



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**SMART ACCIDENT IDENTIFICATION USING WEB-BASED
SYSTEM FOR EMERGENCY DEPARTMENT**

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

by

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DECLARATION

I hereby, declared this report entitled Smart accident identification using web-based system for emergency department 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 Computer Engineering Technology (Computer System) with Honours. The member of the supervisory is as follow:

.....

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ABSTRAK

Sistem pengenalpastian kemalangan adalah direka khas untuk kegunaan kereta bagi mengesan kemalangan yang berlaku. Terdapat beberapa jenis kenderaan yang sudah mengaplikasikan sistem ini di Malaysia. Namun begitu, sistem ini sangat jarang digunakan dek kerana harga untuk memiliki sistem ini adalah mahal. Kebanyakan rakyat di Malaysia tidak begitu berpengetahuan mengenai sistem ini. Justeru itu, ramai yang abaikan kepentingan sistem ini. Banyak kemalangan berlaku di perkampungan dan juga jalan yang kurang pengunanya. Apabila kemalangan berlaku di kawasan begini, mangsa kemalangan sukar mendapat pertolongan. Mangsa kemalangan selalunya sukar dilihat kerana jalan gelap atau terjatuh kedalam gaung. Tambahan pula, kemalangan sebegini selalu mendapat pertolongan daripada penyelamat lambat. Hal ini kerana, pasukan penyelamat sukar mencari lokasi kemalangan. Walaupun kemalangan yang berlaku di lebuh raya, pasukan penyelamat tetap tiba lewat di lokasi. Ini kerana, pasukan penyelamat menerima maklumat berkaitan kemalangan lewat. Terdapat beberapa kes dimana mangsa meninggal/mati kerana kelewatan pasukan penyelamat. Oleh itu, sistem pengenalpastian kemalangan menggunakan laman web diwujudkan untuk mengatasi masalah sebegini. Sistem ini boleh mampu digunakan oleh semua kereta di Malaysia.

ABSTRACT

Accident identification system is design specifically for car purpose in order to detect the accident. There not many car models apply this system already but in Malaysia, these systems are rarely being used. This is because the systems are quite expensive and most of Malaysian citizen do not familiarize and notices the important of this system. Many of accident happen at rural or quite area. In which, it make the victim hardly receive any help from the road user. Furthermore, accident at this area always receives help from emergency department late, because the rescue team do not have an exact location of the accident happen. Even though the accident happens at highways which have many road users, yet the rescue team arrives late. This is because the emergency department receive call or notification late. In some cases, the victim die because of ambulances late arrive at the accident location. Therefore, smart accident identification using web-based system for emergency department is asuitable method to overcome this problem. And also, it can be used by every car user in Malaysia.

DEDICATION

To my beloved mom, dad and myself.

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CHAPTER 1

INTRODUCTION

In this chapter includes background, problem statement, objectives, the scope of the project, and significance of the project. It also contains a summarization of idea that related to this project.

1.1 BACKGROUND

In this era of technology and modern lifestyle, the demands of vehicle especially car also increased along the time. Because of this, the traffic hazards and roads accident rises rapidly. Based on a report from Malaysian Institute of Road Safety Research (Mios), a fatality may cause the nation an average of RM1.2million, RM120,000 for serious injuries and RM12,000 for non-serious cases in medical cost, productivity loss and other payouts(Gan, 2017). If an accident happens, not only the person involves the accident felt the pressure, our government will effect too. Yet, the family's victim will suffer the greatest loss. The family member may traumatize from the incident.

The car industries have tried their best in order to provide the best safety features for driver and passenger safety. Many alternatives have been creating in order to reduce the risk of accident as well as avoid them. The government also play a role by tightening up the roads rules.

Additional speed track plus AES camera on the road and highway are placed to catch the guilty person. But, accidents never counter it. An accident may happen anywhere, whether the driver prepared or not.

Usually, when an accident happens, an emergency department which includes polices ambulances and firefighter come to the location. The reinforcement will help to save the accident victim. However, the emergency department will never know the accident happen unless there is someone reporting it to the control room. What if there is no one around to help report the incident to the control room? Then, there is nobody there to help the victim. This is where the idea begins. It is to create a system to notify the control room about the accident. In which, the department can take action without delaying time.

The project is to create a system known as Smart accident identification using the web-based system for the emergency department. This product acts as accident identification systems in which it will detect accident occur by detecting the shock or orientation of the car. After that, it sends the basic information to control room within few seconds covering geographical coordinates and time accident occurred. The exact location can be traced by using GPS module implanted in the system. This information will send to control room via a web-based system. The web-based system is connected to the system using MiFi module. The brain for this project is by using Raspberry Pi while the output for this project can be seen on the web.

1.2 PROBLEM STATEMENT

The rate of car crash fatalities increases every year. Accident sometimes takes place at highway or sometimes on a normal road. It can happen anywhere. Accident never concerned about where to happen and who the victim to choose. In our country Malaysia, there are many rural areas. The rural areas or rural roads often used by car driver to avoid a traffic jam on the highway. Thus, people tend to drive fast in this area, which may cause a serious accident. In fact, these roads have least user and least streetlight. Hence, when the accident happened, there is no one around to help the victim.

In another case, if the victim of the accident received a help by the roads user especially on the highway. Highways usually have many roads user. Yet, most of the fatalities accident usually occurs on the highway. Even though there are many people offering aid to help the victim, but without the ambulance or medical teams it is hard to save a person life. When the accident happens, people who witness and help the victim normally will call an emergency department. This is where the time-consuming. People who witnessed the tragedy normally will panic. It may take the time to move from their car to the victim car. Besides, when the helper reaches the victim, they will check whether the victim okays or not before making a call to the emergency department. Without our realization, the time that waste may lead to the victim deaths. Since every second is important for the patients. It is between life and deaths of the victim.

Every car companies have designed safety features to reduce injuries during the accident. Majority nowadays car contain airbags and seatbelts to reduce injuries of the people in the car. What is more, they also design safety features to avoid the accident take place. Such as ABS systems, brake assist, automatic emergency braking and etc. As many people from varies industry tried to reduce accident problem, they create a system to detect the location of the accident occur. This system will send the location to the control room. But, this system is not used by any industry due to their lack. The current system is designed to send the location to the control room using GSM. When using GSM, the control room will receive a message that contains the location of the accident, but messaging will cause many problems. It consumes time and device slowly responds as many messages will receive at the same time.

1.3 OBJECTIVES

1. To study the solution of any emergency situation involving car accident occurs at the quiet place or rural area.
2. To develop a system which helps the emergency department reach and save accident victim in shortest time.
3. To analyze the effectiveness of the system sending the specific location to the control room when an accident occurs.

In the first objective, the aim of this project is to find a solution involving car accident. Usually, an accident which occurs in the rural area or in a quiet place (less road user) hardly is being reached by the emergency department. Thus, this project is to find the solution to this long-lasting problem.

The second objective, the aim of this project is to develop a system which helps emergency department locating the victim of the accident. By developing this system, the victim of the accident can be reached faster. In which, the emergency department can help saving people life and can reduce the number of people died due to a car accident.

For the last objective, the aim is to analyze the effectiveness of the system. This is to decide whether the system can send specific location and personal information of the victim to the control room. Then, the control room can take action by sending reinforcement faster without delaying time in order to save the victim.

1.4 SCOPE OF PROJECT

The aim of this project is to notify the control room about the accident occur so that they can take action faster in order to help the accident victim. In this system, if the accident occurs, the GPS will detect the current location of the car and send it to the control room. The control room received the information through MiFi modem that links to the web-based system. The control room will receive the notification containing location and personal information of the driver via the website.

Since this project using Mi-Fi module, the area coverage is wider. The MiFi modem support 2G, 3G, 4G and also 5G. The system will only cover and available for mobile network coverage. Nowadays, the majority of the road or highways in Malaysia are already enclosed by mobile network coverage. So if the area where the misfortune happens does not have mobile coverage, then the system cannot send the notice or warning to the control room.

This project able detects shock of the car. If the car collides with anything that exceeds the requirement shock than the system is activated. Furthermore, it able detects the orientation of the car. In this case, if the car is upside down or inclination position, the system is activated.

Lastly, this project limit to the car in Malaysia only. Most of the Malaysian citizen afford to own a car. Yet, in Malaysia, the safety features provide by the car are limited. Compare to another country, some of the cars contain advanced safety features in order to avoid an accident and also to save people life during the accident which is expensive and not affordable to our citizen.

1.5 SIGNIFICANT OF STUDY

According to The Star Online, Transport Minister, Datuk Seri Liow Tiong Lai state that 7152 people died due to a road accident in 2016(Murad, 2014). By developing this project, it can contribute to emergency department sector, a vehicle user, and car industry.

This system may help in reducing the number of people died and help the emergency department reach the victim of the accident without delaying time. Besides, it helps the vehicle user to contact the control room without using human effort even though the accident occurs at the quiet road or the victim condition is critical. Furthermore, car industry can use this system to improve their safety features. This system can be installed in the user car and detect if an accident occurs. The system will send notification via web-based to the control room. Meanwhile, the control room will send their reinforcement to the location received through the system.

1.6 STRUCTURE REPORT

Generally, this report contains three chapters. Each chapter has a specific scope which contains all information, process, and steps to be done to reach the complete product.

In chapter 1, concisely explain how often people died due to the accident and how the emergency department can reach the victim faster. Besides, in this chapter, it discussed problem before the presentation of the system. It also contains the objectives of this project, the limitation of this project and the significance of the study.

In chapter 2, the literature review of this project. In this chapter, it discusses and contrasts about the earlier project that been created by other people. Despite the fact that this chapter discussed how the earlier project can be improved and upgraded in order to create a useful system.

In chapter 3, discusses the methodology of the project. The flowchart provides to show the flow of the project. In addition, this chapter explained about the hardware and the software being used in this project.

In chapter 4, the result of the project is present and discuss in this section. The specific flow of the system explained in detail in this chapter. the output including the picture of the project is shown in this chapter.

In chapter 5, the conclusion of this project is stated clearly in this chapter. Besides, the future work for improvement that can implant in the system also discussed in the last chapter.

1.7 CONCLUSION

The chapter is the beginning step to understand and have an overview about the project. In this chapter, problem related and objective of the system are discussed as both of the part are the crucial part in developing the idea of the project.

CHAPTER 2

LITERATURE REVIEW

In this chapter, several types of research have been done in order to investigate the improvement that can be applied to this project. A research through a journal, website, and book has through in order to develop an understanding of this project. The software and hardware requirement detail have also been discussed in this chapter. The entire journals studied are comparing with each other to produce a new system.

2.1 Internet of Things (IoT)

The Internet of Things (IoT) is a system of interconnected computing devices, mechanical and digital devices, vehicle or building that is provided with unique identifiers and embedded with electronics, software, sensors, actuators and network connectivity. It has a capability to transfer information over a network and exchange it without requiring human-to-human or human-to-computer interface. A thing in IoT can represent a person, animal, automobile or any object that can set the IP address and able transfer data using a network. An example of IoT applied to the animal is a farm with a biochip transponder, for a human is heart monitor implant while for a vehicle is sensors built-in to warn the driver.

IoT has emerged from the convergence of internet, wireless technologies, a microelectromechanical system (MEMS) and microservices. By combined the operational technology (OT) with information technology (IT) in order to create free machine-generated data to steer the improvement of technology. The co-founder and executive director of Auto-ID Center at MIT, Mr. Kevin Ashton is the first person talk about the Internet of Thing. In the talk, he states that every people have their owned lack. They have limited time, awareness and precision which make people cannot capture or store every data about things happened in the real world. Thus, to detain all the data without any lack, we need a computer that knows the whole thing without helps from people (Rouse, 2016).

The IoT helps humankind by reducing mankind interference in doing jobs. By using IoT system also helps enhanced efficiency, the accuracy, and economics of the system user. The IoT allows the thing to be detected or controlled remotely across an active network. Besides, IoT gives many other benefits such as it can count and record everything. People can take action based on the data provided by IoT system. In fact, this system can help in saving energy, cost and reduce waste.



Figure 2. 1: Internet of Thing

(Source: < https://en.wikipedia.org/wiki/Internet_of_things>)

The IoT technology applications are widely used in many industries nowadays. The industries using IoT includes the building management, healthcare, agriculture and even transportation. Furthermore, the IoT becomes an example of the common class of cyber-physical system which involve the technology such as smart cities, smart homes, automation plantation and intelligent transportation. Naturally, IoT is offering a higher connectivity of devices, system, and services that are further than machine-to-machine communications. It is expected to lead in automation of all field include the highly developed application similar to a smart grid and then to develop smart cities.

2.2 Safety Features

Most of the important things to consider when buying a car are the safety features. Mostly all people when choosing a car to buy, they would consider the safety features provided in the car. But, that's not the first priority people would consider. Some of us would consider the engine technology, fuel consumption, comfort, the body pattern or colors, and the price. Without our consideration, the main concern arrives the destination safely. People cannot predict the future hold for us. In fact, an accident can happen anywhere and to anybody. Thus, it is the car owner to take the responsibility when choosing a car, because prevention is better than cure.

There are many types of safety features provided in a car. The majority all automobile industry is competing to produce the best car with best safety features. In 2016, a survey by Safety Departments conducted to rate top 10 cars that have the best basic of the safety package and the crash experiment on the car. The first car in the ranks is Toyota Avensis Tourer. Toyota Avensis Tourer has win Car of The Year Safety Award 2016 due to its safety features for interior and the exterior (Matt, 2016). Toyota car provides the best safety features compare to another car model.