

# Document History

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<b>VR Map 2Go! - Project Proposal-1.0.2.docx</b>	-Update Introduction and Background - Business Review - Technology Review - Development Tools Review	Draft	28/5/16	Advisor	PP
<b>VR Map 2Go! - Project Proposal-1.0.3.docx</b>	-Update Business Review - Quality Standard - Deliverables and Limit -Future Work	Draft	29/5/16	Advisor	PP
<b>VR Map 2Go! - Project Proposal-1.0.4.docx</b>	- Motivation - Aim and Object - Architecture Review	Draft	30/5/16	Advisor	PP

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	1 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

	Schedule and Milestone				
<b>VR Map 2Go! - Project Proposal-1.0.5.docx</b>	- Update Schedule and Milestone	Release	31/5/16	Advisor	PP

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Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	2 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

# Abstract

Nowadays, there are a lot of Map applications provides a service of location tracking in the market. (e.g. Google Map application on Android and iOS). Google Map provides good service and experience with Google Play Services to satisfy this need, but in the form of an old interactive map as part of their user interface.

"VR Map 2Go!" is a mobile application provides a new user experience and service with a Virtual Reality technology helping users to explore and find the nearby locations on Map easily by capture the map photo and see the 3D pop-up objects via this application. Also, it allows users to interact with each location to get the direction as Google Map can do, but the user can click on each location to see more information and detail.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	3 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

# Table of Contents

<b>Chapter One   Introduction and Background .....</b>	<b>5</b>
<b>Chapter Two   Literature Review.....</b>	<b>7</b>
<b>2.1 Business Review .....</b>	<b>7</b>
<b>2.2 Software Review .....</b>	<b>8</b>
<b>2.3 Architecture Review .....</b>	<b>12</b>
<b>2.4 Technology Review .....</b>	<b>13</b>
<b>2.5 Development Tools Review.....</b>	<b>18</b>
<b>Chapter Three   Quality Standard .....</b>	<b>21</b>
<b>3.1 ISO29110 for Very Small Entity (VSE).....</b>	<b>21</b>
3.1.1 Project Management Process .....	21
3.1.2 Software Implementation Process .....	22
<b>Chapter Four   Project Plan.....</b>	<b>23</b>
<b>4.1 Motivation .....</b>	<b>23</b>
<b>4.2 Aims and Objectives.....</b>	<b>24</b>
4.2.1 Aims.....	24
4.2.2 Objectives .....	24
<b>4.3 Deliverables and Limits .....</b>	<b>25</b>
4.3.1 Deliverables .....	26
4.3.2 Limits .....	26
<b>4.4 Future Work .....</b>	<b>27</b>
<b>4.5 Software Process Model .....</b>	<b>27</b>
4.5.1 Iterative Model .....	27
<b>4.6 Schedule and Milestones .....</b>	<b>28</b>
<b>Chapter Five   References .....</b>	<b>31</b>

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	4 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

# Chapter One |

## Introduction and Background

A number of new geo-tracking tools from big name companies in the mobile application industry have recently appeared on the scene and getting higher to support and fulfill the customers expect. Google, Apple, Microsoft have all released Web-based and mobile mapping tools in the past year. Although their functional capabilities don't provide anything difference too much, but with new technology and new trend make the user looking for a new experience more than just only an application usability.

Virtual reality (VR) is an artificial environment that is created with software and presented to the user in such a way that the user suspends belief and accepts it as a real environment. The simplest form of virtual reality is a 3-Dimension object that can be explored interactively at a smartphone and the most popular tool used to support virtual reality view on the smartphone is Augmented Reality (AR). Augmented Reality is a type of virtual reality that aims to duplicate the world's environment on the smartphone. An augmented reality system generates a composite view for the user that is the combination of the real scene viewed by the user and a virtual scene generated by the smartphone, with sensory input such as sound, video, graphics or GPS data, that augments the scene with additional information. The virtual scene generated by the smartphone is designed to enhance the user's sensory perception of the virtual world they are seeing or interacting with.

In geo-tracking application, it typically includes global positioning system (GPS) to pinpoint the user's or target location and its compass to detect device orientation and show the 3D object to the user via the camera view. With the advantage of AR technology, the user becomes interactive virtual experience on Map application with a virtual object they are seeing or interacting with.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	5 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

We decided to develop an application on the Android operating system. This application allows the user scans the camera on the map picture to get the nearby locations around the user in Virtual Reality view. Apart from that, this application uses Google Map API to identify the location with the map feature. So, the user can get the exact location and go without getting lost with correctness. With user friendly interface design makes this application easy to use for everyone.

This application requires a smartphone on Android Operating System (OS) to serve portability to the users. In addition, it uses Google Maps API to identify the location of the destinations, Vuforia API to support Virtual Reality view by using AR (Augmented Reality) and Facebook API that allows the user able to share to other people on a social network via a Facebook application.

This application provides a many kind of nearby locations in difference symbols, such as famous destination, Hotel, Police station, Fuel station, Hospital and etc. with their information, details, pictures and the phone number which intractable for users.

Moreover, the administrator can add more the destination to the server. With easy User Interface makes this application are always up to date, interesting and very easy to use to everyone.

The goal of this application is to help users and travelers easy to explore and find the nearby location on a map by capture the map picture via this application by themselves. As well as helping them to know where to go to the place they need. In addition, it would be handier for the user to do it on a portable device like a smartphone, which can access at anywhere and anytime.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	6 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

# Chapter Two |

## Literature Review

### 2.1 Business Review

#### 2.1.1 Overview

VR Map 2Go! is an android application for a smartphone that supports Android operating system. This application allows the user scans the camera on the map picture to get the nearby locations around the user in Virtual Reality view. In addition, they also are able to interact with the 3D object to get more information and detail. In case the users want to go for each location, the location feature can be done via Google Maps API.

This application provides many kinds of nearby location, such as famous destination, Hotel, Police station, Fuel station, Hospital and etc. with information, details, pictures and the phone number which user can click on each object to get them. Apart from just exploring the location' information, the users can also get the routing direction to navigate the user to the destination.

#### 2.1.2 Target

There are two main targets for this application. One is everyone who wants to explore the nearby location on the map picture they want to go. Another one is the support the traveler who come from other country or another place which they want to travel to Thailand. However, the main factor for them is to have a smartphone with the Internet connection to access the application services.

#### 2.1.3 Benefit

##### 2.1.3.1 Users

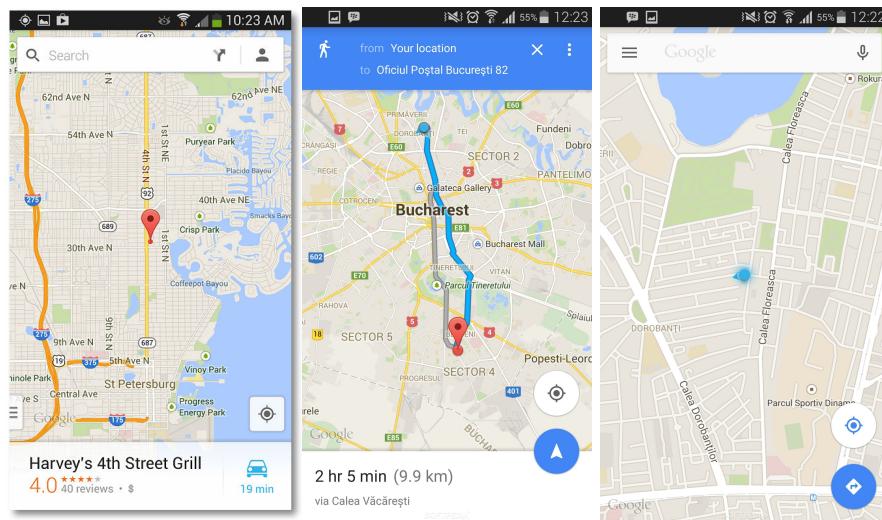
- Users can save more time to find nearby location on the map picture by scan the mobile camera on the map via this application.
- Users can explore all provided locations on the map.
- Users can see more information and detail on each nearby locations.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	7 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

## 2.2 Software Review

### 2.2.1 Google Map on Android

Google Map on Android is a mobile application mapping service developed by Google. It offers satellite imagery, street maps, 360° panoramic views of streets (Street View), real-time traffic conditions (Google Traffic), and route planning for traveling by foot, car, bicycle, or public transportation.



**Figure 1.1:** Google Map Graphic User Interface

#### Pros

- The application has more excellent search capabilities
- The application has a great additional features like aerial photos and traffic information.
- The application has maps include parks, airports, hospitals, malls, and other points of interest.
- The application has visually appealing maps.

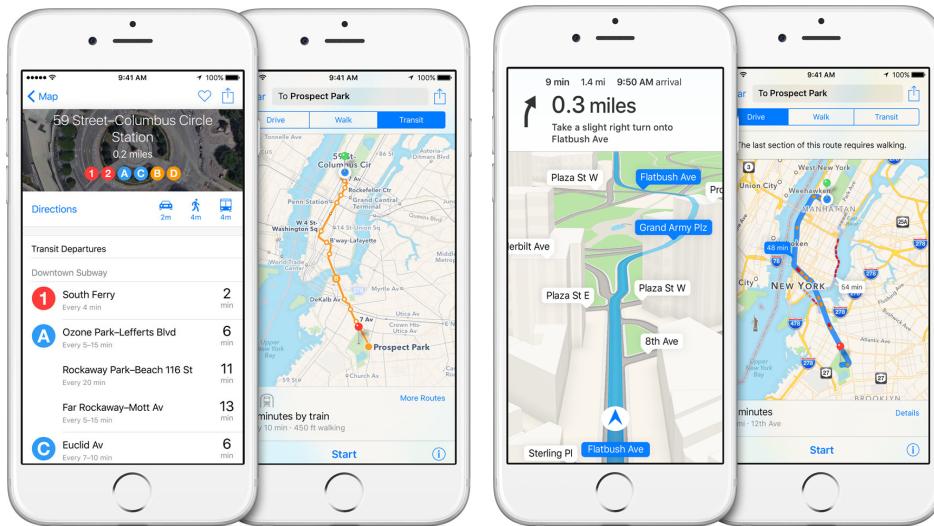
#### Cons

- Unattractive user interface.
- Hard to use for some people with low usable capability.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	8 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

## 2.2.2 Apple Map on iOS

Apple Maps is a mobile mapping application developed by Apple Inc. It is the default map system of iOS and watchOS. It provides directions and estimated times of arrival for automobile, pedestrian, and public transportation navigation. Apple Maps also features the unique 'Flyovers' mode, a feature that enables a user to explore densely populated urban centers in a 3D landscape composed of models of buildings and structures.



**Figure 1.2:** Apple Map Graphic User Interface

### Pros

- The application has impressive 3D views and layout.
- The application has accurate turn-by-turn navigation.

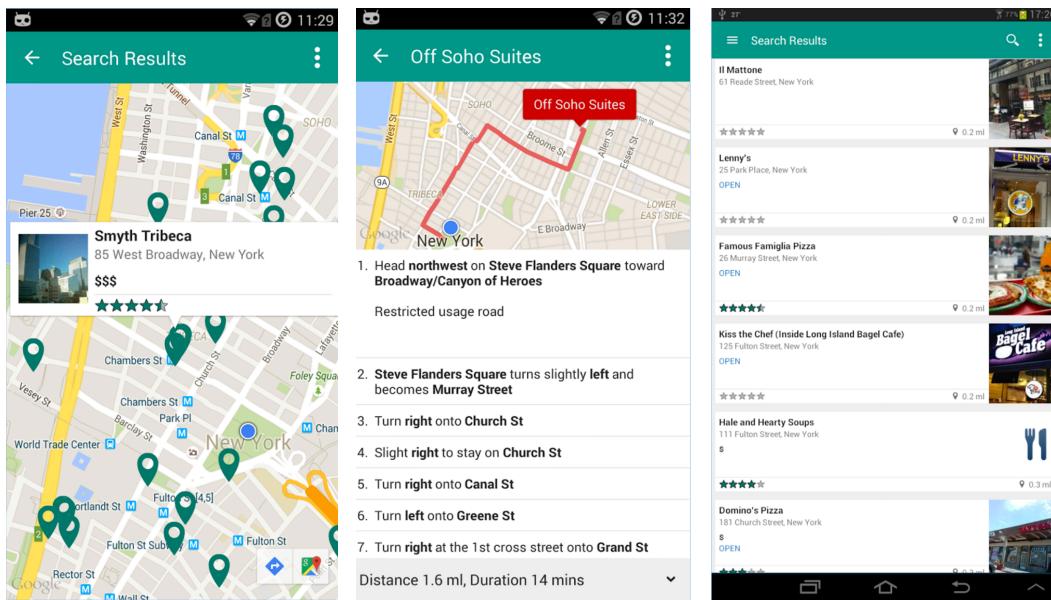
### Cons

- The application has drain the mobile battery when in use.
- The application search results could be displayed more efficiently.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	9 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

### 2.2.3 NearBy Me - Places

NearBy Me is mobile application helps you find new and fun places near your location, for you and your loved ones to spend some quality time together. Either it be dinner, coffee or even drink. NearBy Me is also a great navigation tool to take on a vacation as you can find your way around an unfamiliar city. Also calculates the route towards your selected destination, so that it will be easier to find.



**Figure 1.3:** NearBy Me - Places Graphic User Interface

#### Pros

- The Application provides nearby banks, bars, clubs, restaurants, food points, hotels, or any other place users want to search easily.
- The Application provides rating level for each place.
- The Application allows users add places to Favorite list

#### Cons

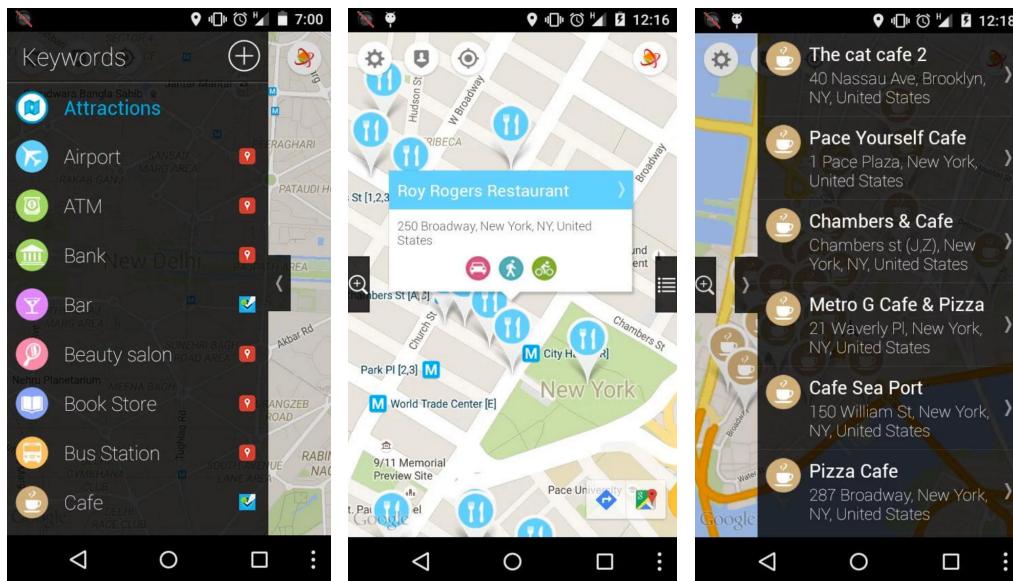
- Unattractive user interface.
- Search results based on the user current location.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	10 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

## 2.2.4 Find Near Me – Places Around Me

Find Near Me is an easy to use application which helps you find ATM, Bank, Gas Station, Restaurant, Bar, Café, Hospital, Hotel, Taxi, Movie Theatre, Beauty Salon, Wi-Fi spots or virtually anything near you.

With this GPS-base locator on mobile, you can also search around any location across the globe and add them to their favorite search locations. So if you are planning a trip abroad and want to find restaurants, hotels, taxi services or just about anything you can do so easily with this application.



**Figure 1.4:** Find Near Me Graphic User Interface

### Pros

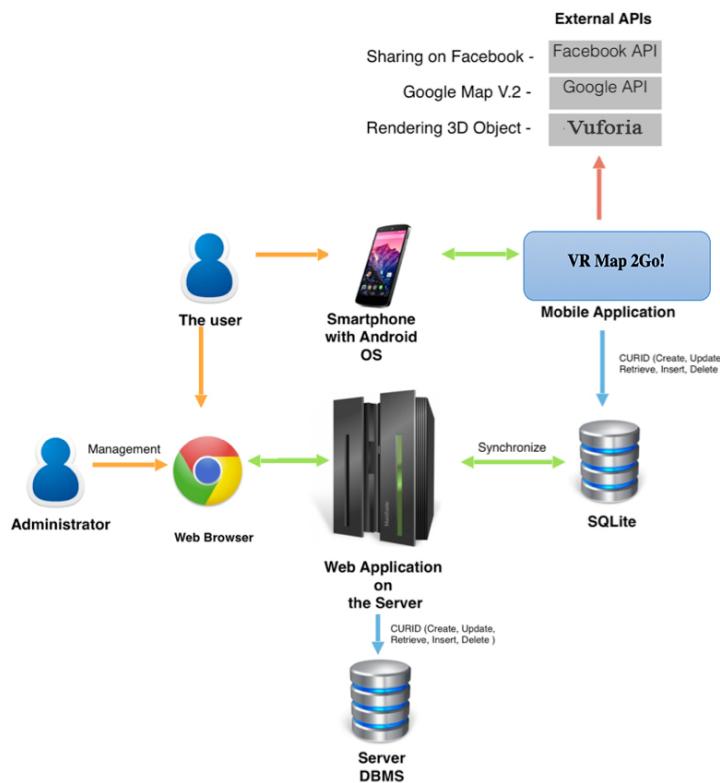
- The Application allows users Customize the distance units (kms/miles), map types and the ordering of how search results are displayed.
- The Application displays detailed information such as Ratings, Reviews, Opening Hours and Photos for places.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	11 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

### Cons

- The system provides too many advertisements.
- The system provides lack of attraction point.

## 2.3 Architecture Review



**Figure 1.5:** Architecture Review

This **figure 1.5** shows the system architecture of VR Map 2Go! mobile application has separated to two sides that are mobile application and web server. The user can access the application via using mobile. The application will transfer data between web servers via JSON and XML. The mobile application has build-in database (SQLite) to manage and maintain data between mobile application and the server.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	12 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

The server has database system on the server side also. The server can synchronize the data and information between mobile application and web server each other. Administrator can access to manage and maintain the data into the server via using web browser (e.g. Google Chrome). The applications using external APIs are “Vuforia” library, to read and rendering 3-Dimension object model, Google Map API version 2 and Facebook API to connect with online social network with the third.

## 2.4 Technology Review

### 2.4.1 *Android Operating System*

Android is operating system that develops on a Linux-based for mobile devices such as smart phone and tablet. Android is open source, it is free for everyone who are interested to develop. Because Android has developed by Google, so it has a lot of Google services supported such as Gmail, Google Calendar, and Google Maps.<sup>[1]</sup>

#### Alternative Tools

- iOS
- Symbian
- Window Phone
- BlackBerry OS
- WatchOS

#### The selection of this technology

Nowadays smart phones are very popular. For us we choose the Android OS because it is an open source operating system. It is free for developing and also support by many tools. It can directly be tested on the smart phones.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	13 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

### 2.4.2 JSON

JSON (JavaScript Object Notation) is a lightweight data-interchange format. It is easy for humans to read and write. It is easy for machines to parse and generate. It is based on a subset of the JavaScript Programming Language, Standard ECMA-262 3rd Edition - December 1999. JSON is a text format that is completely language independent but uses conventions that are familiar to programmers of the C-family of languages, including C, C++, C#, Java, JavaScript, Perl, Python, and many others. These properties make JSON an ideal data-interchange language.<sup>[2]</sup>

#### Alternative Tool

- Extensible Markup Language (XML)

#### The selection of this technology

JSON makes us be more easy to read and write. It is not extensible because it does not need to be. Moreover, it is not a document markup language, so it is not necessary to define new tags or attributes to represent data in it. We can use JSON to store and retrieve data between Web-Service and our application.

### 2.4.3 Google Maps API

Google Maps is a web mapping service application and technology provided by Google, that powers many map-based services, including the Google Maps website, Google Ride Finder, Google Transit, and maps embedded on third-party websites via the Google Maps API. It offers street maps and a route planner for traveling by foot, car, bike (beta), or with public transportation. It also includes a locator for urban businesses in numerous countries around the world.<sup>[3]</sup>

#### Alternative Tool

- Bing Map

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	14 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

### The selection of this technology

There are a lot of information of Google Maps API provided, such as source code samples and tutorials on the internet. Also, there is a complete code of the Google Maps provided for us to apply for our projects. Therefore, we do not have to waste our time writing the whole source code for this part again.

#### **2.4.4 Facebook API**

Facebook API let us reach and bring some information or features of Facebook to use in our application. We can use it in Log in system by letting the users log in with their Facebook ID. Also, use it to share information from our application to the users' Facebook wall. In addition, we can use it to access to information of the user too.<sup>[4]</sup>

#### **Alternative Tool**

- Twitter API

### The selection of this technology

We use Facebook API to let users share their information from our application to their own Facebook wall.

#### **2.4.5 Augmented Reality (AR)**

Augmented reality (AR) is a live, copy, view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data. It is related to a more general concept called mediated reality, in which a view of reality is modified (possibly even diminished rather than augmented) by a computer. As a result, the technology functions by enhancing one's current perception of reality.<sup>[5]</sup>

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	15 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

## Alternative Tool

### The selection of this technology

This technology is support with mobile device. Mobile application with AR makes more comfortable for user in order to transfer and receive data via network more than Personal Computer or Laptop. It is unique / different (for the moment) and the possibilities of augmented reality are only just being explored, and any new developments are likely to achieve further exposure.

### 2.4.6 PHP

PHP, stands for "**Hypertext Preprocessor**", is a server-side, HTML embedded scripting language used to create dynamic Web pages. PHP offers excellent connectivity to many databases including MySQL, Informix, Oracle, Sybase, Solid, PostgreSQL, and Generic ODBC.<sup>[6]</sup>

## Alternative Tool

- Perl
- Python
- ASP.NET
- JSP
- Ruby

### The selection of this technology

PHP has many tutorials and examples of how to use it provided everywhere. Moreover, it is open source and does not too complicated to understand.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	16 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

### 2.4.7 *SQLite*

SQLite is the way to connecting between android and Database. SQLite is famous because its has small database size on the application with run on the smartphone. Working process of SQLite is standalone then it has a basic structure and easy to use with other application. Then SQLite has suitable for application that working on smartphone. This can solve the problem of the limited in hardware and memory usage on Smartphone. [7]

#### Alternative Tool

- Microsoft SQL Server Management Studio
- MySQL Enterprise Edition

#### The selection of this technology

It supports the mobile application with small size of database, reduce on the memory usage and work well with android application.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	17 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

## 2.5 Development Tools Review

### 2.5.1 *Android Studio*

Android Studio is Android's official IDE. Its purpose is built for Android to accelerate your development and help you build the highest-quality apps for every Android device. It offers tools custom-tailored for Android developers, including rich code editing, debugging, testing, and profiling tools. It supports people in developing software with Java. It provides a simple and understandable user interface. Moreover, the developers also be able to download many different plugins to work with Android Studio. Further than that, it is free. <sup>[8]</sup>

#### Alternative Tools

- Eclipse with ADT
- IntelliJ IDEA

#### The selection of this technology

This is an Android's official IDE development tool from Google. Not only because it's free, but also because it is easy to set up and find various plugins to work with. In addition, it supports Android platform too. Therefore, we decided to use this software as a tool for our project.

### 2.5.2 *MySQL*

MySQL is an open source relational database management system which is used by many users around the world. It can create both standalone and server database. It can integrate with other products such as MySQL Workbench, MySQL Connector and MySQL Connector. It also supports many development tools for creating applications such as Eclipse, NetBeans. <sup>[9]</sup>

#### Alternative Tools

- SQLite

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	18 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

### The selection of this technology

Due to our application needs to connect the database with the web server. From this point, MySQL does support our need for our application. Not only Android OS that it supports, but also in other different platforms. In addition, it's free. Apart from that, there are many people have been using it, so there are many tutorials introducing us the software on the Internet. Therefore, if we have any problem, we can immediately figure it out.

### 2.5.3 GitHub

GitHub is a social network for programmers. Git is a distributed software management program created by Linus Torvalds, originally for the Linux Kernel Development. GitHub is a hosted Git repository. GitHub allows you to take part in collaboration by forking projects, sending and pulling requests, and monitoring development.<sup>[10]</sup>

### Alternative Tools

- Dropbox
- Google Drive
- iCloud
- Sky Drive

### The selection of this technology

We use GitHub as our repository to share and store our work. It provides free storage and also the history when there is something changed. The history will show all the details of the changes such as who changed it, what has been changed, when did it change and so on. More than that, it gives automatic version control too.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	19 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

### **2.5.4 Aptana Studio 3**

Aptana Studio 3 is build web applications quickly and easily using the industry's leading web application IDE. Aptana Studio harnesses the flexibility of Eclipse and focuses it into a powerful web development engine. It is an open source rapid development web application development for Web 2.0 and Ajax for use with a variety of programming languages (such as JavaScript, Ruby, PHP and Python).<sup>[11]</sup>

#### **Alternative Tools**

- Cake PHP Framework
- Notepad++
- Coda2

#### **The selection of this technology**

Aptana Studio 3 provides functions such as auto closes tags, code hinting, preview, which give ability for users to create a website easier. Moreover, this development tool can preview any web-plugin we use are support or not.

### **2.5.5 Unity 3D Editor**

The Unity 3D Editor enables you to create 2D and 3D games, apps and experiences. The Unity Manual helps you learn how to use the Unity Editor and its associated Services. You can read the Manual from start to finish or use it as a reference.<sup>[12]</sup>

#### **Alternative Tools**

- 3D Max Studio
- Maya

#### **The selection of this technology**

Unity 3D Editor supported the Augmented Reality SDK on Android development tools that allow the developer use many features and plugin e.g the VideoTextureRenderer on the ARCamera to create the 3D object model and easy to implement with Augmented Reality on mobile application.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	20 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

# Chapter Three |

## Quality Standard

### 3.1 ISO29110 for Very Small Entity (VSE)

ISO29110 is a guide applies to a Very Small Entity (VSE), enterprise, organization, department or project up to 25 people, dedicated to software development. The Guide provides Project Management and Software Implementation processes which integrate practices based on the selection of ISO/IEC 12207- Systems and Software Engineering — Software Life Cycle Processes and ISO/IEC 15289Software Engineering – Software Life Cycle Process – guidelines for the content of software life cycle process information products (documentation) standards elements.

#### ***3.1.1 Project Management Process***

The purpose of the Project Management process is to establish and carry out in a systematic way the tasks of the software implementation project, which allows complying with the project's objectives in the expected quality, time and cost.

#### **Selected process**

- Project Planning Process
- Project Plan Execution Process
- Project Assessment and Control Process
- Project Closer Process

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	21 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

### ***3.1.2 Software Implementation Process***

The purpose of the Software Implementation process is the systematic performance of the analysis, design, construction, integration and tests activities for new or modified software products according to the specified requirements.

#### **Selected process**

- Software Implementation Initiation Process
- Software Requirements Analysis Process
- Software Architectural Design Process
- Software Construction Process
- Software Integration and Test Process
- Software Delivery Process

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	22 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

# Chapter Four |

## Project Plan

### 4.1 Motivation

Nowadays, there are a lot of geo-tracking application provides a location-based service for users. Their functional capabilities don't provide anything difference too much, but the new technology trend makes the user always keep looking for a new experience more than just focus only on usability. They tend to keep exploring new application comes with interesting ideas and easy to use. As a result, there are many applications and websites provided to let them explore and search locations and give route planning for how to go into it. Although those medias seem to provide perfect and sufficient features for the users, there is one point that they did not concern. The problem is some users with low capability pay for more time to learn and understand how to use the application. Therefore, VR Map 2Go! the application will help users to find out many nearby locations on the map easily with virtual reality view technology trends to enhance the user experience with 3D-object which can interact in the real world.

The reason we want to work on map application and present to the user with virtual reality in the real world is that it is becoming very popular for people who looking for the new technology trends. Apart from the usable purpose, it also helps people in the way of relieving from confusing and saving the time to learn when to install the new application, increase more concentration with new technology to make their life more easily.

Moreover, technologies have become an essential thing for people. Apart from the web application that can be accessed by various devices, there is a popular technology like smart phones too. There are several operating systems developed to support them, one of those operating systems that are well-known is Android OS. Due to it is an open source, there are many resources provided to develop, and it is easy to learn.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	23 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

From this software project, we expect to get more knowledge and experiences in processing in order to develop new software. On the other hand, also to get the experience of working for the good of our working life in the future.

## 4.2 Aims and Objectives

### 4.2.1 Aims

The aims of VR Map 2Go! application are to allow users scan on the map picture to explore the nearby locations and shows as the interactive real world object virtual technology. Users can check-in and share location to social network via Facebook. The administrator can manage the information on the server side to keep this application are new and up-to-date. The development of this application will be done under the ISO 29110 software quality standard.

### 4.2.2 Objectives

- Develop an Android application using open source technology and development tools to give portability to the user.
- Develop a web application using open source technology and development tools for the administrator to manage and update the location's information on the server.
- Let the users scan the map pictures via this application to find all nearby locations on the map.
- Let the administrator present the new locations by managing and providing the information into server database system.
- Be able to seek for locations' information and location
- Develop an Android application with Augmented Reality.
- Allow users share the traveling location to Facebook.
- Apply the knowledge about JAVA programming language, Database, Web application, OOP, Software Component base (MVC) and mobile device technology into this project

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	24 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

## 4.3 Deliverables and Limits

### 4.3.1 Deliverables

#### Progress Report I

##### Feature 1: Authorization Management (On web and mobile)

- Develop register, log in, and log out system for an administrator. (On web)
- Develop register, log in, and log out system for the user. (On mobile)
- The system can display user's profile and let the user edit the information. (On mobile)
- The administrator can edit, delete and update user's account. (On web)
- The administrator can insert, delete and update the location's information including with location id, location name, information, related URL, latitude and longitude into the server database. (On web).
- The user can recover the username and password via using email address.

##### Feature 2: Augmented Reality Management (On mobile)

- The user can scan on the map picture to get an interaction.
- The system can show the 3D-object via camera view.
- The user can interact with 3D-object by click to get the action.
- The system can show multiple 3D-object via camera view.

##### Feature 3: Map Management (On mobile)

- The user can click on each 3D-object to get route direction planning.
- The system can navigate route direction via Google Map application.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	25 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

## Progress Report II

### Feature 4: Map Management

- Develop Map using Google Maps API. (On mobile)
- The system can show nearby locations based on the user current location. (On both web and mobile)

### Feature 5: Communication Management

- The user can share location destination on Facebook via using Facebook API. (On mobile)
- The system can send the notification to the user when has any update.

## Progress Show Pro

Ensure that the system both of mobile and web-application are complete more than 90%

## Final Progress

Ensure that the system and documents are complete.

### Documents

- Proposal
- Project plan
- Software requirement specification
- Software design document
- Testing document
- Traceability record
- Software quality assurance document
- Demo of program
- Poster for presentation

### 4.3.2 Limits

- The application requires Android Operating System.
- Internet connection is required for the application to perform.
- The application requires Google Play service.

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	26 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

## 4.4 Future Work

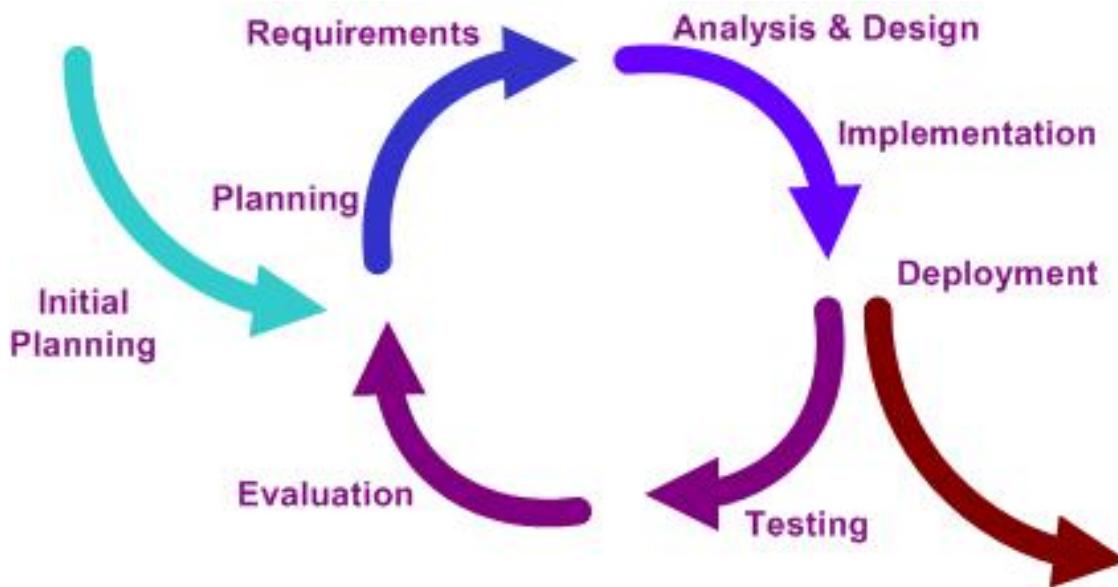
- VR Map 2Go! application should be able to operate in iOS.

## 4.5 Software Process Model

### 4.5.1 Iterative Model

In Iterative model, iterative process starts with a simple implementation of a small set of the software requirements and iteratively enhances the evolving versions until the complete system is implemented and ready to be deployed.

An iterative life cycle model does not attempt to start with a full specification of requirements. Instead, development begins by specifying and implementing just part of the software, which is then reviewed in order to identify further requirements. This process is then repeated, producing a new version of the software at the end of each iteration of the model. <sup>[13]</sup>



**Figure 1.6:** Iterative Model<sup>[14]</sup>

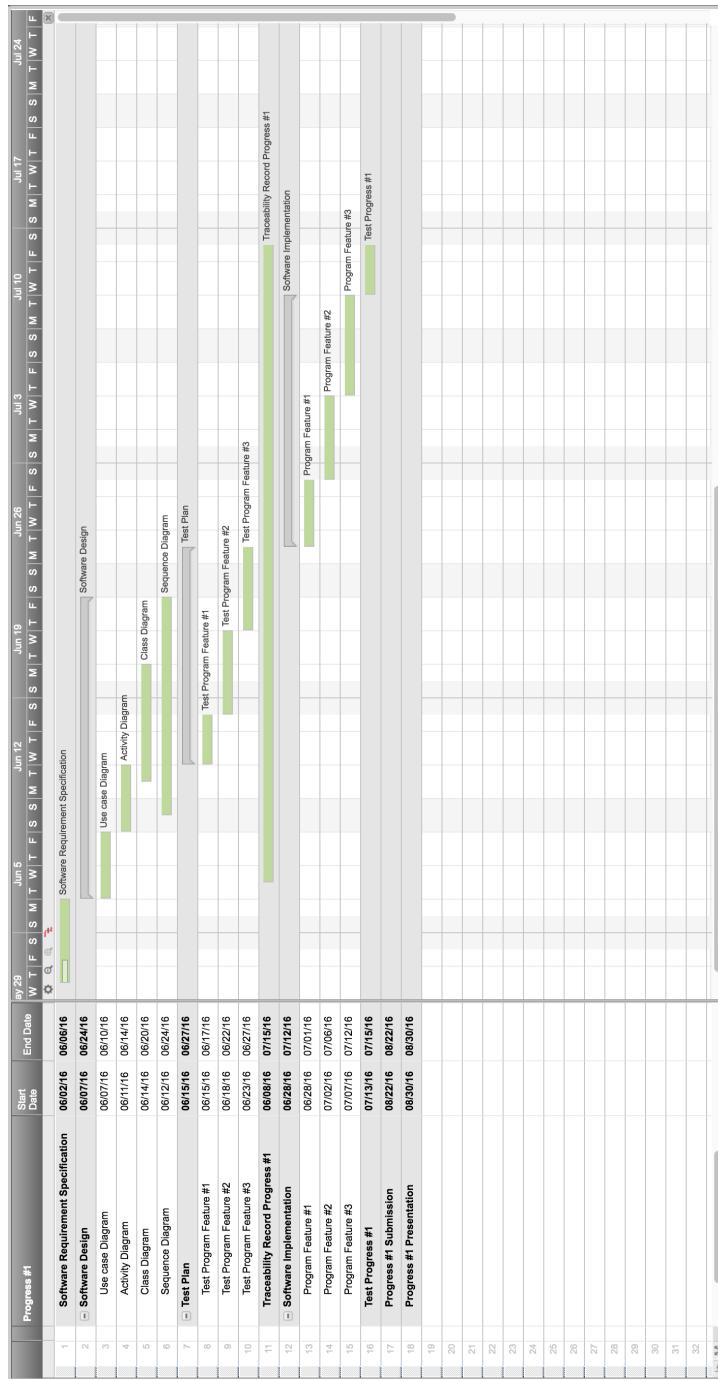
Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	27 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

## 4.6 Schedule and Milestones



**Figure 1.6:** The Milestone of Initial Project

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	28 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016



**Figure 1.7:** The Milestone of First Progress Report

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	29 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016



**Figure 1.8:** The Milestone of Second Progress Report

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	30 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016

# Chapter Five |

## References

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**Source:** [http://en.wikipedia.org/wiki/Android\\_\(operating\\_system\)](http://en.wikipedia.org/wiki/Android_(operating_system))

[2] **Topic:** JSON Information  
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[3] **Topic:** Google Maps API Information  
**Source:** [http://en.wikipedia.org/wiki/Google\\_Maps](http://en.wikipedia.org/wiki/Google_Maps)

[4] **Topic:** Facebook API Information  
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[5] **Topic:** Augmented Reality (AR) Information  
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[6] **Topic:** PHP Information  
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[8] **Topic:** Android Studio Information  
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[9] **Topic:** My SQL Information  
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[11] **Topic:** Aptana Studio 3 Information  
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[12] **Topic:** Unity 3D Editor Information  
**Source:**

[13] **Topic:** Iterative Model Information  
**Source:** [http://www.tutorialspoint.com/sdlc/sdlc\\_iterative\\_model.htm](http://www.tutorialspoint.com/sdlc/sdlc_iterative_model.htm)

[14] **Topic:** Iterative Model Picture  
**Source:** [http://en.wikipedia.org/wiki/Iterative\\_and\\_incremental\\_development](http://en.wikipedia.org/wiki/Iterative_and_incremental_development)

Document Name	VR Map 2Go!-Proposal-V.1.0.5.docx	Owner	PP	Page	31 / 31
Document Type	Proposal	Release Date	29 May 2016	Print Date	31 May 2016