



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

VEHICLE THEFT INTIMATION USING GSM

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor's Degree in Electronic Engineering Technology (Telecommunication) with Honours

by

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DECLARATION

I hereby, declared this report entitled “Vehicle Theft Intimation Using GSM” is the results of my own research except as cited in references.

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Electronics Engineering Technology (Telecommunication) with Honours (Department of Electronic & Computer Engineering Technology). The member of the supervisory is as follow:

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(PUAN SITI ASMA BINTI CHE AZIZ)

.....
(ENCIK FAKHRULLAH BIN IDRIS)

ABSTRAK

Kes kecurian kenderaan semakin meningkat dari hari ke hari. Bagi sesetengah kenderaan lama atau kenderaan yang tidak teknologi tinggi mudah dicuri oleh pencuri kerana ia tidak mempunyai sistem keselamatan yang baik di dalam kereta mereka. Tujuan projek ini dijalankan adalah untuk mengurangkan kecurian kereta . Disamping itu projek ini menggunakan teknologi “wireless” bagi mengesan atau memberitahu pemilik kenderaan bahawa kereta mereka kini didekati orang asing. Dalam hal ini demikian skop yang digunakan dalam kajian ini adalah menggunakan Pemberitahuan Kecurian Kenderaan menggunakan GSM. Satu pengaturcaraan untuk mikropengawal dan GSM telah dibuat untuk mengawal keseluruhan sistem ini. Apabila seseorang yang tidak dikenali memasuki kereta tersebut, pengesan PIR yang diletakkan di tempat sembunyi dalam kereta akan mengesan pergerakan manusia dan satu isyarat akan dihantar ke mikropengawal untuk mengarahkan GSM menghantar SMS kepada pemilik kenderaan. Pada masa yang sama, system pam minyak kereta dihentikan agar minyak tidak dapat mengalir ke enjin dan ini menyusahkan pencuri penghidupan enjin. Apabila pam minyak dihentikan maka buzzer akan bunyi. Dalam project ini, analisis terhadap pengesan PIR dan GSM telah dijalankan. Jarak maksimum yang boleh dikesan oleh pengesan PIR dan sensitiviti dia telah diuji dalam project ini. Selain itu, data yang diperolehi direkod dan graf dilukis untuk mendapatkan waktu puncak dalam sehari untuk penghantaran SMS menggunakan GSM. Beberapa cadangan telah dikemukakan dalam laporan projek untuk meningkatkan sistem ini pada masa hadapan.

ABSTRACT

The ratio of vehicle theft is increasing from day to day. Some of the old vehicle or non high-tech car are easily stole by thief because it does not have a good security system in their car. The purpose of this project is to reduce the car theft. This project is using a wireless technology to alert the car owner that their car is being approach by the stranger when the stranger is detected. This project with the title of ‘Vehicle Theft Intimation Using GSM’ is to recommend a way to prevent the car from being stolen by the thief. A programming for microcontroller and GSM was developed to control the whole system. When unauthorized person get into the car, the PIR sensor that has been hide inside the car will detect the human motion, a signal will send to microcontroller to order GSM to send SMS to the owner of car. At the same time, the fuel pump system will be stop working, resulting fuel cannot flow into the engine and this will difficult the unauthorized person to start the car engine. While the fuel pump stops working the buzzer will active. Analysis on PIR sensor and GSM was carried out in this project. The maximum range that can be detected by the PIR sensor and it sensitivity was testing in this project. Besides that, the data was recorded and the graph was plotted to find out the peak hours of the day for send message using GSM. Some of the future work was suggested in this report in order to improve the vehicle theft intimation system.

DEDICATION

To my beloved parents, supervisor, co-supervisor and all friends.

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LIST OF ABBREVIATION

GSM	-	Global System for Mobile Communication
SMS	-	Short Message Service
PIR	-	Passive Infrared
PIC	-	Peripheral Interface Controller
GPS	-	Global Positioning System
RTO	-	Regional Transport Office
TTL	-	Transistor-Transistor Logic
LCD	-	Liquid Crystal Display
RFID	-	Radio Frequency IDentification

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter will describe the overview of the project with the title vehicle theft intimation using GSM. It will include the project background, objective that will be a solution of problem statement, work scope and thesis outline that list the content of each chapter.

1.2 Project Background

Vehicle theft can be categorized as a property crime that will happen all around the world include our country Malaysia. Nowadays, there are many cases about the vehicle stolen happen and it is keep increasing in Malaysia. This means that we must find a solution to prevent this case from happening.

As a solution, this proposal with a title of ‘Vehicle Theft Intimation Using GSM’ is to recommend a way to prevent the car from being stolen by the thief. By using this system the total of car stolen crime in Malaysia will be reduced. In this globalization we need a technology to prevent our car being stolen. This project is using a wireless technology to alert the car owner that their car is being approach by the stranger when the stranger is detected. The working of this system is the owner will receive an auto generated SMS when his car entered by the theft. Besides that, by doing some modify on the fuel pump system as to stop the flow of fuel to the engine, this will cause the engine

of the car is difficult to start. Because if there is not fuel flow into the engine the vehicle will fail to start or cannot go too far.

Meanwhile the PIR motion sensor will be install inside the car that can detect unauthorized people who has enter into the car, then microcontroller will get the signal from PIR sensor and order the GSM modem to generate and send SMS to the owner of the car. If the owner receives SMS that their car being stolen by theft at the same time the system will automatic disable the fuel pump system of the vehicle to slowly stop the car. With this system, owner of the car can received an alert message at anywhere and they don't have to worry about their car that has been drive far away because the vehicle has the automatic disable fuel pump system this is the advantaged to the owner of the car. The alarm will be active after the fuel pump system has stop.

1.3 PROBLEM STATEMENT

Vehicle stolen has been an issue recently. Most of the old vehicle or non high-tech car does not have a good security system in their vehicle. Although vehicles have an alarm system but the thief still has the skill and knowledge on opening the car's door and start the engine without owners aware. The existing vehicle alarm systems are no match to the well-equipped thieves. According to Jiwa Abdullah(2011), in United States, there are many vehicle manufacturers that has employ Global Positioning System (GPS) for stolen vehicle recovery and monitoring vehicle fleet management. However there are situation where the GPS system cannot perform well at underpasses and indoor parking. To find a car that has been stolen in a period of time is very difficult. For low income family, they may be a burden to buying a new vehicle due to buying a new car need a higher cost. With this GSM project, the owner can immediately discover that his/her vehicle is trying to access by unauthorized user and the engine of the vehicle can stop slowly, so that the vehicle doesn't go too far from the original place. The cost of installing this system on the vehicle for is cheaper if compare with buying a new vehicle.

1.4 OBJECTIVE

1. To design a security system using GSM technology for the automotive environments.
2. To develop a program for microcontroller and GSM.
3. To analyze the vehicle security system by doing some research.

1.5 WORK SCOPE

This project will involve several steps in order to achieve the stated objective. The work scopes which is involve is writing a programming to detect the stolen activity by using the PIR motion sensor. With this programming, the stolen information will be sent to the owner by SMS through a GSM modem. After sending the message, the system will stop the engine that has done some modification of vehicle fuel pump inside of the vehicle which will not allow the fuel to flow into the engine and cause the vehicle fail to start.

1.6 THESIS OUTLINE

This thesis is structured in three main chapters. The contents of each chapter are summarized as chapter 1 consists of the introduction, problem statement, objective for problem solving, the work scope of project, and summary of the content of thesis.

Chapter 2 is describe the literature review on vehicle theft statistical analysis, existing car security system, some related works on vehicle theft intimation and related work on PIR sensor.

For chapter 3, it has explained on the methodology and the system architecture of the project. The flow and the operation of this project also will present in this chapter. Besides, block diagram and flow chart about this project also will be discussed in this chapter. Moreover, this chapter also explains about the specification of project hardware such as Global System for Mobile communication (GSM), AT command, PIR motion sensor, Microcontroller PIC16F877A, LCD.

In chapter 4 has cover result and analysis of the project. The operation of the project and the limitation of the project have been discussed in this chapter.

The last chapter is conclusion and recommendation which conclude the overall project and suggest the future work.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

To develop this project, there some research must be done as the literature review. This chapter describes the recent research on the technology of GSM in various automotive environments and application. In this generation many vehicle stolen has been reported, although vehicles have an alarm system for their vehicle but the thief still manage to steal the vehicle without owner aware. In this chapter the description will be focused on the related vehicle theft intimation. The research has conduct in order to suit the objective of this project which is to design a security system using GSM technology for the vehicle. To achieve the stated objective this project will involve several steps in work scope which is write a programming to detect the stolen activity and send the stolen information to the owner by SMS through a GSM. Besides, the scopes also need to ensure that GSM modem can receive the message sending by owner and the engine is able to stop or cannot start after reading the message. Some of the related journals and research paper will be discussed at this chapter.

2.2 Vehicle Theft Statistical Analysis

According to Jiwa Abdullah (2011), as many as 1000 cars were stolen monthly in Malaysia in the year 2007.

Below are some simple statistical analysis of car thefts for Malaysia:

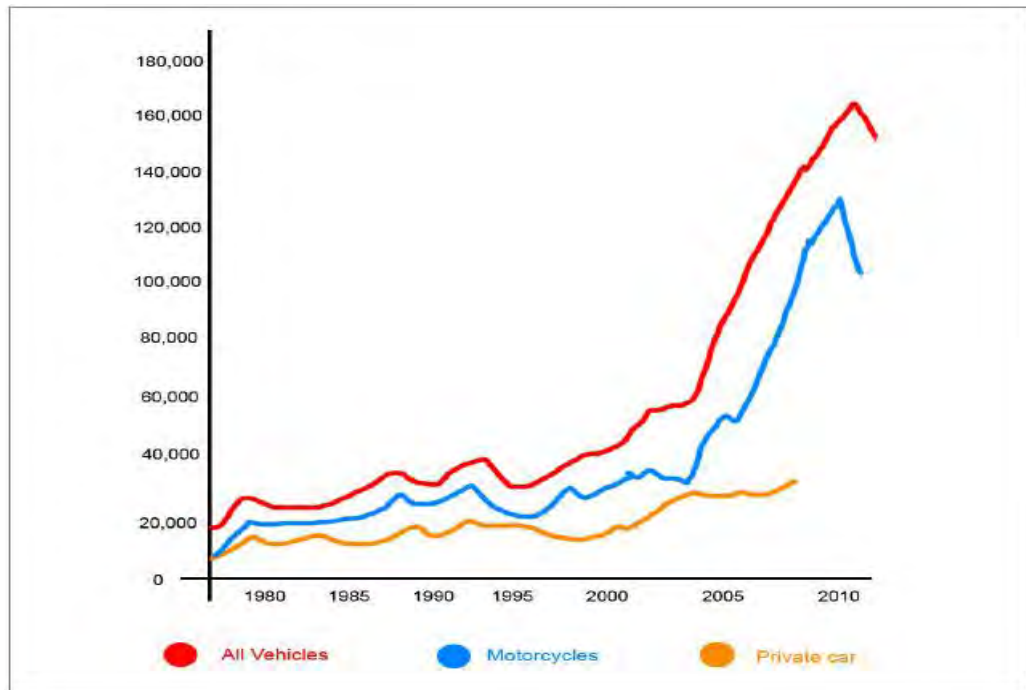


Figure 2.1 : Car theft statistics in Malaysia from 1980 to 2010 (Rahman,2012)

Based on the graph, in 1980, around 9000 cars were stolen. Car theft has decreased slightly on 1990 to 1997 but drastically increased from 2000 to 2005. At 2010 the car theft has increased significantly compared to 1980. From the graph, there are 21000 cars have been stolen in 2010 and given percentage increase about 133% compare to 1980.

2.3 Existing Car Security System

According to Rahman, M.M. and Nahid, M.K.U (2012), the car security system has been leading by a few manufacturing countries such as China, USA, Italy and India. Existing car security system that has been used is alarm system. In practically, the quickly and effectively way to influences on the thieves is noise. It also can be a messenger to inform the people nearby that the car is enter by unauthorized. This is the reason why the alarm system sensor has been used in wide range. Examples of existing alarm system sensor are impact sensor, motion sensor, door-open sensor, etc. To grab the people's attention most of the owner will ensure that their vehicle alarm system noise is louder. Besides that, remote keyless entry system is one of the vehicle security systems that has been existing. This system is using a remote to lock and unlock car. It has achieved by sending pulse on a particular frequency and advanced mechanism uses encrypted pulse transmissions that ensure higher safety. The steering wheel locks system is only effective for unprofessional thieves. This system is achieved since the steering gets firmly fitted that allows theft to be practically impossible.

Moreover, there have another vehicle security system is immobilizers which is cuts off the fuel or allow the ignition system to stop the car from being started. However, even with this method the thief can break into a car but as long as the immobilizer is not disabled by the thief then it is not easily for a thief to steal the car. In additional, GPS vehicle tracking system is one of the recently popular technologies. By installing the GPS tracking device in the car, the owner can ensure that his car won't ride away too far a distance without his awareness. When the owner has aware that his car has been stolen, it can inform the police and they will immediately tap into the GPS system to check the location of the car. Although the thieves has the skill to override the car's alarm system and steal away the car, but with the activation of GPS tracking system the owner still can know their the car's location.

2.4 Related works on Vehicle Theft Intimation Using GSM

2.4.1 GSM-GPS Based Intelligent Security and Control System for Vehicle

Mr. Kiran Gaikward (2013) has designed a GSM-GPS Based Intelligent Security and Control System for Vehicle. The project is using embedded system based on GSM and GPS technology to protect the vehicle from unauthorized access, through entering a protected password and intimate the status and location of the vehicle to the owner. The vehicle owner can use cell phone or a personal computer (PC) to control this system. LPC2148 microcontroller was used in this project to interface different module such LCD display, relay, keypad, GPS-GSM module with each other. To activate relay or to start the vehicle, the owner need to enter the correct password. To stop the vehicle, GSM will control the system by received SMS contains code from owner mobile phone. The Microcontroller processes the GPS location information from satellites in the form of latitude and longitude and transmits it to the user using GSM modem through SMS. By using this system, owner can exactly know their vehicle location with the help of Google map.

2.4.2 Motorcycle Security System using GSM and RFID

According to W.W.I. Wan Jusoh *et al.* (2015) has designed a model of motorcycle security system using GSM and RFID (Radio Frequency Identification) to improve the safety of motorcycle. This system will detect the identification tag and compare it with the preprogram ID number. If the ID number matched than system will deactivate the secure mode and user can use the motorcycle as usual. However, if the ID number does not match, an alarm will be trigger by the system and the GSM will automatically inform owner via

SMS. As a brain to read and process the data receives, microcontroller PIC16F877A was used in this system to control and verify all the data coming from input device such as RFID reader, sensor and switch.

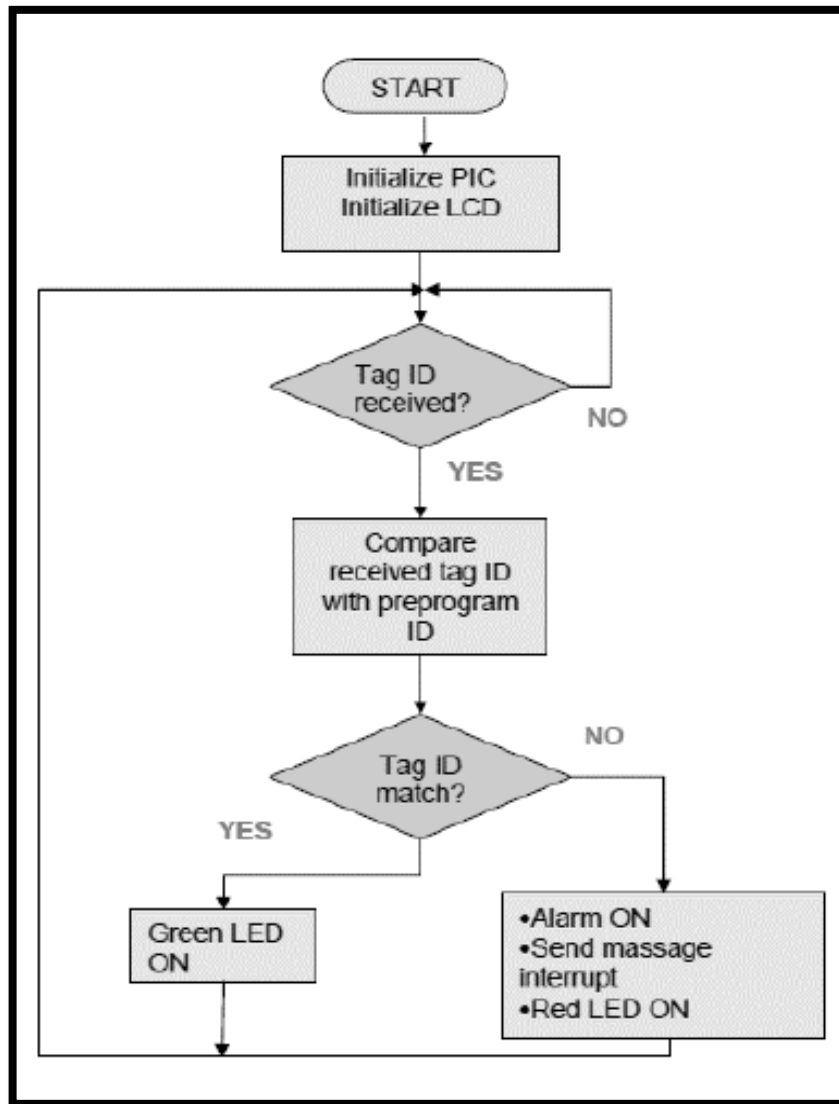


Figure 2.2: System flow of Motorcycle Security System using GSM and RFID
(W.W.I. Wan Jusoh et al., 2015)

2.4.3 GSM based car security system

Ruchita J. Shah et al. (2012) has created a GSM based car security system. The aim of this project is to save the car when someone tries to steal your car. This system can immediately alert and send SMS to owner phone through GSM modem. The buzzer will also make sound so the owner can get the information immediately and save the car from being stolen. In this system, it sense five parameters for security which are vibration sensing, obstacle sensing, revolution sensing, micro switches (door1 and door2 open) and battery sensing. SMS is sending through GSM modem and sound was generating at every sensing point. In this project, a microcontroller AT89s52 was used and a BUZZER has been incorporated, which will sounds when any parameter sensed. This project has additional benefits which the system can give information to the owner about their car's front doors (open/close), who is on the front sit, and any type of vibration on the car, who is trying to start or take the car by pushing or revolving. If anything happened the owner can get the information from all parameters including detected parameter.

2.4.4 Embedded Automobile Engine Locking System using GSM technology

Embedded Automobile Engine Locking System using GSM technology was design by Jayanta Kumar Pany and R. N. Das Choudhury (2011). The aim of this project is to protect the vehicle from being stolen, through a protected password and intimate the status of the vehicle to the owner using GSM technology. This system is installed with GSM modem in the engine of the vehicle. The 12V relay is activated and engine is started when the password is correctly entered. If any unauthorized access is trying to enter the password more than three times then the AT89S52 microcontroller will block the password and