily life, founded in summer of 2009 as one of the first mobile augmented reality browsers to hit the market. This application is available in both iOS and android devices with over 10millions of download (Layar, 2017).

In general, this application allows user to enhance their experience of a single printed material by adding an additional layer of digital information on top of it, such as website link, video, etc. Furthermore, user can also use purchase item by clicking the direct mobile shopping link that appeared when scanning an image of a product. Another

pointed out the direction of the object in the layer that they interested in. For example, if

object of interest such as ATM and metro shops that will aid you in resupplying for your journey.

<u>Pros</u>

- Allow quick access to the detailed information of an object
- Simple yet easy to learn interface
- Provide in application guide which helps user to understand the application quickly.
- No login is required
- Can sign up quickly with Facebook account available
- Has favourite list that allows user to favourite their scanned product to be access quickly later on
- Has a filter that allows user to see only the object of interest around them

<u>Cons</u>

- Slightly buggy
- Unattractive interface (All features are mixed up in a page, no page transition)
- Maximum scanning range is only 2.5km

<u>Suggested ways to improve</u>

- Separate the features into different page to enhance user experience
- Fix all the current bugs found
- Adjustable maximum scanning range based on user hardware

2.2.2 Yelp
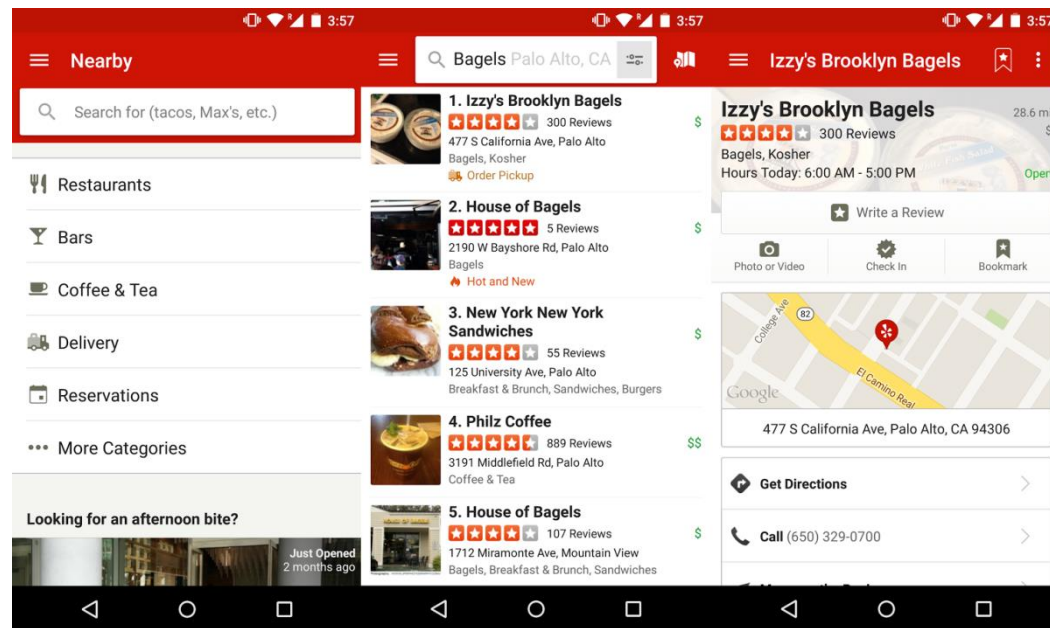
Figure 2.2.2a- A series of poster of Yelp

Yelp is a mobile application that helps user to find the perfect places for them to eat shop, drink, relax and play. This application was founded in 2004, by former PayPal employees Russell Simmons and Jeremy Stoppelman. In 2009, Yelp released their update on augmented reality feature which is

user to see Yelp data not only on 2D Google map but their camera. Yelp is available in both IOS and Android devices with over 10 million of download for each (Yelp, 2017).

In general, Yelp helps user to locate their place of interest such as restaurant with the help of all the data in their website, Yelp.com which is a crowd-sourced local business review and social networking site. In fact, Yelp is also a platform to make friends with its large social ne

their own wall to share their wonderful moment with the community and their friends in Yelp. Furthermore, Yelp even has their own messaging feature allow their member to communicate with one another like any other social application. Apart from the entire

shown below:

- Write review   (Able to review any of the restaurant, bar, etc in the database)

- Check in   (Check in to show friends where the user are)
- Activity   (Activity wall that shows all the worth notice things around the user)
- Events   (Create, manage or notify people an event)
- Monocle   (Augmented reality feature that display data on the top of things user sees in their camera)
- Add business   (User may notify other the community their business by register themself in the Yelp database)

Pros

- Attractive and convenience interface   Access to most option in less than 3 clicks
- Connectable to huge and active community social network
- Allows user to login via Facebook
- Profile information taken from Facebook
- Has in-app messaging
- Has event planner
- Able to check in
- Free to use

Cons

- Profile information not editable
- Augmented reality feature is not stable
  up together
-

Suggested ways to improve

- Allows user to edit their profile information
- Check for bugs or improve location accuracy
- Work with different agencies to expend the database
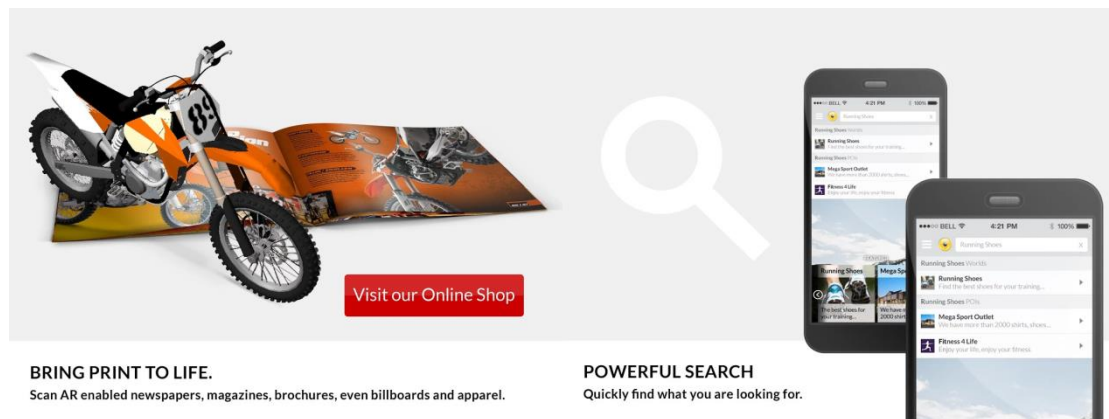
2.2.3 Wikitude

Figure 2.2.3a – A series of poster of Wikitude

Wikitude an augmented reality provider but in this case is a mobile application that provide augmented reality experience to the end user. This application is first released in year 2008, developed by Wikitude developers (Wikitude, 2017). This application is available in both IOS and Android devices with over 10 million of download.

Generally, wikitude provide both location-based augmented reality experience and image recognition technology to the user in a nutshell. User can select either different augmented reality features with different functionalities (World), and depending on the type of world wikitude behaves differently. World are created by other user using Wikitude Studio offline and upload to its database.

Pros

- Simple interface
- Worlds can be created by user based on their own object of interest
- Rather stable compare to most of the AR apps

Cons

- Not user friendly   The help feat
  search
- World search results contains a lot of redundant world   World that is created by other user mainly for fun or testing

- Interface are unattractive

Suggested ways to improve

- Provide hints, detailed guide, or step-by-step navigation to guide new user to quickly get used to the application
- Separate officially useful world and the redundant world
- Add more page transition, colours and attractive icons

2.4 Comparison between existing systems

Table 2.4.1   Comparison of features/function of three different application

Application Function/Features	Layar	Yelp	Wikitude
User guide	x	x	x
Image recognition	x		x
Location-based AR	x	x	x
In-app messaging		x	
Event		x	
Review	x	x	
Bookmark location		x	
Map navigation	x	x	x
Check in		x	
Login via Facebook	x	x	
Personal space		x	
Account	x	x	

2.5   Explanation of features/function

Table 2.5.1   Explanation of feature stated in table 2.4.1

Feature/Function	Explanation
User guide	A proper user guide which guide the user throughout the application
Image recognition	Able to recognise image with camera and display data accordingly
Location-based AR	Able to point out location and distance of an object of interest with camera
In-app messaging	Able to personal message friend within the application
Event	Able to create, organise or being notify of event around the user
Review	Able to review location of interest
Bookmark location	Able to bookmark location of interest for more convenience access later.
Map navigation	Able to navigate user to their location of interest
Check in	specific location to let other user around to get notify
Login via Facebook	Able to quickly create an account using Facebook to access to the application
Personal space	Has page of your own to edit and present your own personal information and moments
Account	Able to create an account to save your details

Chapter 3: System Design

3.1 User requirements

3.1.1 Functional requirement

1. User should be able to authenticate him/herself during login.
2. User should be able to register him/herself.
3. User should be able to view the event in augmented reality.
4. User should be able to filter the POI results that he/she wished to see by category.
5. Event Organizer should be able to register a new event into the application.
6. Event Organizer should be able to upload photo with caption that is related to the event.
7. Event Organizer should be able to generate report about an event.
8. User should be able to review the event.
9. User should be able to show interest in a particular event.
10. User should be able to make comment on a particular event.
11. User should be able to update his personal information.
12. User should be able to search for friends and add them.

3.1.2 Non-functional requirement

1. The application should be maintainable (Allow new update or new features to be added).
2. The application should be ease to use and easy to learn.

3.2 Use-case Diagram
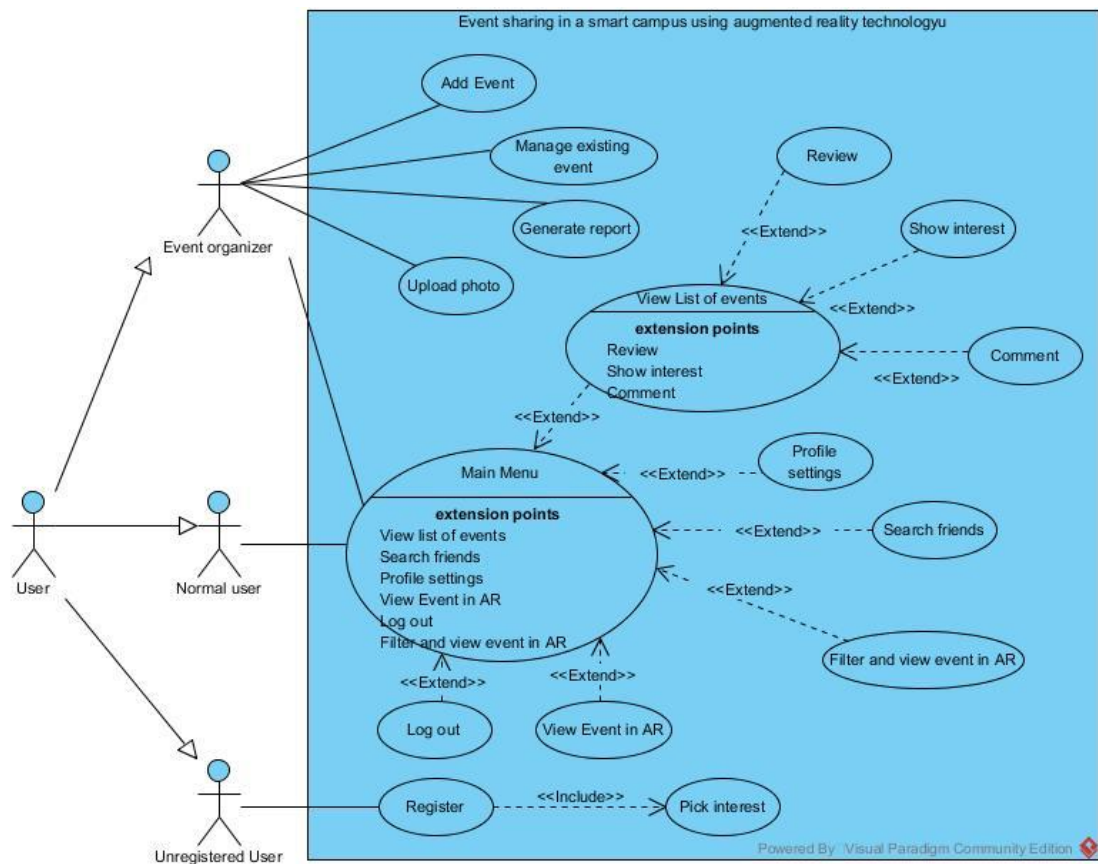
Figure 3.2.1 Use case diagram of the proposed system

3.3 Activity Diagram
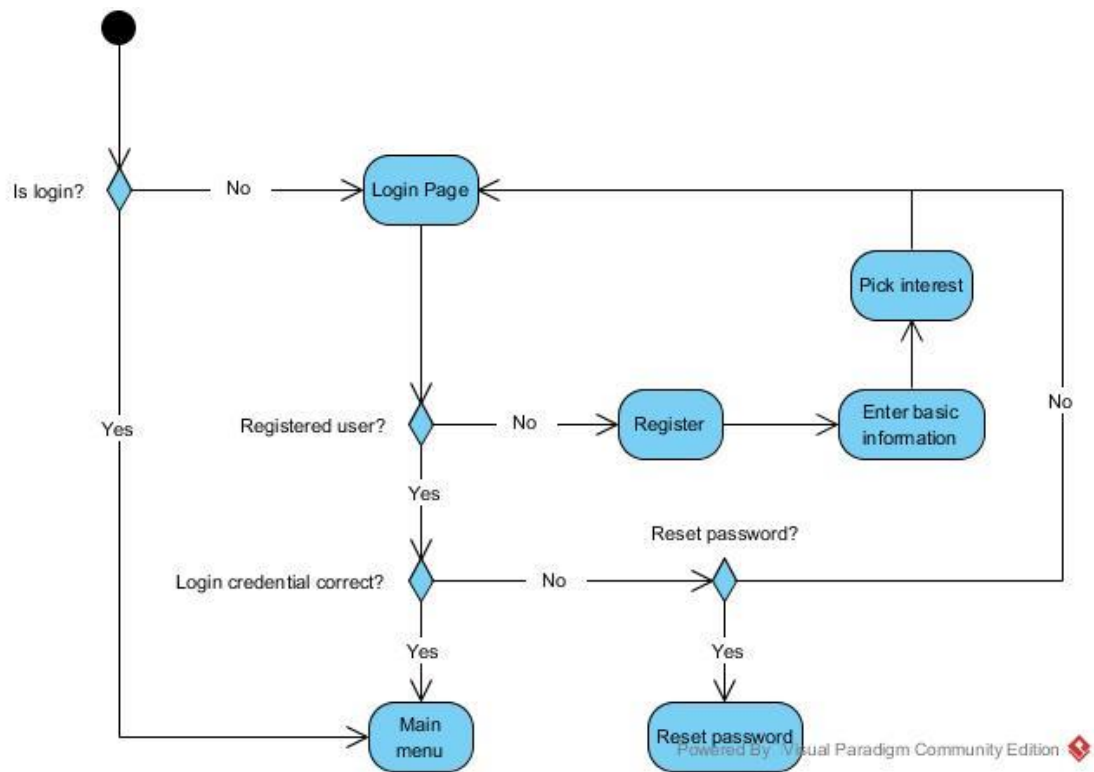
Figure 3.3.1 System flowchart of the system (Part 1)
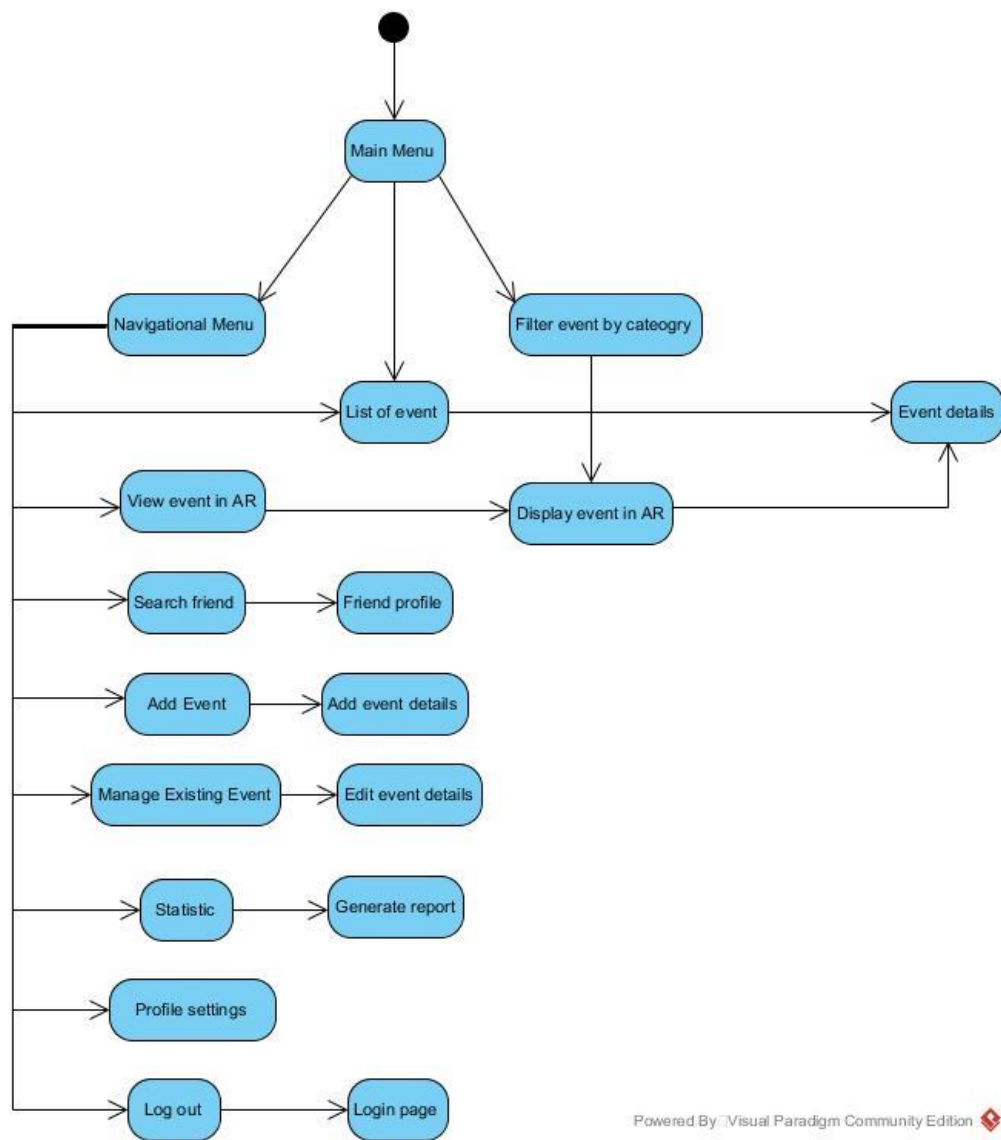
Figure 3.3.2 System flowchart of the system (Event Organizer) (Part 2)
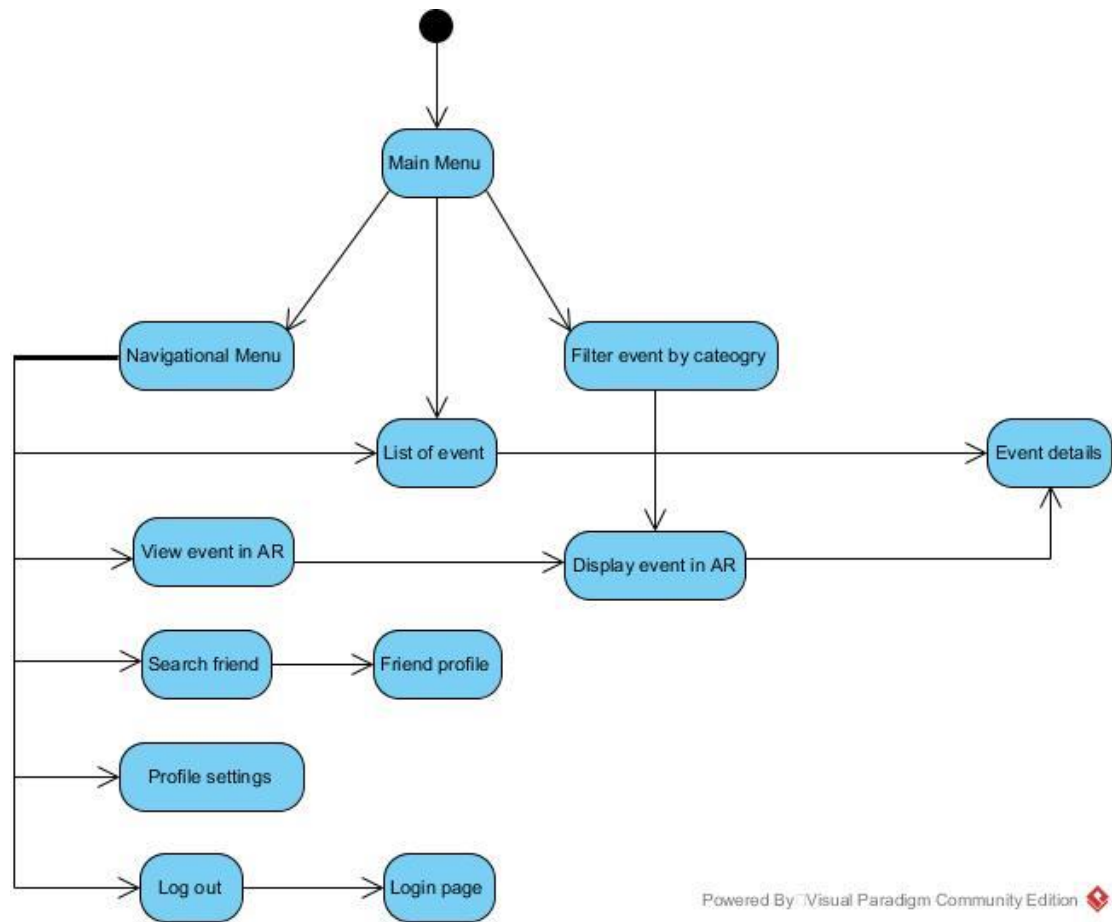
Figure 3.3.3 System flowchart of the system (User) (Part 3)

3.4 Entity-Relationship Diagram
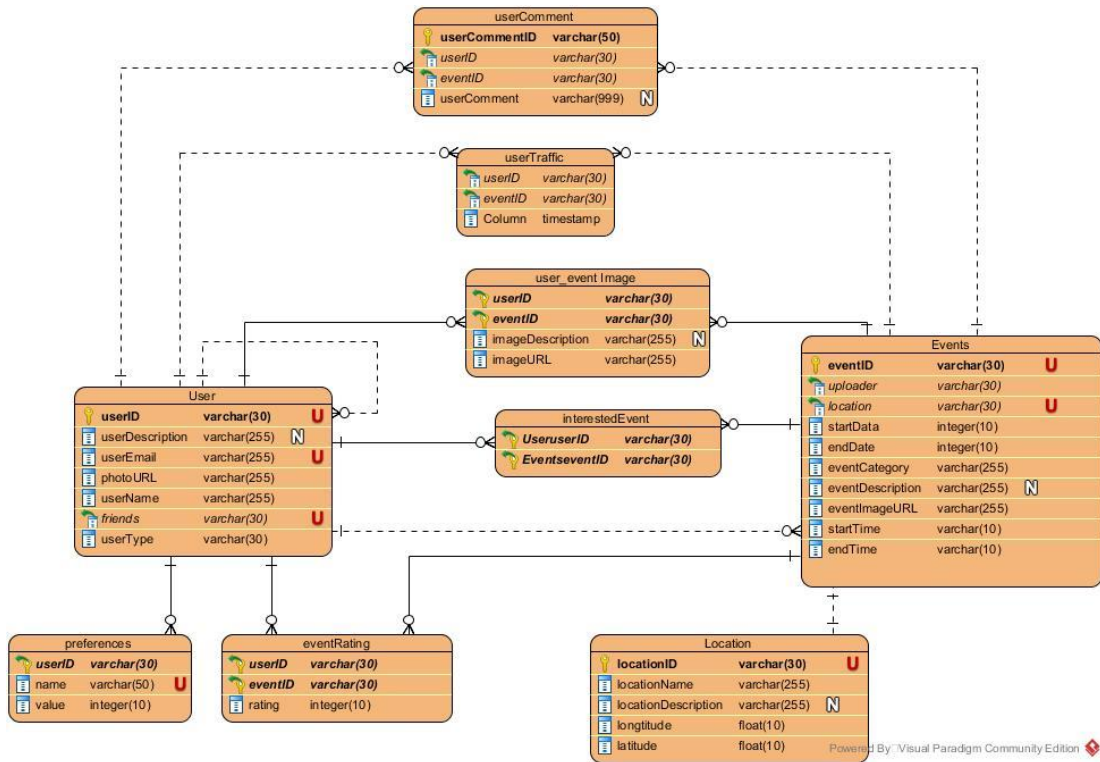
Figure 3.4.3 Entity-Relationship Diagram

3.5 Interactive augmented reality platform

An interactive augmented reality can be defined as an information layer which can be overlaid on the live view and interacted with by a user (Brett Bilbrey, Nicholas V.King & Aleksandar Pane, 2013). To achieve that, we implemented clickable marker
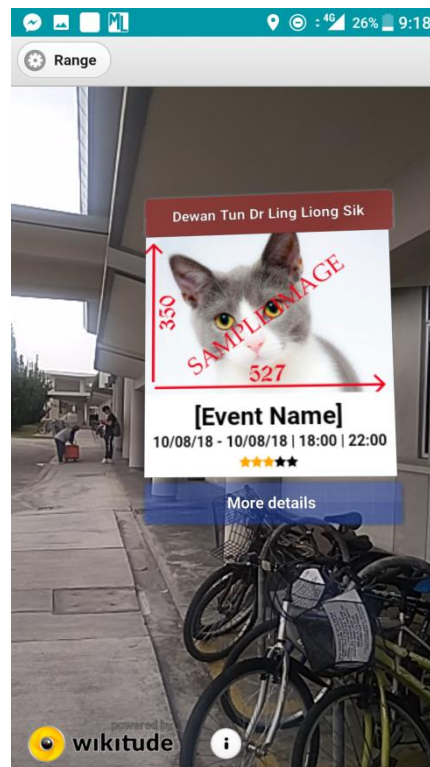
Figure 3.5.1 shows the marker expended when clicked

By clicking the marker, the marker which originally contains only icon and name will then expand and display further information of a particular event (Date, Time, Location and Image). If the user feel interested or wanted to know further more details about the event. There is a clicka
information panel which directs the user out from the AR view into an activity which contains all the possible detail the event organizer has provided. In addition, the numbers of click will be recorded and affects the user experience from time to time which will be explain later in section 3.5 Event recommendation and highlights.

Figure 3.5.2 shows the number of views of an event is recorded in database

3.6 Clustering Algorithm

At times when there is much POI which are generated in a same direction, there will be overlapping issues which cause difficulty for user to see or interact with the POI smoothly. Hence, before putting the marker on the user screen, the unclustered marker list is first passed into the clustering function to be analysed and group.

This function accepts 3 variables which is the cluster angle, user location and unclustered marker list. Cluster angle will determine the size of the angle which the markers are grouped together while the user location defines the middle point which the angle refers to. Lastly, the unclustered marker list is the list of raw marker data that is loaded from the database. This function will first compute the respective angle for each marker using user location as the center point and based on their value of longitude and latitude which is obtained from the database and group them accordingly. The clustered marker list will then be passed back to the main function for further use.
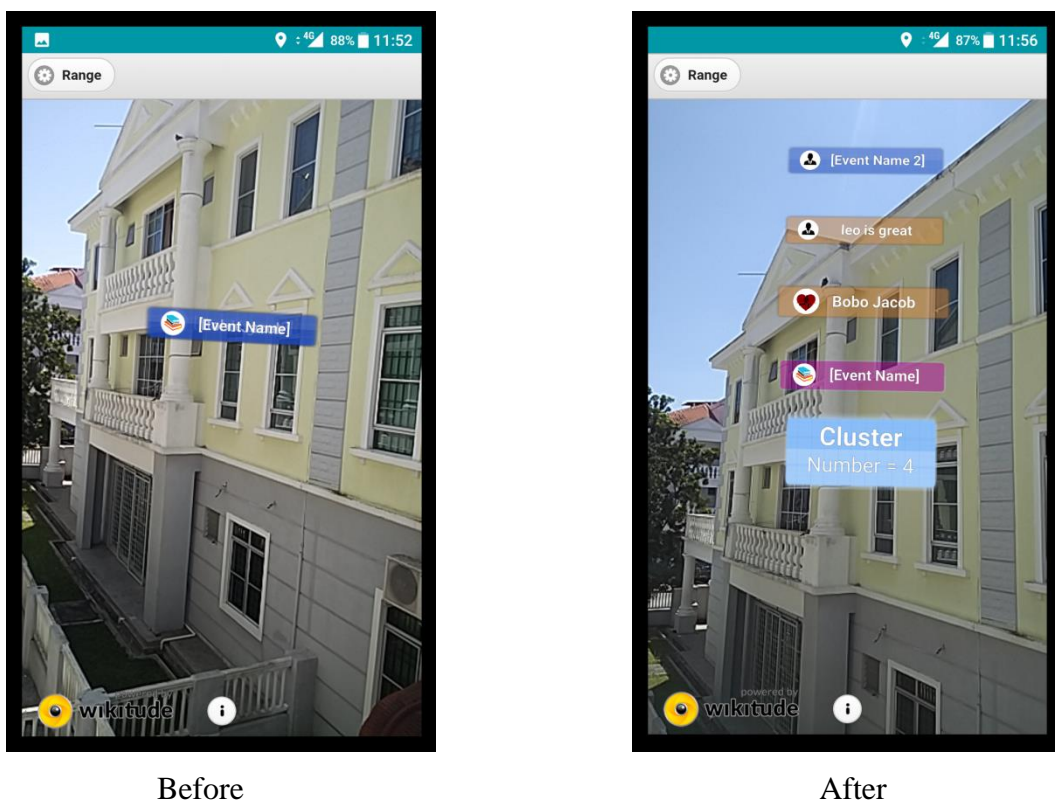
Before   After

Figure 3.6.2 shows the comparison before and after using the clustering algorithm

Chapter 3: System Design

Inside the clustering algorithm there are 5 functions in total.

```
createClusteredPlaces: function(clusterAngle, usrLocation, placesArray)
```

Description: This function accepts 3 variables, which is the clusterAngle (Determine the size of each segment, in number), usrLocation (User current location, in object) and placesArray (Unclustered marker list from the main JavaScript, in ArrayList).

Function: Main function of the clustering algorithm. Group the marker by looping through all 360° to check whether there is any marker in each degree where the current location of the user as the center point. (For example, 1°~60° is in group 1 and 61°~120° is in group 2).

```
angleBetween: function(lat1, lon1, lat2, lon2)
```

Description: This function accepts 4 variable which in latitude and longitude of the first location (User location) and latitude and longitude of the second location (Marker location) all in double values.

Function: Calculate the angle between the user and the marker.

```
centerPoint: function(pois)
```

Description: This function accepts a single variable, which is the marker (Object).

Function: Calculates the center value of the latitude and longitude of a marker.

```
toMercator: function(lat, lon)
```

Description: This function accepts 2 variables, which is the latitude and longitude in double values.

```
toLatLon: function(mercX,mercY)
```

Description: This function accepts 2 variables, which is t values.

Chapter 3: System Design

3.7 Event recommendation and highlights

To create a smart augmented reality mobile application that will collect and display data according to user preferences as mentioned in the objective, we

In addition of allowing user to see event through AR, this application also gathers user activities such as interaction with the marker in order to improve the event that is suggested to the user in the future. A sample is shown as below:

Initially when user registers, the system will ask for their initial preference.
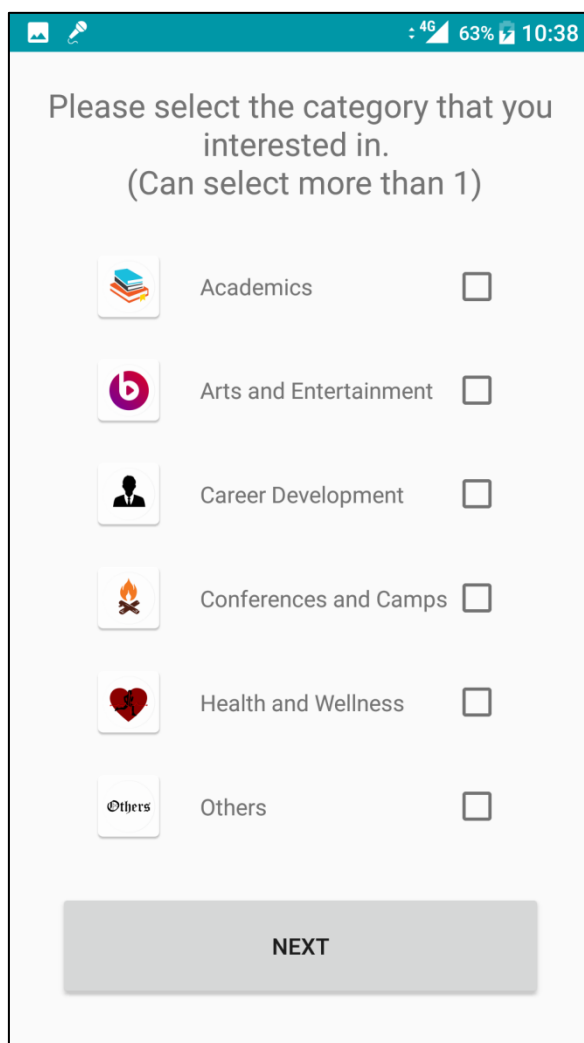
Figure 3.7.1 shows the "User preference" page where the user registers their initial preference

Chapter 3: System Design

After the system has verified and recorded user initial preference, the value is then updated to the database. The default value 10 means that user has checked interested for that particular event where the default value 1 means the user did not.
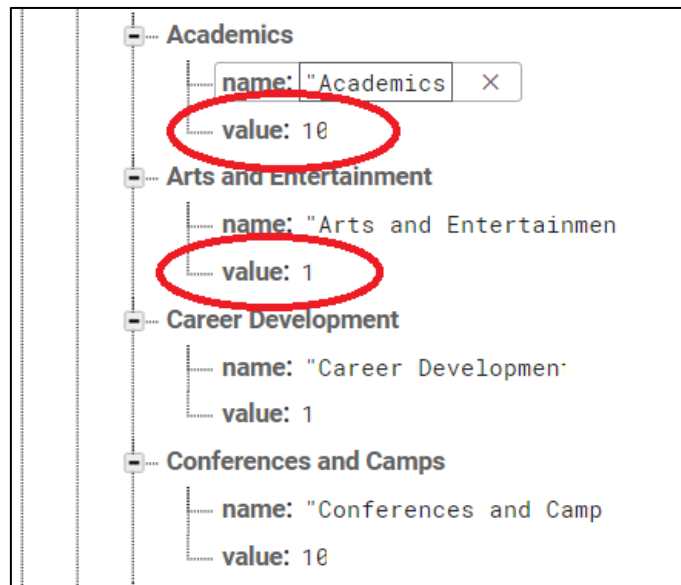
Figure 3.7.2 shows the initial value of the user preference table in the firebase

The value may vary from time to time depending on which category of event that user

suggest the event accordingly.
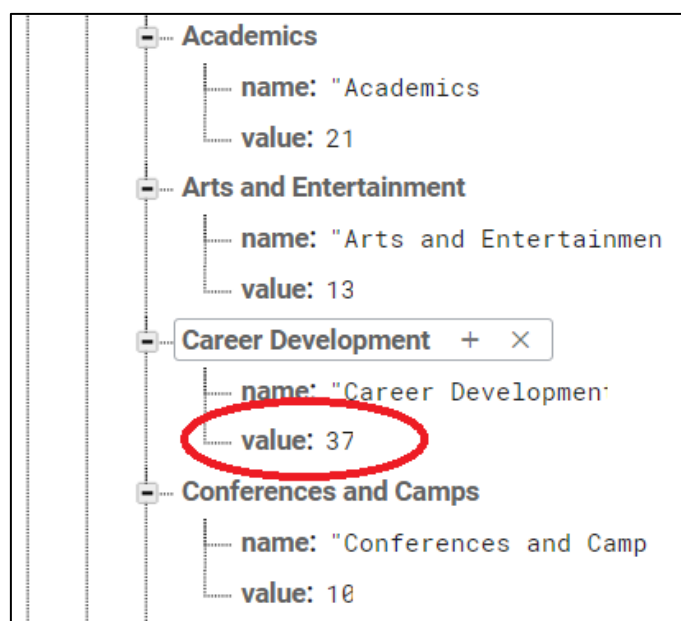
Figure 3.7.3 shows the value changes as the user use this application

The suggested event is shown in the AR mode in a distinct colour different from the other marker which is the Purple colour.
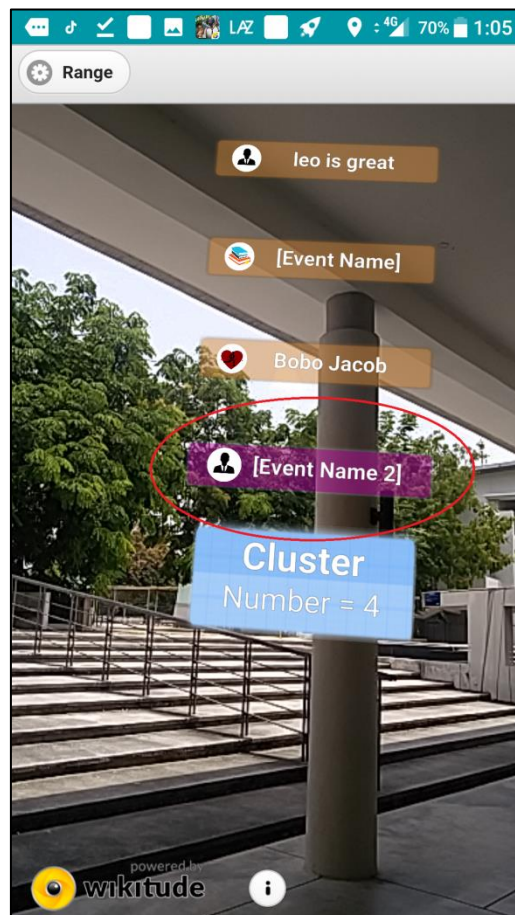
Figure 3.7.4 shows the suggested event which is in circle

Other than that, we considered that there may be some user who wanted to be part of a bigger group in the world. Hence we added a feature which helps user to determine which the current most popular event that the user might want to attend so that the user

animation which is easily differentiate from others.

Chapter 4: Methodology and Tools

4.1 Project Methodology

Phased development which is one of rapid application development (RAD) approach is chosen as the methodology to develop this project. Phased development divides the typical development approach into multiple versions which seeks to improve the system with each iteration. Version 1 commonly contains all the major and most determining function of the system while the rest of the versions slowly add the sub function into it. Phased development is choose because this mobile application still has a lot of potential to improve and new requirements may be added in from time to time in each version of the system.

4.1.1 General Work Procedures Elaboration

During the planning phase, the mobile application core value, project scope, objective and requirements are determined. By observing and gather opinion around UTAR, the result shows that event adverting is always been a core factor which determines whether the event is going to succeed or not. Due to that, product that can resolve this situation is aimed to be produce. In the analysis steps, most of the time is spent on reviewing existing mobile application which has related to augmented reality is reviewed to seek the difference between each. Strengths and weaknesses of those applications are compared in order to produce an application that is most suitable for students. Suitable features are taken into account and weaknesses are being take note of so that it can improve later on. After this stage, system will be continuously being developed and improve by analysis, design and implementation this 3 steps on each iteration.

For the first version of the iteration, the fundamental function or features is expected to be delivered. First in the analysis phase, we will determine the fundamental feature to add on such   -
core feature of the current system. Next in design phase is to determine the type of data used to test our system, such as the input and output that we should be expecting. At last for this iteration, we will procedure to the implementation phase which is

translating everything that concluded in analysis and design phase to coding. Once the first version is accepted in testing, the improvement to be made is brought to the second iteration.

After the first version has been released, the development for second version starts. In the analysis phase, the improvement to be made is considered along with any feature that is second important after the first iteration such as the account feature. The design in the second iteration will be roughly the same as the first. At last moving to the implementation phase, conclusion from the analysis phase and design phase should be translated to code. Once the second version has been tested and accepted, next iteration begins.

Moving on to the third iteration and so on, the development steps will be same by now. In the analysis phase, apart from the improvement to the previous version, any sub features or interesting features that is the least important but may increase the business value is also considered here. The design phase for this iteration will be same, which is determining the data type for the input and the output of the system. Finally in the designing phase, all conclusions in the previous phase are again translated to code. After this version is tested and accepted, the iteration will continue refine the system until a final product is delivered.

Chapter 4: Methodology and Tools
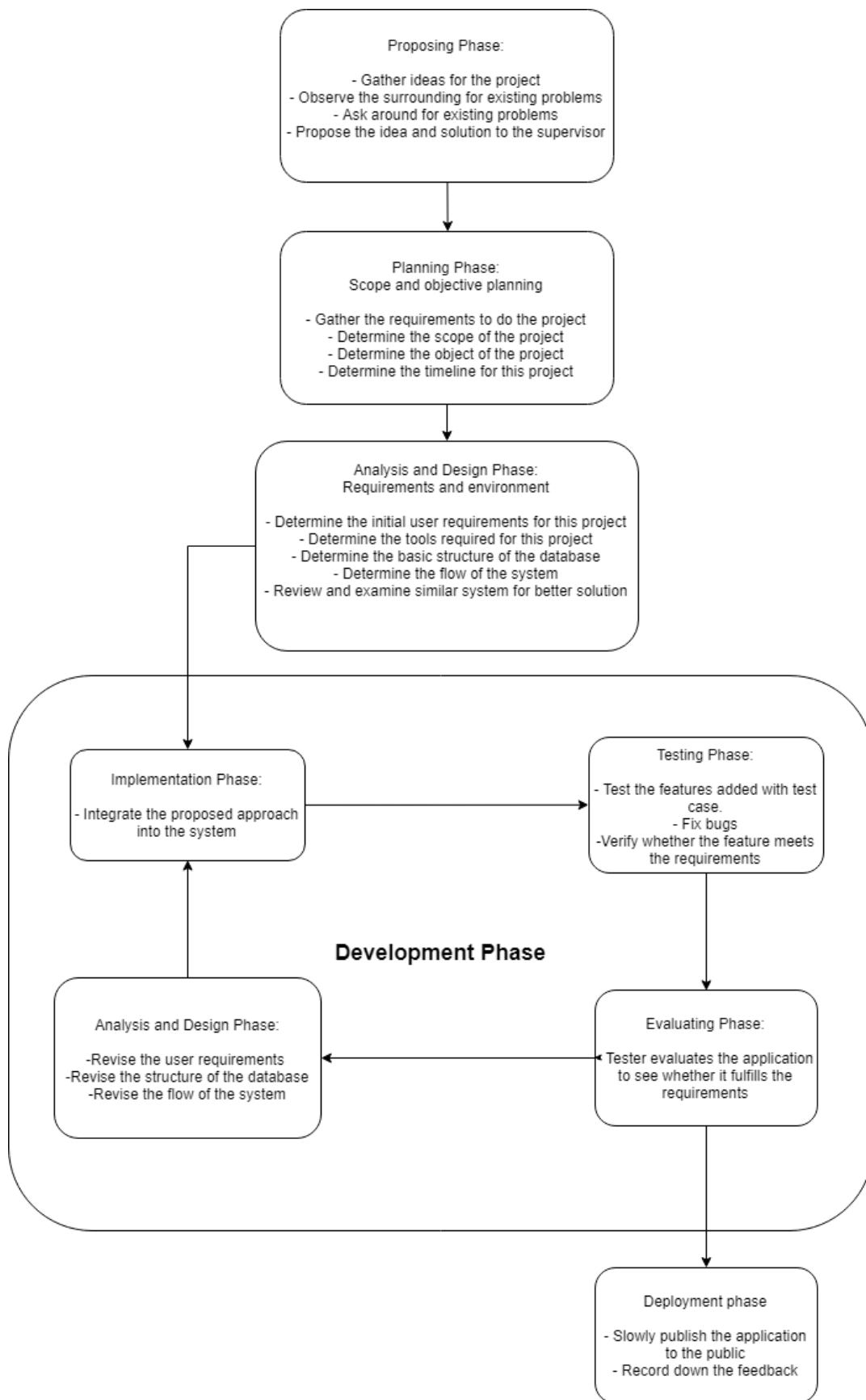
Figure 4.1.1a SDLC of phased development

4.2 Tools to use

Software

Android Studio

Android studio is one of the top integrated development environments for developing android operating system based application.

Firebase

Firebase is the latest database used by lots of developer nowadays when developing their application. Firebase is popular for its SQL free properties and real time database which can constantly provide feedback to the user.

Wikitude Studio

Wikitude studio is a web-based drag and drop studio which is easy to use that can be even used by people without any programming knowledge to involve in AR creation.

Hardware

Computer

Edition: Windows 10 Home Single Language

Processor: Intel(R) Core(TM) i5-4210M CPU @ 2.60GHz

Installed Ram: 8.00 GB

System type: 64-bit operating system, x64-based processor

Smartphone

Phone Name: One plus two

Operating System: Oxygen OS

Android Version: 6.0.1 (Marshmallow)

Ram: 4GB

Chapter 5: Implementation and Testing

5.1 Black Box Testing – Use case testing

Table 5.1.1 – Use Case Description for Register function

| Use Case ID	UC001	
Feature	F001 Register	
Purpose	To allow new user to register an account.	
Actor	Normal user, event organizer	
Trigger	New user clicks "Not a member? Get registered in Firebase now!" Button.	
Precondition	System is connected to the internet	
Scenario name	Step	Action
	1	User presses the "Not a member? Register in Firebase now!" Button
	2	System verifies the email address and uploads the information to the database.
	3	System requests general information (Name, gender, age, type of user, profile picture) of the user.
	4	User fills in all the information required.
	5	User presses the "Proceed" Button
	6	System verifies and records the information to the database.
	7	System requests for user preference.
	8	User chooses their preference by clicking the checkbox.
	9	User presses "Next" Button.

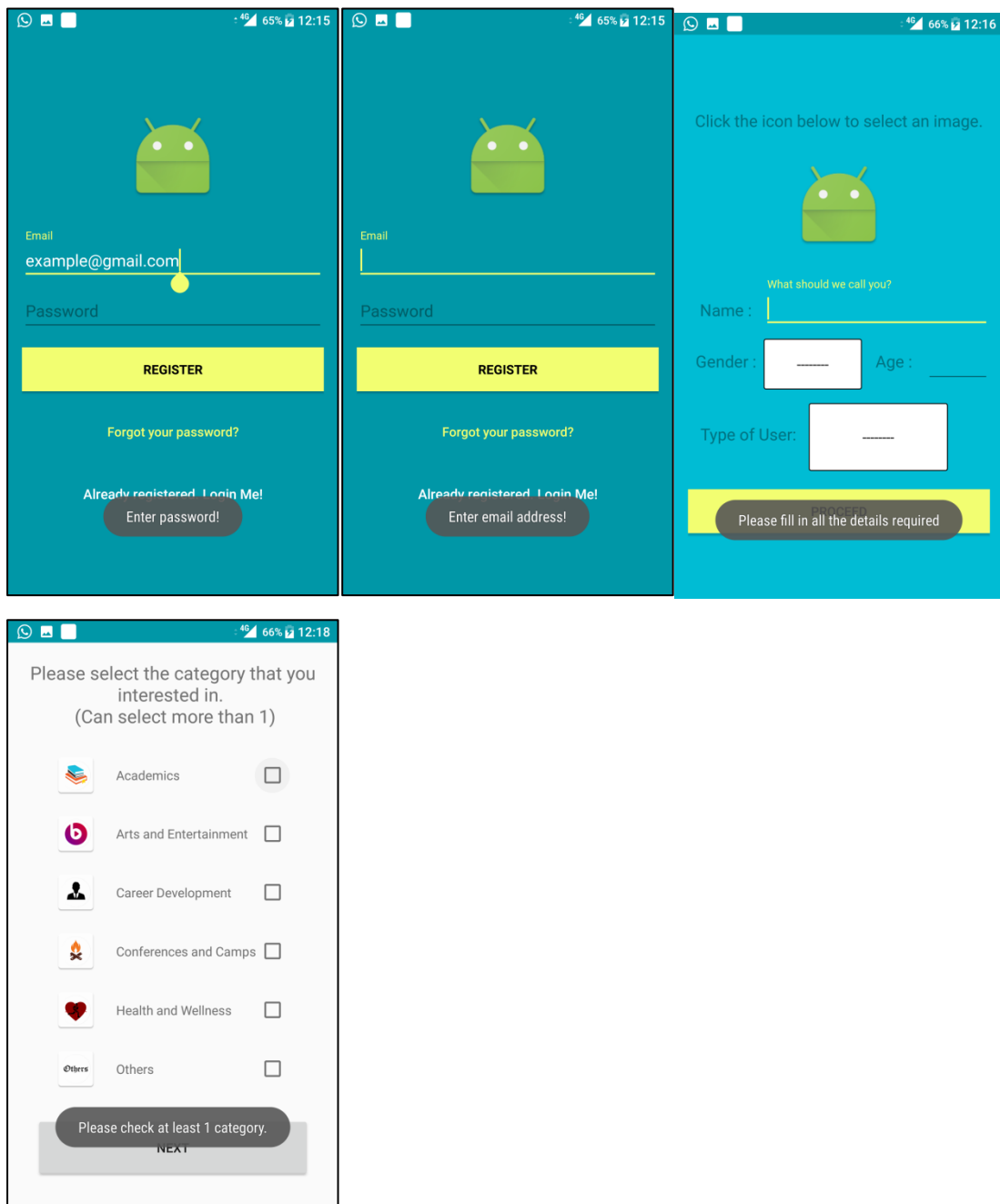| Use Case ID	UC001	
	10	System verifies and records the information to the database.
	12	System displays the Main Menu.
Alternative Flow – Email address is empty	1.1	User did not enter an email address.
	1.2	System displays an error message.
Alternative Flow – Password is empty	1.1	User did not enter a password.
	1.2	System displays an error message.
Alternative Flow – Incomplete general information	4.1	User did not fill in all the required information.
	4.2	System displays an error message.
Alternative Flow – Incomplete preferences	8.1	User did not choose any preferences.
	8.2	System displays an error message.

Main flow
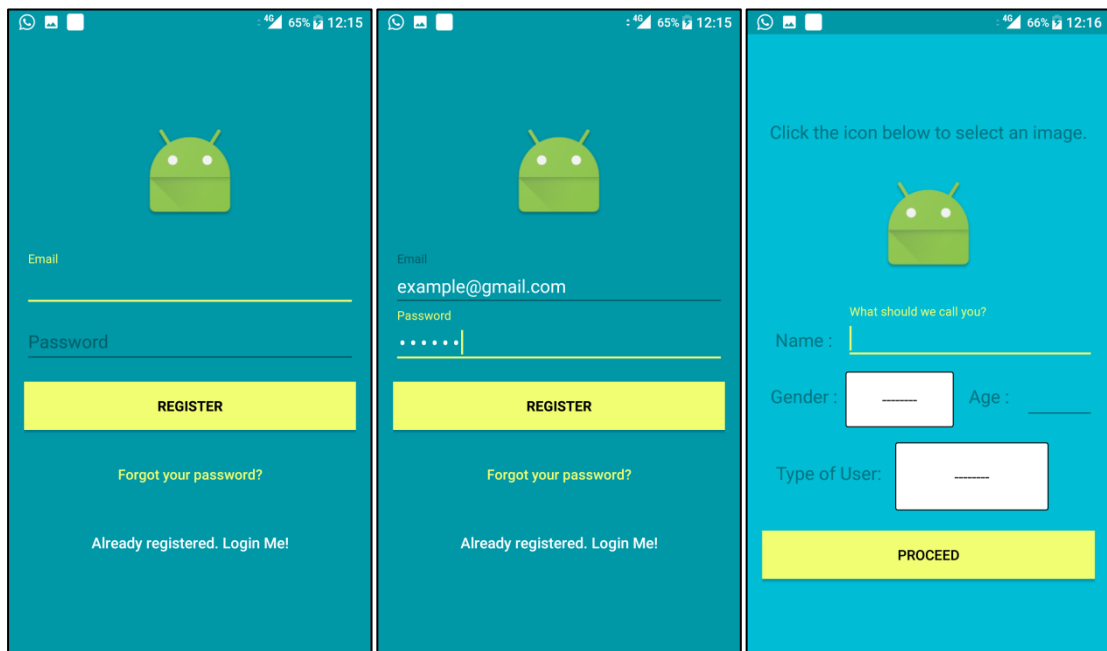
Figure 5.1.1a Use case testing results for Register Function (Part 1)
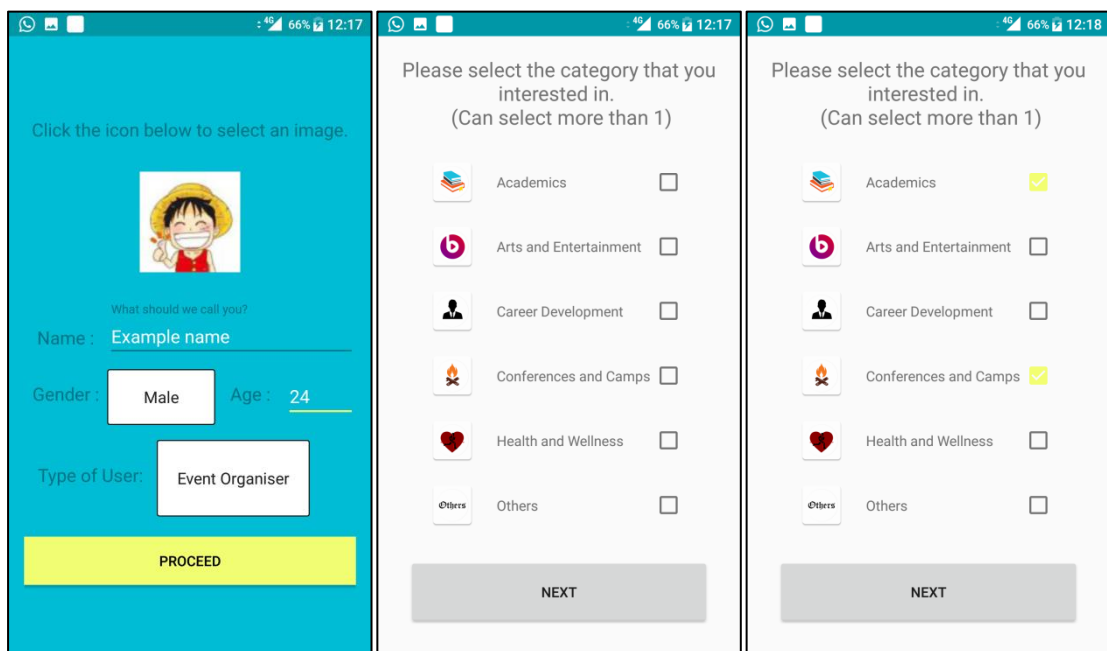
Figure 5.1.1b Use case testing results for Register Function (Part 2)
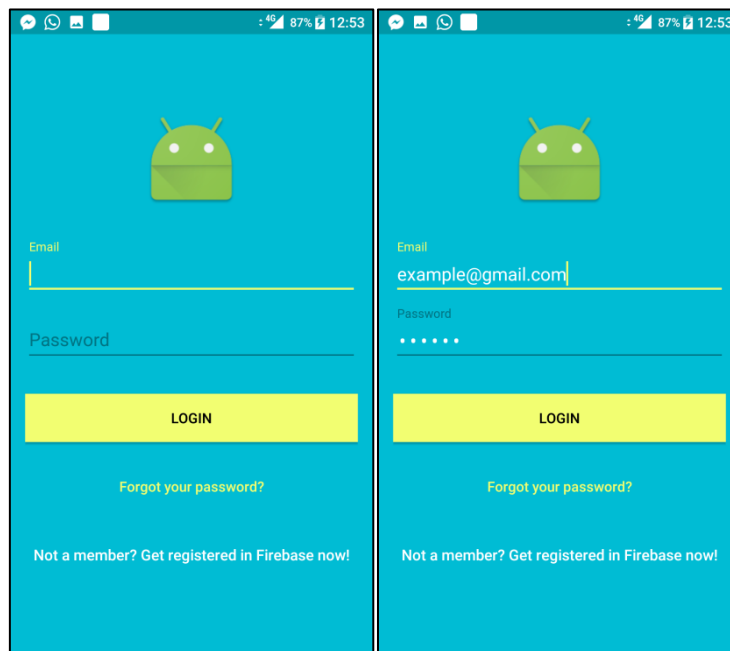
Alternative flow

Figure 5.1.1c Use case testing results for Register Function (Alternative flow)

Chapter 5: Implementation and Testing
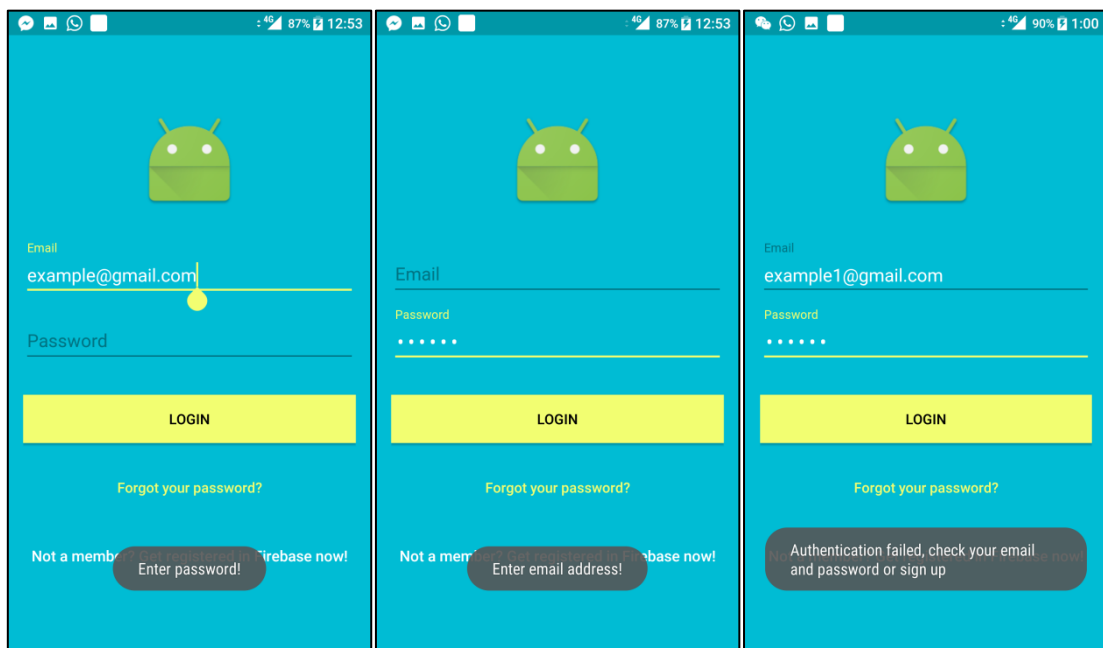
Table 5.1.2 – Use Case Description for Login function

Use Case ID	UC002	
Feature	F002 Login	
Purpose	To allow user to authenticate themself	
Actor	Normal User, Event Organizer	
Trigger	User clicks the "Login" button	
Precondition	System is connected to the internet	
Scenario name	**Step**	**Action**
Main flow	1	User enters the email address and password.
	2	User clicks the "Login" Button.
	3	System verifies the email address and password.
	4	System redirects user to the main menu.
Alternate Flow(Invalid login credentials)	1.1	User inserts an invalid email address or password.
	1.2	System displays an error message "Authentication failed, check your email and password or sign up".
Alternative Flow – Email address or password field is empty	1.1	User did not enter a password or an email.
	1.2	System displays an error message.

Main Flow

Figure 5.1.2a Use case testing results for Login Function

Alternative Flow

Figure 5.1.2b Use case testing results for Login Function (Alternative flow)

Chapter 5: Implementation and Testing

Table 5.1.3 – Use Case Description for view event in AR function

| Use Case ID	UC003	
Feature	F003 View event in augmented reality	
Purpose	To allow user to view event in augmented reality	
Actor	Normal User, Event Organizer	
Trigger	User clicks the "View event in AR" button	
Precondition	System is connected to the internet. GPS is enabled.	
Scenario name	Step	Action
Main flow	1	System redirects user to AR page.
	2	System opens the camera.
	3	System loads and displays the marker.
Alternative flow – No permission is given	2.1	User did not gave the all the permission needed for this application to runs.
	2.2	System request for permission.
Alternative flow – GPS can't determine user location	3.1	System displays a message "Trying to find your location".
	3.2	System loads and displays the marker from the database once user location is determined.

Main Flow
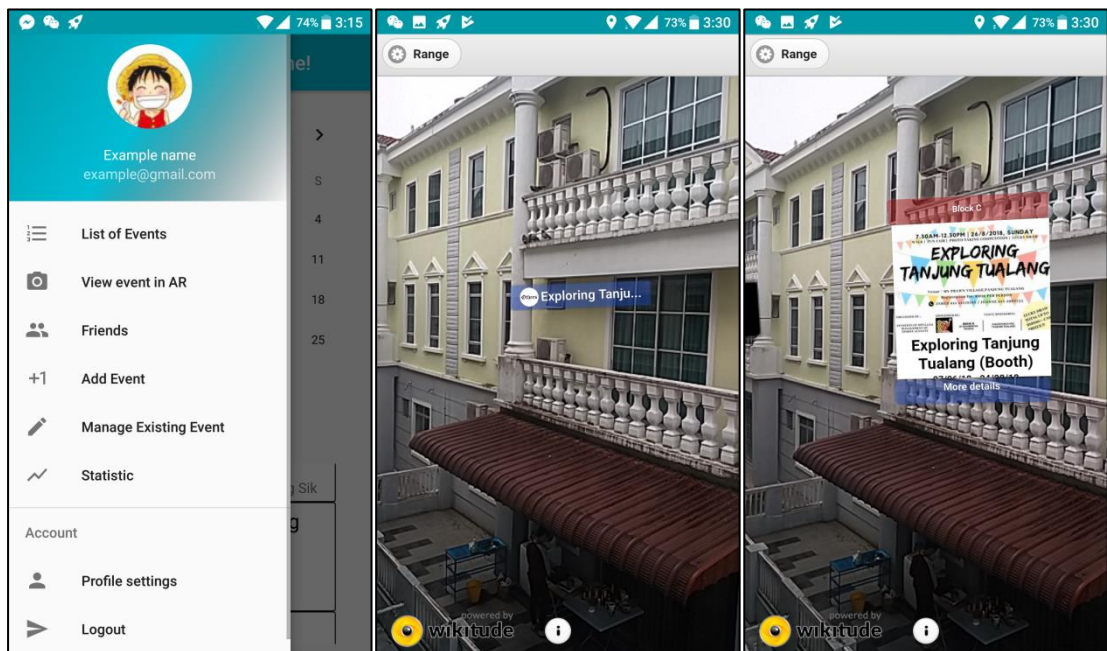
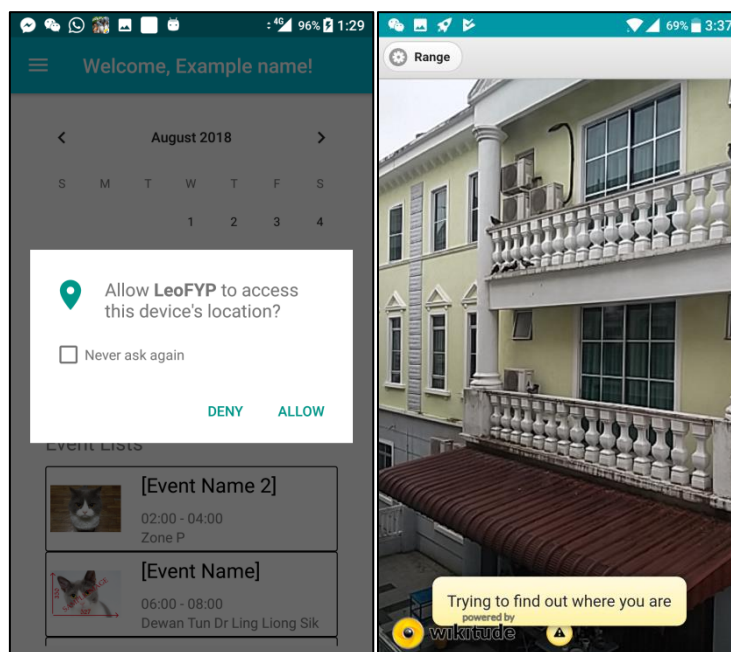*Figure 5.1.3a Use case testing results for View event in AR Function*

Alternative Flow

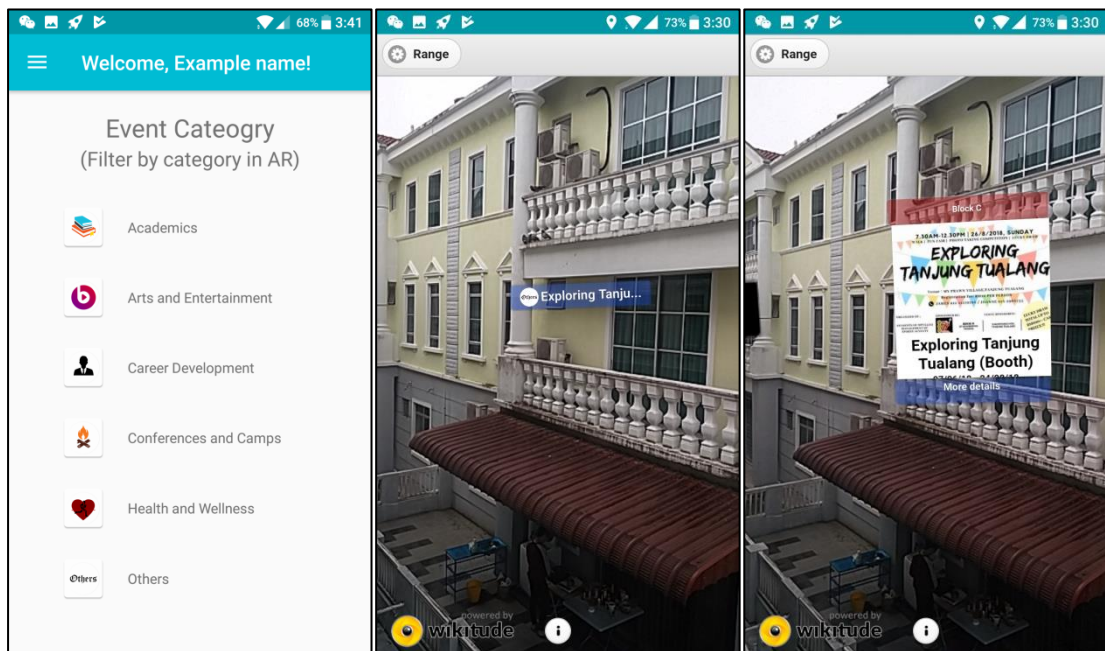*Figure 5.1.3b Use case testing results for View event in AR Function (Alternative Flow)*

Table 5.1.4 – Use Case Description for filter and view event in AR function

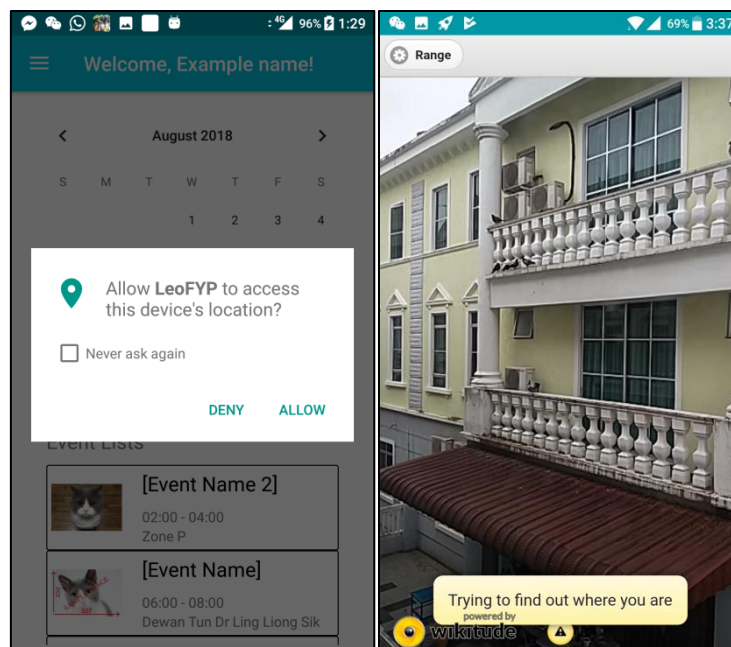| Use Case ID	UC004	
Feature	F004 Filter and View event in augmented reality	
Purpose	To allow user to filter the showing event in augmented reality	
Actor	Normal User, Event Organizer	
Trigger	User clicks the "List of Events" button	
Precondition	System is connected to the internet. GPS is enabled.	
Scenario name	Step	Action
Main flow	1	System redirects user to "Event List" page.
	2	User clicks on a category.
	3	System redirects user to AR page.
	4.	System opens the camera.
	5.	System load and displays the filtered marker.
Alternative flow – No permission is given	4.1	User did not gave the all the permission needed for this application to runs.
	4.2	System request for permission.
Alternative flow – GPS can't determine user location	5.1	System displays a message "Trying to find your location".
	5.2	System loads and displays the marker from the database once user location is determined.

Main Flow

Figure 5.1.4a Use case testing results for Filter and View event in AR Function

Alternative Flow

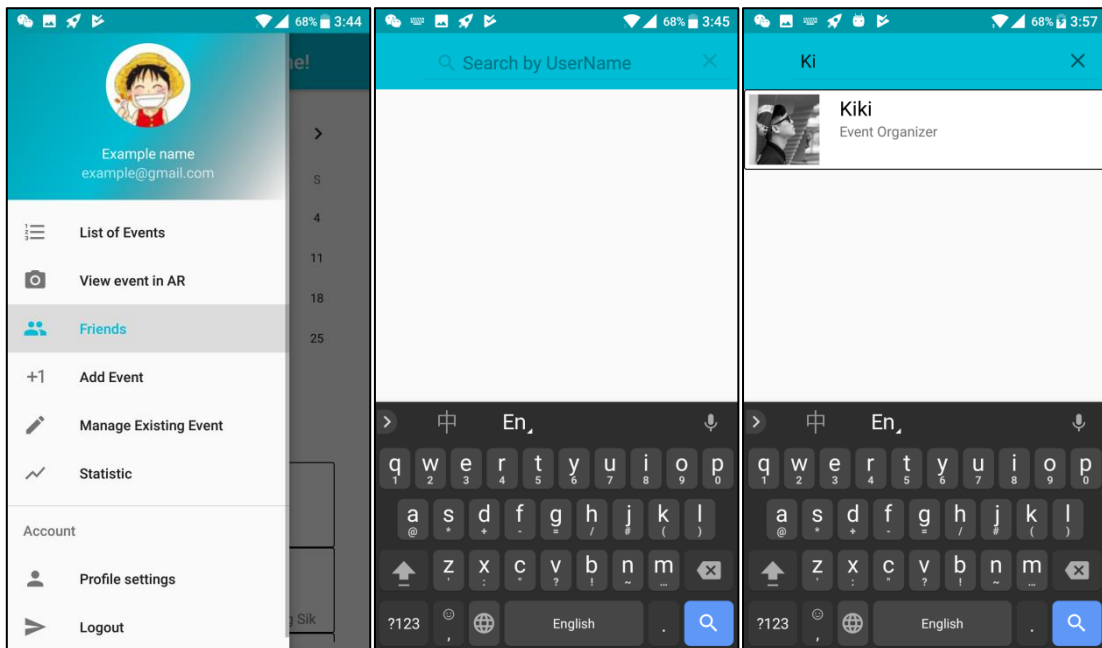*Figure 5.1.4b Use case testing results for Filter and View event in AR Function (Alternative Flow)*

Table 5.1.5 – Use Case Description for Search Friends Function

Use Case ID	UC005	
Feature	F005 Search Friends	
Purpose	To allow user search for other user	
Actor	Normal User, Event Organizer	
Trigger	User clicks the "Friends" Button.	
Precondition	System is connected to the internet.	
Scenario name	Step	Action
Main flow	1	System redirects user to the search page.
	2	User clicks the search icon located at the top right.
	3	System prompt user to enter the name of another user that the user wishes to search.
	4.	User enters a name.
	5.	System looks for the name in the database and displays the results below the search bar.

Main Flow

Figure 5.1.5a Use case testing results for Search Friend Function

Chapter 5: Implementation and Testing

Table 5.1.6 – Use Case Description for Add Event Function

Use Case ID	UC006	
Feature	F006 Add Event	
Purpose	To allow the user to add an event to the event list.	
Actor	Event Organizer	
Trigger	User clicks the "Add Event" Button.	
Precondition	System is connected to the internet.	
Scenario name	Step	Action
Main flow	1	System redirects user to the add event page.
	2	System displays a list of information (Event name, start time, end time, start date, end date, event location, event category, event description, image) for user to fill in.
	3	User fills in the required information.
	4.	User presses the "Add Event" button.
	5.	System verifies the information and records it into the database.
	6.	System redirects user to the main menu.
Alternative flow – Incomplete information	3.1	User doesn't fill in all the required information.
	3.2	System displays an error message according to the part that the user missed out.

Main Flow

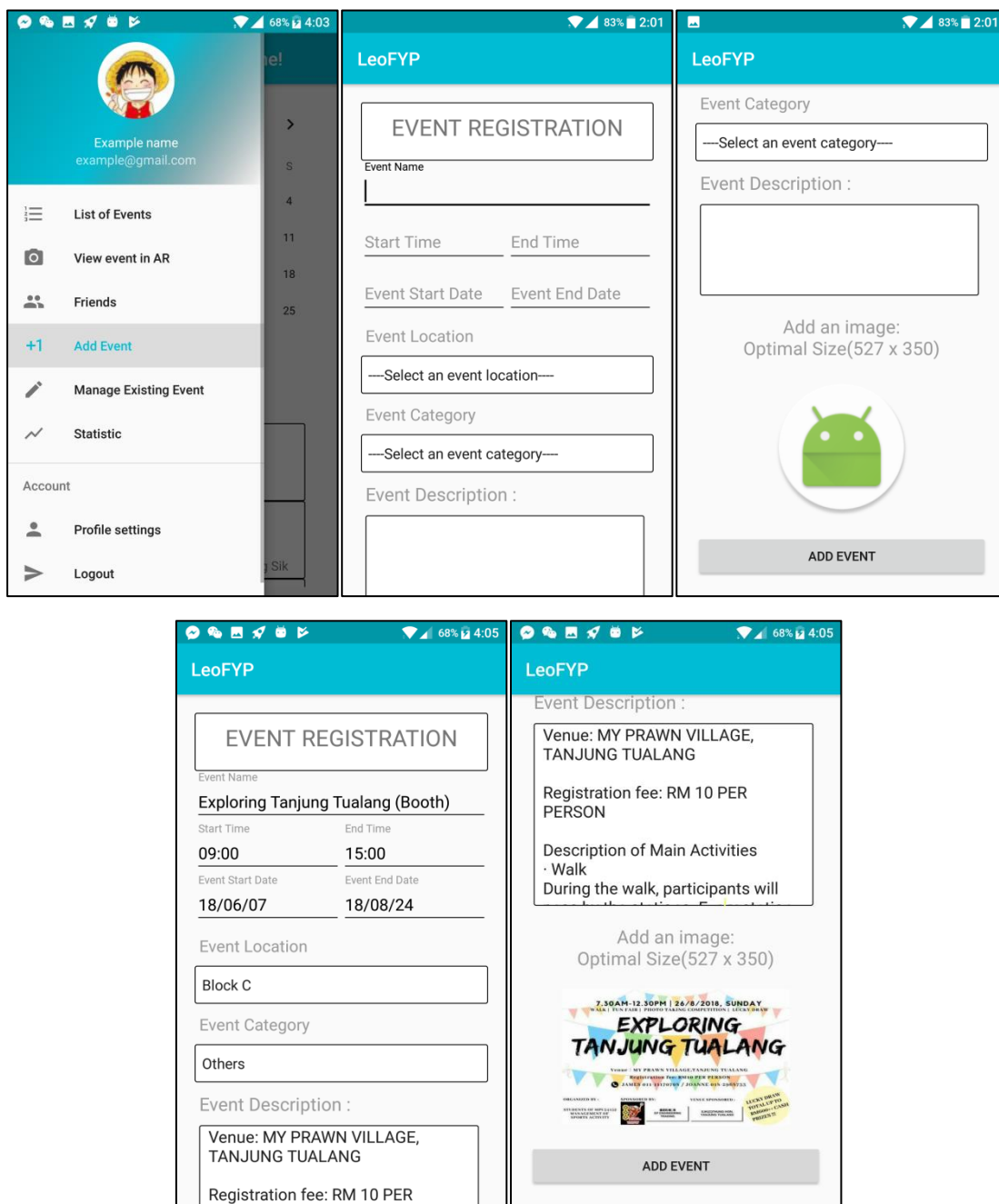*Figure 5.1.6a Use case testing results for Add Event Function*

Alternative Flow

Figure 5.1.6b Use case testing results for Add Event Function (Alternative Flow)

Table 5.1.7 – Use Case Description for Edit Event Function

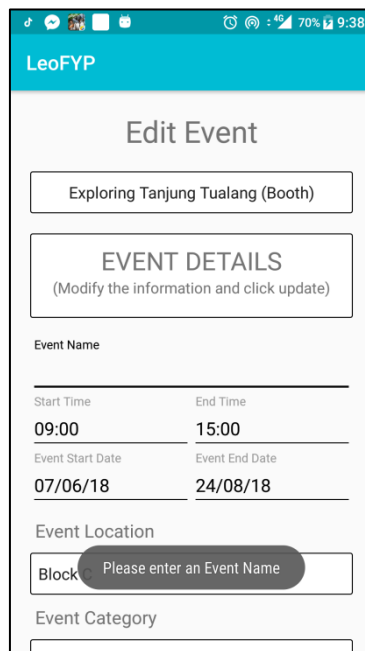| Use Case ID	UC007	
Feature	F007 Edit Event	
Purpose	To allow the user to edit an existing event that belongs to the user.	
Actor	Event Organizer	
Trigger	User clicks the "Manage Existing Event" Button.	
Precondition	System is connected to the internet.	
Scenario name	Step	Action
Main flow	1	System redirects user to the edit event page.
	2	User selects an event from the spinner.
	3	System loads the event information.
	4.	User edits the events.
	5.	User presses the "Update" button.
	6.	System verifies the information.
	7.	Systems highlights the information that user changed in red color and prompts a message to confirm update.
	8.	User presses the "Update" button.
	9.	System updates the information to the database.
Alternative flow – Incomplete information	4.1	User doesn't fill in all the required information.
	4.2	System displays an error message according to the part that the user missed out.

Main Flow
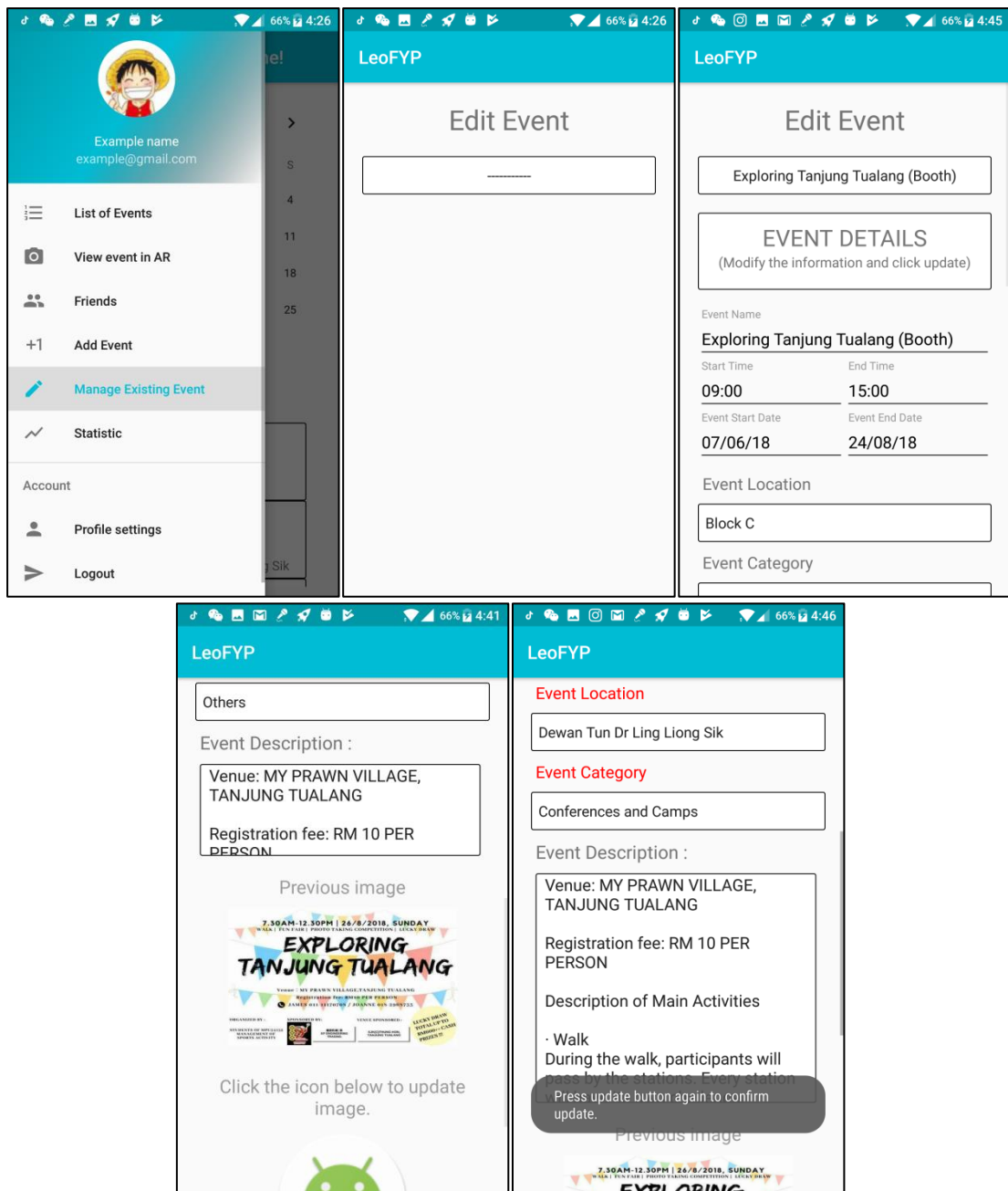
Figure 5.1.7a Use case testing results for Edit Event Function

Alternative Flow

Figure 5.1.7b Use case testing results for Edit Event Function (Alternative Flow)

Table 5.1.8 – Use Case Description for Upload Photo Function

Use Case ID	UC008	
Feature	F008 Upload Photo	
Purpose	To allow the user to upload photo in additional to the head photo of the event.	
Actor	Event Organizer	
Trigger	User clicks a specific event in the event list.	
Precondition	System is connected to the internet.	
Scenario name	Step	Action
Main flow	1	System redirects user to the "More Details" page.
	2	System displays a list of event information.
	3	User clicks the camera icon with a label.
	4.	System redirect user to their phone's gallery.
	5.	User selects a photo from their gallery.
	6.	System redirect user to the "Upload photo" page.
	7.	User add a description of the image that the user about to upload.
	8.	User clicks the "Upload" Button.
	9.	System prompts a successful message and return to the main menu.
Alternative flow – Failed to upload	9.1	System prompts an error message and return to the main menu.

Main Flow
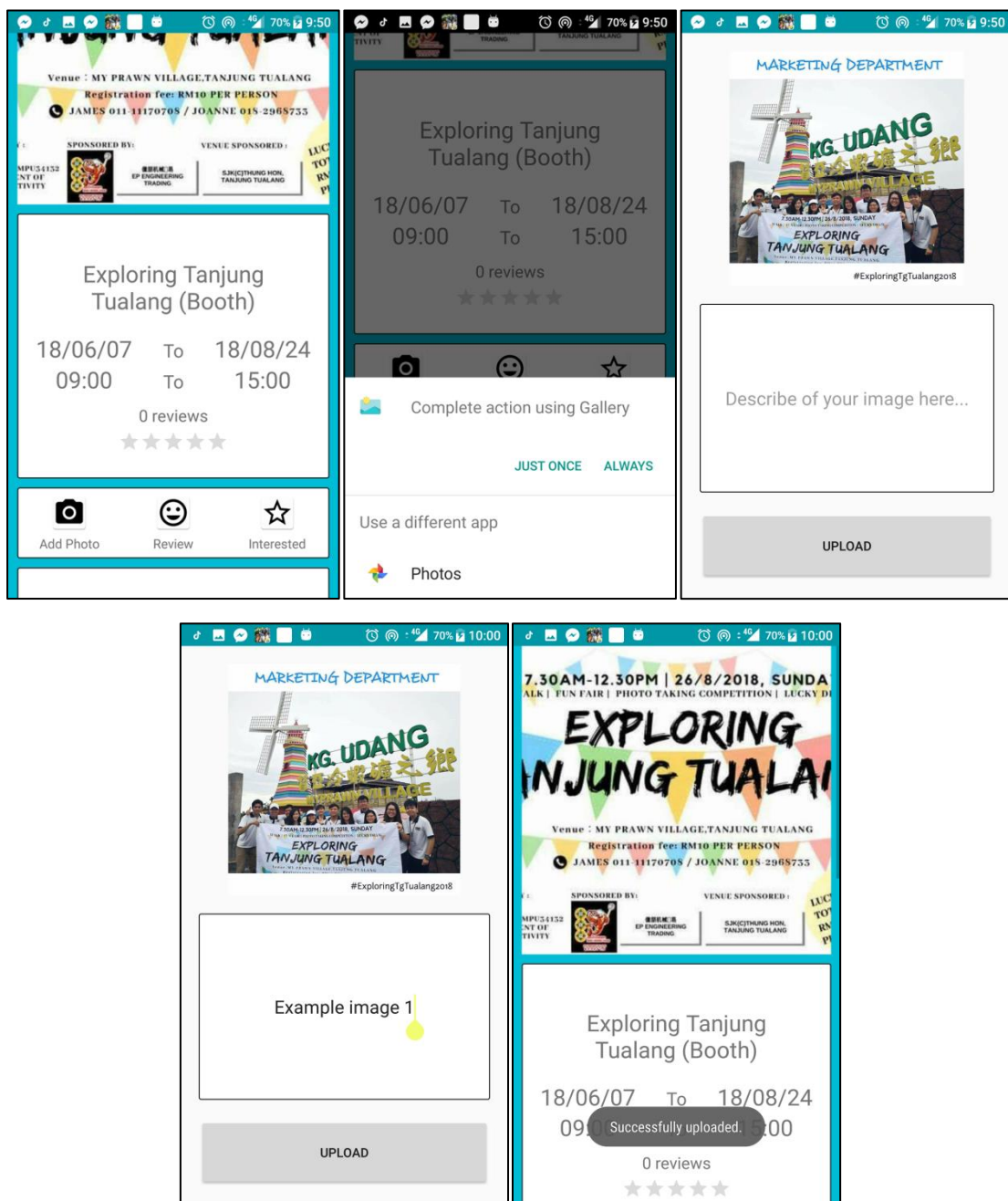
Figure 5.1.8a Use case testing results for Upload Photo Function

Table 5.1.9 – Use Case Description for Edit Profile Function

Use Case ID	UC009	
Feature	F009 Edit Profile	
Purpose	To allow the user to edit information on their profile.	
Actor	Normal User, Event Organizer	
Trigger	User clicks the "Profile settings" Button.	
Precondition	System is connected to the internet.	
Scenario name	Step	Action
Main flow	1	System redirects user to the "User Profile" page.
	2	System displays the user profile information.
	3	User clicks the "Edit Profile" button.
	4.	System highlight the changeable contain.
	5.	User makes changes.
	6.	User clicks the "Save Edit" Button.
	7.	System updates the database.

Main Flow
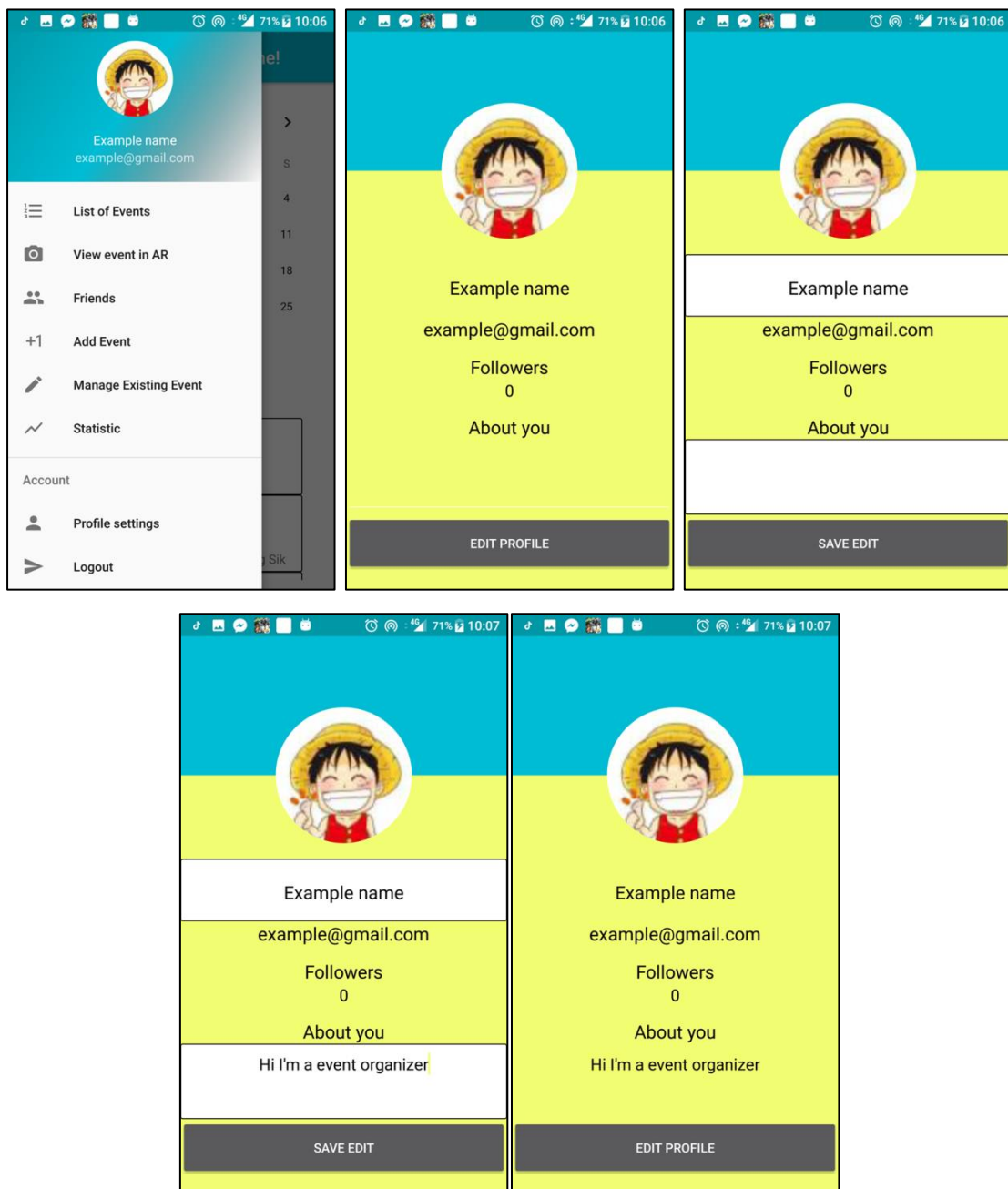
Figure 5.1.9a Use case testing results for Edit Profile Function

Chapter 5: Implementation and Testing

Table 5.1.10 – Use Case Description for Review Function

Use Case ID	UC010
Feature	F010 Review
Purpose	To allow the user to make a review for a particular event.
Actor	Normal User, Event Organizer
Trigger	User clicks the "Review" Icon.
Precondition	System is connected to the internet.

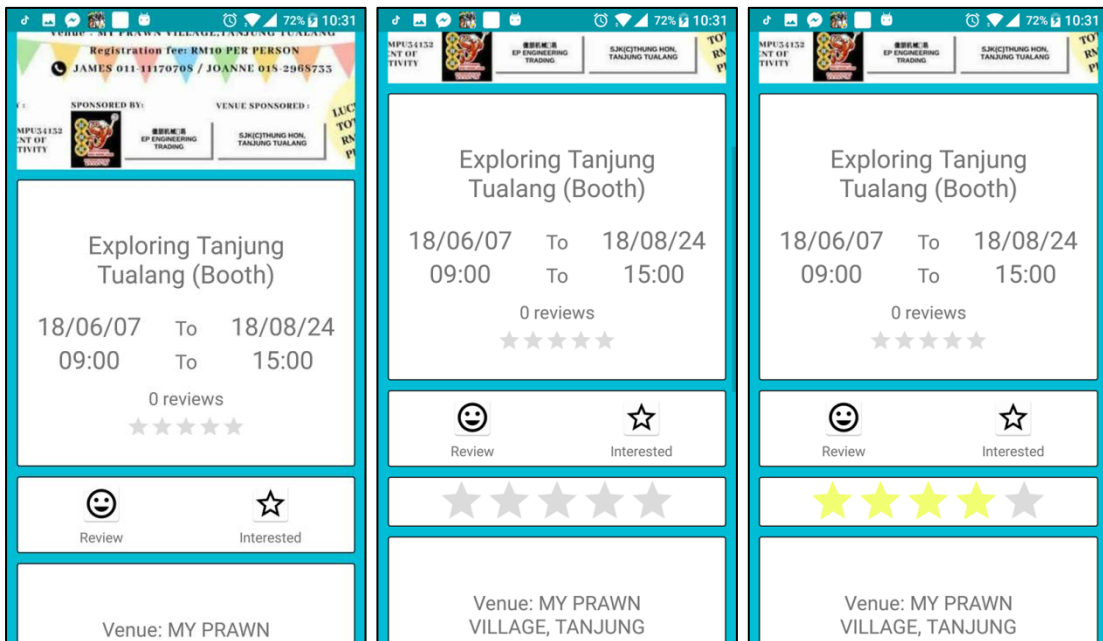| Scenario name	Step	Action
Main flow	1	System displays a rating bar.
	2	User clicks the rating bar.
	3	System records the rating and saves to the database.

Main Flow

Figure 5.1.10a Use case testing results for Review Function

Chapter 5: Implementation and Testing

Table 5.1.11 – Use Case Description for Show Interest Function

Use Case ID	UC011	
Feature	F011 Show interest	
Purpose	To allow the user show that he/she is interested in an event.	
Actor	Normal User, Event Organizer	
Trigger	User clicks the "Interest" icon.	
Precondition	System is connected to the internet.	
Scenario name	Step	Action
Main flow	1	System records the action and saves to the database.
	2	System changes the "Interest" icon.

Main Flow
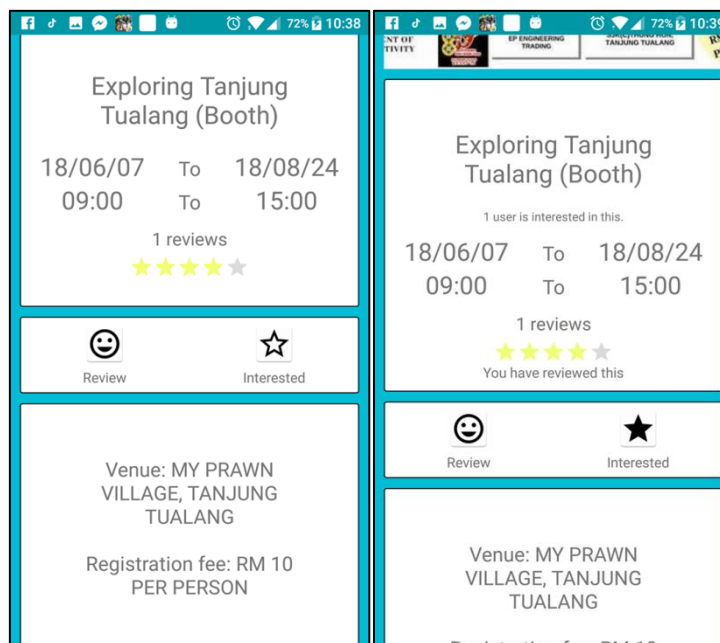
Figure 5.1.11a Use case testing results for Show Interest Function

Table 5.1.12 – Use Case Description for Give Comment Function

Use Case ID	UC012	
Feature	F012 Give comment	
Purpose	To allow the user to give comment in an event.	
Actor	Normal User, Event Organizer	
Trigger	User clicks a specific event in the event list.	
Precondition	System is connected to the internet.	
Scenario name	Step	Action
Main flow	1	System redirect user to the "More detail" page.
	2	User scrolls to the bottom and clicks the space where there is a sentence "Write a comment. . . ." .
	3.	User enters a comment.
	4.	User clicks the "Post" Button.
	5.	System records the comment and saves it to the database.
	6.	System refreshes the comment section.

Main flow
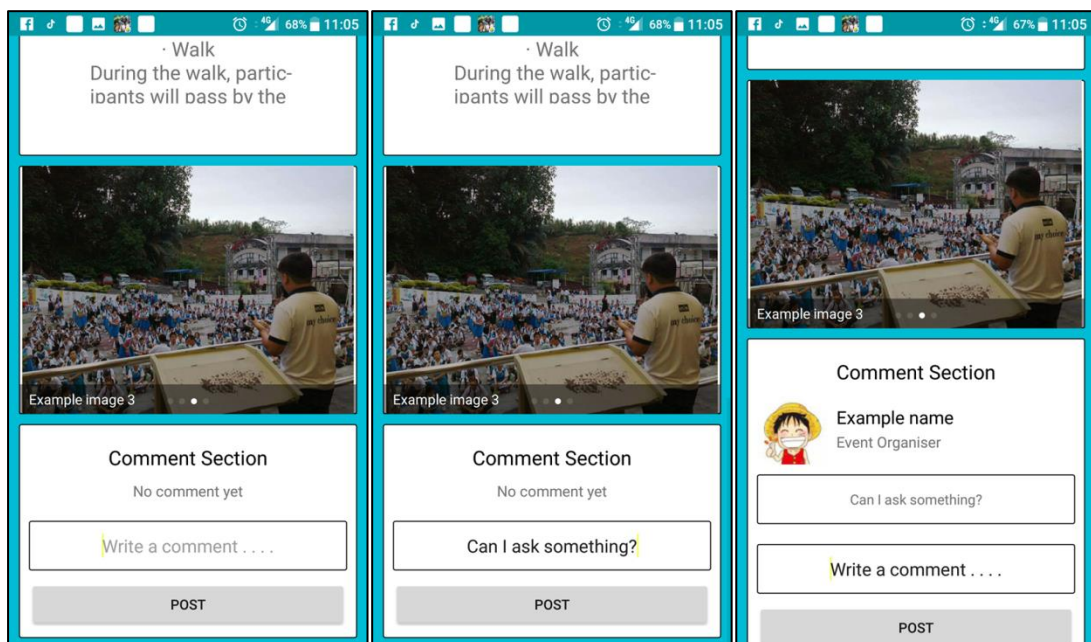
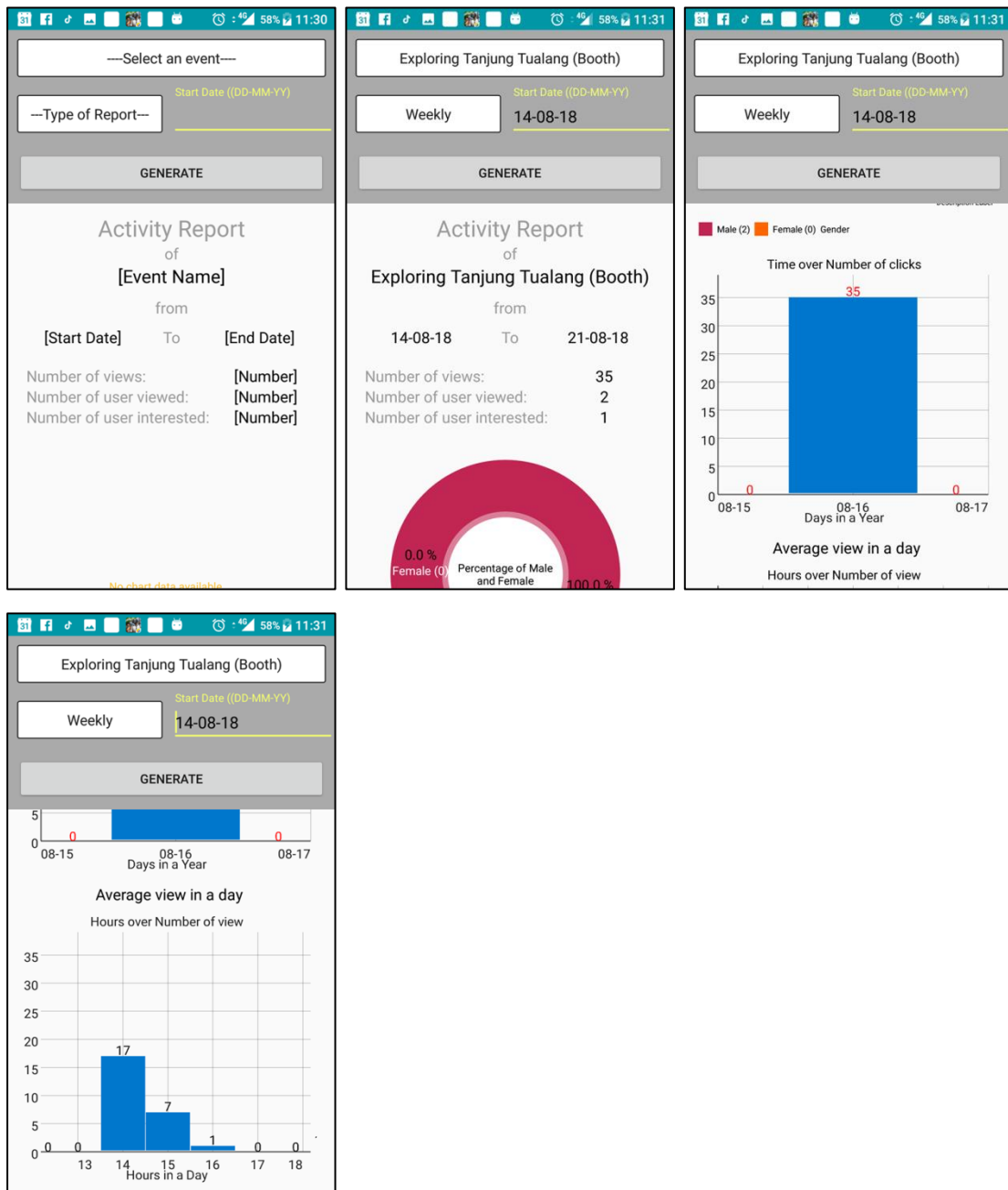*Figure 5.1.12a Use case testing results for Give Comment Function*

Table 5.1.13 – Use Case Description for Generate Report Function

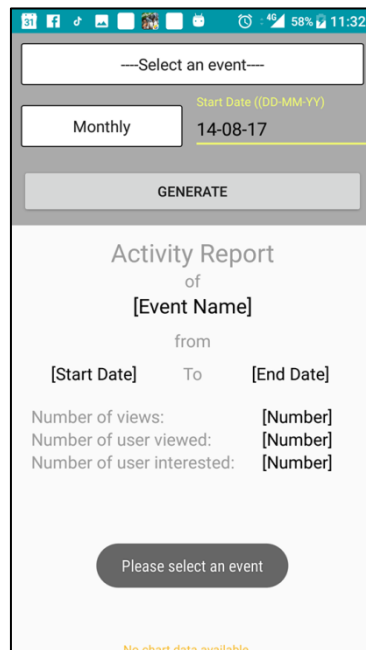| Use Case ID	UC013	
Feature	F013 Generate report	
Purpose	To allow the user to generate report on a specific event.	
Actor	Event Organizer	
Trigger	User clicks the "Statistic" Button.	
Precondition	System is connected to the internet.	
Scenario name	Step	Action
Main flow	1	System redirects user to the "Statistics" page.
	2	System displays a list of information (Event name, type of report and start date) for user to fill in.
	3	User fills in the required information.
	4.	User clicks the "Generate" button.
	5.	System displays the report.
Alternative flow – Incomplete information	3.1	User did not fill in all the required information.
	3.2	System displays an error message according to the information that user left blank.

Main Flow

Figure 5.1.13a Use case testing results for Generate Report Function

Alternative Flow

Figure 5.1.13b Use case testing results for Generate Report Function (Alternative Flow)

Table 5.1.14 – Use Case Description for Log Out Function

Use Case ID	UC014	
Feature	F014 Log out	
Purpose	To allow the log out from the current account.	
Actor	Normal user, Event Organizer	
Trigger	User clicks the "Log out" Button.	
Precondition		
Scenario name	Step	Action
Main flow	1	System redirects user to the "Login" page.

Main Flow
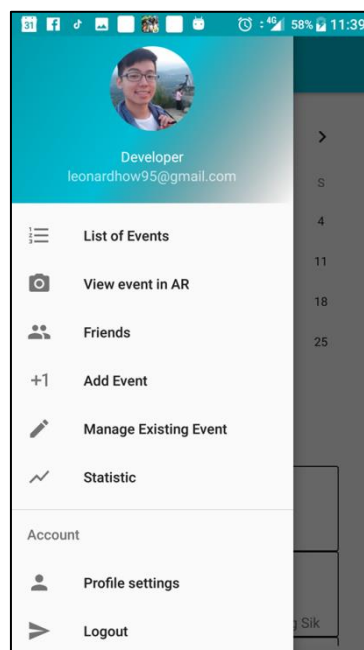
Figure 5.1.14b Use case testing results for Log out Function

5.2 Testing summary

Table 5.2.1 – Testing summary for the test cases

Summary		
Test Status Report Summary		
The status of the test are as follow:		
Number of Test Cases Planned to be Completed	Number of Test Cases Remaining to be Executed	Number of Test Cases Completed
14	0	14

Incident ID	Short Description

Document references
Test Design Specification v.1.0.0
Test Case v.1.0.0, Test Case v2.0.0, Test Case v.3.0.0,
Test Procedure v1.0.0, Test Procedure v2.0.0, Test Procedure v3.0.0,
Test Log v3.0.0,
Test Incident Report v3.0.0.

Result Summary
14 test cases have been planned and executed.
No incidents found.
If there is no new incident raised, it is expected that the product is ready to be deploy for beta testing.

Rationale for Decisions

Conclusion and Recommendation Based on Test Result
Conclusion: The current version of the product is fit for release for beta testing.

Chapter 6: Conclusion

The

a casual user especially freshman, this application basically served as a platform for them to look for events at the same time making friends. In addition to the standard way of viewing, this application introduced a less popular but uprising method, AR to aid the user in their finding. AR features are especially effective when user are not familiar with the surrounding and bad at 2D maps because that it actually points of the location of the event based on the direction that the user is facing. Hence, freshman who are not familiar with the area can quickly being navigated to their desired location of event with ease. Secondly, for user who are unsure of event that they wanted to attend, this application helps to categorized and even suggest the user some other event that they might interested in from time to time based on the data of the

preference system will record user interaction with the system (For example, when user clicks into a particular event) and use it for the suggestion making in future time.

As for the use of the data this application collected, event organizers are the one who are beneficial from it. Event organizer has an option of generating activity report for a specific time range (For example, time range of their past event) in order to obtain the necessary information to plan for their next event. These data is what makes this application valuable because only this application has the ability to record and obtained it since human recording only gives general information of a past event but not the detail. At the moment, this application are able to generate an activity

number of comments, gender, average age, graph of clicks over days in a year and

predict the outcome of a certain action (For example, making promotion at a certain hours) or plan the execution of a certain action which can obtain maximum effectively with least effort   At the same time, being the highest view event of all other event will be rewarded with a blinking effect on the marker which definitely helps to attract more users to the event.

Chapter 6: Conclusion

Even though that many features have been mentioned above, there are actually still lots more possibility that can be achieved with this application. For example, event organizer can pay to decorate their marker or for the application to promote their event. Secondly, advance navigating system as such an arrow which points the path to the destination can be added so those users who are new to UTAR can easily navigate themselves to a particular event. Last but not least, an e-wallet which can directly deal with event organizer without needed to go to the location.

In conclusions, even though the entire objective has been achieved, there are still much more potential lies within this application which are yet to discover. As a developer, I hope that this application can be further develop or at least the concept can be bring forward to a better application which can helps student to be active in participating event that is held in UTAR in the future.

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Appendix

Appendix A-Poster:

Appendix

Appendix B-Screenshot of UI:

Part 1

Part 2

Appendix

Part 3

Part 4

Appendix

Part 5
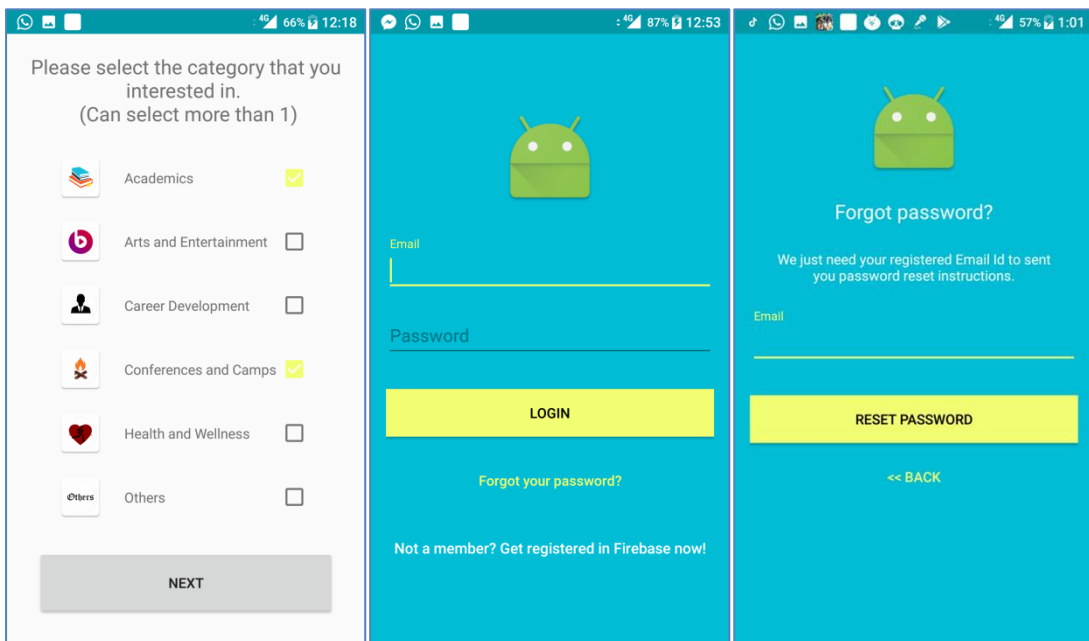
Part 6

Appendix

Appendix C – Turnitin Result

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FYP-2-Turnitin

ORIGINALITY REPORT

7%	4%	1%	5%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to University of Southampton Student Paper	1%
2	Submitted to City University Student Paper	1%
3	greenbay.usc.edu Internet Source	1%
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Appendix

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Appendix

Appendix

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)

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: