



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**VEHICLE TRACKING DETECTION ACCIDENT USING GPS,  
GSM AND ACCELEROMETER BY ARDUINO**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electronics Engineering Technology (Telecommunication) with Honours.

by

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## APPROVAL

This report is submitted to the Faculty of Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Engineering Electronics (Telecommunication) with Honours. The member of the supervisory is as follow:

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## ABSTRAK

Dalam projek ini, teknik pengesanan kemalangan dan beberapa kemungkinan masa depan dalam bidang ini. Pada masa kini, banyak kemalangan berlaku di lebuh raya disebabkan peningkatan trafik dan juga disebabkan oleh pemanduan pemandu. Selain itu, banyak ahli keluarga atau ambulans dan polis tidak dimaklumkan dalam masa yang singkat. Ini membuat penangguhan bantuan dicapai kepada orang yang dialami akibat kemalangan. Tujuan projek ini adalah untuk mencari tempat kemalangan di mana-mana tempat dan intimasikannya ke ambulans melalui rangkaian GPS dan GSM. Pecutan mengesan perubahan tiba-tiba di paksi kenderaan dan kelajuan kenderaan dalam knot akan dihantar dalam mesej. Projek ini adalah Kemalangan Pengesanan Pelacakan Kenderaan menggunakan GPS, GSM dan Pecutan oleh Arduino direka untuk situasi ini.

## ABSTRACT

In this project, the accident detection technique and some future possibilities in this field. Nowadays, lots of accidents happen on highways due to increase in traffic and also due to rash driving of the drivers. Besides, many situation family member or the ambulance and police is not informed in time. This make in delaying the help reached to the person suffered due to accident. The purpose of this project is to find the accident spot at any place and intimating it to ambulance through GPS and GSM networks. Accelerometer detects the sudden change in the axes of vehicles and the speed of vehicle in knots will be send in the message. The project is Vehicle Tracking Detection Accident using GPS, GSM and Accelerometer by Arduino is designed to this situations.

## **DEDICATION**

To my beloved mother and father THALASIAH BINTI SELAN and TAJUL ARUS  
BIN MOHD ALI

Supervisor EN. AHMAD SAYUTHI BIN MOHAMAD SHOKRI

And all my friends

(Noor Anis Binti Amran, Ili Nadrah Binti Ismail, Nurul Syafinaz Syasya, Siti Norliani  
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## LIST OF SYMBOLS

<b>sec</b>	-	Seconds
<b>km/h</b>	-	Kilometre per hours
<b>mV/g</b>	-	Millivolt per gravity
<b>MHz</b>	-	Mega Hertz

## LIST OF ABBREVIATIONS

<b>GSM</b>	Global System of Communication
<b>GPS</b>	Global Positioning of System
<b>MEMS</b>	Micro-Electro-Mechanical System
<b>VANET</b>	Vehicle Ad-Hoc Network
<b>RF</b>	Radio Frequency
<b>IoT</b>	Internet of Things
<b>SMS</b>	Sending Messages Systems
<b>LCD</b>	Liquid Crystal Display
<b>SIM</b>	Subscribers Identification Module
<b>ARM</b>	Advanced RISC Machine
<b>EGSM</b>	Extension Global System of Communication
<b>TTF</b>	Time To First Fix

# CHAPTER 1

## INTRODUCTION

### 1.0 Introduction

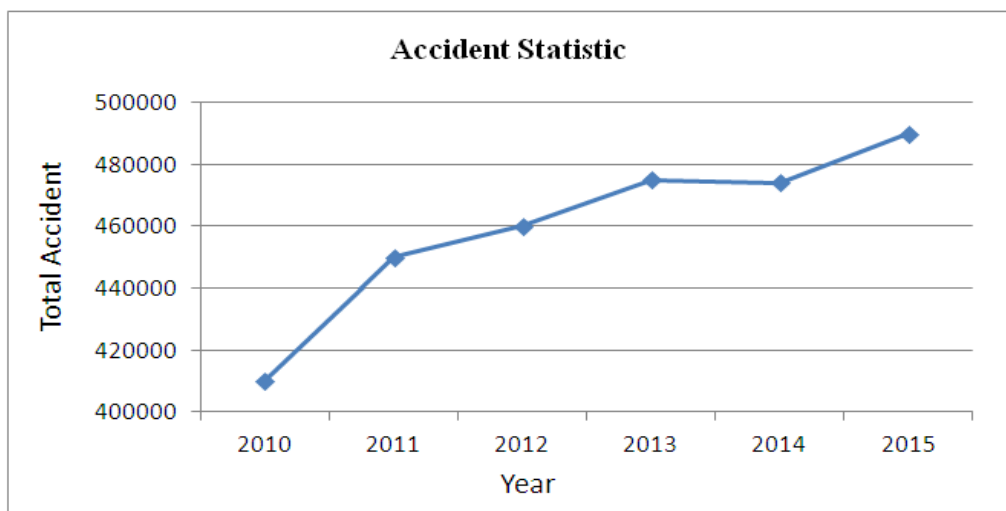
Vehicle tracking system main aim is to give Security to all vehicles. The Accident alert system is to rescue people in accidents. This is an improved security system for vehicles. The latest like GPS are highly useful nowadays, this system enables the owner to observe and track his vehicle and find out vehicle movement and its past activities of the vehicle.

This accident alert system in it detects the accident and the location of the accident occurred and sends GPS coordinates to the specified mobile, computer, etc. The fire detector circuit in it is used to detect fire in the vehicle, if the temperature inside the vehicle goes above a certain limit then a warning will be automatically sent to the intended receiver. The infrared sensor which is additionally interfaced to the microcontroller is used to detect the obstacles and accidents, in any case if any mishap occurs, then its warning will be directly send to the intended receiver. When a request by the user is sent to the number of the modem, the system automatically sends a return reply to that particular mobile indicating the position of the vehicle in terms of latitude and longitude. A Program has been developed which is used to locate the exact position of the vehicle and also to navigated track of the moving vehicle on a Google Map.

## 1.1 Background

During the past two decades, dramatic changes have taken place in the lifestyles, the expansion of the highway. Number of crashes, death and injuries, only highlighting that mobility, transport and safety need to grow together for the infrastructure, especially in major metropolitan areas has not kept pace with the increasing traffic demand. According to road statistics of Malaysia, accidents are occurring due to lack of road availability compared to the number of vehicles. In most of the cases, deaths are occurring due to no proper treatment at the right time.

Based on Bloomberg (2017) reported that statistics from the World Health Organization (WHO) for 2013, stating that Malaysia is among the emerging countries with the riskiest roads after Thailand and the Philippines, registered a 15 and 11 death rate respectively. According to the data, Malaysia registered a death rate of about 23 per 100, 000 population. The fatality rate on Malaysia road is still considered to be very high and it should be improved because it is very close to average among low-income nation. Bloomberg reported that the average for developed nation is 9.3, while the rate for low-income and middle-income countries are 24.1 and 18.4 respectively.



**Figure 1.1:** A graph of number of road accidents from 2010 – 2015

Factors contributing to accidents were understanding why accidents occur has been explored in depth in studies worldwide. Many factors may contribute to accident occurrence, and most accidents involve more than one factor. Human factors contribute to 95%, road factors to 25%, and vehicle factors to less than 5%. The main human errors are going too fast for the situation, failing to give way at junctions, following too close, overtaking & over speeding, misperceiving or misjudging the road situation ahead and impairment as a consequence of drinking alcohol. Road deficiencies that are the main contributory factors, poor design of the layout or control at junctions, inadequate signing, road markings and lighting, slippery roads, and obstructions on the road such as parking vehicles. Main vehicle factors are defects in tires, brakes and lights, arising from poor maintenance of the vehicle.

Many of the authors explained the detection of the accident alert system. One of the them, (V. Ramya, B. Palaniappam, K. Karthick) explained the system which provides vehicle cabin safety. This system monitors the level of the toxic gases such as CO, LPG and alcohol within the vehicle and provides alert information as alarm during the dangerous situation. The system sends an SMS to the authorized person through the GSM. (Albert Alexe, R. Ezhilarasie) explained system based on cloud computing infrastructure. In this system sensors are used to monitor the fuel level, driving conditions, and speed of the vehicle. All the data transferred to the cloud server using GSM enabled device. All the vehicles equipped with GPS antenna to locate the place. To avoid the drunk and drive, the alcohol sensor installed to monitor the driver status.

## 1.2 Problem Statement

Nowadays, most of these road accidents have been attributed to over speeding and wrong overtaking by the drivers. As a result of these reckless behaviour by a driver on our roads, some residents living along the town and villages on the major highway have taken the law into their own hands to check some of these irritant drivers. The committee set a target of reducing fatalities by 30% by the year, (Federal Highway Administration). A comparison of Malaysia's figure with those of several developed and developing countries indicates that Malaysia is ranked about midway between the developed and developing countries. Although the accident fatality rate in Malaysia is still concern as the death rate per 10000 vehicles is well above for the rest of the developed countries.

Beside that, New Straits Times (2016) reported that there a total of 7,152 people died in road accidents in Malaysia, an alarming jump from 6,706 deaths in the year before. Datuk Seri Liow Tiong Lai (2016) he said that number of the death involved motorcyclists was 62.7 per cent. In 2016, 6,570 fatal road accidents involving were recorded while in 2015 there were 6,193 of such cases. Deputy Director-General of the Road Safety Department (JKJR), Datuk Roslan Eusoff stated that motorcycle and pillion riders lead with the highest number of road fatalities. This means an average of 12 out of 20 fatal road accidents involve these vehicles.

Therefore, an ideal the vehicle tracking detection accidents system which track vehicle current location using Global Positioning System (GPS). This product gives the live updates of accidental vehicle with their location details. It ensures the vehicle which has got accident to send location details to web server located at emergency ambulance center further that location details of accidental vehicle send to nearby ambulance as well as display it on the map. Vehicle tracking detection accidents are

working same, as follows. When the accident will occur, then the system will direct send the accident alert message along with location details of the accident vehicle to emergency dispatch sever further it will send that alert message to the nearby ambulance so that it will go to that location. By using a system like this we can decrease the mortality rate which is lead by accident.

### **1.3 Objectives**

Based on the problem statements discussed above, the objectives of this study are:

- i. To study vehicle tracking detection accidents using Global Positioning System (GPS), Global System of Communication (GSM) and accelerometer to give the best possible level of safety.
- ii. To design an affordable vehicle tracking detection accident system.
- iii. To examine the relationship between the response time of accelerometer technology against with the acceleration.

### **1.4 Scope**

The scopes of this research work are established based on the objectives that mentioned. This vehicle tracking detection accident is built using accelerometer as the authority detection purpose. Another essential point, the Global System of Communication (GSM) will be adopted as the communication devices between the owners through sending a short message to warn them. Addition, the Global Positioning System (GPS) is used as for tracking and locate the coordinates of the vehicle accident. Lastly, the Arduino Mega256 microcontroller will set as the core controller for governing the input and output of this project

## 1.5 Organization

This project focuses on development a low cost and reliability of vehicle tracking detection accident by using GPS, GSM and accelerometer technology. This report consists of five chapters. First, a short introduction to the problem, objective and scope are given in chapter one. Then, follow by chapter two literature reviews on existing methods adopted and various technologies that implemented in the previous project. In the mean times, the comparison regarding pros and cons will be discussed. Next, the components and method description that planned to use will be explained in chapter three. Furthermore, a brief of overview flow of the project may show here. In the chapter four, the results, including data tabulation and project analysis will be shown then discussed. Finally, conclusion and future recommendation will be emphasized in chapter five.