EMERGENCY ALERT SYSTEM AND DATA RECORDING

IN A CAR

Piragas A/L Rajoo

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Special thanks to my family, project supervisor and friends

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ABSTRAK

Tujuan utama sistem notifikasi wayarles kemalangan kereta ini adalah untuk menghantar mesej pesanan ringkas ke Pusat perkhidmatan Kecemasan sejurus kemalangan di jalan raya. Biasanya sewaktu kemalangan berlaku mangsa memerlukan bantuan kecemasan, dan situasi pemandu yang berkemungkinan kritikal ini akan menyukarkan beliau untuk menghubungi orang luar. Dalam mesej pesanan ringkas ke pusat kecemasan, lokasi kemalangan, berserta dengan masa dan jumlah penumpang kenderaan juga dihantar untuk memudahkan proses penyediaan bantuan. Selain dari itu, sistem ini juga merekod infromasi kemalangan seperti lokasi , data pemilik kenderaan, masa, kelajuan dan pecutan semasa kemalangan. Informasi ini boleh digunakan untuk proses analisis selepas kemalangan oleh pihak insurans dan polis. Modul Global Positioning System(GPS) digunakan untuk mendapatkan data kemalangan dan modem Global System for Mobile Communication (GSM) digunakan untuk menghantar mesej. Sistem ini juga mempunyai butang pembatalan mesej, diaman tiada kecederaaan parah dialami oleh pemandu. Disamping itu sistem ini juga mempunyai fungsi pengesanan kecurian kereta. Sistem ini sememangya mempunyai potensi tinggi di pasaran kereta. Sistem ini dapat dipasang secara mudah di semua kereta tanpa mengira jenis atau jenama kenderaan. Sistem ini juga dapat dintegrasikan dengan GPS sedia ada didalam kereta. Sistem pengesanan kecurian dalam projek ini juga dapat menarik perhatian pengguna. Selain dari itu kos pembinaan projek ini juga berpatutan dan kos efektif.

ABSTRACT

The main purpose of this project is to create an automated emergency alert system in the incident of accident. With the advent in science field things become automated. During the occurrence of the accident, the fatally injured driver would face a big problem in reaching out for help.. Besides that, one can not always expect help to be reached out once accident occurs. If the accident took place in a place where the are no people around, things would be to dangerous for the driver. Hence this system could solve this problem by sending a message directly to the emergency service centre whenever accident occurs. The crash sensor automatically acts as the accident trigger. The GPS module gets in the location during collision and the GSM modem is used to send the message. Not all accident involves fatal injury. In this case, the driver could cancel out the message by clicking the cancel button in the system. This would avoid unnecessary call for the ambulance. Inside the system there is a SD card that saves information such as the driver's information, location, time, speed and acceleration during accident. This data will be used by the insurance company and police for post crash analysis. Besides that this system is also equipped with theft detection system that will inform the car owner of unauthorized entry in the car. This system has a high potential in the market as it is a life saving device. It is easily fixed in any cars regardless of the car's model and brand. In addition this system is has theft detection function that could convince the buyers. In short this system is a cost effective system that should be installed in every car.

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LIST OF ABBREVIATIONS

GPS	-	Global Positioning System
GSM	-	Global System for Mobile Communication
JPJ	-	Jabatan Pengangkutan Jalan Raya
SD	-	Secure Digital
GPRS	-	Global Packet Radio Service
RAM	-	Random Access Memory
SMS	-	Short Service Message
PC	-	Personal Computer
ADC	-	Analog to Digital Converter
TDMA	-	Time Division Multiple Access
CDMA	-	Code Divison Multiple Access
PIC	-	Programmable Integrated Chip
ASAD	-	Automated System for Accident Detection
CMD	-	Command
IDE	-	Integrated Drive Electronics
IP	-	Internet Protocol
SIM	-	Subscriber Identity Module

CHAPTER 1

INTRODUCTION

This chapter presents the background of the study, problem statement, objective of the study, and the scope of project. The background of the study is focused on the working method of the emergency alert system of the car and the data recording. The problem statement reveals the impact of main purpose of this research. In the objectives, the intention of this study is to propose an emergency alert system in a car to save the passenger of the car. At the end of this chapter, the scope of study highlights the focus and mechanism of the project.

1.1   Project Overview

Basically this a project on creating a device that could send an alert message to ambulance whenever an accident occurs. Normally it would take some time before the

ambulance is informed about the occurrence of the accident. Every single minute counts as it involves life matter. With this system installed in the car whenever there is a major impact an alert message will be sent to the ambulance to inform the occurrence of the accident. Besides that this system also records data such as speed during impact the location and time takes for the car to stop. This device will be installed beside the the seat of the car driver to avoid any damage during accidents. Impact sensors will be fixed at the front bumper of the car and will be connected to the microcontroller inside the device. There will be a Global Positioning System (GPS) tracker installed to calculate the speed and location of the car. A Global System for Mobile Communication (GSM) modem will be connected to the microcontroller and whenever the impact sensor and the speed changes drastically, through this modem message will be sent to the ambulance. The device has a micro Secure Digital (SD) card that records data during accident.

1.2   Problem Statement

Accidents involve life matter, and whenever an accident occurs it could take some time before the ambulance is informed of the accident occurrence. Hence this device is created to send message instantly to the ambulance once the accident occurs. This invention could be a life saving device. Since it is hard for the insurance company to determine the cause of the accident, with this device, the insurance company can have the access of the data during accident. With this the insurance company could analyze the true cause of the accident.

1.3   Objectives of Project

1. To create a device that could send alert message immediately to the emergency service centre once accident occurs.
2. To create a device that could record speed , location and the acceleration during impact.

1.4   Scope of Project

Basically this project will be limited on creating an system for a car that would send alert messages to the ambulance. This device is also capable of recording data such as speed and braking time of the car and its location. Any other aspects such as video recording during accident , accidents in water will not be covered in this. This project is just is limited to be used in a car and cant be used in any other vehicle.

1.5   Overview

Completely, this report consists of 5 main chapters and there are Introduction, Literature Review, Methodology, Result & Analysis and Conclusion & Recommendation. In Chapter 1, the introduction is briefly explained the overview of the whole project and why it must be implemented in real life. It is highlighting on the background, project objectives, problem statement, methodology and scope of work on the operation of the emergency notification system. In order to achieve the objective the methods that have been used in the project are explained in detail in Chapter III. This chapter also briefly explains the development of the project. It includes the integration of hardware and software that have been used in this project. Chapter IV is a Result &

Analysis that explained analysis of the circuits. Conclusion & Recommendation are included in Chapter V. This chapter discusses on the overall conclusion and how it can be improved for further development.

CHAPTER II

LITERATURE REVIEW

This chapter extend the literature reviews that cater the information in accordance with the objectives of this project. This section includes the following elements: alert message sending, detecting the accident, and saving data for post crash analysis. The relevant information and other extra features were gathered as shown below.

2.1   Introduction

In this chapter, there will be discussion and description of information that is related to the objectives of studies. This section includes the following elements such as the GSM modem, GPS module, calculating speed and location of impact. In the hardware section, the way of connection between components are described. The way of

communications between the emergency service centre and the car are explained in detailed.

2.2   Literature Review and Background Study

In this section, the background study regarding to alert notification and car black box will be discussed. The information is acquired from various resources such as journals, online articles and relevant previous research paper. Most of the researches are based on the previous similar projects that have been conducted which are related to this study. Resources such as articles or journals from IEEE (Institute of Electrical and Electronics Engineering) are utilized as reference and provide a better understanding in term of the implementation and simulation of this project.

2.2.1   Journal of Design and Implementation of Car Black Box Based on Embedded System

Basically this journal emphasizes on the role of a microcontroller in a Black Box system of a car. This system has the ability to not only record the main driving data of the cat comprehensively and accurately in real-time, but also reconstruct the accident with data process software, which can help people analyze the accident rapidly and legitimately after a collision. Beside that this black box also could also receive real-time data including driving speed, rev, light, tire pressure, brake car door, lay-up and life belt, and also process the data and store it in RAM [1].

This system basically save the record informational and displays it. This car system certainly plays a very important role in preventing speeding and motorbike offences, restricting the car offences, avoiding accidents ,controlling road offences and etc [1]. Talking about the analyzing function, this system is equipped with wire less

communication system can send accident location information to emergency centre and. Hence drivers who are in desperate need for help, they could receive immediate help. This car Black Box detects a car crash and also records the motion of the vehicle and driver's actions during a set time of period before and after the accident. The information recorded consists of information about cars status and the driver's actions. In addition the Car Black Box not only records data before and during collision but also the record after a collision[1]. With this technology many accident related problems related to car accident like such as insurance problems, laws can be managed. This system can provides analysis of the car and help in crash incestigations.In addition this system has alarm that sounds, once speed is over limit.
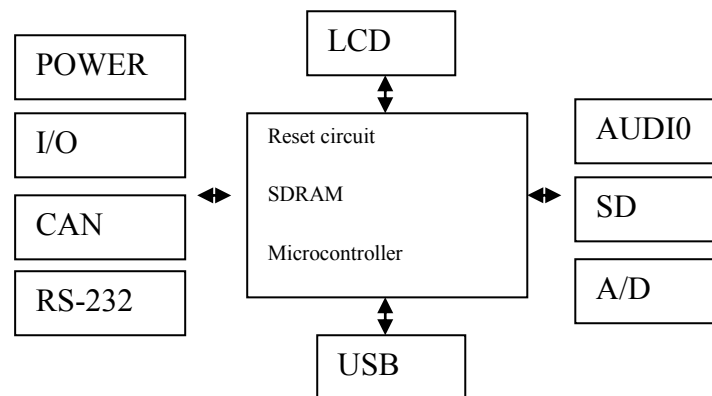
Figure 2.1: The hardware structure of the system