



Faculty of Computer Science and Information Technology

***Secondary and Independently Operated Security System for Cars***

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Bachelor of Computer Science with Honours  
(Network Computing)  
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*Secondary and Independently Operated Security System for Cars*

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This project is submitted in partial fulfillment of the requirements for the degree of  
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## Abstract

*Nowadays, there are a lot of car crimes happened in Malaysia. Having an existing car security system is not enough to secure the cars. The car thief easily to bypass the existing system and steal the car unknowingly. The thief knows how to breach the security system because they might be an expert on it. There are various ways to bypass the current car security system, such as disabling the battery, cloning the car keys and etc. In order to solve this problem, a secondary and independently operated security system for cars is proposed. The purpose of this system is to introduce a secondary security system as a backup for the default car security system. Besides, it is also to alert the owner in the shortest possible time so that the owner can take immediate action to stop the crime. Waterfall model is used to develop this system. Thus, this thesis gives an introduction to the system, methodology used, design of system, accomplishments of the system and future improvement of the system. It would be significant that the system could give a great impact to the car owner.*

## **Abstrak**

Kini, terdapat banyak jenayah kereta yang berlaku di Malaysia. Mempunyai sistem keselamatan kereta sedia ada tidak mencukupi untuk mengamankan kereta. Pencuri kereta dengan mudah untuk memintas sistem yang sedia ada dan mencuri kereta tanpa sedar. Pencuri tahu bagaimana melanggar sistem keselamatan kerana mereka mungkin pakar di dalamnya. Terdapat pelbagai cara untuk memintas sistem keselamatan kereta semasa, seperti melumpuhkan bateri, kloning kunci kereta dan sebagainya. Untuk menyelesaikan masalah ini, sistem keselamatan sekunder dan bebas yang dikendalikan secara bebas untuk kereta dicadangkan. Tujuan sistem ini adalah memperkenalkan sistem keselamatan sekunder sebagai sandaran untuk sistem keselamatan kereta lalai. Selain itu, ia juga memberi amaran kepada pemilik dalam masa yang sesingkat mungkin supaya pemilik boleh mengambil tindakan segera untuk menghentikan jenayah itu. Model air terjun digunakan untuk membangunkan sistem ini. Oleh itu, tesis ini memberikan pengenalan kepada sistem, metodologi yang digunakan, reka bentuk sistem, pencapaian sistem dan peningkatan masa depan sistem. Akan sangat penting bahawa sistem itu boleh memberikan impak yang besar kepada pemilik kereta.



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## CHAPTER 1: INTRODUCTION

### 1.1 Introduction

Car crime is a major issue at present days. According to Lim (2019), there are 5629 private cars in Malaysia reported for theft insurance claim. Although car alarms are built into the cars, but car alarm is the most basic devices. It consists of at least one type of sensor, siren, flashing light and a remote control to make it work (Laukkonen, 2019). The main purpose of car alarm system is to scare the thief away. Car alarm system usually works with a sensor installed at the car doors. If the thief tried to open the door, the door will send a signal to the remote control. The remote control will receive signal and activate the siren, creating the alarm sound.

Nevertheless, the car alarm system could be malfunction occasionally. For instance, remote control problem. A malfunctioning remote control cannot send signal accurately to make the siren goes off. Besides, the faulty sensors installed cannot work properly as it is connected to the alarm system. If the sensors are damaged, the car alarm system definitely could not perform well. In addition, the low car battery is another cause of malfunction of the car alarm system.

Nonetheless, car alarm system is vulnerable that the thief is able to bypass and hack the car alarm system. The thief can use different methods to bypass the primary security system. Hence, there is a need for secondary and independently operated security system. This proposed system is introduced so that it is more effective in reducing the cars from being stolen. Besides, this system also acts as a second level protection to the primary car security system. The system will notify by calling the car owner when the thief breaks into the car. This system is independent which it is not integrated to the existing car alarm system hence it has its own

backup battery module and can be installed separately and independently. The car owner can install the system on its own without the knowing of car manufacturer.

## **1.2 Problem Statement**

The car alarm system is essential for cars and it is built into the cars for security purpose these days. However, the operation of today's car alarm systems commonly known by many and it can be broken into relatively easy as the thieves know exactly what to expect when trying to breach the security system. The existing car security system is vulnerable that the thief can use many ways to bypass or disable the car alarm system. There are various ways to disable the car alarm system. For example, replicating the remote control or frequency, disconnecting the battery and etc. The car owners are facing the issues that their cars are stolen in no time. It is difficult to recover the cars once it has been stolen.

## **1.3 Objectives**

1. To introduce a secondary security system as a backup for the default car security system
2. To alert the owner immediately so that the owner can take immediate action to stop the crime.



## **1.4 Project Scope**

The secondary and independently operated security system for cars is targeted to alert car owners only. Other vehicles such as motorcycles, bus, lorry and etc are not in the scope. According to VTREC (2019), there are 3189 cases of vehicle theft claims records for private car while commercial vehicle such as trucks, van, bus and others have 407 cases. For motorcycle, there are 4070 cases of vehicle theft claims. Among these three-vehicle class, commercial vehicle is the lowest and it only occupied 5% of the overall stolen vehicle cases. Besides, motorcycle has the highest number because motorcycle is lightweight, harder to lock up due to the design (Monimoto, 2019). Also, there is no way to implement the proposed system into the motorcycle because of the design of motorcycle. Therefore, in my FYP, I will not cover both commercial vehicle and motorcycle. Besides, the sensors can be turned on and off using mobile application. The mobile application is focus on android based smart devices only. On the other hand, installing the system in real environment is not in the scope.

## 1.5 Brief Methodology

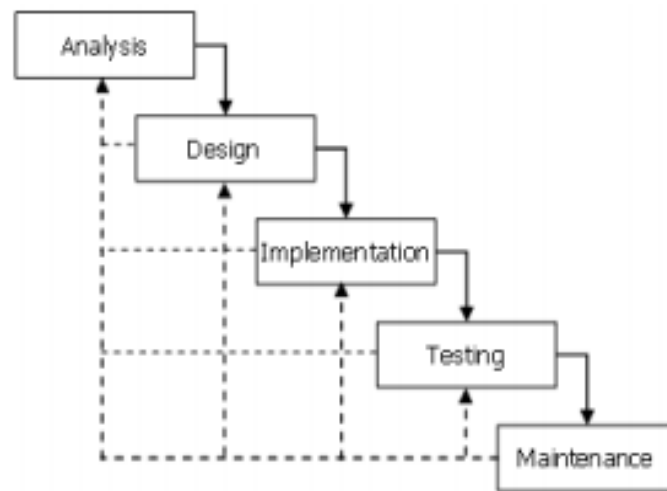


Figure 1. 1. The waterfall model (Bassil, Y, 2012).

Waterfall model is being applied to develop this project. The reason to choose waterfall model is because the proposed project is hardware and software based. Each phase in the waterfall model must be completed before moving on to the next phase. Waterfall model consists of five phases which is analysis, design implementation, testing and maintenance. These five stages in the waterfall model can help to analyse and design the system step by step.

During the analysis phase, the problem faced by the car owner is identified. Detail description of the problem and user requirement needed to be discussed. A plan is created to meet the specification of the user. In addition, objectives are defined so that the proposed system can achieve the objectives. Hence, it can help to reduce the car crime. Besides, the system will also be reviewed and compare with the existing primary security system.

In design phase, the features are designed and described. Flow chart are used to show the flow of the proposed system. Besides, the hardware and software needed will also be stated in this phase.

The implementation phase is when the real coding and development starts. The system will be constructed and programmed in this phase. After the implementation phase, it comes to the testing phase. The testing phase requires to check the accuracy of the system such as the features in the system. The system needs to be tested carefully whether it meets the users' requirements. Test cases will be created to test the system after finishing the development.

The maintenance phase will be started after the implementation successfully completed. Since it is a prototype in FYP, there will be no maintenance needed.

### **1.6 Significance of project**

The significance of the project is to design a secondary and independently operated security system for cars. This system does not rely on the primary car alarm system. If the primary car alarm system goes off, the proposed system will still work because it is independently operated. Besides, the system is user friendly. The owner of car can install this system on its own without the notice of car manufacturer. Besides, the system will automatically alert the car owner by calling which is the fastest way to alert the owner. When the thief opens the door, the additional sensors will be triggered and call the owner so that the owner can take immediate action.

## **1.7 Project Outline**

### **Chapter 2: Literature Review**

The literature review explains about the existing system similar to the proposed project. Review and comparison will also be done based on trusted resources such as online articles, journals, articles and research paper.

### **Chapter 3: Requirement Analysis and Design**

Chapter 3 discuss about the methodology implements in the proposed system. Besides, all the requirements, hardware and software will be determined in this chapter. Moreover, the system design which is the flow chart of the system will be created. System architecture will be included to give a clearer view of the system.

### **Chapter 4: Implementation and Testing**

The implementation details of the proposed system are specified in this chapter. Testing program will be conducted, and the output of the project will be screenshot and recorded into the report.

### **Chapter 5: Conclusion and Future Work**

Chapter 5 is to summarize the whole project and the discussion of the future work.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

In this chapter, there will be three existing system to be reviewed. Reviewing the systems are vital because it helps in identifying the current issues and problems in real life. Each existing system will be studied and reviewed in terms of features, advantages and disadvantages. The comparison of each existing system will be done. The features, strength and weaknesses of each of the system will be analyzed and reviewed.

### **2.2 Review of Existing Systems**

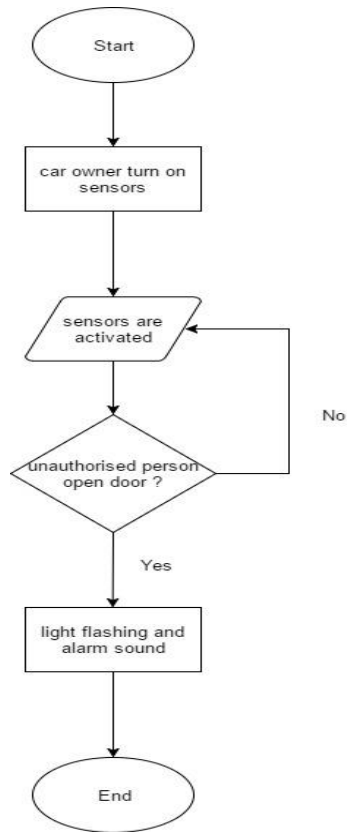
In this section, three comparable existing systems will be reviewed which is Car Alarm System, Immobilizer System, Physical Locks and GPS Tracking System.

## 2.2.1 Car Alarm System



*Figure 2. 1. Car Alarm System (Africa, 2018).*

Car alarm is the most common car security system. The purpose of the car alarm is to prevent the car from being stolen. It is the main security system of the car. The car alarm system is used in conjunction with sensors. When the car collides or moves, the sensor will be activated. Consequently, if someone tries to open the door, it will trigger the car alarm system. Thus, the alarm will sound and make a loud sound, and make the car lights flash to attract people's attention.



*Figure 2. 2.* Flow Chart of Car Alarm System

In car alarm system, car owner has to turn on the sensors using the car keys. The sensors are then activated. If someone is trying to open the door, there will be light flashing and the alarm will sound to grab attention of the people. The car thief will be scared off if there is too much attention on the car. On the other hand, the car alarm system will stay still with sensors activated until the car owner disable the sensors.



*Figure 2. 3. The remote (Harris, n.d.).*

The car alarm system made up of several components, which is a siren, sensors, computer control unit, and a remote (Africa, 2018). The computer control unit is the main component of the car alarm system. It receives the signal from the sensor and emits the signal to the siren to produce a sound. This could happen if an unauthorized person initiates the sensors. The internal battery is normally the power source to the car alarm system. The second component is siren. The function of a siren is to alert the people around and scares the thief off. The remote is to control the car alarm system and send instruction to the computer control unit. The purpose of the remote is to turn on and turn off the alarm system. When the owner leaves the car, he can use the remote to lock the door which means that it will arm the system. To disarm the system, the owner can just unlock the car by pressing a button in the remote.