**PROXIMITY BASED INFORMATION DELIVERY MOBILE APPLICATION**

By

Yap Seng Choon

A REPORT

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

BACHELOR OF INFORMATION SYSTEMS (HONS)

BUSINESS INFORMATION SYSTEM

Faculty of Information and Communication Technology

(Perak Campus)

JAN 2016

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I am using this opportunity to express my sincere thanks and extend my gratitude to my supervisor Mr Tan Teik Boon who has given me this great opportunity to participate in an mobile application project, I would like to express my deep gratitude to have you as my supervisor as you would guide me the most of the time even you are busy with your work, a big thanks to you.

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**Abstract**

This project is to design a mobile application which will be used by end users to capture their point of interest in a way of allowing them to obtaining more relevant information, such that each of the information can be optimized individually. The proposed mobile application will be used to solve the current problem that are most occurred in many other location based application, where most user was not able to get information related their particular point of interest, coming along with the lack of information delivery in these application, and also the absent of integration between users in the format on the point of interest.

The main objective of this project is to change the way of how people obtain information while using their mobile devices, the main features of this application includes a visualized graphical map designed using Google Maps API, the map can helps users to identify their current location by using GPS and by that users can identify different information that are available around them. The application also allows users to select their point of interest such as buildings or streets where then the application will optimize the information displayed based on user delight, and by clicking on each shown result users are able to get full details on each information where they may find interested to. Another feature is that the profiling of users, each user can perform a registration in order to create their own user profile, with profiling to be stored into the database, users can then add in their individual point of interest such as their own business, a tourism spot or a place for food and it will be added into one of the point of interest in the map, just to share out to other users who are using the application, this is to integrate information ground into our mobile application where users gather in our application and share their point of interest.

All of the above feature will truly provide an revolution in how information is being created and shared; users who are using this mobile application will found themselves able to find their particular point of interest more effectively while also enabling them with the ability to create them, with such possibilities of capturing consumers to use this mobile application, it come with great chances of receiving good feedbacks and high impact on the society.

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| | |
|---|---|
| LBS | Location Based Service |
| UTAR | Universiti Tunku Abdul Rahman |
| UniCAT | University Cyber AgenT |
| UTDOA-AGPS | Uplink Time Difference of Arrival and Assisted GPS Technique |
| MS | Mobile Station |
| UMTS | Mobile Telecommunication System |
| ICMP | Internet Control Message Protocol |
| GPS | Global Positioning System |
| RAD | Rapid Application Development |
| SDLC | System Development Life Cycle |
| GUI | Graphical User Interface |

# CHAPTER 1 INTRODUCTION

## 1.1 Motivation

In today society, most people tend to go places for particular reason, with behavior from whom that may then emerge a social atmosphere that fosters the spontaneous and serendipitous sharing of information with people around them; these environments can be described as an "information ground". (Pettigrew, 1999)

Information grounds are redefining information sharing like never before. With the occur of information grounds, information are easily delivered around, for the act of buying, selling, sharing and advertising online is one of the popular topic among all, (Pettigrew, 1999) and most people have successfully made the transition from buying things from traditional physical stores to making purchases online, from referring to a tour map to receive guidance from the online web.

Fisher, Landry and Naumer concluded that place-related factors plays an important role in the effectiveness of an information ground, it is also suggested that place-related factors would be one of the single greatest influence on creating a satisfy information ground, surpassing even the quality of the information acquired as a central evaluation point. (Fisher et al 2006.)

Location based service or abbreviated as LBS, is one of the handling of place related service where information grounds would benefits from it, LBS have started springing up at astounding regularity, with each one offering information and deals better than the other, as of today more LBS application are then released to cope with the market today. (NADINE, 2015)

LBS application is a great innovation of tool which would help us in locating the position of people or entity depending upon their current location/whereabouts, it greatly increases the accuracy of detection an individuals' location on the map, although these application are a great innovation (NADINE, 2015)

With information grounds, LBS application, and trends above that gets popular rapidly, why not we combine these technologies, synthesizing them into an application where user can locate their point of interest, sharing information and allowing them to seek information more easily through the application?

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## 1.2 Problem Statement

At first glance, it may seem like these current LBS applications can provide a lot of help for the users that are using it, in regards to the existing system we found out there are a few problems and function that **does not allow users to create, share and obtain information through the application,** most of the information was pre-made by the application provider where those information was not constantly monitored and may have been outdated.

This initial perception fails to take into account; there are many other LBS applications where users are **not able to get more information related to a particular point of interest**. An example would be a shop that he/she might be interested in, food that he/she wishes to hunt for, or a tourist who wishes to get to know more about a particular place, due to the fact that most of LBS applications only provide the location of the current user and the destined location but **it doesn't provide further information regarding the surroundings** where these information is then not delivered to the user.

Now we understand the **lack of information delivery is absent in the application**, we'll begin to see the major problem here, for example a neglected tourism spot, important announcement of a particular business or hawker, these information are not provided to nearby users at a particular point.

Other than that, **integration between users with the applications point of interest plays an important role such as search function,** to acquire information from a point of interest user need to search for it, similar to a the searching section for Google it provides analytics and data that gives all sorts of insights into what the users want, **but it seems this function have been neglected or have been poorly designed.**

In the proposed project, a mobile application – *Proximity Based Information Delivery Application*, titled "Tour de App" will be the solution to the problems, which it will fully **provide user with their location on map, giving details of information nearby in an effective manner, establishing and integrating with search functions for better interaction between users and the application with a more effective way**, we will also conduct an survey after the development of the application to receive feedbacks from users to further improve and enhance our application.

## 1.3 Project Scope

At the end of the project, "Tour de App", a Proximity Based Information Delivery Application will be developed and it is an application that supports different users with unique list of features. The features of the Application includeds:

- Profiling, it stores all the information regarding the users that uniquely identify themselves by registering through the application. The information includes personal details, point of interest and more.

- Location detection and visual display, the proximity of user's current location are to be visually displayed to the user and also giving them details on the location they are in.

- User can browse through registered entity to acquire more information such as the information and service the entity provided and the location of the entity.

- Social network integration feature, users are able to share their favorite location or to inform their friends their current location, this feature is optional based on the user's point of view into the matter of their privacy.

- Feedback features will also be implemented in the application where user can provide feedback to us, the developer, this allows us to obtain feedbacks from the users in order to enhance and improve the application.

## 1.4 Project Objectives

To design an application that are able to provide and retrieve location of the user on the map, showing information for registered entity, information and point of interest that are nearby to the user, filter and displaying prioritize information is also an option depends on the user's point of interest.

To provide users the ability to promote their own point of interest such as promoting an product or services, or a tourism spot, by using our mobile application they are able to advertise these locations and information based on the data they provide for these particular business, information regarding these data or business are then displayed on the application for other users to refer to if it is on the interest list.

To allow direct feedback on the particular point of interest from the users, by having the feedback from the users, registered users have the flexibility on handling social integration such as liking or dislike a particular point of interest, allowing more user integration with the information, creating an environment which allows user to facilitate a virtual information ground.

To evaluate the usability and functionality of the proposed mobile application, by compare it with multiple available LBS application. (Google Maps, , GEO Alert, GTDollar) The comparison and result will be noted down for further enhancement for the application; a survey questionnaire will be distributed to the potential users and evaluated accordingly by analyzing the feedbacks from them.

## 1.5 Impact, Significance and Contribution

At the end of the project, "Tour de App", our Proximity Based Information Delivery Application will be delivered and it would solve the problems where we have stated above.

Information on point of interest is much niche in the market, and our application would penetrate the market more easily upon releasing where we would provide an application that can provide information on a much more broad scale.

The proposed application would be installed on user's mobile phone, for users such as tourist, shop owners, hawkers, students, or a particular entity to obtain and allocate their point of interest or give out information as a registered user about their information such as business details, event details, and also merely a piece of information.

Tourist and students can benefit from this application where it will give information regarding on their point of interest, as for shop owners or hawkers they can give out their current location for their shops and information to other user who use the application.

Filtered based relevant information for each individual can be optimized rather than broadcasting broadly can obtain more relevant information towards their point of interest, this can also benefits for registered users to have their own information delivered in a more tidy and organized way.

By having this application, our users are able to obtain better information around them, and also giving registered users the potential to advertise their business or share their point of interest through the application.

## 1.6 Background Information

### 1.6.1 What is proximity, and proximity based service?

Proximity can be described as "nearness" and it is often qualified by the word "close". (Vocab, 2015) Proximity based service is a subclass of location-based service, where mobile device access these services by making use of geographical position of the current device. (IGI, 2015) Our project focuses on the use of user's geo-location, which allows user to find and explore their particular point of interest around their location, and also provide user more information for the particular point of interest.

### 1.6.2 Integration with Google Maps

Google Maps is a graphical location based service system. In Google Maps, users are able to see their location as avatars which will then move around an designed visual map, the visualized map contained locations such as the buildings and many more visual aids. Our proposed application can be integrated as to use Google Maps to handle the navigation as to soften the burden of the application, and also to to further enhance the functionality in Google Maps by providing our application's unique function.

### 1.6.3 Project title

The title of Proximity Based Information Delivery Application is clear enough with the name "Tour de App" given for the mobile application as it is because the application name is simple yet enough for people to understand that the project is about. "Tour" means information spots "de App" carries a meaning of an app designed to suit information sharing.

Although user's initial reaction would be having a trendy naming application, with marketplace proliferation and recognisability name, the application will be easier for user to find and also understand.

**1.6.4 What is the impact of this project when it is released?**

The impact of this application will be the changing of how integration between location service of Google Maps and information delivery synthesized together, an application that allows user to track their location and also providing them information surrounding them. Users such as shop owners, students, hawkers or hypermarket can get use of this application to advertise them-selves to other user who uses the application to find their point of interest.

With information grounds rising nowadays, it is wise to seek out new advertising and information delivery portals, for such as our proposed project, a significant impact on mobile based location service where it allows user to obtain and gives out information about a particular interest or advertising an particular information.

## CHAPTER 2 LITERATURE REVIEW

**2.0 Literature Review**

Based on the research, it is less likely for having this kind of application in the real world, most of the location based mobile application handle function for such as searching for a particular entity or point of interest, and the result was shown without identifying the user's current location, or showing accurate results, vice versa.

Therefore, the study of the similarity of the benchmarked application are needed, some of the problem domain that occurs in the application can be revised and improved, these applications also to be reviewed and studied independently. More importantly, all existing approaches have certain weaknesses or limitations

## 2.1 Uplink Time Difference of Arrival and Assisted GPS Technique (UTDOA-AGPS)

**Introduction**

U-TDOA, or Uplink-Time Difference of Arrival, is a wireless technology that can determine the location of a mobile phone using the cell tower's sensitive receivers. (Zahhad, Ahmed & Mourad, 2013)

UTDOA-AGPS is a new technique for high accuracy and detection for current user's location along with accepted execution time. With the technology nowadays such as cellular networks and GPS working together to provide high end positioning techniques, UTDOA-AGPS utilizes Universal Mobile Telecommunication System (UMTS) network, Mobile Station (MS) and GPS positioning characteristics and techniques, and as a result a great boom in the field of location based application. M. (Zahhad, Ahmed & Mourad, 2013)

**Application of Research**

By studying the technique we are able to have the knowledge and the available technique for us to apply into the development of the proposed application, this can lead us to locate user's location by using GPS technique and allowing us to fulfill one of the application's main functions.

**Strengths**

Based on UTDOA-AGPS technique, the result from this technique shows high accuracy and shortened time of execution compared to other positioning systems. Besides that, many other applications are being proposed and develop by utilizing both high position accuracy of UTDOA-AGPS and ICMP algorithm, some of these proposed application were such as traffic management system, people tracking systems, etc. (Zahhad, Ahmed & Mourad, 2013)

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**Weakness**

One of the major issues for this technique was the inefficient way of the use of GPS network platform, the GPS network platform did not fully enhance the mobile network allocation of resources, and managing it requires much more GPS supported terminals, in the research it is known the technique used by UTDOA-AGPS are the UMP algorithm and it is outperformed by the RIP method. (Zahhad, Ahmed & Mourad, 2013)

**Solve the Weakness**

The weakness are overcome and solved from the utilization of both mobile network and ALLMOP algorithm, an intra cell architecture are created in a map base and this can help improves and enhances the mobile network resources and location services. (Zahhad, Ahmed & Mourad, 2013)

## 2.2 Google Maps

### Introduction

Google Maps is a web mapping service developed by Google; it offers street maps, visual imagery from the satellites, and a 360 degree view of the street, GPS navigation, route planning and traveling for users to locate their destination on the map. (Google, n.d)

Most common way for users to use Google Maps is to simply drags the map when using, like many other Google's application, which they runs using JavaScript extensively. As the user drags along the map, the grid squares are downloaded from the server and displayed visually and any navigation function such as route planning are also being read from the server and the route is then displayed and calculated. (Google, n.d)

### Strengths

The strengths of Google maps would be the visualization of the street, clear imagery presentation through the application for showing the views of the street and the building around it is a fascinating feature by Google. The Street View allows user to view the street visually, and by doing that users can identify whether it is the location they desired or not, and this makes navigation more dynamic and flexible. (Google, n.d)

### Weakness

Some of the information delivered by Google maps is inaccurate, for such as that depending on the country and the destined location user interest in, user may find that some building are blurred out in Street View, with less information regarding the particular building. This problem are due to the privacy request from the building owner, and causes limitation to the effectiveness of this feature, when information is not delivered accurately and effectively to the user, an application are then to be considered with a flaw. (Google, n.d)

**Solve the weakness**

Although we must note down the privacy concern of the building owner, we can solve this problem by offering the services of the application to the owners and offers them to the improvement for the building's reputation by letting users know more information regarding the building itself, for example by having the owner to enter the information himself, this will let the owner himself decide what information should be shared out and what's not. Suitable and accurate information is then delivered without breaking the privacy of these owners and the results are aiding the other users.
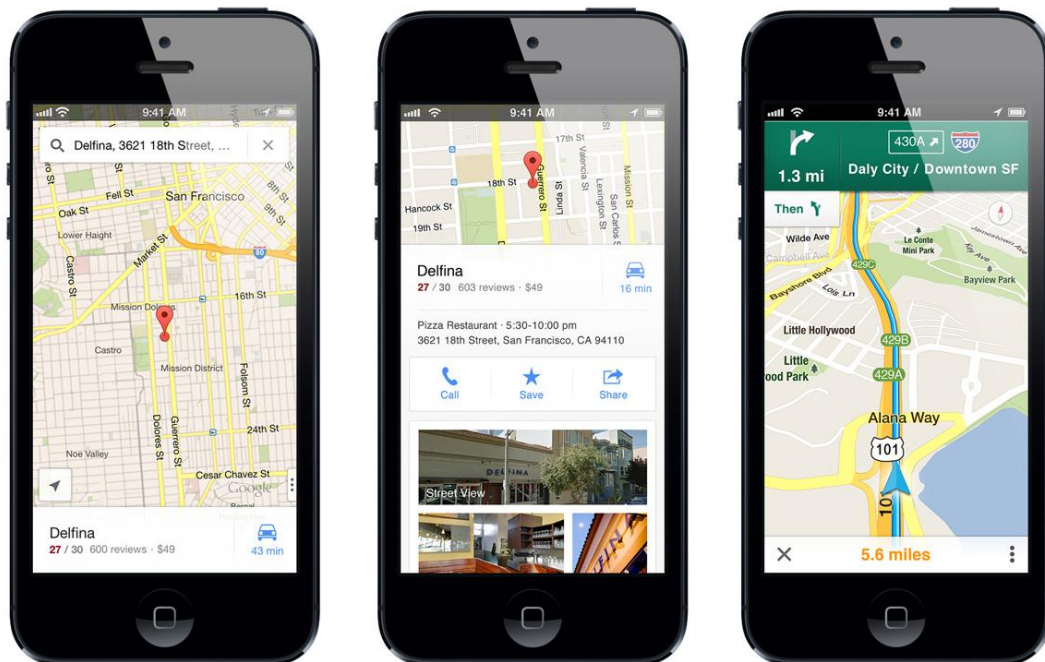


*Figure 2.2.1 Graphical User Interface for Google Map Application*

**2.2.1 Google Maps API**

**Application of Research**

Google has offered a built in library for developers to design a map into their own project, with Google Maps API, we are able to utilize and design a proper satellite view map with the built in functions.

Google Maps API provide the capability for us to develop and design a map interface easily, and also displaying current available streets and buildings as visual aids. Basic functions are designed to ease developers to build an simple map, and also they allow developers to customize their own unique functions to integrate with the API.

For our project, we would use the Google Maps API as our basic foundation for map displaying, and then we will add in functions such as location displaying and also functions such as map overlay, customized information entry and more.
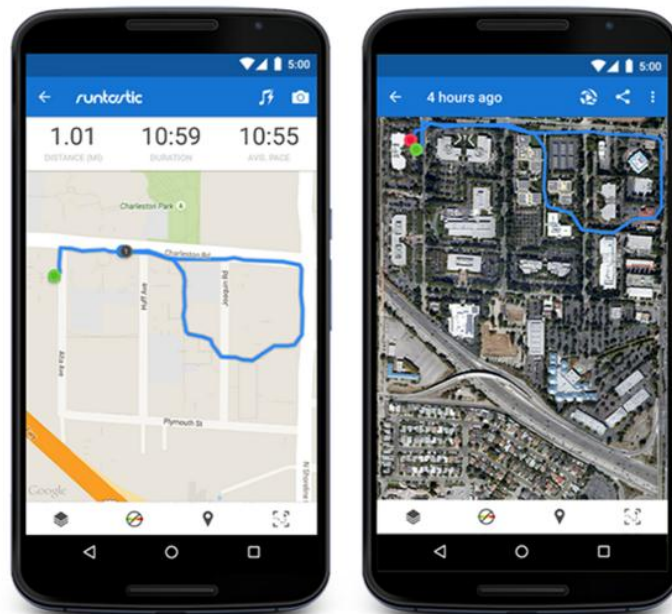


*Figure 2.2.2 An Sample Project, Runtastic, utilizing Google Maps API for a simple UI and map display*

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## 2.3 Inferring friendship network structure by using mobile phone data

**Introduction**

LBS and their applications are regarded as the most growing services, where it has been applied on mobile devices such as smartphones, tablets, or GPS guidance, these communication devices helps users to integrate with these LBS applications to obtain better services, especially social networks where LBS have been integrated with these social network applications to perform more functions and giving out more services. (Nathan, Alex & David, 2009)

**Application of Research**

This research in to examine the relationship among human interactions, based on their social network status and relationships, the research focused on the accuracy of the data collected from these analyses.

The study of social networks has generally give the potential for developers to understand the relationships between users, when users uses these LBS applications, some of the user might share out their favorite locations and places they are interested in, or to give our information to the social networks to inform his or her friends their status. (Nathan, Alex & David, 2009)

This research can allow us to identify the relationship between our users, such as one users would like to have an point of interest on a particular information, and our application would identify similar interest among other users and provide an linkage between them, such as automatically identifying both of them would be friend of interest.

*Figure 2.3.1 Example of a friendship network.*

**Strengths**

Integration between social networks and LBS application provide better service satisfaction and performance upgrade for both user and the application, the demonstration of collecting not only communication information but also location and proximity data from mobile users to the application can allow the application to give out pin point of interest from user's social networking friends and thus promoting these services. (Nathan, Alex & David, 2009)

**Weakness**

One of the major weakness for these current social network integrated LBS application are the lack of communication patterns identified and also real time sharing of information, for such as when the users are intended to share out their current point of interest of location, they are unable to give out full information of these location, but just merely sharing out to their social networks. (Nathan, Alex & David, 2009)

**Solve the weakness**

These weakness can be solved and overcome by introducing more information delivery on the application, for example by allowing these LBS application to locate the proximity of user's location, and the point of interest around them and share these information to their own social networks status, this can provide more satisfaction for the users. For example, embed the social network as a plug-in for the LBS application by retrieving approximate and accurate information from the LBE application and sharing them to their social networks.

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## 2.4 GEO ALERT- A Location Based Alarm System Using GPS in Android

**Introduction**

The application – Geo Alert is to assist travelers and tourist at various places, this application can provide useful functions for travelers to locate particular location on where they are currently stand at while also giving user information on favorite tourist spots when they are near the place.

According to Deepika Garg, the reason behind the LBS is to provide services to mobile users based on their locations, such as traffic information delivery, geological map locating services, where it provides dynamic guidance service to the tourist or users based on their location to ease their journey. (Deepika & Anupam, 2013)

**Application of Research**

By studying this application, we could find out new technique to assist our users, function that Geo Alert was unique and interesting enough for us to research and study on, and by applying functions such as alerting on information alerting it would be a boost in our project as it would help our users if we implement the alert function.

**Strengths**

An alert system on the application will alarm the user when the users are near to the places that they have highlighted or filtered, and also displays the information available when they arrive at certain location. User simply needs to tap on the alarm that provides the location of interest, so the application would alert when user are near to their destined location. (Deepika & Anupam, 2013)

**Weakness**

The weakness of this application is that it needs the internet facility provided by the mobile, and also the GPRS must be turned on whenever users visits, the application was not compatible or fully functional when there is no internet connection available. (Deepika & Anupam, 2013)

**Solve the weakness**

The application can save the details of location nearby during the uptime of the internet connection and store it as a local data, when user does not have any internet collection they can still locate nearby information by having the historical data stored inside their mobile devices, these data are to be updated when users have the chance to establish internet connection for their mobile devices.
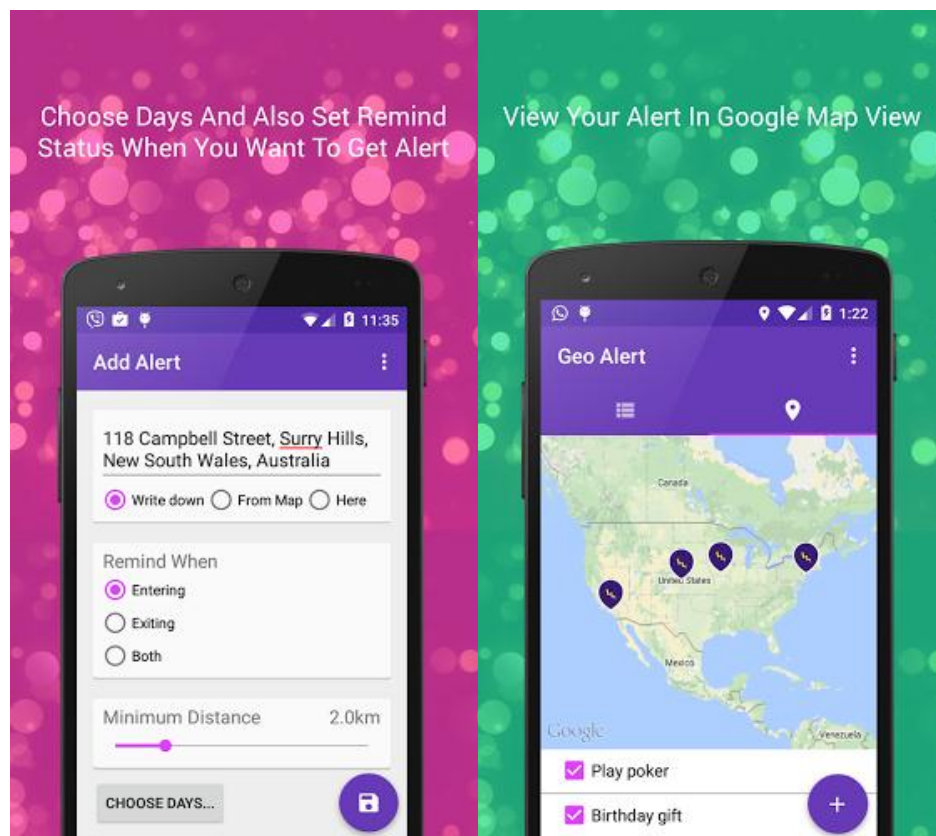


*Figure 2.4.1 Graphical User Interface for Geo Alert*

## 2.5 GTDollar

## Introduction



*Figure 2.5.1 GTDollar Logo.*

GTDollar is a worldwide, fast, secure mobile payment solution that designed to meet both global and local consumer needs, where they provides virtual electronic money that can be used for paying services and purchasing products at all member stores of GT Credit Alliance. (GTDollar, 2016)

Other than that GTDollar also helps consumers to explore more around their surroundings, where they can receive and use virtual credits for their purchases, gain access to a wide range of products and services, and benefit from attractive discounts and promotions anytime, anywhere. GTDollar enables easy communication and connection between merchants and consumers via GPS and user-friendly booking systems. (GTDollar, 2016)

Also to note that, a consumer doesn't need to register in order to use the mobile application, but it would be an extra features to be offered to the user as for them to find their interested products and services more easily.

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**Application of Research**

From the study from GTDollar, we are able to understand the importance of an platform for users to communicate to each other, allocate and retrieve information, GTDollar provides a graphical platform with suitable UI to help users to choose upon their needed information and displays them in a list to ensure that each user would retrieve the same information, and users can select these information by clicking to it and it would display further information regards on the particular point of interest.

By understanding the importance of information delivering in GTDollar, it would be a must to implement this function in our proposed application, ion such way users could select their interested relevant information such as each can be optimized rather than broadcasting broadly to every users.



*Figure 2.5.2 GTDollar User Interface & Search List*

## 2.6 Applications Comparison

| Application \\ Feature | Google Maps | Geo Alert | GTDollar | Tour De App |
|---|:---:|:---:|:---:|:---:|
| Mobile app | ✓ | ✓ | ✓ | ✓ |
| Display on Decktop | ✓ | ✗ | ✗ | ✗ |
| Estimate time of arrival | ✓ | ✓ | ✗ | ✓ |
| Distance left | ✓ | ✓ | ✗ | ✓ |
| Navigation Route | ✓ | ✓ | ✓ | ✓ |
| Filtering | ✗ | ✓ | ✓ | ✓ |
| Profiling | ✗ | ✗ | ✓ | ✓ |
| Alert upon arrival | ✓ | ✓ | ✗ | ✗ |
| Custom Overlay | ✗ | ✗ | ✓ | ✗ |
| Interaction Platform | ✗ | ✗ | ✓ | ✓ |
| **Virtual Market** | ✗ | ✗ | ✓ | ✓ |

*Table 2.6.1 Features on different chosen research applications*

## 2.7 Comparison Conclusion

In Conclusion, based on the comparison on each chosen research application, most of the application implement navigation route, filtering, alerting, and estimate time of arrival. These feature are no doubt to be good to take as an idea to develop our proposed application, but the accuracy of these data are questionable since as we know there are different factors that would affect the outcome of an designed application. After research and study on each system's strengths and weaknesses, it can be concluded that all the system have different issues and lack of some features.

Therefore in this proposed project, our intent is to create better mobile application where the uniqueness of features are able to be taken into consideration along with the study and reviews of technique and systems above.

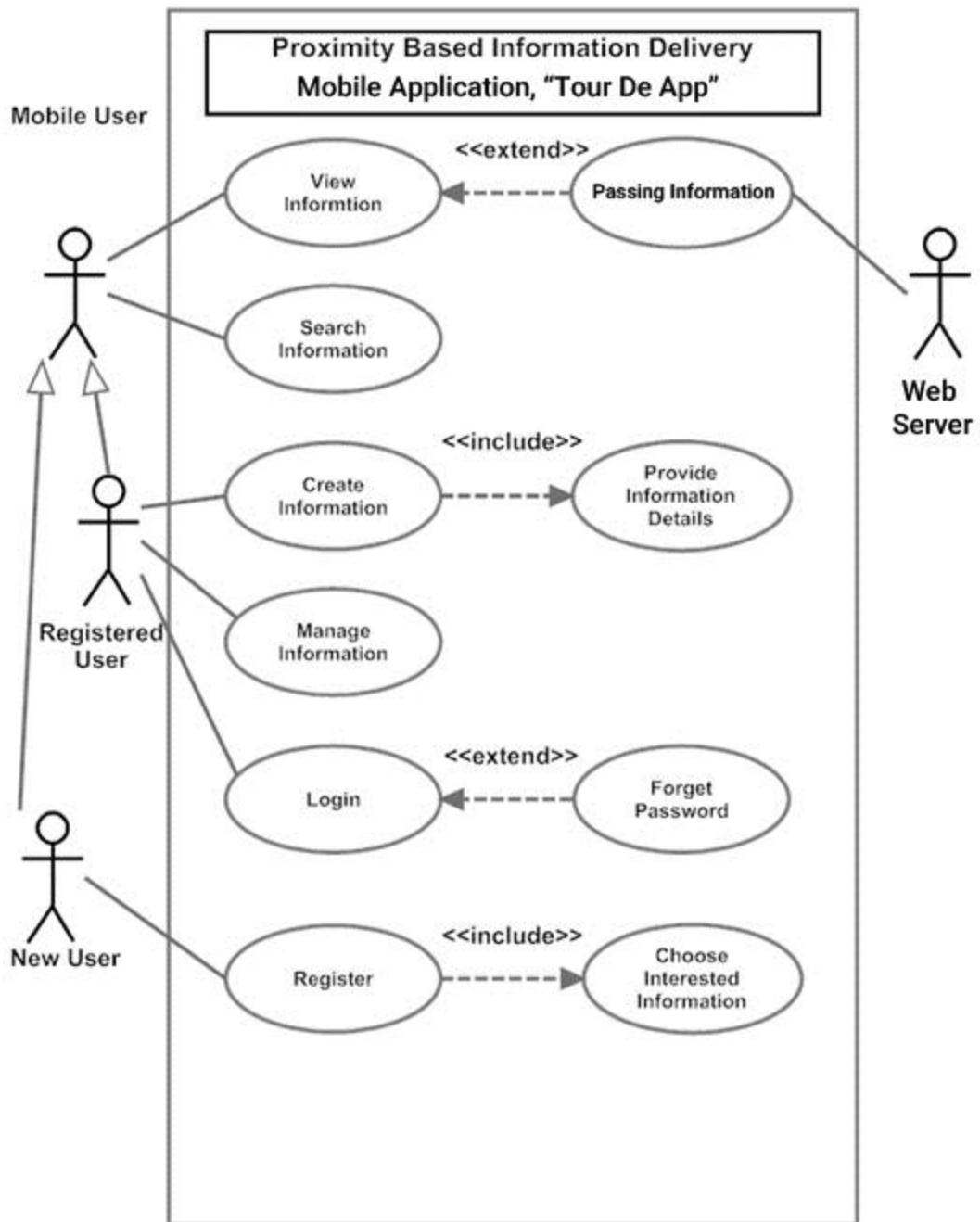**CHAPTER 3 SYSTEM DESIGN**

**3.1 System Use-case Diagram**



*Figure 3.1.1 Use Case Diagram of Tour de App*

By referring to the use case in figure 3.5.1.1, there are 3 actors which are **Registered User, New User and the Web Client**, Registered User and New User are generalized and classified as Mobile User, both of these 2 actors are specialized as a generalization relationship between each other, each and every actor has its own use case respectively.

For **New User** there are only have one use case which are **Registering** as an user for the application, in the register use case the user are prompt to enter their details such as their name, username for the profile, passwords and also most importantly their particular interested information, where these data are sent to the server and being validate as to create a valid user.

As for **Registered User** there are 2 use case which were **Create Information and Manage Information**, where they have the ability to add information such as point of interest or and information ground to the server, during this process user provides details on the particular data or information they want to create and these data are then passed to the server as the server validates it and store them into the database. In the other hand managing information are one of the another use case Registered User have, where they are able to handle their own unique information and edit them , data edited are then also updates the server's database to ensure integrity of data.

As for both actors, they are generalized into as Mobile User, where they can access to a more public use case which is the **View Information and Search Information,** users are able to view information from the server as the application will parse every information from the server's database into the application, these information are handled by the **Web Client** and when user request a filtered information the Web Client will response to that and provide with more suitable information to the user.

Every actor and use case plays a big role in this project as each of the entity specifies a role played by a user or any other system that interacts with the subject, this use case diagram can enable us to work out with our project more efficiently as we know which actors would perform what usage moves.

### 3.1.1 Use Case Specification

| Use Case Name: View Information | ID: 1 | Importance Level: High |
|---|---|---|
| **Primary Actor:** Mobile User | **Use Case Type:** Detail, Essential | |
| **Stakeholders and Interests:**<br><br>Mobile User – wants to view the information | | |
| **Brief Description:**<br><br>This use case describe how mobile user can view the information in the application | | |
| **Trigger:** Mobile user wants to view the information<br>**Type:** External | | |
| **Include:**<br>**Extend:** AsynTask | | |
| **Normal Flow of Events:**<br>1. Mobile user wants to view the information.<br>2. The user opens the main page on their device and the view loads information from the server database.<br>**3.** The web server pass the database's data into the user's mobile device and displayed the data visually. | | |
| **Alternate / Exceptional Flows:**<br>**-** | | |

*Table 3.1.1.1 Use Case Specification for View information*

| Use Case Name: Search Information | ID: 2 | Importance Level: Medium |
|---|---|---|
| Primary Actor: Mobile User | | Use Case Type: Detail, Essential |
| **Stakeholders and Interests:** Mobile User – wants to search for a particular information | | |
| **Brief Description:** This use case describes how the user can search their particular point of interest | | |
| **Trigger:** The user want to search for a particular information **Type:** External | | |
| **Include:** **Extend:** | | |
| **Normal Flow of Events:** 1. The user wants to search for a particular information 2. The user enters the search activity and entered filtering query that promts data from the server that matches with the query 3. The server then send data that are queried back to the user's mobile device and display the information visually. | | |
| **Alternate / Exceptional Flows:** - | | |

*Table 3.1.1.2 Use Case Specification for Search information*

| Use Case Name: Create Information | | ID: 3 | Importance Level: High |
|---|---|---|---|
| Primary Actor: Registered User | | Use Case Type: Detail, Essential | |
| Stakeholders and Interests: Registered User – Key in respective details on the add activity to add a new information to the server database. | | | |
| Brief Description: This use case describes how the user creates information. | | | |
| Trigger: User intend to create an information Type: | | | |
| Include: Provide Information Details Extend: | | | |
| Normal Flow of Events: 1. The user open up add activity 2. The user start inserting information details to the activity 3. The user confirms the information creation and the application validates and passes the data to store in the server's database. | | | |
| Alternate / Exceptional Flows: - | | | |

*Table 3.1.1.3 Use Case Specification for Create information*

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| Use Case Name: Manage Information | ID: 4 | Importance Level: Medium |
|---|---|---|
| Primary Actor: Registered User | Use Case Type: Detail, Essential | |
| **Stakeholders and Interests:** Registered User – Key in respective details on the information they owned | | |
| **Brief Description:** This use case describes how user edit information | | |
| **Trigger:** User intend to edit an information **Type:** | | |
| **Include:** **Extend:** | | |
| **Normal Flow of Events:** 1. The user open up own activity 2. The user start editing information details to the activity 3. The user confirms the information editing and the application validates and passes the data to store in the server's database. | | |
| **Alternate / Exceptional Flows:** - | | |

*Table 3.1.1.4 Use Case Specification for Manage information*

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| Use Case Name: Login | ID: 5 | Importance Level: Medium |
|---|---|---|
| Primary Actor: Registered User | Use Case Type: Detail, Essential | |
| **Stakeholders and Interests:** Registered User – wants to login to use the application | | |
| **Brief Description:** This use case describes how registered user login to their respective accounts. | | |
| **Trigger:** Registered user wants to login to their account **Type:** | | |
| **Include:** **Extend:** Forget Password | | |
| **Normal Flow of Events:** 1. The registered user loads the application 2. The registered user wants to login to their account 3. The registered user fills in their username and password and proceed to login 4. The login parameter is sent to the database for validation and authenticating and process the user's credentials 5. User are either allowed to login or prompt to register | | |
| **Alternate / Exceptional Flows:** - | | |

*Table 3.1.1.5 Use Case Specification for Login*

| Use Case Name: Register | ID: 6 | Importance Level: Medium |
|---|---|---|
| Primary Actor: New User | Use Case Type: Detail, Essential | |
| Stakeholders and Interests: New User – wants to register and use the application | | |
| Brief Description: This use case describes how new user register before proceeding into using the application | | |
| Trigger: The new user starts to operate Type: | | |
| Include: Choose Interested Information Extend: | | |
| Normal Flow of Events: 1. The new user loads the application 2. The new user wants to register as a registered user 3. The new user enters details on the register activity 4. The details are then passed to the server for validation and a user profile is then created. | | |
| Alternate / Exceptional Flows: - | | |

*Table 3.1.1.6 Use Case Specification for Register*

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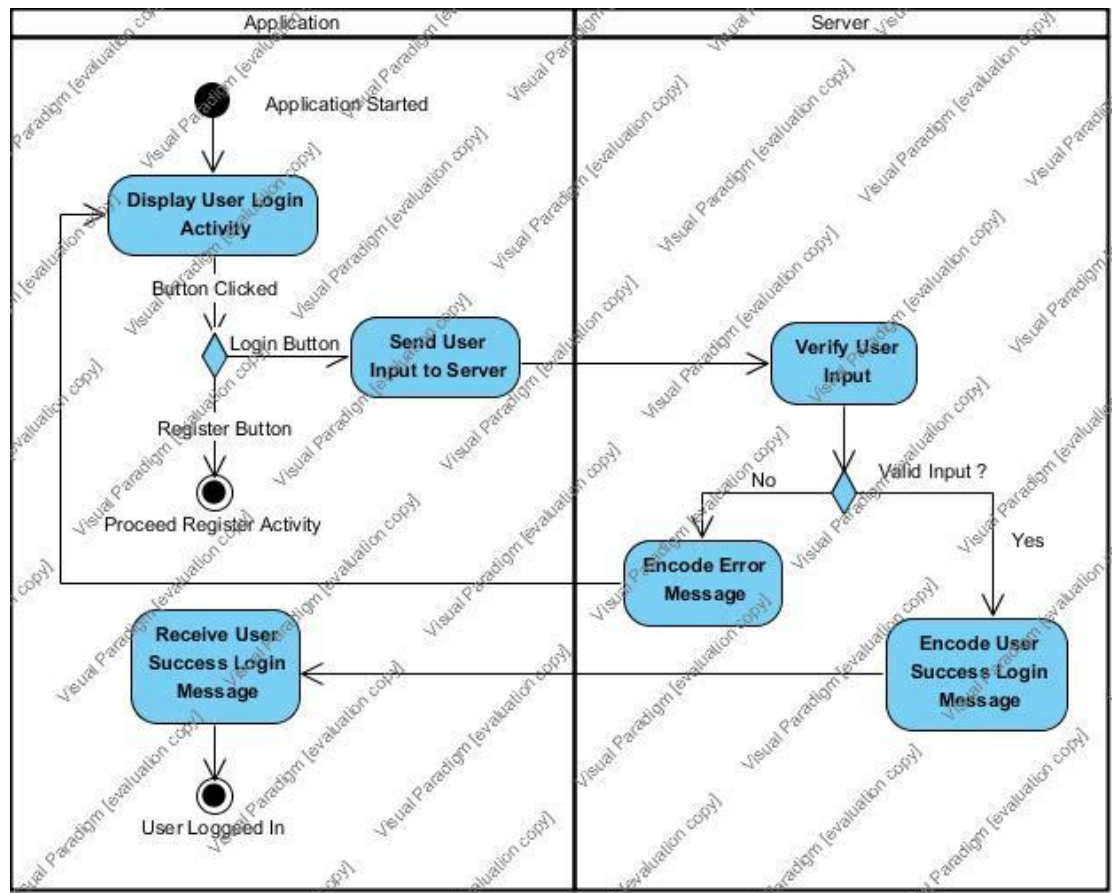## 3.2 Activity Diagram for Tour de App



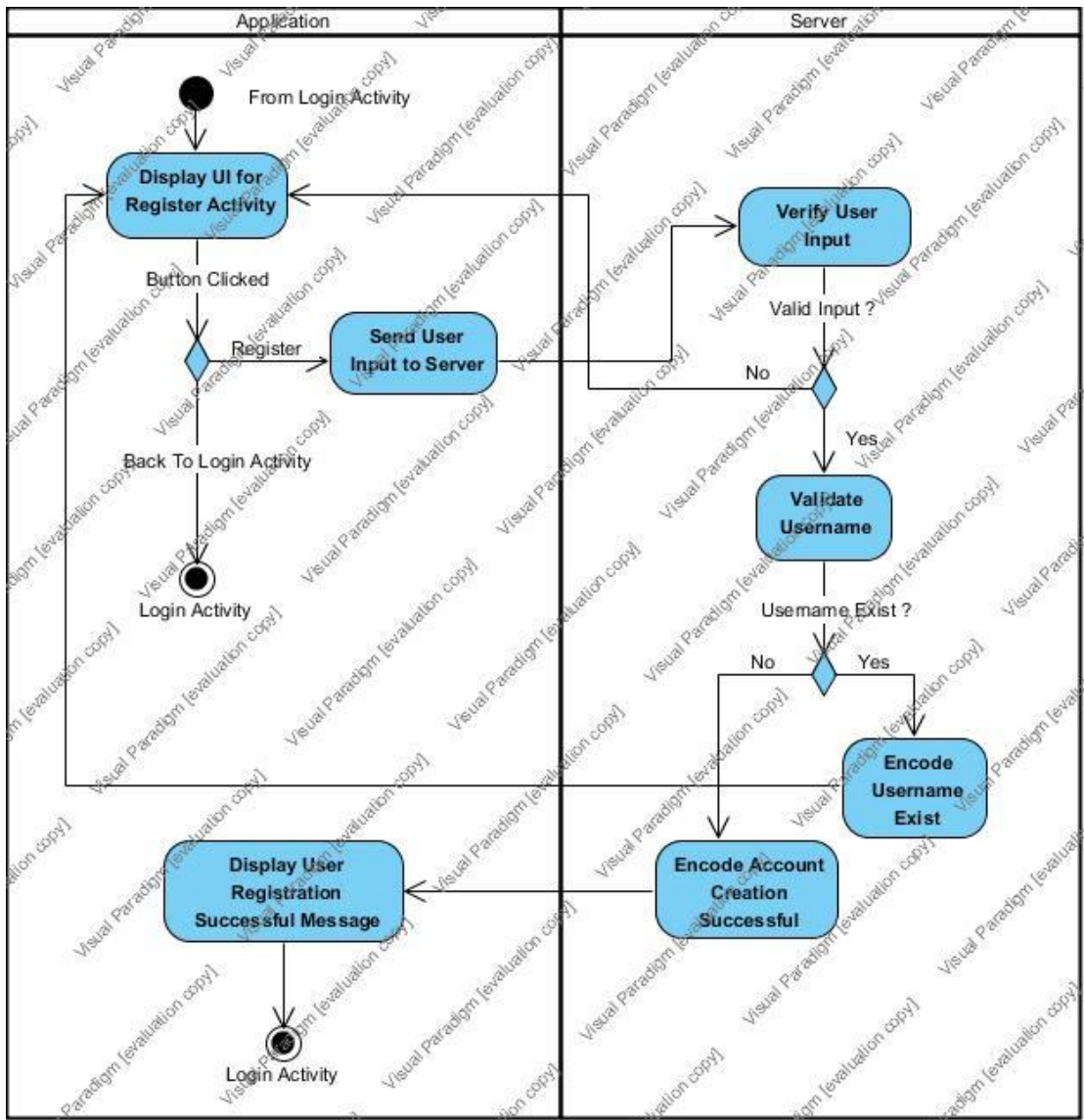*Figure 3.2.1 Activity Diagram for User Login Activity*

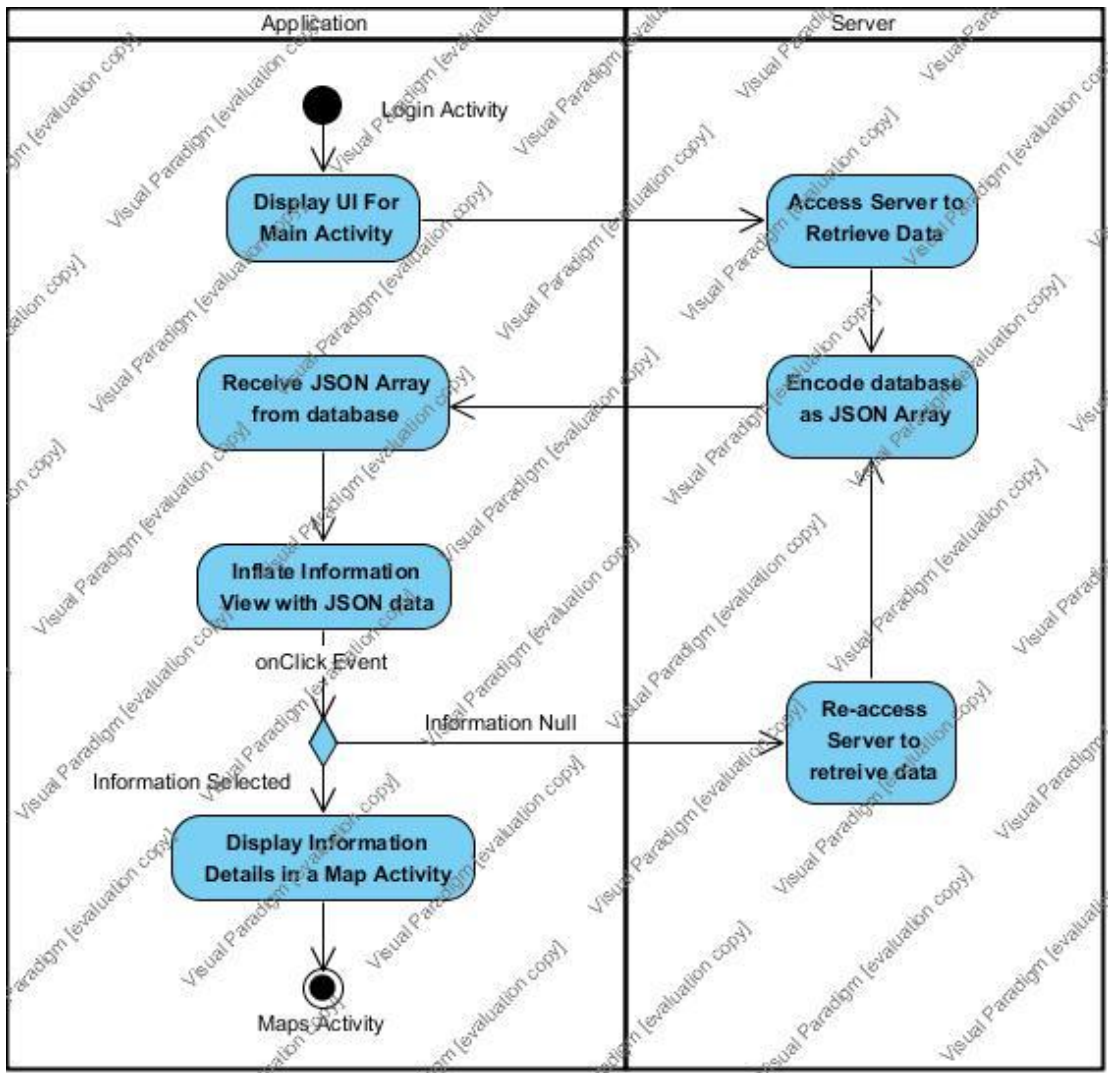*Figure 3.2.2 Activity Diagram for User Register Activity*

*Figure 3.2.3 Activity Diagram for View Main Activity*
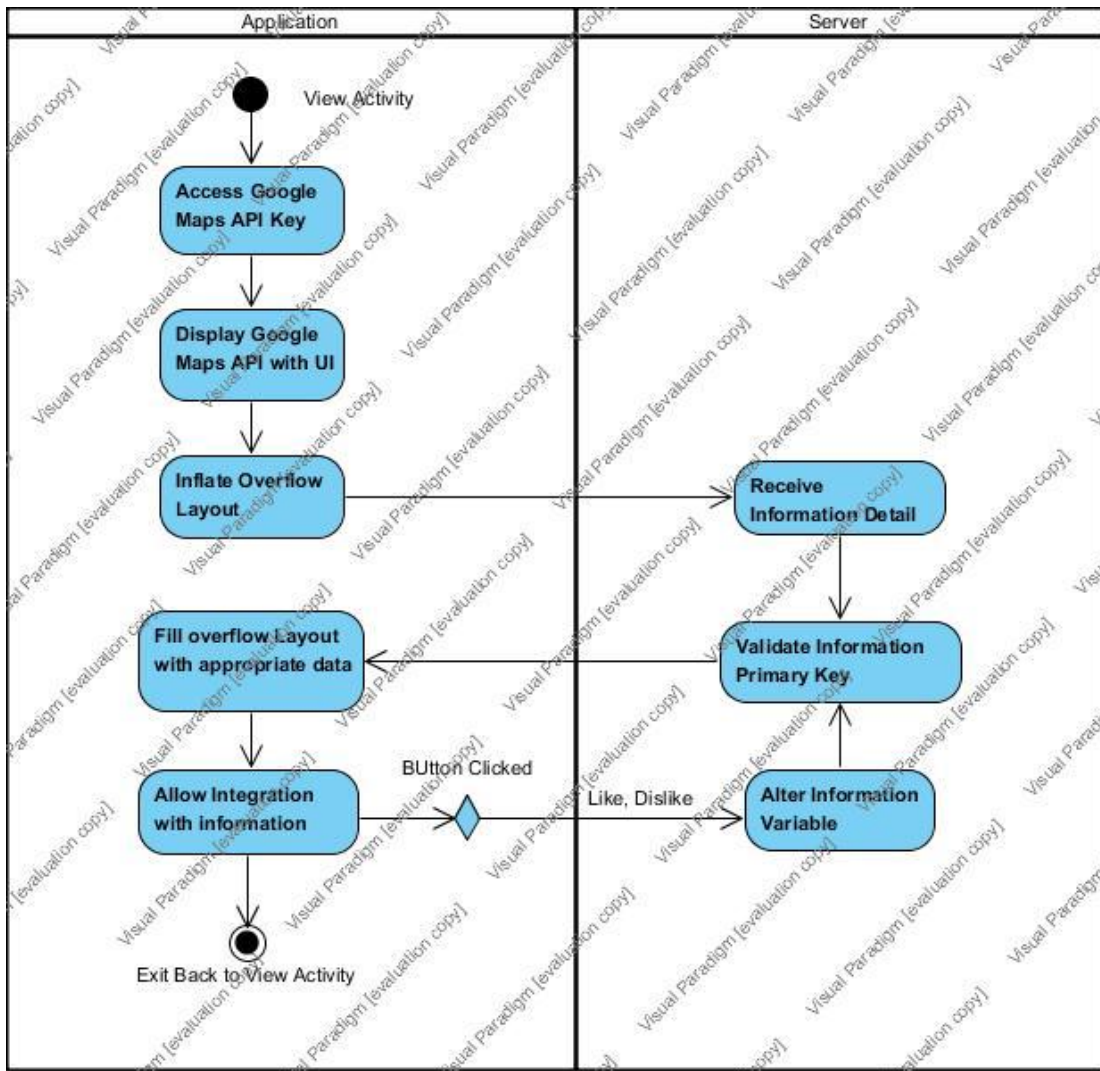
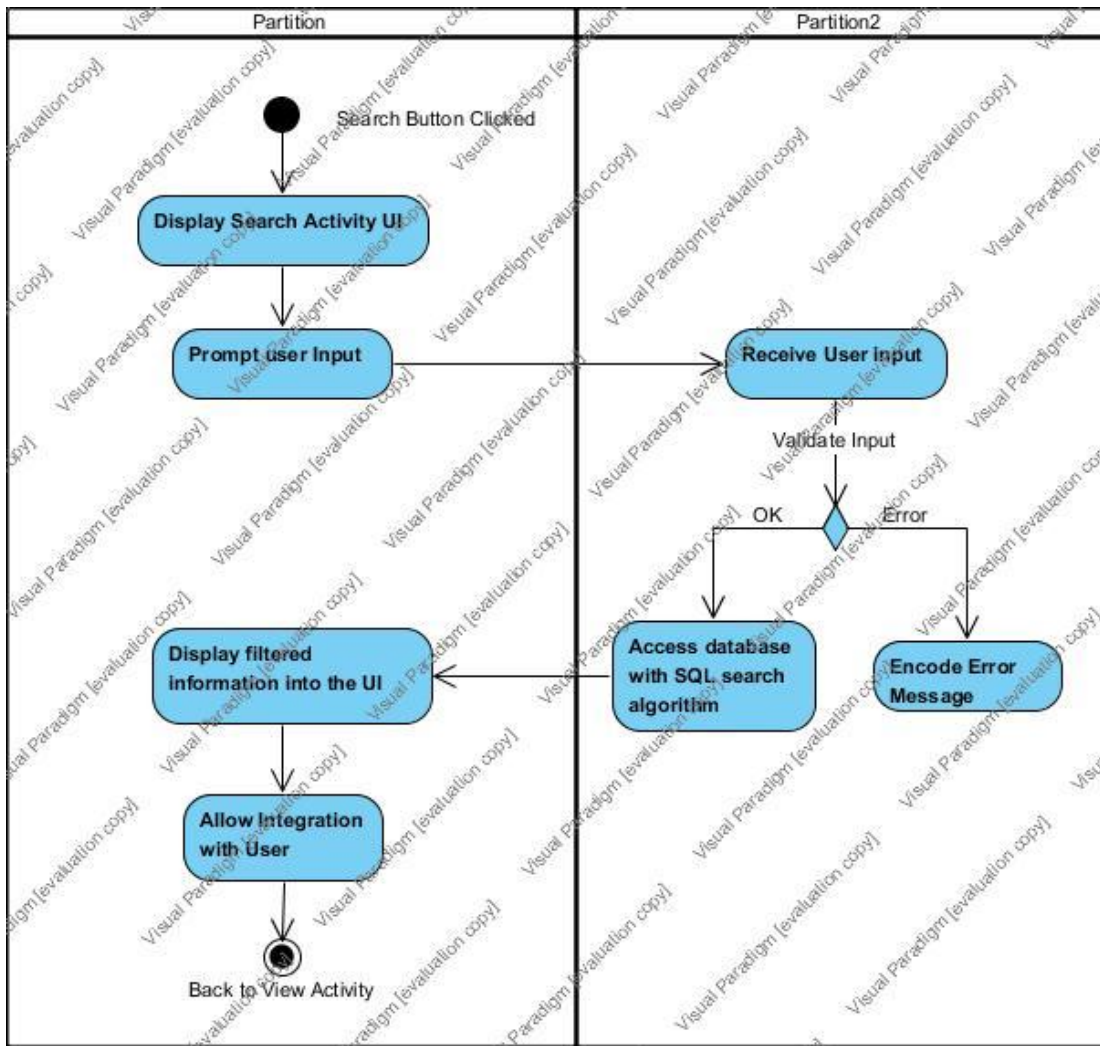*Figure 3.2.4 Activity Diagram for Google Maps Activity*

*Figure 3.2.5 Activity Diagram for Search Activity*
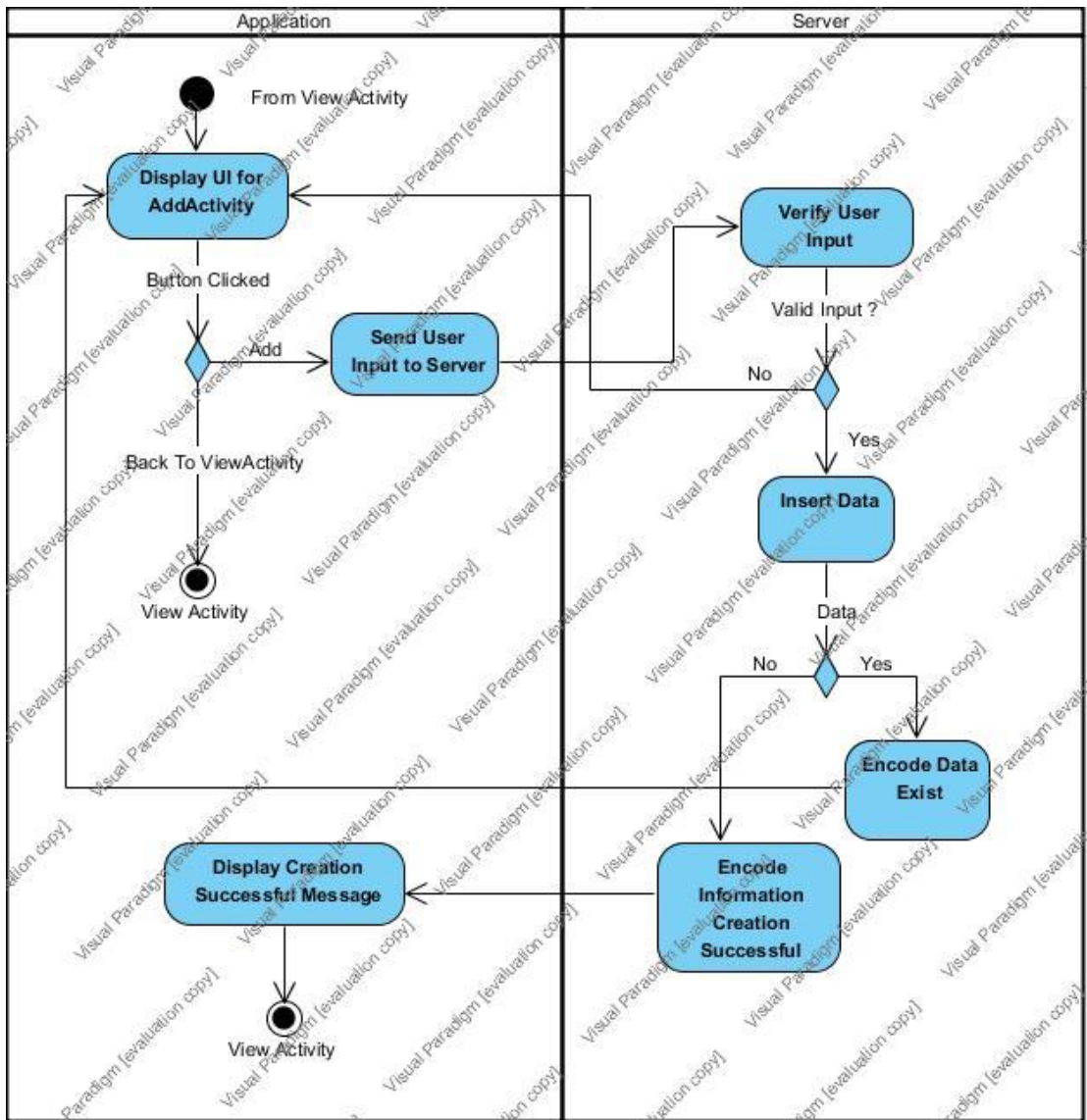
*Figure 3.2.6 Activity Diagram for Add Activity*

**3.3 SQL & Data Dictionary for Tour de App**

**3.3.1 Information Table**

```
CREATE TABLE information
(
infoID int(255) NOT NULL AUTO_INCREMENT PRIMARY KEY,
infoImg varchar(255) NOT NULL,
infoName varchar(255) NOT NULL,
infoOwner varchar(255) NOT NULL,
infoDescription varchar(255) NOT NULL,
infoCategory varchar(255) NOT NULL,
infoCreateDate varchar(255) NOT NULL,
infoLat varchar(255) NOT NULL,
infoLng varchar(255) NOT NULL,
infoLike int(255) NOT NULL,
infoDislike int(255) NOT NULL,
infoView int(255) NOT NULL
);
```

*Figure 3.3.1.1 SQL code for creating information table*

| Entity Name | Attribute | Data Type | Null | Description |
|---|---|---|---|---|
| **Information** | infoID | int(255) | No | Unique id to indentfy each piece of information |
| | infoImg | varchar(255) | No | Information Image Used |
| | infoName | varchar(255) | No | Information Title name |
| | infoOwner | varchar(255) | No | Information Creator |
| | infoDescription | varchar(255) | No | Information Description |
| | infoCategory | varchar(255) | No | Information Category |
| | infoCreateDate | varchar(255) | No | Information Creation Date |
| | infoLat | varchar(255) | No | Information Latitude Value |
| | infoLng | varchar(255) | No | Information Longtitude Value |
| | infoLike | int(255) | No | Information Total Likes |
| | infoDislike | int(255) | No | Information Total Dislikes |
| | infoView | int(255) | No | Information Total Views |

*Table 3.3.1.1 Information Table Data Dictionary*

### 3.3.2 User Table

```
CREATE TABLE User
(
user_id int(255) NOT NULL AUTO_INCREMENT PRIMARY KEY,
name varchar(255) NOT NULL,
age int(255) NOT NULL,
username varchar(255) NOT NULL UNIQUE,
password varchar(255) NOT NULL,
interest varchar(255) NOT NULL,
information varchar(255) NOT NULL
);
```

*Figure 3.3.2.1 SQL code for creating User table*

| Entity Name | Attribute | Data Type | Null | Description |
|---|---|---|---|---|
| **User** | user_id | int(255) | No | Unique id to indentfy each registered user |
| | name | varchar(255) | No | User name |
| | age | varchar(255) | No | User age |
| | username | varchar(255) | No | User account unique username |
| | password | varchar(255) | No | User account password |
| | interest | varchar(255) | No | User Interest Point |
| | information | varchar(255) | No | User related information |

*Table 3.3.2.1 User Table Data Dictionary*

# CHAPTER 4 METHODOLOGY

## 4.1 Methodology

Methodology, sets of general principles that provide guidance to the manager and developer to select a particular method for the project. Methodologies are categorized into a vast category such as structured design, rapid application development (RAD) and agile development. For our project, **rapid application development is chosen as our development methodology** as it is more suitable for our project because of the fast implementation, prototyping of the application, delivering a faster and quicker way with high quality results of building up an application compared to other methodologies, we can build prototypes and enhance the prototype by phased prototyping.

The approaches for RAD are phased; prototyping and throwaway prototyping, **this prototyping approach is chosen for our project**. With methodology such as prototyping, we can **achieve the project's objectives and sub-objectives quicker** and accurate because it aims on producing prototype instead of only working out the phases on paper, the result can be immediately confirmed and receive direct feedbacks based on the prototype.

While comparing to the traditional waterfall methodology, RAD gives out more frequent working result of the application, every phases of the waterfall methodology takes a longer period to deliver the deliverables. For every phases of the waterfall methodology, the results must be approved by the stakeholders before going to the next phase, and the next phase cannot be started when its predecessor phase is still in progress, besides it is extremely difficult to provide backward tracing for the phases that has been ended.
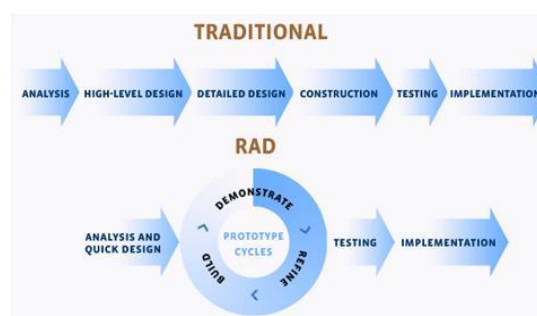


*Figure 4.1.1 Traditional methodology vs RAD methodology (Novulo)*

Prototyping methodology are consider more efficient ways to develop our project as it allows us to **produce prototypes and it to allow us to know the problems and issue and get direct feedbacks** and improvement to apply based on the prototype, so that the application can be improved during the process of prototyping time from time and we can deliver a much more better and well-designed application to suit the needs of the stakeholders.

Prototyping consist of four phases which involved in the system development life cycle (SDLC) which is planning, analysis, design and implementation. For RAD methodology, it takes a lesser amount of time to do on planning and perform more critical analysis, design and implementation concurrently to build the first version of the prototype. Suggestion, comments and feedbacks for the prototype are then to be obtained from the stakeholders, the performing of re-analyze, re-redesign and re-implementation are then executed separately based on stakeholders feedbacks, these concurrently phases will iterative until the stakeholders agreed that the prototype provides enough of features to the project.



*Figure 4.1.2 the flow of prototyping, Spiral Model (Student Ask)*

### 4.1.1 Prototype Phase 1

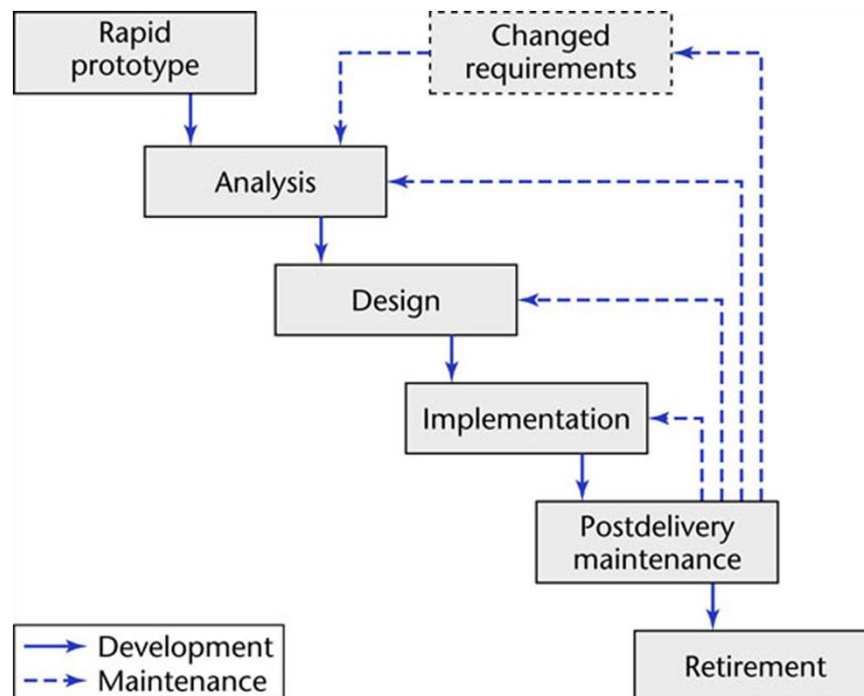Firstly we will identify the proposed project's background, scope & objectives, and the methods of develop, with proper analysing the $1^{st}$ prototype are then decided, with requirements to be meet as follows:

- Creating a Graphical user interface (GUI) for visualize the display.
- Implement Google Maps API for map displaying.
- Implement dummy locations on the Google Maps API
- Displaying each dummy block individually with labels.
- The ability to interact with the visualized dummy block in the prototype
-

After the $1^{st}$ prototype is completed, the application would be tested out and errors and bugs will be identified and will be solved before carrying into the $2^{nd}$ phase of prototyping, the result of the $1^{st}$ prototype must able us to locate each dummy block and visualize them to the users.

### 4.1.2 Prototype Phase 2

After the $1^{st}$ prototype are designed and evaluated, we will continue the project with set of objectives, which is the delivery of information through each interaction of buildings in the prototype, the requirements of the $2^{nd}$ prototype are as follows:

- Converting static data into database, currently in our project we would choose between MySQL and phpMyAdmin and store available data into the server's database.
- Acquire a free hosting website which we have chosen "000webhost"
- Information from the server are then import into the mobile application by using php codes and commands as well as Asynchronous
- Creating a GUI for displaying the information.
- Formalize every GUI into Google's Material design guideline.

After the $2^{nd}$ prototype is completed, bugs and errors are then identified and checked, test data entry into the database is them carried out by identifying weather the application would retrieve the data from the database or not, with the successful of data retrieval information is then displayed on the information GUI.

### 4.1.3 Prototyping Phase 3

After the $2^{nd}$ prototype, the application would be carried forward to the ability for profiling each user, where each user can choose to register themselves into using our application and thus providing them additional functions such as profiling, creation of information grounds, and much more.

- Creating a GUI for user login and register.
- Import each user details into the database by performing php json encode.
- Integration of user profiling and map navigation in prototype $1^{st}$ & $2^{nd}$
- System implementation with available data
- Import data from server and display in the mobile application using json encode, each data is monitored and studied for accuracy.

After the $3^{rd}$ prototype is completed, we will allow users to have an optional of being a registered user or not, with registered user they can then access to more function that out application would provide, where these application will be implemented and developed in the next project phase.

### 4.1.4 Prototyping Phase 4

After all data have been fully success and retrieve from the server's database, we come to the part where we implement our Map where it would integrate with the available data, by inflating a Map layout which provides information from the users.

- Creating a GUI for Maps Activity.
- Allocate server's data into the Map Activity and display to users.
- Design functions to allow user to search and filter data.
- Design functions to let user integrate with the information.

After the $4^{th}$ prototype is completed, we will allow users to integrate with the information such as giving a like or dislike to it, or to allow user to filter information that suit their particular points of interest, due to the data was passed from server into the mobile application, each data is monitored for changes, as changes occur we validate and will then update the database to ensure information integrity;

## 4.2 Tools

The development platform for the Proximity Based Information Delivery Mobile Application will be Android SDK and Android studio. The reason of choosing these development platforms is because our Proximity Based Information Delivery is a mobile application, where the mobile devices such as Android devices would run our application smoothly.

As for the technology to be used to develop the application would be, MySQL server and phpMyadmin that provided by our free hosting website "000webhost", the platform we will be using for the mobile application will be Android, as the prototype will be tested out and the final output will be displayed and used in an workable Android smartphone.

The MySQL server and phpMyAdmin will be chosen to be used because of storing and profiling user's data, and also the information regard of the locations and services provided. These techniques are good to use as a server sided database and suitable to build up a server to store the appropriate information for our application.

Due to the reason that these software are open sourced, the Android Studio along with Android SDK plays an important role in developing the mobile application, without these software we are unable to develop the project that we proposed.

## 4.3 Implementation Issues and Challenges

Proximity Based Information Delivery Mobile Application will be implemented in a mobile application platform, and therefore we must be familiar with the development tools such as Android Studio, Android SDK, and also SDK

Information on the location are done by using the Google Maps API, where the Lat Lng or user's current location are retrieved in order to create a new information, since Google Maps API is open sourced, we are able to seek a lot of information and help through the web as we can learn many things for the usage of Google Maps API and its functions.

User's profiling are stored in the our server and retrieved using phpMyAdmin, the unfamiliarity of php is a challenge to this project as php programming language is used to retrieve information from the server, since we have not no experience of using php as our json language, we need to explore it ourself, besides these issues and challenges, multiple phased testing must also be carried out to ensure the application runs well on a mobile device

Moreover, implementation of "Tour de App", the Proximity Based Information Delivery Module would be another challenge for this project because it has to communicate with the server, database connection, synthesise with Google Maps and coding studies. During the development process of the project, the combines these features and techniques would be another challenge as well.

## 4.4 Timeline

This project module is scheduled and predicted to be completed in two university trimesters, with an approximate of total 33 weeks. For each trimester a report of documentation is required to hand in for submission and a viva presentation is conducted shortly after each individual submission.

For the first session trimester, a prototype of the proposed module solution should be demo and presented, as for the second session trimester a completed PROXIMITY BASED INFORMATION DELIVERY MODULE titled "Tour de App" will be used for demonstration upon presentation.

## 4.4.1 Gantt Chart

| | | Task Mode | Task Name | Duration | Start | Finish | Predecessors |
|---|---|---|---|---|---|---|---|
| 1 | | | Study Existing Program | 14 days | Mon 18/1/16 | Thu 4/2/16 | |
| 2 | | | Planning The Project | 7 days | Fri 5/2/16 | Mon 15/2/16 | 1 |
| 3 | | | ◢ **Requirement Analysis** | **32 days** | **Tue 16/2/16** | **Wed 30/3/16** | 2 |
| 4 | | | Identiffy Project Scope and Objectives | 7 days | Tue 16/2/16 | Wed 24/2/16 | |
| 5 | | | Literature Review | 7 days | Thu 25/2/16 | Fri 4/3/16 | 4 |
| 6 | | | System Design | 14 days | Mon 7/3/16 | Thu 24/3/16 | 5 |
| 7 | | | FYP1 Documentation | 4 days | Fri 25/3/16 | Wed 30/3/16 | 6 |
| 8 | | | ◢ **Prototype Development** | **25 days** | **Mon 14/3/16** | **Fri 15/4/16** | |
| 9 | | | Prototype Design | 14 days | Mon 14/3/16 | Thu 31/3/16 | |
| 10 | | | Prototype Testing | 2 days | Fri 1/4/16 | Mon 4/4/16 | 9 |
| 11 | | | Prototype Adjustment | 7 days | Tue 5/4/16 | Wed 13/4/16 | 10 |
| 12 | | | Prototype Presentation | 2 days | Thu 14/4/16 | Fri 15/4/16 | 11 |
| 13 | | | Completion of FYP 1 | 0 days | Mon 18/4/16 | Mon 18/4/16 | 8 |
| 14 | | | Begin FYP 2 | 0 days | Thu 28/4/16 | Thu 28/4/16 | 13 |
| 15 | | | ◢ **Continuity of System Development** | **65 days** | **Sat 30/4/16** | **Thu 28/7/16** | 14 |
| 16 | | | FYP 1 Lookup | 3 days | Sat 30/4/16 | Tue 3/5/16 | |
| 17 | | | System Development | 60 days | Wed 4/5/16 | Tue 26/7/16 | 16 |
| 18 | | | System Testing | 2 days | Wed 27/7/16 | Thu 28/7/16 | 17 |
| 19 | | | FYP 2 Documentation | 7 days | Fri 29/7/16 | Mon 8/8/16 | 15 |
| 20 | | | FYP 2 Report Submission | 0 days | Tue 9/8/16 | Tue 9/8/16 | 19 |
| 21 | | | FYP 2 Presentation | 7 days | Tue 9/8/16 | Wed 17/8/16 | 19 |

*Figure 4.4.1.1 Gantt Chart I*

*Figure 4.4.1.2 Gantt Chart II*

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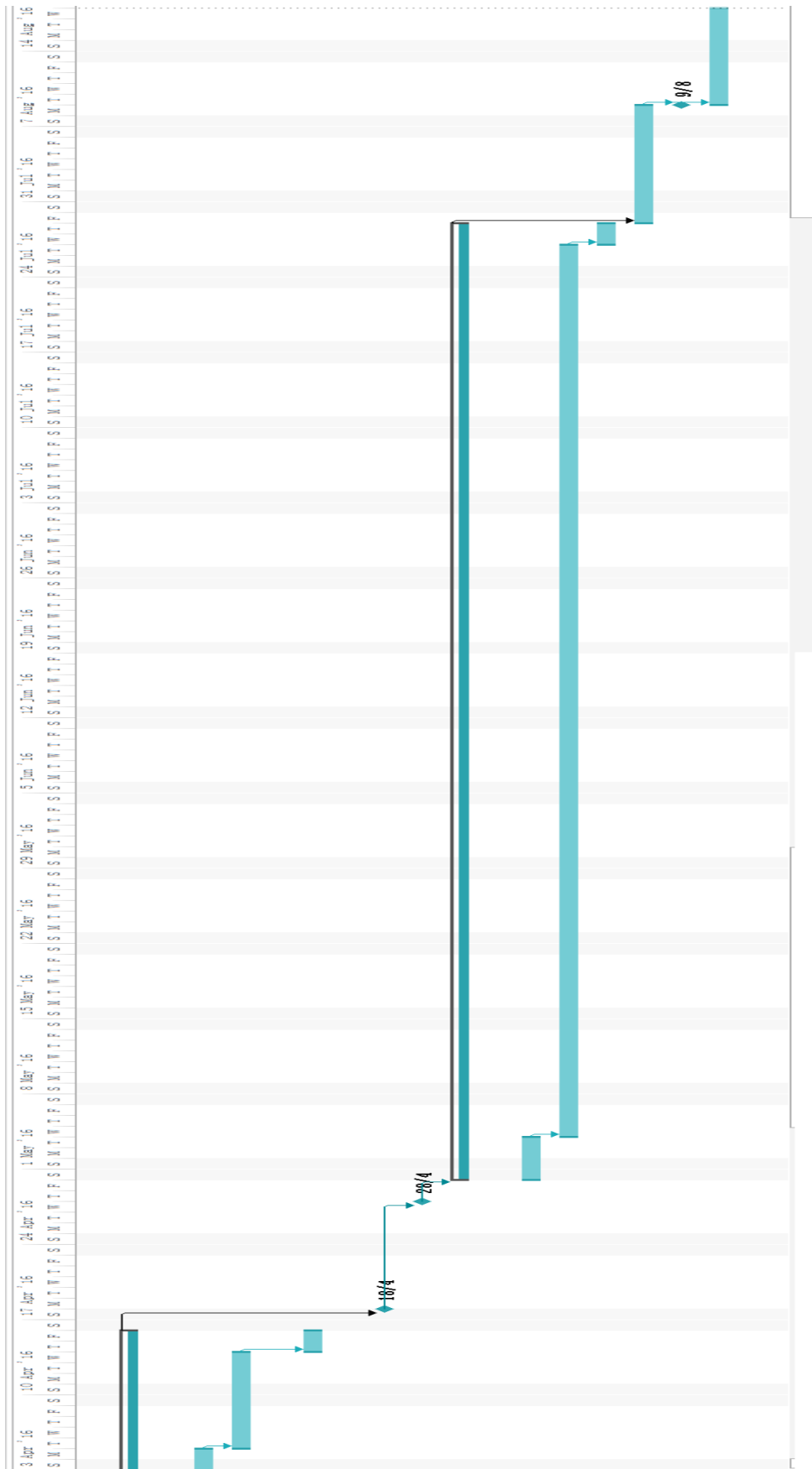
*Figure 4.4.1.3 Gantt Chart III*

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# CHAPTER 5 IMPLEMENTATION AND TESTING

## 5.1 Application GUI Design, Android Materialized Design



*Figure 5.1.1 Google's Material Design Guidelines for Android*

Material design (codenamed Quantum Paper) is the most popular visual, motion, and interaction design across platforms and devices, as it was released back in the year 2014, various material design guidelines are created through the time, and now Android includes support for material design apps.

## 5.1.1 Advantages of using Material Design in the project

**Branding**

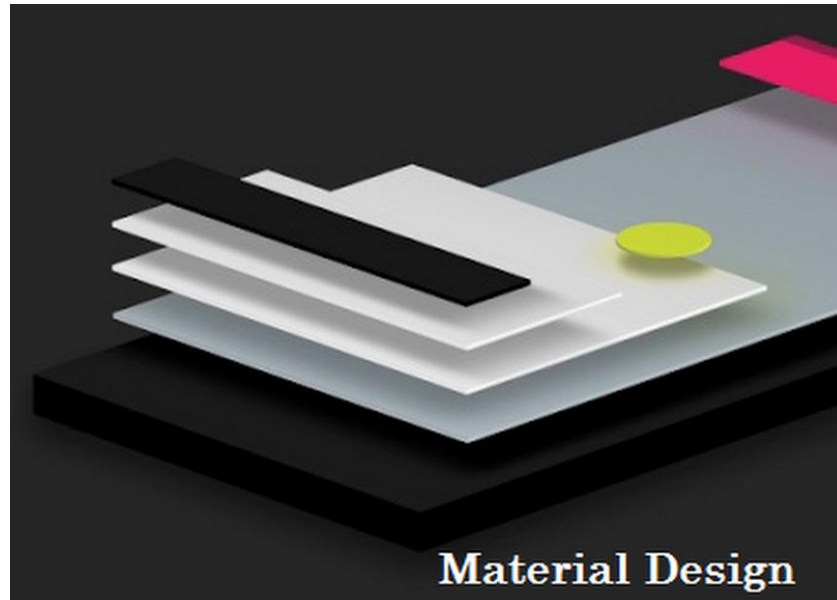Material design uses a perspective flat design with light objects, as referring to figure 5.1.1 we can notice that each object such as Buttons, Layout, or even sub-layouts are described as an individual object and a singular light object. Most of the project that follows the Android Material guidelines consist and requires only just two to three colors to brand the entire app.

**User Engagement**

In this era of vast internet usage, it is very important to engage user with your application, we need to develop an application to communicate with users, where users would engage will be the key factors to successfully publish and application and distribute its usage. From Research shows that only 35% of the Smart-Phone apps are used just once in the lifetime of the user who installed in their own mobile device. (Aravind Rajendran, 2016). This is where Material Deisgn provides a visual language between developers and users.

**Better GUI**

GUI is medium of communication between a developer and the User. A bad GUI will make the user to uninstall your APP, who would use an app with ugly designed and disorientated GUI?

Material Design takes care of the user's experience as it deeply interacts with users by giving out a fresh and smooth GUI to the users. Material Design guidelines provides responsive and meaningful interactions for each GUI design, we can delight the user by integrating material Design to our project to enhance more user visual satisfaction.

**Cost Effective**

Google introduced Material Design as an open sourced library, with many library are available for developers to explore and use it in their own project, as for our project we can design a better GUI to satisfy users with a more cost effective and less time consuming method.

Material Design is easy and simplest way to achieve great milestones in a short time. It is a complete one stop design solution, for all the platforms based on Android.
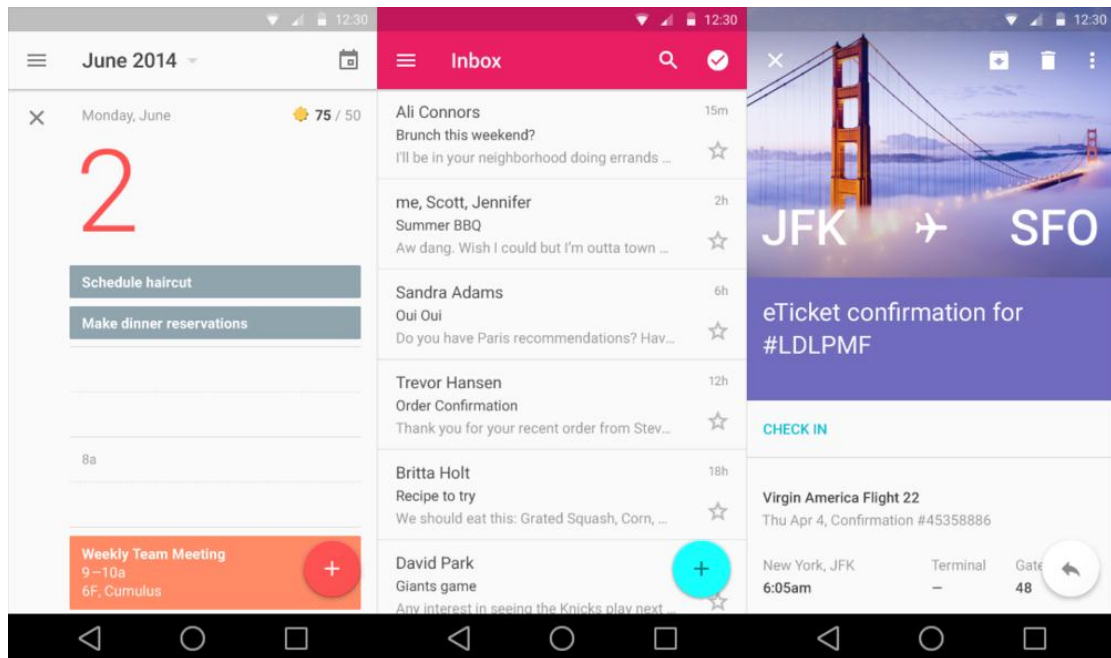


*Figure 5.1.1.1 Example of Google's Material Design GUI*

## 5.2 Black Box Testing

To ensure the developed mobile application is error free, evaluation plan must be conducted. There are several methods that can be used to evaluate the system. Black Box Testing is a common method use to perform unit test for each of the feature in the system.

Unit testing will be conducted by creating test cases, expected action, observe actual output, and make corrective action on error made.

### 5.2.1 Login Activity

| Event/Inputs | Expected Action/Output | Actual Action/Output | Comments/Corrections Made |
|---|---|---|---|
| **On Activity Load** | Login Layout inflated to the activity | Login Layout inflated to the activity | Pass |
| **Login Button** | Allow user to login to use the application | Allow user to login to use the application | Pass |
| **Register Button** | Redirect User to Register Activity for creating an account. | Redirect User to Register Activity for creating an account. | Pass |

*Table 5.2.1.1 Login Activity Testing*

### 5.2.2 Register Activity

| Event/Inputs | Expected Action/Output | Actual Action/Output | Comments/Corrections Made |
|---|---|---|---|
| **On Activity Load** | Register Layout inflated to the activity | Register Layout inflated to the activity | Pass |
| **Signup Button** | Allow user to Register to use the application | Allow user to Register to use the application | Pass |
| **Back Button** | Redirect user back to login activity | Redirect user back to login activity | Pass |

*Table 5.2.2.1 Register Activity Testing*

### 5.2.3 Main Activity

| Event/Inputs | Expected Action/Output | Actual Action/Output | Comments/Corrections Made |
|---|---|---|---|
| **On Activity Load** | Main Layout inflated to the activity | Main Layout inflated to the activity | Pass |
| **Tab Adapter Load** | Tab Adapter initialized to handle 3 fragment view | Tab Adapter initialized to handle 3 fragment view | Pass |
| **Fragment Home** | Fragment Home inflated in the first tab layout | Fragment Home inflated in the first tab layout | Pass |
| **Fragment Map** | Fragment Map inflated in the second tab layout | Fragment Map inflated in the second tab layout | Pass |
| **Fragment POI** | Fragment POI inflated in the third tab layout | Fragment POI inflated in the third tab layout | Pass |
| **Add Button** | Redirect User to Add Activity for creating an information | Redirect User to Add Activity for creating an information | Pass |
| **Search Buttom** | Redirect User to Search Activity for creating an information | Redirect User to Search Activity for creating an information | Pass |
| **Navigation Drawer** | Have multiple function to assist user in order to use the app. | Have multiple function to assist user in order to use the app. | Pass |

*Table 5.2.3.1 Main Activity Testing*

### 5.2.4 Add Activity

| Event/Inputs | Expected Action/Output | Actual Action/Output | Comments/Corrections Made |
|---|---|---|---|
| **On Activity Load** | Add Layout inflated to the activity | Add Layout inflated to the activity | Pass |
| **Add Button** | Enable user add information name, information details, category and date time created | Enable user add information name, information details, category and date time created | Pass |
| **Back Button** | Redirect user back to main activity | Redirect user back to main activity | Pass |

*Table 5.2.4.1 Add Activity Testing*

### 5.2.5 Search Activity

| Event/Inputs | Expected Action/Output | Actual Action/Output | Comments/Corrections Made |
|---|---|---|---|
| **On Activity Load** | Search Layout inflated to the activity | Search Layout inflated to the activity | Pass |
| **Search Button** | Enable user search information based on filtering | Enable user add information based on filtering | Pass |
| **Back Button** | Redirect user back to main activity | Redirect user back to main activity | Pass |

*Table 5.2.5.1 Search Activity Testing*

**5.2.6 Map Activity**

| Event/Inputs | Expected Action/Output | Actual Action/Output | Comments/Corrections Made |
|---|---|---|---|
| **On Activity Load** | Inflate Google Maps API to the activity | Inflate Google Maps API to the activity | Pass |
| **Content Overflow Load** | Content Overflow layout inflated to the activity | Content Overflow layout inflated to the activity | Pass |
| **Like Button** | Allow user to like the information | Allow user to like the information | Pass |
| **Dislike Button** | Allow user to dislike the information | Allow user to dislike the information | Pass |
| **Share Button** | Allow user to share the information | Allow user to share the information | Pass |

*Table 5.2.6.1 Map Activity Testing*

## **CHAPTER 6 CONCLUSION**

### **6.1 Challenges and Personal Insight**

Along with the proposed project, it required a wide range of programming language and modules to be learned which I am still in the process of learning, although it is a slow process but I was able to slowly breakthrough each obstacles I am facing.

In speak of the project is a mobile application module that needs to communicate with the hosting server, the challenges lies with the task of connecting with the server to pass and retrieve data from the server database,, during the process of developing the application I have learned to use JSON parsing to deliver data across a server to a mobile device more effectively and more less time consuming.

Besides that the mobile app have to keep on updating the table in the server database since update are done by a lot of users where information traffic would be a issue to our application, this challenges me to learn more about configuring a server's property as managing a server and distributing each a time window so that the server won't be fully packed on traffic information that are either spam or false data.

Google's Material Design guidelines are also a source to enhance my personal Android GUI making skills, Material Design allows me to achieve a better looking application for what normal Android design cannot be done, Material design also allow me to create more user engagement design as it is simple to look and to use.

## 6.2 Project Review

In a nutshell, Tour de App is a mobile application that simplifies and enhances information delivery in each user's mobile device; it aims to solve the problems of the current LBS application. By using this application users would able to locate their point of interest more effectively and also allow them to create their own interest point to share with other user, forming an information grounds through the application.

Although there are existing application that provide similar feature such as location navigating, area filtering, our application would have a better experience for user compared to these existing application. At the end of project, the proposed mobile application would be developed and be used by many people who have the interest on it.

## 6.3 Future work and Improvements

There are many more functions and work can be done to enhance out application, as for currently my skill, time and knowledge would be a barrier for me to further enhance the application into a more real world application, in the future where I would have the time and knowledge the application will add in better functions and design.

For such as the application lacks a proper integration between users, where it only have likes and dislikes button for users to interact with each other's information, in the future this can be improved by adding a comment section similar to those various Social Media application where it allows more user integration and also user engagement.

In another hand would be to provide a better server for the application, since the application runs on a free hosting website, it may have the potential to unable to connect to the server database if the traffic is too pact or too much user request is being made, we will seek for a better server in order to further enhance the application by providing a better server with better administration tools and server assistance.

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Lastly it would be about the Google Maps API itself, currently the project runs on a free Google Maps API where we can only obtain the Map layout, in order to grab user's location with address or nearby places we need to register for an licence to Google Map Geo-location API where it would cost around USD10,000/Year, where it would not be possible for now, but if the application runs smoothly and we can have many user who would like to use the application for their point of interest information ground we would maybe subscribe a license from Google to enhance our application even more.

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