Travel Mobile Application

(TraMo)

by

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CERTIFICATION OF APPROVAL

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BUSINESS INFORMATION SYSTEM

Approved by,

_____

(Miss Elaine Chen Yoke Yie)

Project Supervisor

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

January 2011

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgement, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

DAYANGKU AJEERAH BINTI AWANGKU ALI

ABSTRACT

It is troublesome for someone who is not familiar with the places to be there without knowing where to go for having meals, sleeps and shopping or any other purposes. It is even hard if the traveller do not know how to speak in local language. Travel Mobile Application is a system that helps the travellers to know their location, the places near to them and the way to get there especially for those who are not familiar with the places through their phones. It also provides the information about the places especially the cultural information. It is using the GPS to detect the current location of the device and can search the places nearby; within the radius provided with the distance and information of the places. The scope of study is regarding the mobile application and the tourism. The research is basically about those scopes as well as research on Android platform as it is the platform that being used, GPS and also the analysis of the current systems available in market. Throw-away prototyping is the methodology that had been used during the development of this system in which it is flexible enough for any changes made during the development part and the prototype can be seen by the user to compare either it fulfil the requirements or not. The finding of this project is the overview on how the system works at back-end there which will be explained in system architecture. Plus, the result and discussion will show the output or product and discuss about the problems occur in order to ensure the betterment in future. Some recommendations are also being mentioned at the end of this report for further improvement.

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INTRODUCTION

1.0   INTRODUCTION

1.1   Background

Mobile application is the new trend and innovation of the technology to deliver the services more close to the customers. "Mobile Tourism" is the medium where users can access tourist content through the mobile devices. There are several mobile tourisms available in the market and it is getting popular among the travellers around the world since people can easily download and commonly used by most phones. As for travellers, travelling to places where they go for the first time is a little bit challenging to find hot spots that people usually go such as for foods, shopping, and so on. Somehow, for them to get the information is quite hard especially for outsiders who are not really familiar with Malaysia environment such as people from other states or foreigner. Plus, with the time constraint that they have at certain place, they need to get the information quickly in order be able to go to various places. For example the business travellers who are transit for three hours at certain place while waiting for their flight, if they know where to go, it is easy for them to reach at that place at shorter time. With the new advanced technology which is mobile application, people can access through mobile devices to find that place without consume more time. That means people are more close to the mobile system rather than web site that needs a computer or laptop to access it and the mobile devices is moveable.

1.2   Problem Statement

When travellers or tourists who are travelling at certain place for the first time, they not really know where exactly the places for having meals, shopping, and also places for them to sleep. Sometimes, the traveller want to know the places nearby

that can actually reduce the time consumption but unfortunately even though they at that location, they don't even know that the place that they search is exist there. Therefore, it is difficult for them to go anywhere without knowing the exact location, distance and time needed to go there. For example the business travellers and students who have busy lifestyle, probably they don't have much time to make a plan where they need to reserve for transportation, accommodations and so on for their vacation and they need something that they can search the details anytime. Plus, the foreigners who are interested to travel may face the problems to get the information of the accommodation since they are not really familiar with Malaysia enough. Thus, it can be the business opportunity for the developer where there are demands that need to be fulfilled because people who are using smart phones and have interest in mobile application are getting large in number.

The purpose of this project is to overcome the problem as stated early and use the opportunity to develop a mobile travel application that can give information especially cultural information and their current location themselves and places near to them.

1.3   Objective

The objective of my project is to develop a mobile travel application for the travellers to identify their location and find the places that they want to go by identifying the location of places nearby for having meals, shopping, accommodations and others. The place is basically focused in Perak, West Malaysia especially hot spots that people always go. This is because of the developer is studying in Perak and she can do the research without much difficulty to find sources.   The research and development of this project may take 1 year period of time. To be more specific, the target user or customer is travellers who don't really familiar with the place who come from any part of Malaysia and international people who interested to travel here.

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1.4 Scope of Study

1.4.1 Tourism or Travelling

This mobile application is basically about the location-based services that can determine the location of the traveller, the places around them and the information that can be provided to the user such as the cultural information and other information. It is very helpful in finding way during travelling because it will reduce the time, energy and money for travel without knowing the location of the place. The research is about the behaviour and requirement of the traveller especially who are come from far places because they are the one who not really familiar with west Malaysia especially Perak. It is to determine their acceptance of this new system during travelling and their needs as well as requirements for the new system.

The research about the impact of advanced technology to tourism and development of the tourism industry also needed in order to monitor and study how the industry nowadays and the progression of the technology within the tourism industry. It can be related with this project as it is a part of the tourism as well; just it is specifically focus on detecting the current location, places nearby and the way to get there.

1.4.2 Mobile Application

Since the mobile application is the new modernization in technology nowadays, the research is needed to make it is feasible enough to be developed and do analysis regarding on the problems faced of this new technology among the travellers. In addition, the advantages and disadvantages also needed to be discovered as well as the demand of the user about the functionalities in the system.

The programming language used to develop the system must be determined in regard of developer compatibility with the language and also the mobile accessibility.

1.5   Feasibility Study

1.5.1   Technical Feasibility

For this application, the language that is going to use is Java programming language
and the developer uses Android Software Development Kit (SDK) tools to compile,
test and run it. The familiarity of the programming language is medium where the
language is quite different for the developer because it is a language for mobile
application. However, the language can be learnt as there are many sources that can
be referred. Plus, it is Java programming language and the developer had learnt it
before but just that, it is quite different as it is using the Android platform.

1.5.2   Economic Feasibility

Mostly, the development tools that will be used for the site development can be
downloaded from many sources in the internet. As mentioned before, the
development tool for this project is Android SDK tools. It can be downloaded at
Android Developers website. For hardware, there is no cost involved as the
developer is using her own laptop for the coding and smart phone for any testing.

1.5.3   Organizational Feasibility

As there are similar systems that can be challenged and referred to, it can be as one
point of reference for the system that probably the travellers have interest to use the
system since they also have their own smart phone that can detect their locations, the
nearest place to go and give information needed.

1.5.4   Time Feasibility

The time given is one year or two semesters of research and also development
phases. It is feasible to accomplish the system as per scheduled.

CHAPTER 2

LITERATURE REVIEW AND/OR THEORY

2.0   LITERATURE REVIEW

Travel Mobile Application is about the location-based services where the user can know the location of themselves and the places around them and the way to get there. This mobile application is basically good for the travellers who don't really familiar with local landmarks. The user can select the categories such as foods, hotels, shopping and so on. Then, it will show the places that are even near to the user's place. In order to differentiate the application with the others, the information is provided especially the culture information of certain place.

This project involves the research on the mobile application, GPS, Android platform and as well as the analysis on current systems.

    o   Why am I choosing mobile application?

Mobile applications are a rapidly developing segment of the global mobile market. They are the software that can run on mobile devices with certain tasks for the mobile phone. It is downloadable for almost all phones as well as inexpensive, entry-level models. There are several reasons why people believe that mobile applications able to create unique advertising opportunities.

The first one is the availability of mostly mobile phones, smart phones or PDAs anywhere and at anytime. For those who follow the industry, the growth of smart phones has been the consumer-electronics success story of this new century. By some estimates, one out of two mobile phones in circulation by 2013 is expected to be smart phones (Khan, 2010). From this statement, it shows people are more to smart phone as their electronic devices and compares to desktop that are not really

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portable. Thus, it means there is opportunity for the mobile application to be used and utilized by the users in future since it is much closer to the users.

For the first time there are more smart phones than desktop computers being sold, according to International Data Corporation (IDC). The desktop is dying and smart phones are the way of the future. More people are going to carry them around and that is a powerful opportunity for retailers (Tsirulnik, 2010). This statement is another statement about the smart phone that is going to be the influenced and huge factor in future. Plus, with the addition of the portability and easiness for the user to reach the system and can be used anytime and at anywhere. In addition, it reduces the process cycle time where it allows a task's critical information to be delivered to the user wirelessly when requested, resulting in a significant business process cycle-time reduction.

As stated in an article titled *'Mobile Applications'* by Mobile Marketing Asssociation , (2008), from a technical point of view, mobile application can be differentiated by the runtime environment in which they are executed by:

a) Native platforms and operating systems, such as Symbian, Windows Mobile and Linux

b) Mobile Web/browser runtimes, such as Webkit, Mozilla Firefox, Opera Mini and RIM

c) Other managed platforms and virtual machines, such as java/J2ME, BREW, Flash Lite and Silverlight. (p.1)

As the technology moving very fast, there are many other platforms available such as Android, iOS for Apple product and Blackberry. These platforms are getting well-known nowadays but mostly only applicable to certain smart phones only. Usually the developers will develop the applications for each platform in order to reach a lot of demand.

o   What about GPS?

Users of mobile devices such as smart phones have a need to find Point Of Interest (POIs) such as hotels, gas stations, rest areas or restaurants in close proximity to their locations. The way to know the POI is based on the location-based services.

What are the functions of location-based services? According to Mahmoud (2004),

> They determine the location of the user by using one of several technologies for determining position then uses the location and other information to provide personalized applications and services. As an example, consider a wireless 911 emergency service that determines the caller's location automatically. Such a service would be extremely useful, especially to users who are far from home and don't know local landmarks. Traffic advisories, navigation help including maps and directions, and roadside assistance are natural location-based services. Other services can combine present location with information about personal preferences to help users find food, lodging, and entertainment to fit their tastes and pocketbooks.

As stated above, the LBS can be implemented in the system that is going to be developed as it can help in identifying the location of the places such as restaurants, hotels and some other more. In addition there are two basic approaches to implementing location-based services which are first, process location data in a server and deliver results to the device and second, obtain location data for a device-based application that uses it directly.

As for devise-based location services, the real-time positioning methods must be used because it will affects the accuracy of the location. There are several types of positioning methods that can be called by the applications which are:

Table 1: Positioning Methods

Positioning methods	Description
Mobile phone network	In order to identify the base transceiver Station (BTS) that the device is communicating with and the location of that BTS, it can use current sell ID. However, the accuracy is depending on the size of the cell. For example, a GSM cell may be anywhere from 2 to 20 kilometres in diameter. But somehow, the other techniques used along with cell ID can achieve accuracy within 150 metres.
Satellites, GPS	GPS can determine the position of the device by calculating difference in times signals from different satellites take to reach the receiver. The mobile device must have the GPS receiver in order to decode the GPS signals. The disadvantages of GPS are: • the extra hardware might be costly • consumes battery while in use • "canyon effects", in which satellite visibility is irregular situation • Need warm-up after a cold start to get an initial fix on visible satellites. High potential to be most accurate method.
Short-range positioning beacons	A local area network can be used in small areas such as in a building in order to provide locations with some other services. For example, Bluetooth can be used for short-range positioning.

It is depending on the application in which some of them do not need high accuracy in determining the location but the application will be useless if the result is not the user required. For the Travel Mobile Application, it needs the accurate output

because of the unfamiliarity of the place for certain people. It will make them highly demand for accurate and right answer. As mentioned in the table, GPS is the most accurate method compares with the others. Therefore, let's further discuss on GPS.

GPS is stands for Global Positioning System in which it can detect the location through latitude and longitude or it could be an address. The mobile phone industry had successfully integrated GPS receivers with mobile phone devices in order to support 911 emergency locations in 2004. Starting from that success, most of the smart phones are support GPS to provide the location functions (Whipple, Arensman, Boler, 2009).

As stated by Jim Kessel (2007) with an article of '*How to Detect GPS Tracking Units*', there are two types of GPS tracking device technology which are passive or logger tracking device and real time tracking devices. The first one is the simplest one but it is the most difficult to detect and defend against. It is very small devices and it must be retrieved after some time being attached to a vehicle or individual. Then, it is usually being attached to a computer to download the database provided by the manufacturer.

The second one is the GPS auto tracker or personal GPS tracking unit. It provides with the current real time location information in which the devices has been tracked. However the improvement of the current technology has greatly reduced the size and reliability of the tracking devices. Plus, the tracking devices usually being attached to a vehicle and they used the power supply from the vehicle to provide the power to the unit.

These two types of GPS have advantages and disadvantages especially in terms of security and privacy. The main difference of GPS is the real-time location information of individual but for the first one it needs to be retrieved and need to be attached to personal computer for downloading the information into data base provided by the device manufacture.

o   What about Android?

As stated by Ableson (2008), Android is Google's oft-discussed mobile, wireless, computer and communications platform. Android also support GPS and provides Application Programming Interfaces (API) for map and location functionalities. The developers of the Android application can access, control and process the Google Map and thus apply the location based mobile services in the system (Shu, Du, Chen, 2008). Android is the open development platform where the developers can come out with innovative and creative idea to develop applications that use the same framework APIs used by the core applications.

As referred in the Android architecture below, it shows the major components in Android operating system and it is designed to enable the developers to reuse the components and make use the capabilities to develop other applications.
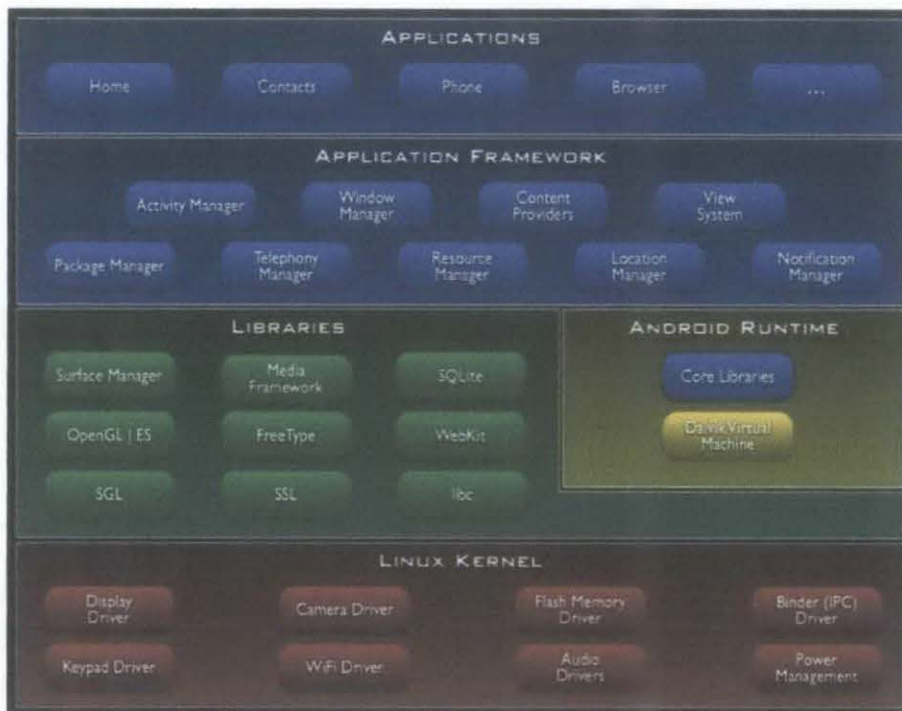

Figure 1: Android Architecture

As shown in the last row of the Android architecture, there is Linux Kernel and it runs on Linux Kernel version 2.6. It provides the hardware abstraction layer, memory management, process management and also the networking. However, the user will never see Linux sub system as it works at back-end. As for process level security, each one of Android applications will run inside its own Linux process. Plus, it has its own sandbox file in which other applications cannot disrupt the application and access any data except it is explicitly shared. It also has own set of preferences and database as appeared below. Therefore, the process of TraMo application will happen here such as in Figure 4.
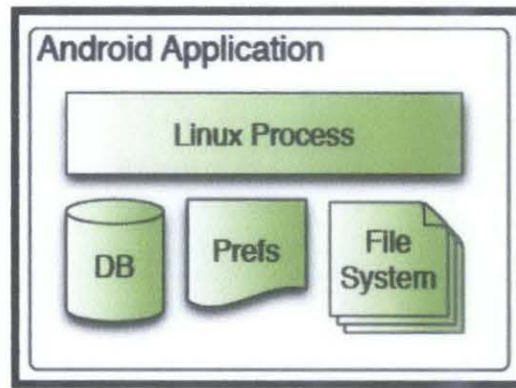

Figure 2: Secured Sandbox

Above the Linux Kernel, it is Libraries in which Android provides a set of C/C++ libraries that used by many components of Android system. There are some of the core libraries as appeared in the diagram of Android Architecture before. Firstly, the *System C library (libc)* is a bionic, a super fast and small GPL-Based library that optimized for embedded Linux-based devices. *Surface Manager* is to compose window manager with off-screen buffering 2D and 3D graphics hardware support or software simulation. *Media Libraries* supports playback and record any popular audio and video formats or static image files. There are other libraries such as LibWebCore, SGL, 3D libraries, FreeType and as well as SQLite. As for TraMo application, it uses the external library which is Google Maps library and has to follow the procedure in order to integrate with Android application. It needs to

register to the Google Maps and obtain a key from them in order to use and view the map.

In the Android runtime, The Dalvik virtual machine is one of Google's implementation of Java that is good for mobile devices. The key differences of Dalvik VM is it is register-based, runs .dex format after being compiled by Java language compiler such as Eclipse. It also relies on Linux Kernel for underlying functionality such as threading and low-level memory management. Somehow, it works efficiently for devices to run multiple VMs.
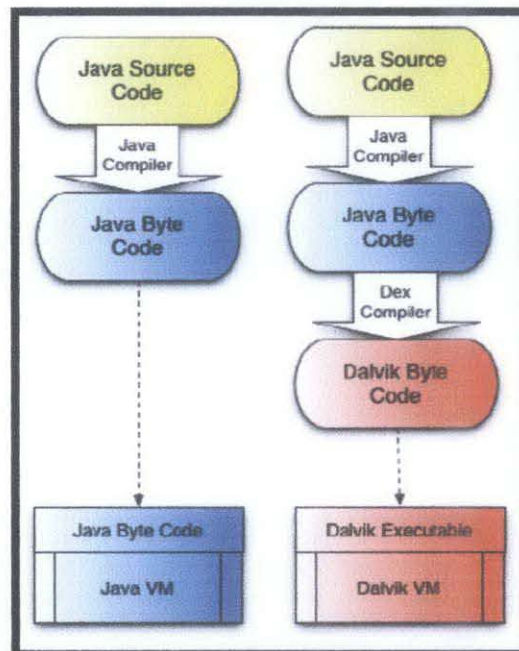
Figure 3: Android Runtime – Dalvik VM

Other than that, the developers can use and access the same frameworks available in the Android system to build innovative applications that implement those frameworks. For example, one of the classes is Location Manager that can detect the location of the devices through GPS, GSM or WiFi. As for Travel Mobile application, it will call this class to be used in the application. It will enable the access to the system location services and could detect the current location of the device and let the application to acquire periodic updates of the device's

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geographical location or to fire an application-specified Intent when the device enters the proximity of a given geographical location. The other one is Notification manager that will keep track the events and notify the users when receiving messages, alarms, and appointments and so on. Basically, these frameworks are already available in the Android system and the developers just use and manipulate it to create an awesome application.

In the end, the last component will show the actual applications that users will use. These are the core applications that a phone usually has such as browser, maps, calendar, contacts, SMS programs and others. Those applications are written by using Java programming language. When the TraMo application finishes build, it will appear to the user after the application has been installed into the device. (AndroidDeveloper, 2010)

Thus, that is all about the Android architecture. Therefore, let's look at some important characteristics of the platform from a market perspective. As stated by Ableson (2008), since the announcement of Android and initial SDK release, android is important as a platform for two distinct reasons.

- Firstly, Android is a market-mover. Even though the mobile application space is really crowded and difficult for the newcomers to join in, Google has the resources and the mind-share to make a splash in any market it puts in its sights. It took a few years for the Google's entry into the mobile space. Google is worldwide known and anything that Google do will get attention from everyone and it is a good publicity to introduce the new platform. As Google bought Android, it gives a push point for the Android that initially, was a separate and distinct company to be acknowledged by others.

- Secondly, it is important because of its application model. It is not just another mobile platform with ordinary phone, menus and a touch screen or in the other words, Android applications are not monolithic, menu-laden applications that require a great deal of clicking and tapping to operate. However, it has an innovative design element to its architecture known as

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intent. To ensure intent is briefly understand, intent is a construct that permits an application to issue a request.

Thus, the clear idea about the importance of the Android in market perspective already been known. Now, let's further discuss about the Android market with some figures.

As mentioned by Gandhewar and Sheikh (2010) in their journal, Android applications may be obtained from any source including the developer's own website and the developers can create their own application market. Google doesn't have a strict requirement for the application to show up compares to iPhone that is restricted to the licensing terms that all the applications need to be registered to Apple before make it public; the Android application can be run on variety phones once it is finish developed.

70/30 revenue-sharing model follows by Android market for application developed by developers in which 70% for the developers and 30% will be distributed. As in Dec 2009, 72% people satisfied with the Android OS as compares with others. Google Android is in second ranking for future smart phone buyers with the people preference to Android grown from 30% in June 2010 to 37% in September 2010. Refer to figures below. (p. 14 and 15)
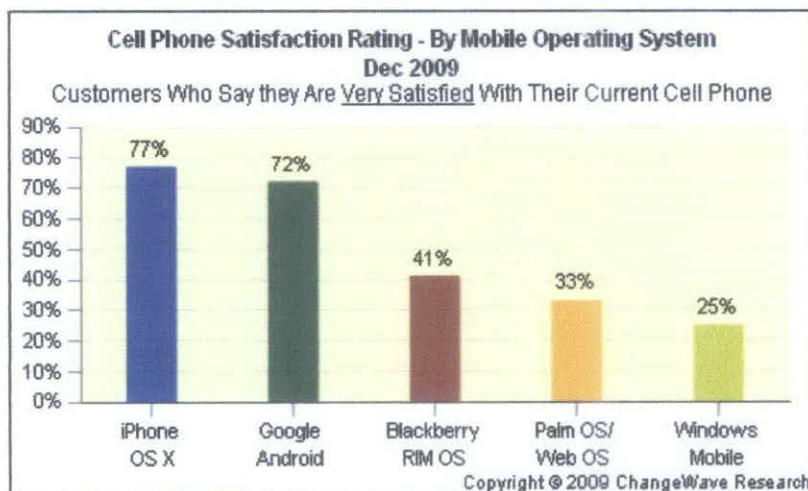

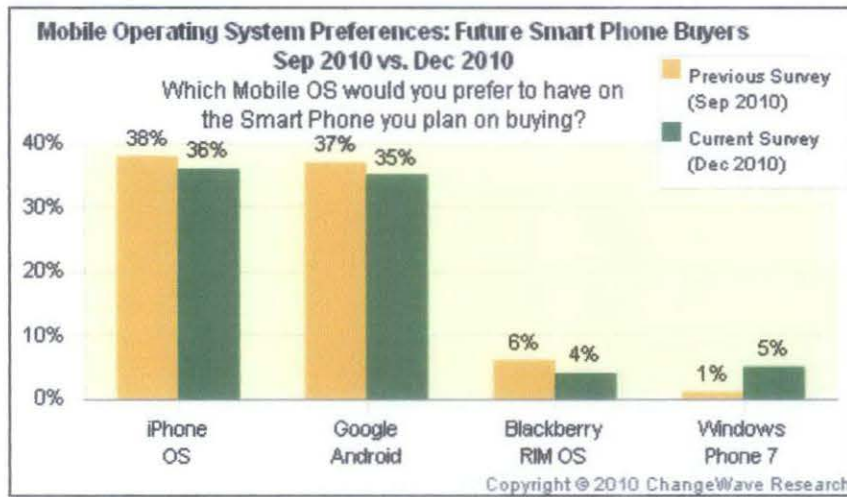**Figure 4: Cell Phone Satisfaction Rating**

Figure 5: Mobile Operating System Preference

Table below shows that the IDC worldwide quarterly mobile phone tracker predicted 50% growth in Android market from 2010 to 2014 while the leader in market in 2010 Symbian decline its market share as much as -18% from 2010 to 2014. It can be referred in table below. (Gandhewar and Sheikh, 2010)

Table 2: Mobile Operating System Market Share 2010-2014

Operating System	2010 Market Share in %	2014 Market Share in %	2014/2010 Change in %
Symbian	40.1	32.9	-18.0
BlackBerry OS	17.9	17.3	-3.5
Android	16.3	24.6	51.2
IOS	14.7	10.9	-25.8
Win Mobile	6.8	9.8	43.3
Others	4.2	4.5	8.3
Total	100	100	

Therefore, the Android platform is getting popular and gets the place among the other platforms in the mobile operating system market.

For the development of Android application, the developer can take advantage of the powerful Eclipse environment by using the Android Eclipse plug-in and Java programming skills are required for developing Android application. Thus, the

environment requires for Android SDK , the Eclipse IDE and the Java Development Kit (JDK) to be preinstalled.

In order to test the just-developed Android application, it can be tested by using the emulator. The emulator also mimics the other hardware and software features same like the real device such as the real phonebook, and other core applications. The device emulator is a tool for debugging, memory and performance profiling and a plug in for the Eclipse IDE. Although there is some limitations exist, the Emulator Control Tool also provides support for telephony in which it can send and receive phone calls and text-messages to other emulators as well as GPS Location control. (Matos, Grasser, 2010)

o   What are the critical analyses of the current systems?

One of the similar system as Travel Mobile Application is Garmin Mobile XT. By having this application in the phone, it has a full-featured navigation into GPS-enabled smart phone. As in the article with the title of "Garmin Mobile XT GPS Navigation Download", this application has plenty of functionalities that can be used by users. It has preloaded maps and gives the directions to the place that the user wants to go. It also has the search engine that can enable the user to search the place but must correctly spell it in order to get the accurate result. It also has the places that stored in the database of the famous landmarks, shopping centres, parks, theatres, attractions, and important places.

However, according to Dreier (2008) in his article, *'Garmin Mobile XT, Garmin makes a wrong turn with its new GPS solution for smart phones'*, during their testing the device often took several minutes to acquire enough GPS satellites to pinpoint or position, compared with plug-in GPD devices. There are some other drawbacks of this application which are out-of-date POI Database, disappointing interface as well as traffic, weather and fuel info.

For the first one is out-of-date POI database. If Mobile XT isn't loaded with extras, it can functions the basic navigation accurately either by entering the address or choose from POI database. It has the static POI database, somehow, the system is

loaded on a smart phone and it have to need the software connect to a central POI database, such as Verizon Wireless Subscription VZ Navigator that always get the current information. The problem with Mobile XT is the POI Database needs to be upgraded which is available in yearly basis and to get the updated maps, the user needs to pay some amount of money.

Secondly, the disappointing interfaces. Maps are not nearly as refined on the Mobile XT as on Garmin's own standalone navigators and screen space is not fully used to give information. The testing had been made by Dreier and the result of it is:
"Start up isn't the only time when Mobile XT is slow; it's also pokey at rerouting after a missed turn. And when rerouting, this solution displays an advertisement while it recalculates the route--an unforgivable offense. So not only does it remove the map at a time when you're likely confused, but it sells advertisement space on a product you've paid for. You'll also see an advertisement while looking up current information online, such as traffic and weather." (Dreier, 2008)

The time loading is taking quite some time to display the result and those unnecessary advertisements somehow distract the user in focusing the direction given by the system.

The next drawback is traffic, weather and fuel information. Even though it promises to give the traffic, weather and fuel information to the user anytime, the system doesn't inform the user about slowdown that happen because of the heavy traffic or in the other word, it doesn't check for new information during the trip. Besides that, one of their functionalities is the hotel finder, Hotels.com only works for some hotels only in the place of the testing process happens, Jersey City, New Jersey. For the fuel price lookup is handy for finding the lowest-priced gas station nearby.

As conclusion, it is good in giving the direction of the locations that the user wants to go even though the information given sometimes not really accurate because of the out-to-date POI database. This application is applicable to GPS enabled mobile phone, especially for Symbian 60 series and Windows Mobile.

The other application that available is NearMe. This application is using Android platform where it can let the user search for places nearby in an easy and fast way. When the places have been found, there are some options will appear such as Call, Add To Contacts, Open In Maps, and Get Directions. There is also a search engine that user can type the name of the place within the certain distance.

There are some feedbacks from the users stated in the website, Appbrain.com. One of the problems is the user not able to convert the distance from kilometres to miles and as a result, the wrong results would appear. As this application is downloadable all wide world, some of the countries that are using miles such as United States and United Kingdom have a problem in using kilometres in distance. Other than that, there is a comment that the starting location is always wrong and there is lack of information about the place. However, it is still useful in giving information about the places near to the user.

As for these two applications, there are the differences between these two because the first one is almost giving all the functionalities and it can be loaded by many GPS-based smart phones but NearMe is only for Android smart phones. Therefore, the research about these two can give the ideas to develop for Travel Mobile Application.

The differences of these two from the Travel Mobile Application are it is available for the whole global in which both of the system have the database of all places around the world. Therefore, it can entertain many people. But somehow, the mobile application that will be developed only focus on the West Malaysia especially in Perak at first in order to test the accessibility of the system to the environment.

Travel Mobile Application is developed by using Android platform in which the first one is using Symbian and the second one is same with the application that going to be developed. There are some frameworks available in Android that can be used for the application which will help a lot. Therefore, it is more compatible.

CHAPTER 3

METHODOLOGY/PROJECT WORK

3.0 METHODOLOGY

For this project, I am using the Systems Development Life Cycle (SDLC) in developing and analysing the project. SDLC is the process of understanding how an information system can support business needs, designing the system, building it, and delivering it to the users (Dennis, Wixom, Tegarden, 2005, p.1).

The SDLC consists of four phases which are planning, analysis, design, and implementation. In order to implement the SDLC, there is many ways or methodologies that can be followed to based on the order and focus on each SDLC phase. As for TraMo project, the suitable methodology that is using is throwaway prototyping. The reasons for this choice are as follows:

a) The throwaway prototyping-based methodologies have a *relatively thorough analysis phase* that is used to gather information and to develop ideas for the system concept. The design prototype that is not a working system but it is intended the user to visualize the system being built.

b) By having the design prototype, it *minimizes the risk* associated with the system by confirming the important issues are understood before the real system is built. If it needs refinement, the project will moves into design and implementation and develop a design prototype. It keeps repeating until all the issues are resolved.

c) Even though it may take longer time to deliver the final system as compared to prototyping methodology, it usually *produces more stable sand reliable*

systems especially when the features are need to be understood more and challenging technical issue to be solved during the development process.
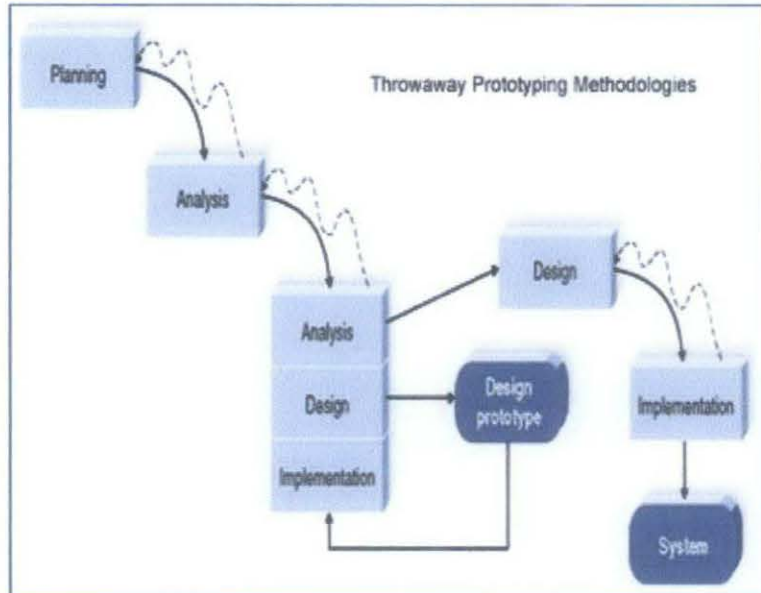
Figure 6: Throwaway Prototyping Methodology

3.1   Planning

For every phase, there are many steps that need to be accomplished. For planning, it needs to have the project plan that will describe how it will go about developing the system. Plus, the works that need to be done for every stage in SDLC as well as what else need to do for the feasibility analysis. For the feasibility analysis, it already explained in the first chapter. Below is the Milestone for First Semester of Final Year Project (FYP). Basically for first semester, it is much more on research part in which to have the thorough idea on the project.

No.	Detail/Work	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Selection of Project Title	▓	▓												
2	Preliminary Research Work			▓	▓										
3	Submission of Preliminary Report				●										
4	Seminar 1(optional)				▓	▓	▓	mid sem break							
5	Project Work				▓	▓	▓								
6	Submission of Progress Report								●						
7	Seminar 2(compulsory)									▓	▓	▓	▓		
8	Project work continues									▓	▓	▓	▓	▓	
9	Submission of Interim Final Draft													●	
10	Oral Presentation														●

Figure 7: Milestone of First Semester of Final Year Project

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The figure below is the Milestone of Second Year of Final Year Project. This second part of project is mostly on development part which is continuing the progress from FYP I. All testing and progress will be done within this timeframe and will show the final result and finding in the end of the semester.

No.	Detail/Work	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	New Progress from FYP I	▓	▓	▓	▓	▓	▓								
2	Progress Report							●							
3	Project work continues								▓	▓	▓	▓	▓	▓	
4	Pre-EDX										●				
5	Dissertation											●			
6	Viva													●	
7	Final Dissertation														●

Figure 8: Milestone of Second Semester of Final Year Project

This Milestone will be the guideline for the progression of the FYP. The advantage to have a milestone is to ensure that the project is still in the time frame where every work must be completed within the time given. Since there is almost one year given, at every point of time, there must have some progression to be done.

3.2 Analysis

During the analysis phase, there are many questions that need to be answered in order to ensure that the requirement is fully followed and the current system, similar systems and any identified improvement opportunities are discovered. By research and some gathering information techniques, it will give the result that describe the business requirement of the new system should have. For example, the journals are needed for reading materials that going to explain any feedbacks or any information or point of view from different people. The analysis and research part are discussed in the Chapter 2.

3.3 Design

Then, the design part is where the hardware, software and network infrastructure are decided and there is the interface design that shows how the user move through the system. In addition, the database and file specification also need to be discovered as it is crucial because of the data stored inside the database management system. At the end, the project plan and feasibility analysis are re-examined and revised to ensure everything is followed orderly. As shown in the Figure 1 above, there is a design prototype where it is not a working system but a product that represents a part of the system that needs additional refinements and just contains enough details to enable users to understand the issue under consideration (Dennis, Wixom, Tegarden, 2005, p.12). It is the way to ensure the system is nearly fulfils the actual and perfect system.

The tool that is going to use for this mobile application is Java Programming language as it is the language for developing Android application. The advantage of using the Java language is the code can be written on one platform and can run the codes on the other platform virtually. Plus, it is also one of the most famous platforms besides than iPhone and Blackberry. It has an all-inclusive package which includes a specialized operating system along with a middleware and several applications (SoftwebSolutions, 2005). The examples of source code are also available in the internet that it will help in developing the system later on. Plus, the discussion among the Android application developers in forums also really useful where many issues about the Android will be discussed and everyone is open for their own opinions.

The software that will be used is Eclipse as it is the software to edit files and verify the source code written, use for error checking, check directories in search for Java files and use the Android Emulator to test the program out to the screen as it will appear almost the same on devices. Meanwhile, for the hardware, it needs a computer with Windows XP/Vista/7, Linux or Max operating system, a minimum of 1 GB of RAM but for better result, 2GB should be work faster and lastly, a minimum of 2 GB of free disk space (Softweb Solutions, 2005). However, to ensure

the application really works on device, it should have a real testing in GPS-enabled phone.

3.4   Implementation

During the implementation stage, it is where the system is already built and tested to make sure it performs well. Mostly, it is more focus on testing the system and training the user to use it properly to ensure it is usable for all users. Any formal or informal post-implementation reviews are needed to identify the major or minor changes for the betterment of the system and improvement in the future. The development process is being done during second semester and will show the result or product in the end of Second Semester of Final Year. The application will be shown after the product is developed.

CHAPTER 4

RESULTS AND DISCUSSION

4.0 FINDING

4.1   SYSTEM ARCHITECTURE

The Travel Mobile Application needs system architecture in order to understand more on the back-end processes. System architecture shows the movement of data as per request by the user for any data. It will help in understanding more the design of the system especially when the system is dealing with GPS.

The system architecture can be divided into three main stages which are input from the user, the process block and the output of user requirement. The figure below is the procedure of the data moving from getting the input of user to the process part in which the data will be process to get the output desired by the user.
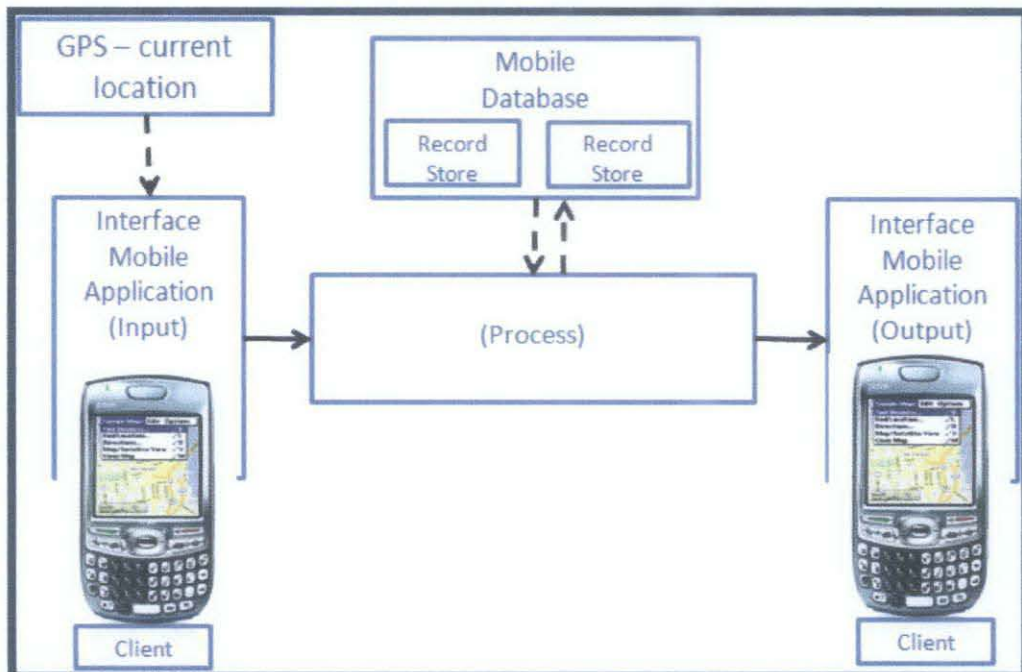

Figure 9: System Architecture

4.1.1   Input

In order to use the application, it needs to enable the GPS Satellites to receive the signal. Therefore, the current location can be detected. After the current location has been pointed, the input is basically from the user in which when the system is on, the user can either search the place by typing the place's name in the search engine. Or other way is the user can click the Category button that compile the places that under the same category. For example, the user is at the place where the user required to know where is the nearest hotel to go.

4.1.2   Process

The processing input is happens when the data is received from the user. When using the wireless GPS and Android together, it allows tracking the target accurately. This is because the data that has been used before are stored in the database for future usage. It is called as historical GPS data in which enable the integration of models and applications in order to observe and edit the movements before sending it to the mobile device. In addition, a landmark is a location stated with a name and a description. These landmarks are stored in device-based database.

To get the location of the user in which there is no input data required from the user, it needs at least three different satellites to determine the accurate latitude-longitude of the location as the way to detect the accurate location. There are calculations to know the differences in the time signals from different satellites to reach to the user.

For the server-side, it is responsible to receive, analyze and provide feedback for travel data transmitted by the mobile phone. It consists of two main software elements which are an application server and a database server. The application server is dealing with the communication and analysis meanwhile, database server is dealing with storage and retrieval of trip information.

From the example above, the user wants to know the nearest hotel that he can go in the short duration of time. At first, GPS will identify the location of the user device and based on that location, the user can select or click on the hotel button, where it

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will list down all the hotels that located near to the device's location. It can be detected by checking inside the database based on the landmark categorised inside there. The direction to the selected hotel will be shown in the screen.

4.1.3   Output

The output for this user request will be displayed to the user with the user interface. Several results will appear and the user may choose the place that they interested to. Then, the information of the places will be displayed such as the culture information of the place.

4.2 Result

This project is basically had been changed slightly different in which this project initially planned to use J2ME as its platform and due to some circumstances; it had been changed to Android platform. Android platform is quite new and getting popular in the mobile application world. Android has its built-in Google Maps external library that allows displaying and managing Maps data. It also offers a location framework that the application can apply to determine the device's location as well as to bearing and register the updates.

The location framework is the Location Manager that had been explained in the previous section of Android Architecture. In order to access the location services that supported by the devices, it can access via the android.location package. Through the Location Manager, it allows the devices to be able query the LocationProviders for the last known user location, get the periodic updates of the current user location from location provider either register or unregistered, and fire the given Intent if the devices comes within the given proximity. This is the aspect of Android where it provides mostly the functionalities that the TraMo application is needed. However, it is quite challenging where the language is quite different even though it is still using the Java Language as the programming language.

As for the main TraMo application, Figure 7 below is the first page that the user will see when click on the application. There is three main buttons in which the first button will retrieve the location of the device. The second one is the Search button, where the user can type the input of required place and it will search it. Lastly, it categorised the places accordingly such as Mall, Restaurant, Gas Station, and Hotel in which it will be appeared like in Figure 14. Then, the information of the location will be displayed to the user.

Figure10: Main Page

For testing purposes, Eclipse allows to send the coordinates to the emulator manually by specifying the latitude and longitude or by sending in geographical location in .GPX (GPS Exchange Format) file or .KML (Keyhole Mrkup Language) file in DDMS. For example, the longitude and latitude have been passed from the Location Control in DDMS manually. When, the developer click on the button Send in Location Control, it will appear the toast message as below. It means the application has been received the GPS signal and succeed to locate the new location of the device.

Figure 11: New Location –Latitude and Longitude

When the first button has been clicked, the Toast which is a message that tells the current location will appear on the surface of the screen for the moment. As if the user moves to another location, the current location might be different. However, It will appears other messages as if the GPS on or off and as well as the Location Provider changed. When the GPS signal in the emulator or device have been turned off by going to this path, Setting> Location & Security, and unmark the Use GPS satellites, the Toast message as below 'Provider disabled by the user.GPS turned off' will be displayed and when it turned on back, the toast message will be appear too in order to notify the user.
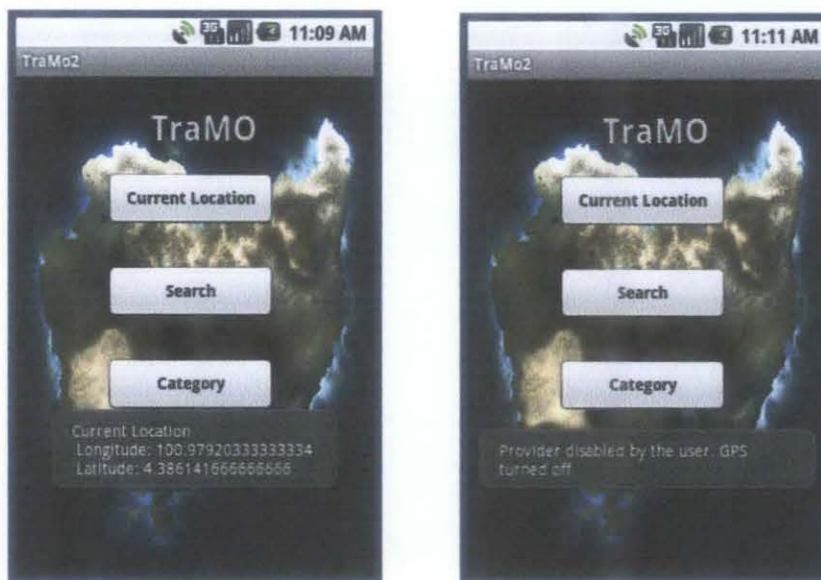

Figure 12: Current Location Button

The second button is the search function in which the user can search the nearby places within radius 50km. The radius had been set by the developer herself. The database contains the longitude and latitude of every places and it will calculate the distance between the current location and the places. If the distance is within the radius, the place will be appeared in the search function list as well as in the Category function. The user may enter first two letters of the name of the place and it will filter the list based on the radius and two letters entered. The suggested places

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will be displayed in the list. When the user clicks on the place, it will display the distance and related information of the place. Please refer to the figure below:
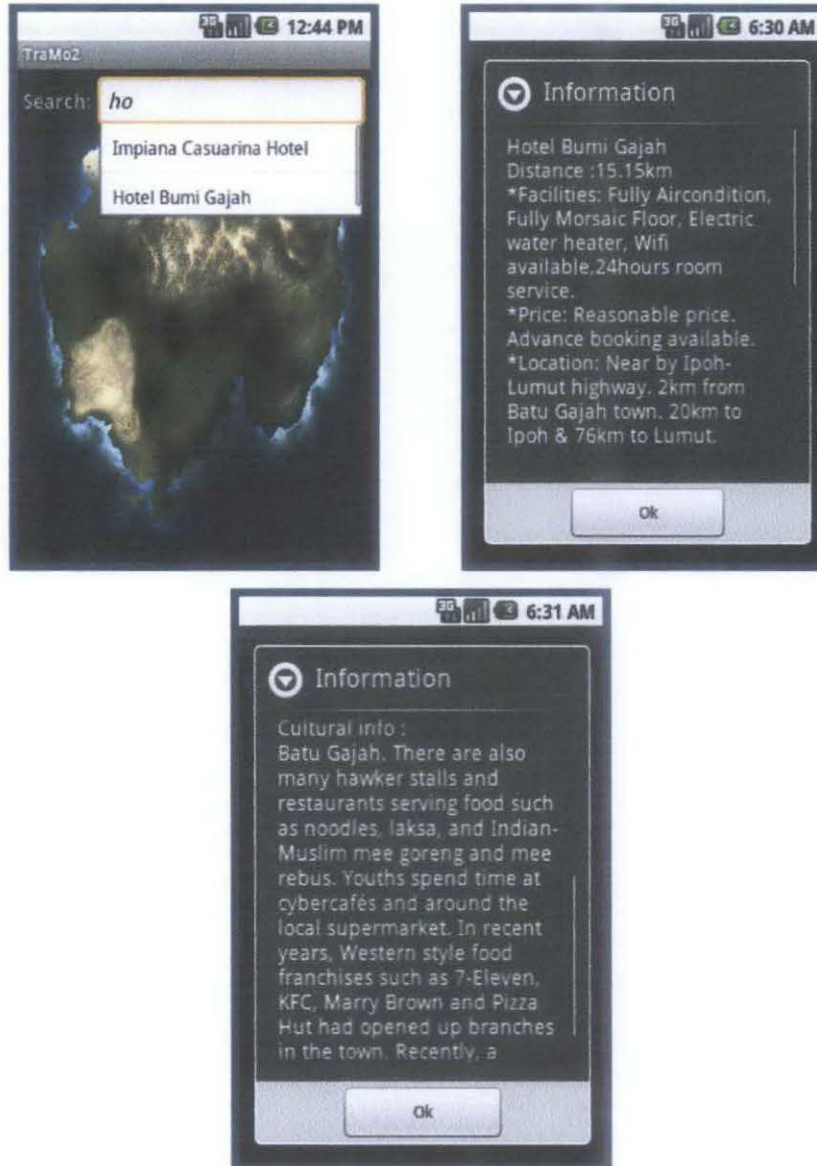

Figure 13: Search Button

The third button will display some categories that already been set and there are Mall, Restaurant, Gas Station, Hotel, Rest Area, ATM, and Best Places. Then, the user may choose either one of them and for example, if the user choose restaurant, it will list down all the restaurants available that within radius; 50km from the current location. Thus, it will display the distance that comes from the result of calculating

the distance to know the radius and information of the place as appears in the figure below. Then, the user can click 'OK' to get back to the list.
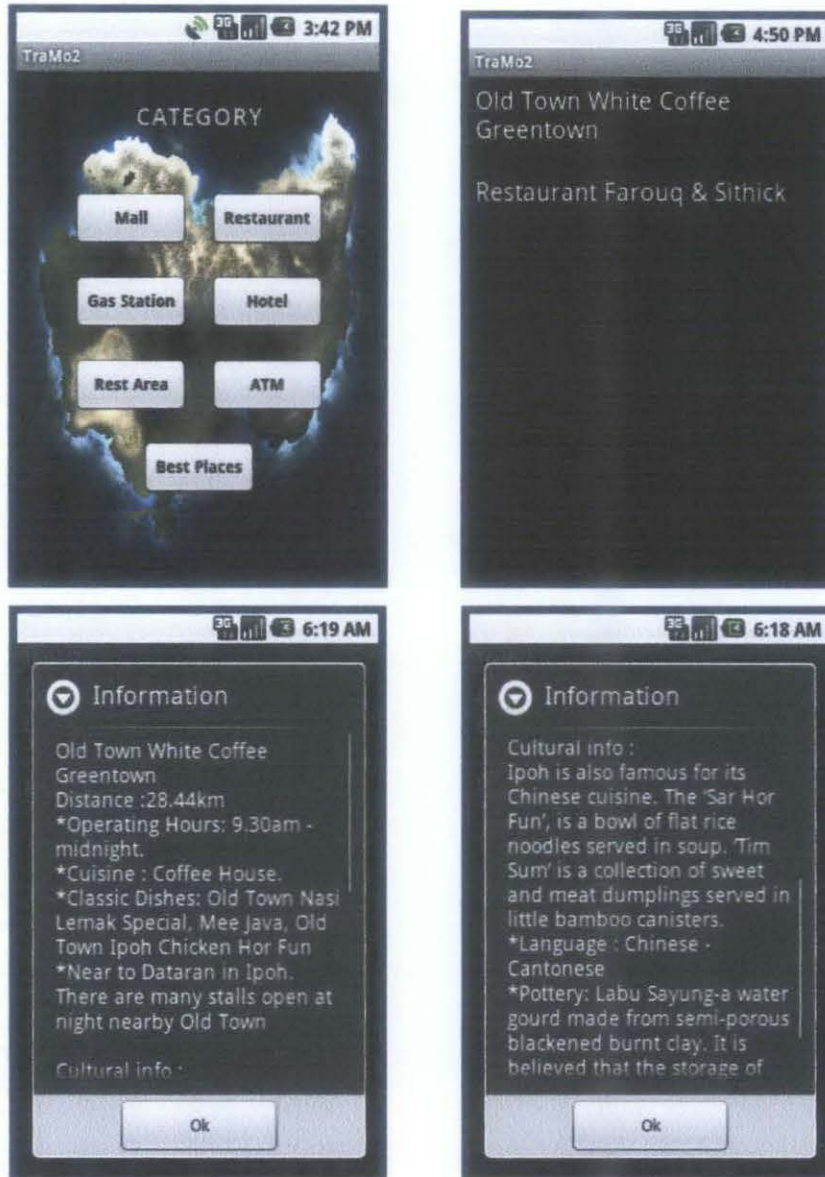

Figure 14: Category Button

In order to differentiate this application with the other numerous applications, it provides the information as well as the additional information about the culture of the place where mostly the information is not available in the existence applications.

Thus, those that had been explained are the main functions in the application that can be used by the user.

4.3   Functionality Test

The functionality testing gives the chance to test and check the application either the functionality functioning well or not. Those below are that functionality that had been tested with the input details, expected result and the actual result.

Table 3: Functionality Test

Case	Functionality	Input Details	Expected Result	Actual Result
1	Main page-receive GPS signal	GPS signal – latitude and longitude	Display new address of the place	Display latitude and longitude in emulator but display address in actual device
2	Current Location	Enter button, GPS signal – latitude and longitude	Display current location with address and will mention the location provider changed	Succeed but display latitude and longitude in emulator but display address in actual device
3	Search	Text field	Display the places within radius and based on the required input	Succeed
4	Category	Enter button	Display all the categories available	Succeed
5	Category – for specific category	Enter button	Display all the places within radius based on category selected	Succeed
6	Information	Enter button	Display distance and other information	Succeed
7	Map view	Enter button	Display map view with current location and places nearby	Not succeed

4.4   Discussion

During the development of this application, the developer has come across several problems and errors that some of them can be solved and some of them cant. The error that not been yet solved is firstly, the address that supposedly replaces the latitude and longitude is not showing up. The way to change latitude and longitude is by using the Reverse Geocoder. Reverse Geocoding is the process of changing the location name and other information from geographic location. The Geocoder class is already in Android and it can be called. It has three methods and for reverse geocoding, it uses the getFromLocation method that accepts three parameters which are latitude, longitude and maximum number of results to return.

However, as the developer tried it, the IOException error message has been displayed saying that 'Unable to parse response from server'. There are two possible solutions. The first one is to include the INTERNET permission onto AndroidManifest.xml file since the application needs to have internet connection in order to communicate with geocoding services. When the developer doing it, the same error has came out. Thus, the internet is already connected. The second possible solution is to change the proxy that blocking the communication to the geocoding services. Probably the geocoding services moved IP address and thus, ended up onto an IP address the computer had no access to. The way to change the IP address is through the command line options that can configure a variety of options to control emulator appearance or behaviour. However, the developer has not been trying it yet due to time constraints. On the other hand, when the developer installs the application inside the actual mobile phone, the address displayed. Therefore, the real problem here is the IP address and it can be fully functioning in the real device. The figure below shows the IOException error once the emulator gets the GPS signal.
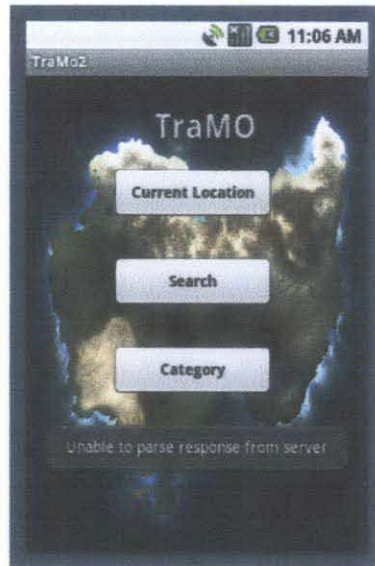
Figure 15: IOException Error

Supposedly, the application should display the current location with the places nearby that within the radius in map view. Therefore, the user has the clear view where the nearest place to go and can do the decision making. In order to view the map, the TraMo application needs to include the com.google.android.maps package. This package provides the built-in downloading, rendering, caching of Maps tiles and displaying options and controls. However, it needs to be registered with Google Maps service and obtain a Maps API Key. For testing, it just needs to get the MD5 Fingerprint of the SDK Debug Certificate.

The map had been succeeding being display in the emulator with the current location of the device but the problem is it is only show the grid line. One of the possible reasons is the application does not specify an API level as the warning shows in the console during the running time, 'WARNING: Application does not specify an API level requirement!' However, after the API level had been added into the AndroidManifest.xml file, the maps still doesn't show up.

Besides, the next possible reason is it is depending on the internet connection. The map will appear if the connection is good and vice versa. Please refer to the figure below. However, this activity haven't been manage to be linked with the main activity of the TraMo application in which it has running time error. Therefore, the map doesn't come out when the application runs at the emulator and the application will be force closed.

Figure 16: Map View with Current Location

CHAPTER 5

CONCLUSION

As conclusions, this mobile application has achieved its objectives as being set at the beginning of this project which is to reduce the troublesome of the user who are new at certain place to detect their location, identify the places nearby and get distance as well as the information about the places. However, some of errors have been occurred and may need more improvement to be fixed in order to increase the convenience for the user.

The researches are thoroughly being done in order to have the clear and unambiguous picture of the application that is going to be developed. Therefore, the questions that had been answered in the literature review, are regarding the mobile application, GPS, Android platform and as well as the analysis of the current systems. This is to ensure there is the competitive advantages have been attached to the application to ensure the application is different from the others.

In order to have the understanding about the system and fully identify with how the back-end works, it is important to know the system architecture of the system. All the results also being explained and the functionality test also being done to ensure the functionality being tested either it is working well or not. Thus, all the errors or problems that make the functionality not working well are being discussed to identify the reasons and possible solutions to overcome it.

For further improvement, the recommendation for this mobile application is to have the better and user-friendly interface in order to ensure user is understand and easy to use the application. Besides, the map direction can also be included as it will give more convenience to the user as turn-to-turn directions will be provided. Thus, the user can use the map direction to head to the place. In addition, the other recommendation is to include the user's comment as the user can give comments for the certain place and the other viewers can view it.

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