Faculty of Electrical and Electronic Engineering Technology

IOT BASED VEHICLE ACCIDENT TRACKER WITH DRIVER ALCOHOL CONSUMPTION DETECTOR

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Bachelor of Electronics Engineering Technology (Telecommunications) with Honours

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A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Electronics Engineering Technology (Telecommunications) with Honours

Faculty of Electrical and Electronic Engineering Technology

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APPROVAL

I hereby declare that I have checked this project report and in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Electronics Engineering Technology (Telecommunications) with Honours.

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DEDICATION

To my beloved parents and siblings and all my friends for their support in completion of this thesis

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ABSTRACT

On a daily basis multiple types of news are being encountered either on social media, news channels or newspapers but there is not even a day without a news regarding a road accident. Road accidents are being so common nowadays where people are not even surprised to hear someone is dead due to a road accident whereas people started recording it using their mobile phones which are widely being seen on social media platforms. Occurrence of deaths and injuries due to accidents are just being a normal information nowadays rather than being a serious news. In a split second, accidents are harming so many lives out there. If it is come to see the factors causing these accidents, the most reported cases are likely to be drink driving, irresponsible driving, disobeying rules and regulations. Consequently, accidents lead to deaths as victims failed to receive medical approach or any assistance immediately. This IoT Based Vehicle Accident Tracker with Driver Alcohol Consumption Detector will help to reduce the delay of reaching medical assistance and reduce the number of accidents. When a vehicle meets an accident, immediately a vibration sensor will detect the signal and sends it to Arduino UNO. Arduino will alert respective officers through the GSM modem whereas to detect the alcohol consumption level by the driven an alcohol sensor MQ3 is used. Location of the accident spot will be detected through GPS module and will be sent to the authorities through GSM modem.

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ABSTRAK

Zaman kini, media sosial, saluran berita dan surat khabar memaparkan pelbagai jenis berita terutamanya kebiasaan baru yang sedang kita hadapi iaitu wabak Covid-19. Namun, berita yang hangat dari dulu hingga kini adalah isu kemalangan jalan raya. Kemalangan jalan raya menjadi suatu kebiasaan kini sampai tahap seseorang tidak rasa terkejut mendengar seseorang menghembus nafas terakhir akibat kemalangan jalan raya sedangkan orang mula merakamnya menggunakan telefon bimbit mereka yang banyak dilihat di platform media sosial. Kejadian kematian dan kecederaan akibat kemalangan hanya menjadi maklumat biasa pada masa ini dan bukannya menjadi berita serius. Dalam beberapa saat, kemalangan menelan begitu banyak nyawa di luar sana. Sekiranya dapat melihat faktor penyebab kemalangan ini, kes yang paling banyak dilaporkan adalah pemandu yang mengambil alkohol, pemandu yang tidak bertanggungjawab dan pemandu yang tidak mematuhi peraturan dan undang-undang. Akibatnya, kemalangan menyebabkan kematian kerana mangsa gagal untuk segera mendapatkan pendekatan perubatan atau bantuan. Penjejak Kemalangan Kenderaan Berasaskan IoT ini dengan Pengesan Penggunaan Alkohol Pemandu akan membantu mengurangkan kelewatan mendapatkan bantuan perubatan dan mengurangkan jumlah kemalangan. Apabila kenderaan mengalami kemalangan, dengan segera pengesan getaran akan mengesan isyarat dan menghantarnya ke Arduino UNO. Arduino akan memberi amaran kepada pegawai masing-masing melalui modem GSM sedangkan untuk mengesan tahap penggunaan alkohol oleh pengesan alkohol yang digunakan MQ3 digunakan. Lokasi tempat kemalangan akan dikesan melalui modul GPS dan akan dihantar kepada pihak berkuasa melalui modem GSM.

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LIST OF SYMBOLS

MHz - Frequency in Mega Hertz

LIST OF ABBREVIATIONS

GPS	-	Global Positioning System
GSM	-	Global System for Mobile Communication
POI	-	Point Of Interest
DoD	-	Department of Defense
SMS	-	Short Messaging Service
I/O	-	Input and Output
PWM	-	Pulse Wisth Modulation
ICSP	-	In Circuit Serial Programming
HTTP	-	Hypertext Transfer Protocol
Arduino IDE	-	Arduino Integrated Development Environment

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CHAPTER 1

INTRODUCTION

1.1 Background

Over the years, road accidents have been a never-ending issue globally. Road traffic deaths were the ninth most common cause of death in 2004, and the World Health Organization estimated that by 2030, they would be the fifth most common (World Health Organization 2009). Every year, over 1.2 million people die on the roads, with 20 to 50 percent of them being children. Millions of people are injured but do not die as a result of their injuries. Malaysia, as a developing country, has a lot of potential, has identified road safety as a key issue that needs to be addressed. (MIROS, 2020).

We have just been through a huge pandemic which harmed the whole world. People were jobless, unable to go out freely, missed out family vacations and struggles in the education field but one good thing that happened in this pandemic was reduction of road accidents. Since there was less traffic on the roads during the movement control process, Malaysia had cleaner air. There are fewer traffic fatalities and injuries so the number of people injured on the road has decreased by 32.7 percent. Meanwhile, during the MCO season, the number of injury cases decreased by 36.1 percent as compared to the same period in 2020. (The Star, Sunday 6 Dec 2020)

Festive seasons in Malaysia is where the number of road accidents will be in peak. Despite having tight security and protection like ‘OPS’, number of accidents never failed to

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accelerate. Recently, in the seven days following the launch of Op Selamat, which coincided with the Chinese New Year travel rush, up to 97 people were killed in traffic accidents across the country. There were 11,788 traffic crashes involving 17,901 vehicles in the past week, with Selangor having the most cases (3611), followed by Johor (1,824), Kuala Lumpur (1,432), and Penang (1,432). (978). (NST, JAN 26 2020).

1.2 Problem Statement

Day by day, number of road accidents are rapidly increasing and the number of lives lost are linearly increasing as well. According to the research done by Abdul Kareem from the Department of Radiology, School of Medical Sciences, from the Health Campus of Universiti Sains Malaysia, 1.17 million deaths occur each year worldwide due to road accidents 70 % of which occur in developing countries. Malaysia is one of those countries. On the average, 16 victims died from these road accidents, every single day according to the research. This happens because of the delay in the transmission of information of an accident spot's location to the respective authorities. Hence, lives lost are out of control and unstoppable. This causes the number of deaths reported due to road accidents increase in a regular basis.

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Although an accident is reported to the respective authorities, for an ambulance to reach the accident spot it has never been as soon as the accident occurred. Moreover, if an accident happens in a location which is not crowded or far away from any medical facilities. The accident to be reported to the relevant authorities itself takes time and by the time they arrive and provide medical aid, it will be longer and there is no assurance for the life of the victim.

Road accidents are caused by wide range of factors such as reckless and inconsiderate driving, lack of proper protection, speeding and many more. One of the most crucial factor is drink driving. Recent records of total drink driving cases involving deaths or injuries in Malaysia shows 22 just in the first five months of 2020 despite the lockdown period. Among the 22 cases reported 9 victims died and the rest 13 survived with injuries. (Ida Lim, Malay Mail, 11 June 2020). Drinking while driving has been common among Malaysian citizens and even youngsters.

Reckless and inconsiderate drivers who do not take drink driving as a serious issue should be warned. If this has not come to an end number of road accidents might not be reduced and drivers will continue consuming alcohol while driving.

1.3 Project Objective

My aim of this project is to create a prototype that is

i. To develop a model of Vehicle Accident Tracker which is integrated with IOT platform.

ii. To detect the presence and level of alcohol consumption by driver using MQ3 Alcohol sensor.

iii. To alert and send location of the accident spot to the respective authorities if the vibration sensor's reading exceeds its threshold value using GSM and GPS technology.

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1.4 Scope of Project

This study is proposed to develop an Arduino based tracker to detect accident spots and notify the respected authorities at the right time. GPS and GSM have become one of the crucial part in a vehicle system. These both elements are being utilized in this study. GPS will be sending the longitude and latitude information of accident spot and send it to the respective authorities. The system will then send the accident location acquired from the GPS using GSM network. This will help to reach the rescue service in time and save the valuable human life. This project has an added value which is alcohol sensing. MQ3 Alcohol sensor is used to detect any alcohol consumption by the driver.

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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter is about evaluating and integrating data from previous research in the same subject. Within a set time period, the released content will be in a certain area of study. A literature review is an assessment of material obtained in journals, papers, or books connected to the topic of research. This literature should be documented, reviewed, analyzed, and highlighted in the review. It should provide a theoretical foundation for the research and assist the writers in determining the scope of their study.

2.2 GPS Tracking

The global positioning system (GPS) is a satellite-based positioning system that was introduced in the last two decades and has seen exponential development based on location. LBSs (site-related services) are services that operate based on a user's location and background. To assess the actual user position, location-based smartphone apps use GPS technologies embedded in smartphones. There are a variety of systems used for delivering various services. Wi-Fi finger printing, wireless sensor networking, and WLAN for indoor positioning, as well as a limited number of outdoor locations, are examples of location-based services utilizing mobile communication devices. However, with a broad variety of location-based services, GPS has emerged as the easiest and most widely used outdoor positioning system. Tourist intelligence, locating the nearest point of interest (POI), military data exchange with location and user confirmation, aircraft surveillance, vehicle tracking, vehicle-to-vehicle communication, vehicle-to-infrastructure communication, and vehicle

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load delivery on road latitude using available satellite signals are almost all done by GPS-based applications. The purpose of GPS is to calculate time, altitude, longitude, and latitude. While the concept of satellite positioning was introduced in the early 1960s , GPS was not implemented until the 1970s, and then it was only being used for military purposes by the US Department of Defense (DoD) for positioning, navigation, and weapons aiming.[1]

2.2.1 GPS Architecture

GPS consists of three segments spatial, control and user segments.

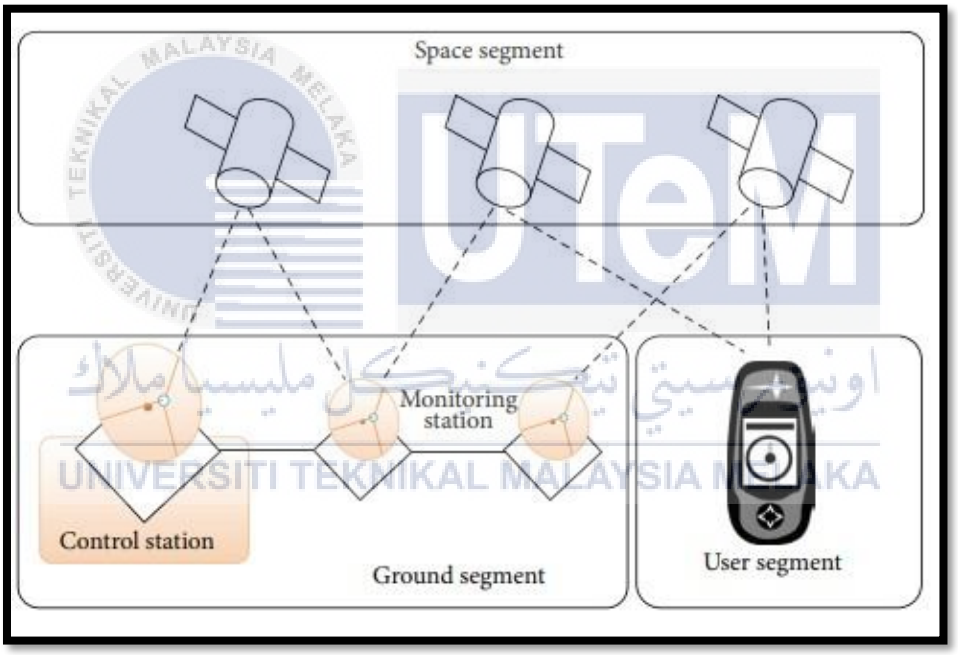

Figure 2.2.1.1: Segments of GPS System

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