Faculty of Electrical and Electronic Engineering Technology

DEVELOPMENT OF VEHICLE ACCIDENTAL SYSTEM BY USING MICRO-CONTROLLER

WAN MUHAMMAD IZZAT BIN WAN ZIN

Bachelor of Computer Engineering Technology (Computer Systems) with Honours

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A project report submitted
in partial fulfillment of the requirements for the degree of
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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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PROJEK SARJANA MUDA II

Tajuk Projek : Development Of Vehicle Accidental System By Using Micro-Controller

Sesi Pengajian : 2021/2022

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I declare that this project report entitled “Development Of Vehicle Accidental System By Using Micro-Controller “ is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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I approve that this Bachelor Degree Project 2 (PSM2) report entitled "Development Of Vehicle Accidental System By Using Micro-Controller" is sufficient for submission.

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DEDICATION

I'm dedicated this project to my family especially my father Wan Zin Bin Wan Sulaiman and my mother Zahran Binti Zainal Din who are always supportive and strong encouragement throughout the course of this study. To friends a struggle that is directly or indirectly in giving ideas and suggestions, millions of thanks, and a word of appreciation. Teach, advice and guidance that is not a little given we will not forget.

May this study that has been conducted be blessed by Allah s.w.t.

Thank you.

ABSTRACT

Most vehicles are involved in accidents, resulting in the deaths of many people. Some people could be saved at that moment, but it may not be possible due to a lack of knowledge, time, or location. This project will provide the best solution to that issue. The goal of this project is to create accidental tracking system for vehicle by using micro-controller, to provide information where, when and how accident happen by using accidental tracking system for vehicle, and to make sure information of victims receive at their relative 5 seconds after the accident happen. This accidental system is utilised an Arduino Uno as a microcontroller to control the system's input and output and GSM is used to send message to relative of victims. Push button is fixed on the vehicle to collects the impact. Accelerometer sensor is used to detect whether the vehicle is capsized or not. If an accident occurs, the car number and individual contact information are automatically passed to the family member so that family member can contact police and rescue teams immediately. The police will quickly pinpoint the site of the accident from which the information collected from the tracking system. Then, once the position has been verified, another steps will be taken. This project is life saver for someone that been involved in accident.

ABSTRAK

Sebilangan besar kenderaan terlibat dalam kemalangan, mengakibatkan kematian banyak orang. Beberapa orang dapat diselamatkan pada saat itu, tetapi mungkin tidak mungkin disebabkan oleh kurangnya pengetahuan, waktu, atau lokasi. Projek ini akan memberikan penyelesaian terbaik untuk masalah tersebut. Objektif projek ini adalah untuk mengembangkan sistem pengesanan secara tidak sengaja untuk kenderaan dengan menggunakan pengawal mikro, untuk memberikan maklumat di mana, bila dan bagaimana kemalangan berlaku dengan menggunakan sistem pelacakan tidak sengaja untuk kenderaan, dan memastikan maklumat yang diterima mangsa pada waktu relatif mereka 5 saat setelah kemalangan itu berlaku. Sistem tidak sengaja ini digunakan sebagai Arduino Uno sebagai pengawal mikro untuk mengawal input dan output sistem dan GSM digunakan untuk mengirim mesej kepada saudara mangsa. Butang togol dipasang pada kenderaan untuk mengumpulkan kesan kemalangan. Sensor accelerometer digunakan untuk mengesan sama ada kenderaan itu terbalik atau tidak. Sekiranya berlaku kemalangan, nombor kereta dan maklumat hubungan individu dihantar secara automatik kepada ahli keluarga sehingga ahli keluarga dapat menghubungi polis dan pasukan penyelamat dengan segera. Polis akan dengan cepat menentukan lokasi kemalangan dari mana maklumat yang dikumpulkan dari sistem pencegahan. Kemudian, setelah kedudukannya disahkan, langkah-langkah yang sesuai akan diambil. Projek ini adalah penyelamat hidup bagi seseorang yang mengalami kemalangan.

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Finally, I'd like to thank my colleague and classmates, as well as the faculty members and others who aren't listed here, for their cooperation and assistance.

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LIST OF ABBREVIATIONS

mV/g	-	Milivolt per gravity
MHz	-	Megahertz
mg/L	-	Miligram per Liter

CHAPTER 1

INTRODUCTION

1.1 Background

This project is about a system that is being developed to automatically identify an accident and notify the victims' families so that they may promptly contact rescue crews. This system may also locate the accident site so that the victims' families know where it occurred. The MEMS Accelerometer is a sensor technology that is utilised in this project to detect an accident. The vehicle has a push button acting like a sensor that gathers the impact. It can be used to detect any impact on the vehicle, which could indicate that it has been involved in an accident. The microcontroller can analyze the accelerometer's output to see if it has surpassed the threshold. A GPS system is utilised to pinpoint the accident site, and GSM technology is used to communicate with emergency services and family members. If medical services receive a GSM message alerting them to an accident and its location using GPS coordinates, they can respond quickly. If the person who has been injured in an accident receives medical care in a timely manner, he can survive the accident, and many lives can be saved. The system is simple to assemble and compact in size, making it suitable for installation in any vehicle.

1.2 Problem Statement

Since there are many accidents happen and some people could be saved at that moment, but it may not be possible due to a lack of knowledge, time, or location. Because of late help to those who have been in accidents, the rate of deaths and disabilities is extremely high. People who are implicated suffer enormous social and economic consequences as a result of them.

1.3 Project Objective

The objectives of this project are based on the above problem statement:

a) To develop accidental tracking system for vehicle by using micro-controller.

b) To provide information where and when accident happen by using accidental tracking system for vehicle.

c) To make sure information deliver via SMS to the relative of victims.

1.4 Scope of Project

The scope of project are as follows:

a) The tracking system is controlled by using Arduino Uno.

b) Push button is fixed in front of the vehicle to collect impact.

c) A microcontroller as able to store factors such as impact, and mems value It is connected with the accelerometer sensor.

d) The GPS is used to locate the position (longitude and latitude) of the vehicle.

e) The GSM is used send a message to the family member of the victims.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The reading of various papers aids in gaining an understanding of the prediction principle. The aim of this section is to review and focus on various trials and tasks that have been completed successfully by various analysts or specialists in the field of science. It will also show the hardware that was used in the process. Aside from that, this system was created with the aim of improving productivity. Aside from that, this system was implemented with the aim of improving interpretation and avoiding unnecessary duplication of the study's problem area.

2.2 Review on Development Of Vehicle Accidental Tracking System Using Micro-Controller

2.2.1 "Wireless Black Box Using Mems Accelerometer And Gps Tracking For Accidental Monitoring Of Vehicles" by Anand Gunadal [1]

This project's aim is to build and construct a vehicle accident monitoring system that incorporates MEMS, GPS, and GSM technology. To fully comprehend all MEMS, GPS, and GSM technology, it is necessary to conduct research and study on how each technology works. The system includes an accelerometer, microcontroller unit (MCU), GPS device, and GSM module that work together to transmit a short message. For awareness and fall detection in the event of an accident, an accelerometer is used. The vehicle's speed and a threshold algorithm are utilised to determine whether a fall or accident occurs in real time.

When a vehicle accident is detected, a mobile short message with the location from GPS (latitude, longitude) will be delivered to the designated number that is set inside the GSM.

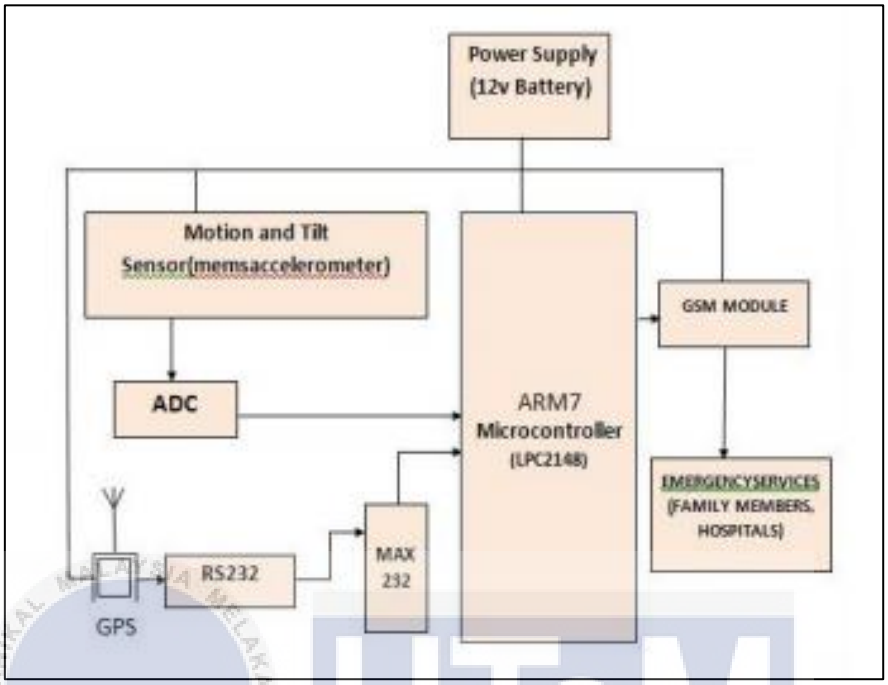

Figure 2.1 Block Diagram For Wireless Black Box Using Mems Accelerometer And Gps Tracking For Accidental Monitoring Of Vehicles [1]

Figure 2.1 shows when the accelerometer is tilted on one of its axes or accelerated in any direction, voltage outputs are generated in response. A voltage output is provided by an analogue accelerometer, while a direct binary output is provided by a digital accelerometer. The acceleration forces are detected by the accelerometer, which can detect any changes in velocity. The accelerometer's output can be sent to an ADC, which will sample it and convert it to digital data by comparing it to predetermined voltage levels. The output of the accelerometer is used to determine whether the tilt or acceleration change of the vehicle is sufficient to cause an accident and exceeds the safe value. If the control unit detects an accident, it consults the GPS device for information about the position. Through the serial port, GPS is connected to the microcontroller control unit. The control unit sends a message to the hospital's medical services and the person's family about the accident via GSM service, as well as the position information gathered from the GPS.

2.2.2 "Wireless Black Box using MEMS Accelerometer and GPS Tracking for Accidental Monitoring of Vehicles" by Giriraj Gurjar [2]

The goal of this project is to create a wireless black box with temperature and smoke sensors that are connected to a microcontroller. The temperature sensor measures the quantity of heat emitted by the vehicle. The amount of gas emitted from the vehicle will be detected by the smoke sensor. These statistics are also shown on the LCD. The entire project's equipment is contained within a vehicle that is not visible to anyone. When a car is involved in an accident, the MEMS detects it and sends the information to the microcontroller. The technology uses a GPS (global positioning system) module to locate the car involved in the accident. The microcontroller is given the location values. GSM module will receive this information from the controller. GSM will send a message to the person involved with information on the temperature, smoke situation, vehicle speed, and accident time. It also includes a graphical representation of the vehicle's location.

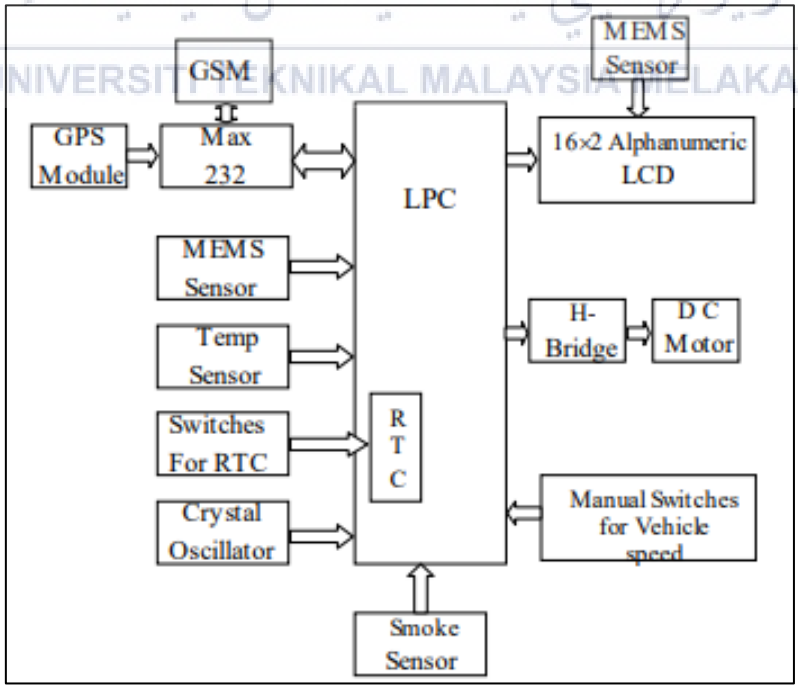

Figure 2.2 Block diagram for Wireless Black Box using MEMS Accelerometer and GPS Tracking for Accidental Monitoring of Vehicles [2]

As shown in Figure 2.2, the system features a MEMS accelerometer that will continually detect the vehicle's movements. When a vehicle is involved in an accident, the MEMS detects the movement of the vehicle during the collision and relays this information to the microcontroller. The GPS module is used to track the location of the car that was involved in the collision. The vehicle's graphical location can be obtained via GPS, and these values are presented on the LCD (Liquid Crystal Display). The microcontroller is given the location values. GSM module receives this information from the controller. We can send the message to family members, the nearest hospital, and the emergency medical service using GSM. Temperature sensors are used in this project, and they are connected to the microcontroller. Temperature sensor that allows us to calculate the quantity of heat emitted by the car. These figures are also shown on the LCD.

2.2.3 "Wireless Black Box using MEMS Accelerometer and GPS Tracking for Accidental Monitoring of Vehicles" by N.Purushotham and J.Madan Kumar [3]

For accidental monitoring, a wireless black box with a MEMS accelerometer and GPS tracking system is built in this research. In the event of an accident, this wireless gadget will send a short text message to a family member, emergency medical service, and the nearest hospital, indicating the location of the vehicle through GPS system, so that they may dispatch an ambulance and prepare care for the patients.

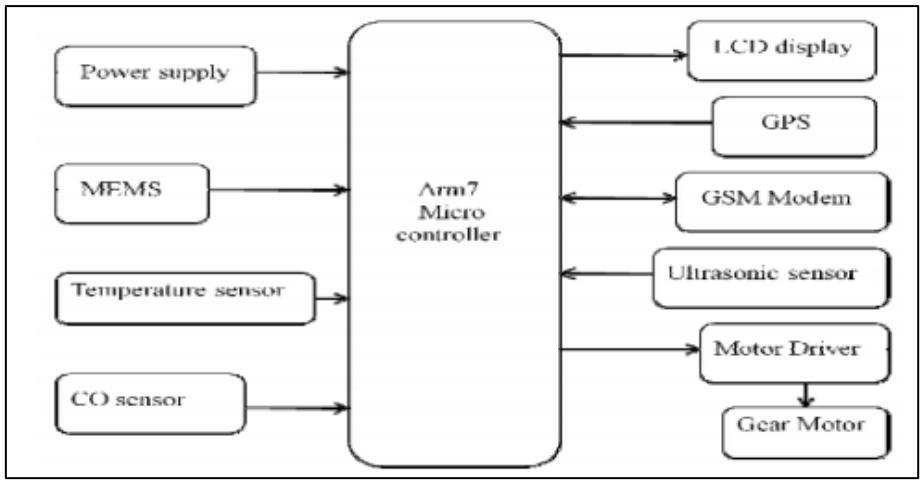

Figure 2.3 Block diagram for Wireless Black Box using MEMS Accelerometer and GPS Tracking for Accidental Monitoring of Vehicles [3]

By referring Figure 2.3, this project uses GPS to track a mobile phone's location by comparing GPS data to a list of pre-defined check points. After the accelerometer readings have been captured, the exact position must be determined using GPS and point latitude-longitude. The location will be mapped on Google Earth after the GPS has discovered it. This information will make it easier for rescuers to reach the location.

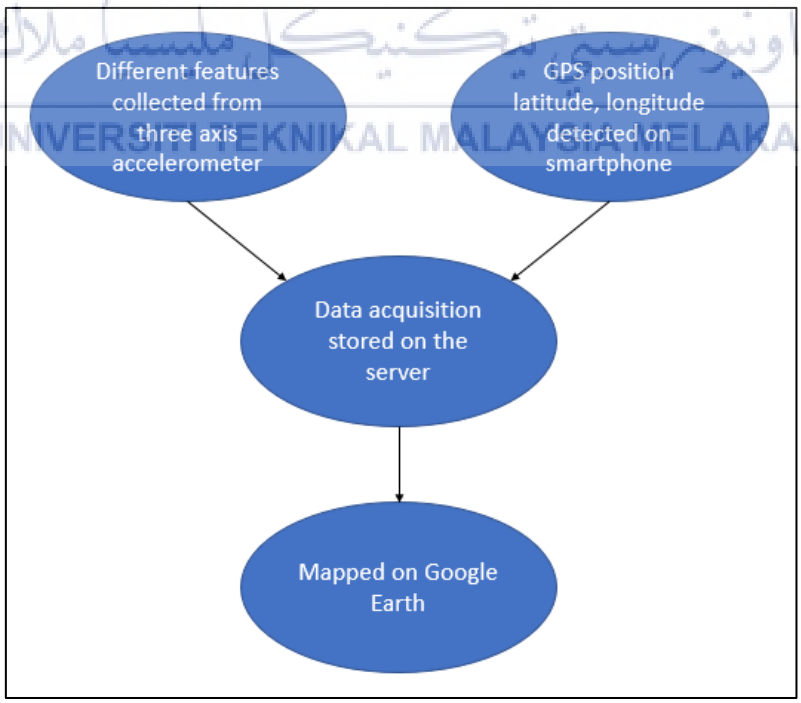

Figure 2.4 Flowchart of Wireless Black Box using MEMS Accelerometer and GPS Tracking for Accidental Monitoring of Vehicles [3]

The Arm7TDMI microcontroller controls all of the input and output data. According to Figure 2.4, this project also employs a temperature sensor to detect the temperature of the electricity in the car. It also employs a CO2 sensor to detect gas leaks from the vehicle. The microcontroller is then interfaced with an ultrasonic sensor, and the triggering and measurement are accomplished via two I/O pins. This sensor emits an ultrasonic wave and generates an output pulse equal to the time it takes the burst echo to return to the sensor. The distance to the target can be simply estimated by monitoring the echo pulse width.

2.2.4 "Vehicle Black Box System" by Abdallah Kassem and Rabih Jabr [4]

The main purpose of this paper is to create a vehicle black box system prototype that can be deployed in any car anywhere in the world The vehicle black box system can help build safer automobiles, improve the treatment of collision victims, assist insurance companies with car collision investigations, and improve road conditions to lower the death rate.

This system is primarily focused on two ways. The first is figuring out how to identify and capture vehicle data. The second issue is how to deliver the data collected to the user in a user-friendly manner. Some major components and various types of sensors were used to implement the first technique. The second method was implemented with the help of a Visual Basic.NET computer software. This application serially gets data from the black box memory, displays it in real-time graphics, and then saves it to a formal excel report for further use. The sensors and black box installed in the vehicle make up the hardware part. This section mostly collects sensor status and saves it to the microcontroller's EEPROM.