MOTORCYCLE TRACKING SYSTEM USING GPS VIA ANDROID BASED PLATFORM

WAN MUHAMMAD IKMAL BIN MOHD TARMIZI

BACHELOR OF COMPUTER SCIENCE (COMPUTER NETWORK SECURITY) WITH HONOUR
FACULTY INFORMATICS & COMPUTING
UNIVERSITI SULTAN ZAINAL ABIDIN
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STUDENT DECLARATION

I hereby declare that this project paper is the result of my personal research. This dissertation is submitted to the Faculty of Informatics & Computing, University Sultan Zainal Abidin as partial fulfilment of the requirements for the degree of Bachelor of Computer Science (Computer Network Security) with Honour. All stated information which has been obtained from other sources is fully referenced.

Signature: ………………………………………

Name: Wan Muhammad Ikmal Bin Mohd Tarmizi

Date: ……/……/………
SUPERVISOR DECLARATION

I hereby declare that I have checked this project and in my opinion, this project is adequate in terms of scope and quality for the award of Bachelor of Computer Science (Computer Network Security) with Honour.

Signature: ........................................

Supervisor: Prof Dr Mohd Nordin Abdul Rahman

Date: ……/……/……..
CONFIRMATION

This project report was prepared and submitted by Wan Muhammad Ikmal Bin Mohd Tarmizi (BTBL15040595) and has been found satisfactory in terms of scope, quality, and presentation as partial fulfilment of the requirement for the Bachelor of Computer Science (Computer Network Security) with Honour in University Sultan Zainal Abidin.

Signature: ........................................

Supervisor: Prof Dr Mohd Nordin Abdul Rahman

Date: ……/……/……..
DEDICATION

In the name of Allah SWT, Most Gracious, Most Merciful

I am grateful and would like to express my sincere thanks and appreciation to my supervisor, Prof Dr Mohd Nordin Abdul Rahman for his guidance. I really appreciate for his continuous support from the initial to the final level in making this research possible. Without his advices, my project will not be completed at the right time. Besides that, I sincerely thanks for spent his time in guiding and correcting my mistakes.

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Lastly, I would like to thanks to any person that contributes to my final year project. Praise goes to Allah, the Cherisher and Sustainer of the worlds.
ABSTRACT

In this time, criminal of theft motorcycle become so serious in this country. Motorcycle can be missing at home, hospital, mosque and other place. Even the owner of motorcycle lock the motorcycle with added lock, the motorcycle still have possibility to lost. After the motorcycle is missing, in most case it could not be traced ever again and in other world the motorcycle is completely lost. In this project Motorcycle Tracking System that act as a medium to detect the coordinate or location of motorcycle when missing. In this system, I want to make the motorcycle become traceable and they did not need to worry when left the motorcycle. This system use android as platform that connected with others devices for improving security of the motorcycle. The connection that happened between these devices can produce a smart system. The GPS receiver is used to detect the coordinate of the motorcycle and Google Maps will display the location in user application. Importance of this system is to make the motorcycle become traceable which mean we can trace the location of the motorcycle using the device that attach on it.
ABSTRAK

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In 20th century, motorcycle theft case is increasing day by day. Awareness of the importance of safety systems on motorcycles is not preferred by motorists. This gives the thieves a chance to steal a motorcycle that does not have a good security system. Motorcycles that do not have a security system usually lose in the parking area of the shopping mall, hospitals, public places and also mosques. This project is about android motorcycle tracking system which is a system can determine the exact location of the motorcycle. To perform this system, Android platform is used that can provide exact location to others smartphones for improving security of the motorcycle.
The connection that happened between these devices can produce a smart system by using an embedded system integrated with Global Positioning System (GPS) and Google Maps. This proposed work is an attempt to design and develop a motorcycle tracking system that uses GPS service to determine the exact location of the motorcycle.

The GPS receiver is used to detect the coordinate of the motorcycle and Smartphones is used to give the instruction to the system to get the exact location of motorcycle.

The uses of motorcycle tracking system can be proposed to any motorcycle in world. The importance of this system is to make the motorcycle become traceable which mean the owner can trace the location of the motorcycle using the android that attached on it.

1.2 Problem statement

In most cases losing the motorcycle, motorcycle owners do not apply any security system to their motorcycle. Most of the motorcycles sold in the market do not have a good safety system on motorcycles. They only provide a physical security feature which is an additional lock.

Every year, motorcycle theft statistic is increased more than the number of thefts of other vehicles. Since 2011 until 2016, the number of motor thefts show sharps drop compared to other vehicles. However in 2011 which recorded
more than 21 thousand motorcycle theft cases. In 2016 the report for theft of motorcycles statistic is about 10,054 cases in Malaysia [1].

Utusan Online [2005, July 22] Polis Diraja Malaysia (PDRM) received 65,076 reports of vehicle theft case involving a loss of RM753.2 million over the past year. Inspector General of Police, Tan Sri Mohd Bakri Omar said that based on statistics, it means that 177 cases of missing vehicles registered in the country every day.

In 2004, 177 vehicles were reported missing everyday with 141 of them being motorcycles, followed by 23 cars and 13 Lorries and van [2].

Usually, lost motorcycles will never be found again and thieves will be missed. With the proposed motorcycle tracking system, the owner can trace the exact location of their motorcycle. This system can also help the police to track and arrest the thieves. In other cases of losing motorcycle, the owner forgot where they park their motorcycle. Usually this cases happen at public place that full with people and happen at big parking in shopping mall. If this tracking system attach on their motorcycle, this problem can be solve and they do not need to worry when they left their motorcycle in large area parking.
1.3 Objective

The project objectives are as follows:

I. To study about the tracking system by using Assisted Global Positioning System (GPS).

II. To design a framework for establishing a connection between the Android and web application.

III. To implement the motorcycle tracking system that can give an exact location of motorcycle to application user.
1.4  **Scope**

The scope of this project is to design the motorcycle tracking system that can detect the exact location at the network in real time.

### 1.4.1 Admin

i.  Add user

ii.  Manage android GPS

iii.  Track motorcycle using web based

### 1.4.2 System

i.  Receives the instruction from user/admin

ii.  Get the longitude and latitude from GPS satellites

iii.  Send the location to user/admin

### 1.4.3 User

i.  Log in into application

ii.  Track motorcycle using smartphones
1.5 Limitation

There are some limitation in this project which are:

I. Can cause of delay when the network is poor.

II. This system only can use in smartphones that have Internet connection.
CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The main objective of this project is to implement Motorcycle Tracking System by using GPS Android. Reviewing on some article, journal and thesis about tracking system is used in this project that applied in existing system.

Based on research paper, there are several method used in tracking system.
2.2 Comparison between Method

There are three (3) main types of GPS vehicle tracking that are widely used. They used active device and can be classified as follows:

2.2.1 Automatic Vehicle Location System (AVL)

AVL system is an advanced method to monitor any remote vehicle and to track with the device that receives and sends signals through GPS satellites (Saniah et al., 2015). AVL comprises of Global Positioning System (GPS) and Geographic Information System (GIS) in order to provide the real geographic location of the vehicle. AVL system consists of PC-based tracking software to dispatch, a radio system, GPS receiver on the vehicle and GPS satellites.

The tracking method uses GPS satellite to locate the vehicle equipped with GPS modem by sending satellite signals. GPS receiver on the vehicle receives the signals of its geographic location. Then the receiver sends that data plus speed, direction, etc. to the base station via a radio system. The system also has some limitation by using the AVL system we cannot get accurate, complete and sufficient satellite data in dense urban areas or indoors and when transmission is blocked by natural obstructions (heavy tree cover) or many buildings (Shandee, et al., 205).
2.2.2 Assisted Global Positioning System (AGPS)

In AGPS system, a terrestrial RF network is used to improve the performance of GPS receivers (Saniah et al., 2015). AGPS provides information about the satellite constellation directly to the GPS receivers. AGPS uses mobiles and cellular networks to locate the accurate positioning information. The tracking method of AGPS uses GPS satellites to track the vehicles. With unassisted GPS, locating the satellites, receiving the data and confirming the exact position may take several minutes. A GPS receiver in vehicle is always in contact with 4 satellites (3 satellites determine longitude, latitude and elevation and the fourth provides element of time).

The location is retrieved from the GPS device and relayed as a SMS using the cell phone by the Client Node to the Base station. This system is more expensive than the AVL system. The system can provide further services like atomic time (Accurate Time Assistance). There is a "panic" button. When pressed, you can contact an operator and he or she will help you out or keep you safe from accidents or hijacks (Shandee, et al., 2015)

Assisted Global Positioning System (AGPS), a wireless network sends information directly to the GPS receiver, which allows the receiver to quickly locate the four satellites and process the data contained in their signals (Skytel Corp, 2004). The system has also some limitations as GSM network is used to transmit data from the
vehicle to the base station, the cost of sending SMS is a major concern to be considered.

2.2.3 Radio Frequency Identification (RFID)

RFID is an automatic identification method using devices called tags to store and remotely retrieves data. RFID uses radio waves to capture data from tags (Saniah et al., 2015). The tracking method of RFID is comprised of three components: tag (passive, semi passive and active), reader (antenna or integrator) and software (middleware). RFID provide a unique identification code that can be read by a scanning device. RFID tag which contains microelectronic circuits sends the vehicle information to a remote RFID reader which is then read via the software (Sudip Evans Costa et al., 2015)

The information is sent to and received from RFID tags by a reader using radio waves. RFID tags are usually attach/inject inside the animals, this can helping us to keep a track on them. RFID tags are placed inside jewellery items in shop, and an alarm is installed at the exit doors. If an unauthorized attempt is made to move the jewellery items away from the shop, the alarm gets activated (Techspirited, 2018). There are some limitation of RFID which is high costs restricted usage to larger businesses. RFID typically more expensive to set up.
Table 2.1 summarized the comparative information for the existing detection methods in tracking system.

Table 2.1: Comparison method of tracking system

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<th>Send Information</th>
<th>Advantages</th>
<th>Disadvantages</th>
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<td>AVL</td>
<td>Via Radio System</td>
<td>-Provide the real geographic location of the vehicle</td>
<td>-Cannot get accurate, complete and sufficient satellite data in dense urban areas or indoors and when transmission is blocked by natural obstructions (heavy tree cover) or many buildings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Useful for Military</td>
<td></td>
</tr>
<tr>
<td>AGPS</td>
<td>Via Short Message Service (SMS)</td>
<td>- A wireless network sends information directly to the GPS receiver</td>
<td>-The cost of sending SMS is a major concern to be considered.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Can provide further services like atomic time (Accurate Time Assistance).</td>
<td></td>
</tr>
<tr>
<td>RFID</td>
<td>Via Radio Waves</td>
<td>- Useful for track animal or jewellery in shop</td>
<td>- High costs restricted usage to larger businesses</td>
</tr>
</tbody>
</table>
2.3 Related Work

Security systems of vehicle is used in round world in many fields. Such as:

2.3.1 Bus Tracking System

Lau (2013) proposed simple bus tracking system in UCSI University, Kuala Lumpur, Malaysia. The tracking system provides students with the location information of a bus within a fixed route. The students are provided with a status of the bus after specified time interval using LED panel and a Smartphone application. Real-time bus tracking systems are beneficial to college students who attend colleges with large campuses.

With the bus tracking system, they can spend more time studying, sleeping, or relaxing rather than waiting for a delayed bus. Spending less time waiting for a bus improves the comfortable and effective time management of the students as well. Also, the bus tracking system helps improve children’s safety when it is equipped in school buses (Eddie Chi-Wah Lau et al., 2013).
2.3.2 Vehicle tracking system using social network service

This method is proposed by (Shafee et al., 2013). Vehicle tracking systems based on social network services has attracted interest in a number of users such as Twitter and Facebook. Each in-vehicle device has an account of the twitter social network and can identify the vehicle location in social network on a regular basis. A web interface is used to display a status vehicle like door open/close, and ignitions on/off and a vehicle location placed on Google maps.

Also users can send commands from the web interface to the vehicle the shut down the vehicle proposed system can be accessed from a Smartphone more easily because the Smartphone has available social network services. This system would become more efficient to users of smartphone who use social network and, they allow quick monitoring of the location and status of the vehicle (Mena Saeed et al., 2013).

2.3.3 Employee Surveillance System Using Android Smart Phone

The application developed by (Nirmal, et al., 2016), worked on Employee Surveillance System Using Android Smart Phone. Their system integrates Employee monitoring and GPS location Tracking
System using Android phone. All the activities of the Employee will be monitored using this system.

The system works on 3G communication between the terminal ends. All the activities of an employee on his cell phone and computer, like all incoming and outgoing calls, web browsing, data usage and secured document modification and illegal transfer of company’s informative details like stocks, blue print and projects will be set under surveillance.

Not only this, the global geographic position of the employee will be traced using GPS. Therefore the organization will be set to surveillance that will restrict the unwanted usage of its resources by the employees during working hours. The system was beneficial for the progress of the organization and will allow the Manager to check the dedication of his employees towards work (Rohit Koul et al., 2016).

2.3.4 Vehicle Tracking and Anti-Theft Tracking System

This application is developed by (Al-Khedher, 2012). The project proposed design and implementation of a vehicle tracking and anti-theft system for protecting a vehicle from any intruders. This system use GSM/GPS technology. This system also use Kalman Filter to reduce positional errors, thus improve the accuracy of the position
determination. When a vehicle ignition is turned on, a vehicle owner receives a confirmation SMS that a vehicle is running now.

If the access to the vehicle is illegal, the owner sends a SMS to turn off the vehicle. A laptop embedded with google earth is used for tracking and viewing the location and a status of the vehicle on a map. A Smartphone is the good alternative to replace the work that the laptop perform (Monsater N. Ramadan et al., 2012).

2.3.5 Public Bus Transportation Tracking and Arrival Time Estimation Using Geo-Fence

This project is proposed by Afnan (2017). The project proposes design and implementation of a public bus transportation and arrival time estimation by using geo fence for prediction for bus arrival time from previous station to the next station. In this system, user as a passenger could request the route number or search location or live departure or live arrival time of the specific bus stops. User could use this system through their smartphones which have internet connection.

They could see live maps of the route and could gain the arrival and departures times based on the bus stops. Therefore, they could track and monitor the bus location precisely by give them a real-time access. Staff as administrator is bus management responsible to analyse.
the information about updated location of the bus and provide the arrival and departures schedule of the whole bus trip of the bus.

Every system have their own limitation. This system only worked if there are internet connection whether mobile connection or Wi-Fi connection.

2.4 Summary

Based on the discussed technology, various different method that can be used to tracking system and also can used the tracking system for another function. Hence, this project will be develop by using AGPS because APGS uses mobile based and SMS to send the information and the other advantage of AGPS that already mentioned in the table comparison.
CHAPTER 3

METHODOLOGY

3.1 Introduction

In this chapter is about process of developing project from the beginning until the end of this project. The flow of the project will discuss briefly to give more understanding of design and develop of this project. There are many method that can be used for developing this project. The methodology that can be decide in this project is System Development Life Cycle (SDLC). In this methodology is based on phases for each development process.
3.2 System Development Life Cycle (SDLC)

In this project, the most suitable methodology that can be apply is (SDLC). SDLC is a structure followed by a development team within the software organization (Arif Fahmi, 2015). It contain of detailed plan describing to develop system, maintain and replace specific software. This methodology is for improving the quality of software and the overall development process. Which have a beginning of the operation and end of the operation. SDLC consists of six (6) activities which is Planning, Analysis, Design, Implementation, Testing and Integration and Maintenance.

Figure 3.1: SDLC Phase
3.3 System Development Life Cycle (Incremental Model)

Figure 2 show the Iterative and incremental model that are chosen in developing the project. This model is used because a project can be developed through repeated cycles (iterative). The developing of the project can be proceeding if there is some error or something that wants to be changing a little bit in the middle of this project. Iterative and incremental model included six phases which are planning, requirement analysis, design, implementation, testing and deployment.

Figure 3.2: SDLC (Incremental Model)
3.3.1 Planning Phase

Planning is the first step that is followed to develop motorcycle tracking system. The suggestions is given to the supervisor to develop this system so that it can be proceeded to another stage. At this stage, planning is important to develop a tracking system for monitoring the actual location of the motorcycle. To make it possible, this project is done by using android as a device that given the location of the motorcycle. And also use smartphones to view the location. Some material that is required has been prepared.

3.3.2 Analysis Phase

In this stage, a lot of information about the system want to enhance is gathered. All the hardware and software requirement is listed to develop the system. Some coding using Hypertext Pre-processor (PHP) to send SMS and more information related is collected. Then, another information gathered is about Firebase website that provide service Send notification messages or data messages.
3.3.3 Design Phase

This is the third stage that is used so that the flow of the project will be successful. After gathered all important information related to the project, a framework is done to show the flow of the system so that this system will more easily to be understood. In this phase, a design of flowchart and framework will be explained to show the flow of the system specifically.

3.3.4 Implementation Phase

After all information has been gathered and the design has been created, starting develop the system using all the hardware and software that listed before. Implement phase is implemented process for android GPS related to Smartphone to track the exact location of the motorcycle. To develop the system, there are programming tools are used such as Android Studio, Notepad++, PHP programming etc. XAMPP server is used for localhost server and web-based programming to create a graphical user interface. If there any error or changes, it will be solved at this phase.
3.3.5 Testing Phase

At this phase, the system will be tested if the error still occurred, it will be solved at this phase and if there is any changes need to implement, the project must back to design phase for revision of flow.

3.3.6 Evaluation Phase

The system is evaluated before it is deploy to end-user. In this phase determine whether the tools related or not with the objective.

3.3.7 Deployment Phase

In this phase, when the system has achieved the objective and passed the testing, the system can be deployed and user can use the system. Once the system is in steady state, it is reviewed that the system met all the objectives and goals.
3.4 Software and Hardware Requirement

This section will show the list of all software and hardware requirement that involve in the development process.

3.4.1 Software Requirement

To develop this project it can be many choices to choose the best software, this is because the selection of software depends on requirement needed in this project. The software to develop this project is shown as below.

- Android Studio
- Notepad++
- phpMyAdmin
- Microsoft Word
- PHP
- Google Maps
- Microsoft Office

3.4.2 Hardware Requirement

Hardware is important in ensuring the research of this project is success. Each hardware has its own function in order to do this research. The hardware to develop this project is shown as below.
3.5 **System Design and Modelling**

Figure 3.3 shows the framework for motorcycle tracking system. In order to perform the system successfully, the user must have their smartphones to connect with android that attach on the motorcycle. The user must log in to the system to view the location of the motorcycle.

![Figure 3.3: Framework for Motorcycle Tracking System](image-url)
3.5.1 System Design

System design is the process of defining the architecture, components, modules, interfaces and data for a system to satisfy specified requirements. System design involves Context Diagram, data Flow Diagram and Entity Relation Diagram.

3.5.1.1 Context Diagram

A context diagram is a data flow diagram, with only one massive central process that subsumes everything inside the scope of the system. It show the system will receive and send data flows to external entities involved. Such as system, organization groups and external data stores.
Figure 3.4: Context Diagram

3.5.1.2 Data Flow Diagram

Data Flow Diagram (DFD) provides a visual representation of the flow of information within a system. By drawing a Data Flow Diagram, you can tell the information provided by and delivered to someone who takes part in the system process, the information needed in order to complete the processes and the information needed to be stored and accessed.
Figure 3.5: Data Flow Diagram for User
Figure 3.6: Data Flow Diagram for Admin
3.5.1.3 Entity Relationship Diagram (ERD)

Entity Relationship Diagram in software engineering is an abstract to describe a database. It is typically used in computing in regard to the organization of data within database or information systems. An entity is a piece of data an object or concept about which data is stored. A relationship is how the data is shared between entities.

![Entity Relationship Diagram](image)

Figure 3.7: Entity Relationship Diagram
3.6 Summary

In this chapter, the methodology of this project is explained. The Iterative and Incremental Method from System Development Life Cycle (SDLC) is used because every phase during the system development follows the project methodology that is mentioned in this chapter. The flow of this project is being shown in framework. The requirement of software and hardware that being used are listed to ensure the development of this project.

Besides, this chapter also discuss on the Context Diagram, Data Flow Diagram and Entity Relationship Diagram of the system which are essential as a guideline for the system development.
CHAPTER 4

IMPLEMENTATION

4.1 Introduction

Implementation method is a systematic structured approached to integrate software based service or component into the workflow of an organizational structure or an individual end-user. The procedures in this section may be modified to make sure the functionality and module to work correctly and test may be performed to ensure the compatibility of Global Positioning System GPS with Android and Web Based system.
4.1.1 Deployment

4.1.1.1 Android Studio

This project developed android based user by using Android Studio. Figure 4.1 shows an example of Android studio welcoming interface.

![Android Studio](image)

Figure 4.1: Android Studio
4.1.1.2 Server

The server that are used to make sure the system function well is online server FIK Web Hosting. Figure 4.2 depicts the login interface of FIK Web Hosting platform.

![Login Interface of FIK Web Hosting](image)

Figure 4.2: FIK Web Hosting
4.1.1.3 Database

The Database phpMyAdmin are connected through online server. The database consist of four tables those were customers, manage, gpslocations and staff. The interface database admin is depicted in Figure 4.3.

Figure 4.3: Database Application Interface
Figure 4.4 shows the database interface for Staff. There are only staff authorized as administrator. Staff could register customers, update and delete the customer’s data. It consists of id and password. The id and password for staff is created by developer. These id and password cannot be change by staff itself.

Figure 4.4: Table of Staff
Figure 4.5 below are table for customers. It consists of id, username, password, name, ic, contact, noplate and type. All the data needed is really importance and this data should not be fake. The data only can be insert by staff. The id and password is really importance to user to log in into the Android application.

![Image of Table of Customers](image-url)
4.1.2 Interface

In implementation, the goal of user and admin interface design is to make sure the interaction between them is simple and efficient as possible. Design interface also created to show the flows from first step until the end of the process.

4.1.2.1 Admin Login

Figure 4.6 show the interface for admin log in into the Motorcycle Tracking System through web application. The interface login admin only can be seen by the staff. The customer not allow to open this application. The staff need to know the id and password to login to the system.

![Welcome Admin](image)

Figure 4.6: Admin Login
4.1.2.2 Main Activity Admin

Figure 4.7 below shows the main activity of admin or staff. The staff is able to register new customers. The Staff need to insert the username and password given by customers. Staff cannot randomly put the username and password without any permission by customer. This is really importance to customers when they want to login to Android application. Others data needed must be original from customers to avoid data fraud. Staff also can update the information of customers when necessary.

Figure 4.7: Register new customer
4.1.2.3 View and Update Customer

Figure 4.8 show the data of customers. Here staff can view the registered user and staff is be able to update the information of customers if necessary. When the staff want to update the information, the staff need to know the id of customer. Staff need to put the id in the columns and click the submit button. After that, staff can update the information of customers.

Figure 4.8: Update customer
4.1.2.4 Admin manage android GPS

Figure 4.9 show the interface of manage android GPS. Before the user can use the Android application, staff must manage the Android GPS information which is plate number motorcycle of user time and date of registration. This is needed for staff report.

Figure 4.9: Manage Android GPS
4.1.2.5 Admin Maps view

Figure 10 show the maps web application. This interface view after the admin want to check the location of their customer’s motorcycle. The admin need to select the motorcycle no plate to view the location. The red marker show the current location of motorcycle and green marker is previous location.

Figure 4.10: Admin Maps view
4.1.2.6 User Login

Figure 4.11 show the interface for customers in android based. The customers or user just need to register with admin to use this application. After registration, user need to put their username and password to log in into the application. After that user just need to push the button request location to track their motorcycle.
4.1.2.7 User Request Location

Figure 4.12 shows the interface that will appear when a user successfully logs into the application. The user needs to push the request location button and then select their no plate motorcycle to get the current location of their motorcycle.

![Android GPS](image)

Figure 4.12: User request location
4.1.2.8 User Maps view

Figure 4.13 show the map in Android application. The user will get this maps view when they request the location. The red marker show the current location in real-time and the green marker show the previous location of the motorcycle.

Figure 4.13: User Maps view
4.1.2.9 Android GPS

Figure 4.14 show the interface of android GPS. This android will attach on the motorcycle. User just need to put their No Plate motorcycle and then turn on the tracking. The GPS will run and user now can track their motorcycle.
4.2 Summary

Implementation is an interrelated process where each of implementation modules need to be tested in order to achieve less errors and meet requirement specified. In general, most of the budget consume on implementation phase because it is core process to complete the product and able to deliver all the functionalities smoothly.
CHAPTER 5
CONCLUSION

5.1 Discussion

There is no standard application for vehicle tracking system that uses smartphone as platform to get the information. The application are written to suit the needs of the scenario which exists. Most of the tracking system uses geographic position and time information from the global positioning satellites.

Regularly, global positioning system have at all around the world. There is no limit to application to get the location. GPS satellites transmit data about their current time and position. A GPS receiver monitors multiple satellites and solves equations to determine the precise position of the receiver and its deviation from real time.

5.2 Limitation

No technology comes without limitation, so is to this system. The limitation if the user didn’t not turn on the GPS on their smartphones that attach to the motorcycle. Besides, the user need to make sure that GPS is always updated because if not the GPS receiver cannot transmit the data. Other
limitation is if the motorcycle is in remote area. There is problem to satellite to get the exact longitude and latitude of the motorcycle.

The biggest problem is the application is fully depends to internet connection. If the connection is lost, the GPS having the problem to get the current location. Same as user, if they want to use the application their android need to have internet connection.

5.3 Recommendation

Basically this project need more improvement and a lot of uses of technology to improve the performance of the system. In the future, the uses of GPS should in offline to overcome the limitation to get the longitude and latitude. Or the next future technology should have big data of database maps that save all the longitude and latitude and in that way the used of internet is not needed anymore.

5.4 Summary

For the factory of motorcycle, they need to improve the security on their product. The security should in many way like tracking system, lock system and other way. The effort in this research is dedicated to develop an attractive and marketable motorcycle tracking system. The user of motorcycle
should start to add the security like this tracking system to their motorcycle. This can guarantee them to track their motorcycle when missing.

Alhamdulillah, praise to Allah, Motorcycle Tracking System application have met its objective to help motorcycle owner track their motorcycle when missing.

REFERENCES

[1]. gedebakviral.com “8 model motorsikal paling panas dan kerap dicuri di Malaysia” (27 August 2017)

[2]. Utusan Online “Kes curi kenderaan libatkan kerugian RM753.2j” (22 July 2015)


[5]. techspirited.com “advantages disadvantages of RFID technology”


[10]. Nursyazima Binti Nordin “Smart Door Bell and Answering Machine System”, Faculty Informatics and Computing University Sultan Zainal Abidin 2015