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DEVELOPMENT OF AUTOMATIC DOA RECITATION IN VEHICLES USING RASPBERRY PI

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

by

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FACULTY OF ELECTRICAL AND ELECTRONIC ENGINEERING

TECHNOGLOGY

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RABIATUL ADAWIYAH BINTI ROSLI

A thesis submitted in fulfilment of the requirements for the Bachelor of Computer Engineering Technology (Computer System) with Honours.

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Faculty of Electrical and Electronic Engineering Technology

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DEDICATION

I dedicate this project work to my beloved mother and father Rosli bin Abdullah and Kaniza binti Hashim as well as to my family members, friends, and supervisor for their word of encouragement during the period of writing this report.

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ABSTRACT

Doa has always been a compulsory thing that every Muslim need to recite in their daily life. In fact, it is an important part of Muslim faith and belief and doa can be consider as a form of prayer and it could be done anytime. There are some problem encountered where muslim always neglect to recite their doa before doing something. Therefore, the purpose of this project is to develop an automatic doa recitation that focus on a vehicle especially a car. It is implemented within the buckle up system of seat belt and an application is built to control the doa recitation that will be played in the smartphone via a Bluetooth connection. The objective of this project is to develop an automatic audio player that operate through application, to develop a seat belt buckle up system and to analyse the functionality of the system for human use. This project used a Raspberry Pi Zero W as a microcontroller to control the input and output of the system. A Bluetooth communication between hardware and software are establish by using an additional Bluetooth module which is HC-06. There is two approach used in this project where it involved electronic devices such as reed switch and push button since the function of reed switch similar like a NOT inverter from push button. A reed switch is used to implement the buckle up of seat belt whether the seat belt buckle is latched or unlatched. An application is developed to automatically play an audio if the buckle of seat belt has been activated by car occupants. The outcomes of this project is to be able to develop an automatic doa recitation that mainly focus in a car and as a reminder to every Muslim that doa is important to recite before doing any activities.

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ABSTRAK

Doa adalah satu perkara wajib yang perlu dibaca oleh setiap penganut agama Islam di dalam kehidupan seharian mereka. Secara fakta, doa adalah salah satu bahagian yang penting di dalam kepercayaan umat Islam di mana ia dianggap sebagai salah satu bentuk doa dan boleh dilakukan pada bila-bila masa. Terdapat beberapa masalah yang sering dihadapi di mana umat Islam sering mengabaikan untuk membaca doa sebelum membuat sesuatu aktiviti. Oleh itu, tujuan projek ini dihasilkan adalah untuk membangunkan satu bacaan doa secara automatik di mana projek ini akan diterapkan di dalam kenderaan terutamanya kereta. Projek ini dilaksanakan di dalam sistem tali pinggang keledar yang terdapat di dalam kereta dan satu aplikasi akan dibangunkan dengan tujuan untuk mengendalikan bacaan doa yang akan dimainkan secara automatik di dalam telefon pintar melalui sambungan Bluetooth. Objektif projek ini adalah untuk membangunkan satu aplikasi yang dapat memainkan bacaan doa secara automatik, membangunkan sistem tali pinggang keledar dan menganalisis fungsi sistem tersebut untuk kegunaan manusia. Projek ini mengunakan Raspberry Pi Zero W sebagai mikrokontroler yang dapat mengawal keseluruhan sistem. Komunikasi secara "Bluetooth" antara perkakasan dan perisian telah berjaya dihasilkan menggunakan "Bluetooth" modul tambahan iaitu HC-06. Suis reed digunakan untuk menyiasat sama ada tali pinggang keledar telah diaktifkan oleh pengguna atau tidak. Satu aplikasi akan dibangunkan di mana fungsinya adalah untuk memainkan audio secara automatik apabila tali pinggang keledar sudah dipasangkan oleh pengguna. Hasil daripada projek ini adalah untuk membangunkan aplikasi yang mengawal bacaan doa secara automatik serta sebagai peringatan kepada setiap umat Islam bahawa doa sangat penting untuk dibaca sebelum melakukan sesuatu aktiviti.

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter 1 consists of project background, problem statement, objectives, scope of project, significance of project and structure of the report which will be briefly explain each chapter in this report.

1.2 Background of The Study

In Muslim religion, doa is a means of supplication which means it plays a role as an important part of our faith and belief. Doa is consider as one way of keeping touch with Allah and due to doa' we will get closer to him. Doa can be made at anytime and anywhere where it is a form of prayer that require no fixed time and place to make a doa. Muslim believe that by making a doa is consider as one of the weapons that can protect them from any harm or danger that could happen.

One of the disadvantages is as a Muslim, they often forget to recite a doa in everything they are doing in their daily life as doa is a compulsory method to recite before we are doing something. This is because they are too many of doa that need to be recited and it is impossible for Muslim to memorize all of them.

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Apart from that, vehicle are one of the most important and become a main transportation for a person to move from one place to another place. There are many vehicles that exist as a part of transportation system such as car, van, bus, motorcycle and train. In Malaysia, a vehicle that is a part of road transportation that are commonly used is a car which is 40% from the total transportation medium after motorcycle. Based on the statistics, the use of seatbelt can overcome the possibility of death among car occupants by 45% to 50% (Sivasankar Sambasivam, 2014). Since then, seatbelt has been acknowledged as one of the most practical ways that can reduced the possibility of injuries and non-injuries during accidents.

Among one of the weakness that can cause a road accident for car occupants is lack of wearing a seatbelt. They favour to neglect the importance and use of seat belt and declared that seat belt limit their movement while driving. In most cases, victim of road accidents were thrown out of their vehicle because they are not wearing their safety belts. Hence, Malaysia Institute of Road Safety (MIROS) has stated that if passenger obeys the law by wearing a seat belt, the fatality of road accidents can be reduced to 40 to 50 per cent.

Thus, this project is aim to develop a system where the doa recitation will automatically being play when passenger started to buckle up their seat belt via a Bluetooth connection.

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1.3 Problem Statements

The idea of this project come out after reviewing that passengers of vehicles especially Muslims do not frequently recite a doa' before getting on the vehicle. The problem is, Muslims religion make it obligated to always recite a doa' before doing everything because as an Muslims we should make an effort to remember Allah SWT as he will be protecting us. Moreover, we do not want to rely only on memory and will power to recite the doa' as it is often easily distracted and forgetful.

The passengers of the vehicles also do not frequently wear a seatbelt after getting on the vehicle. This is due to the existence of seat belt reminder that is being used in every vehicle which has becoming a major problem.

Thus, the seat belt reminder does not havea fix level of standard operating procedure which is in most local vehicles the warning signal on dashboard come out without a sound or signal which makes passenger and driver often forget to wear the seat belt. In addition, lack of wearing seatbelt among people will make the chance of injuries happen during accident.

Therefore, the main idea of automatic doa recitation in vehicle is by combining it into the buckle up system of the seat belt. As driver and passenger wear the seat belt, an audio of doa' will be automatically play inside the vehicle. Besides, kodular.io will be used to enhance and improved the system. There is an audio detection as one of the inputs and there is a function that will inform and give reminder to the user to always wear a seat belt when getting into the vehicles.

In order to enhance the buckle up system for seat belt to make it more effective, a combination of microcontroller, smart mobile phone and wireless technology such as Bluetooth connection will be used as one of the hardware to develop project. To implement the functionality of this system, the hardware require will establish by a serial communication between Raspberry Pi and Android through Bluetooth medium.

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1.4 Objectives

Mainly, the objective will clarify about the results that need to be accomplished at the end of the project. The goal of the objectives is to preserve the project in the correct way and well specified. The key of this objectives recorded as below:

1. To develop an automatic audio player that operate through apps
2. To develop a seat belt buckle up system

For the first objective, the audio player will be enhanced by using Kodular. Kodular is chosen because it is an online platform-based software that can be used without downloading to someone personal computer or laptop. Thus, kodular is a development of mobile application. This software is considered as user friendly because user can easily develop the application by only dragging and dropping the components into a design view.

In order to program the application behaviour, kodular use a visual blocks language. Thus, kodular authorize anyone to change to technology creation from technology consumption.

For the second objective, this project will establish a seat belt buckle up system to make it easier for driver and passenger to always remember wearing a seat belt. By applying a buckle up system, it can be detected if there is no passenger wearing a seat belt.

Hence, the advantage of this system is that when the buckle up system of seat belt has been activated there will be automatically audio player will play through phone application via a Bluetooth connection.

1.5 Scope of Project

The scope of this project is to enhance the seat belt reminder system to automatically play an audio of doa' recitation when user start to buckle up the seat belt. An interactive interface of application will be create using kodular which can easily help user to always remember to wear a seat belt. Hence, the application is focus only on Android user.

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The focus of this application as is it will be direct to the functionality of the application itself. A good application always caters to the requirements of the user. The application must have a clear and specific purpose in order for the system to operate successfully. In an addition, the target user for this project is for car occupants especially a Muslim.

Furthermore, the development of this project involved a Raspberry Pi Zero W as the microcontroller board that function as a "brain" for other hardware to communicate to each other with the presence of Bluetooth connection. So, an excellent knowledge and information about microcontroller is required to choose a suitable microcontroller board that will produce a better result according to the system requirement. The microcontroller board that is chosen indeed the most suitable microcontroller that is used to produce this project as it is small and compact.

1.6 Significance of Study

This project can be very important to people especially to Muslim society in remembering and improving their memory about the importance of doa' in their daily life. The target people that will implement this project is that consumers that use a transportation medium especially a car. Moreover, an accident also could happen where mostly driver and passenger often forget to wear a seat belt. Thus, this project can help to always remind driver to always wear a seat belt that is comply with the government law because this system using a buckle up technique of seat belt that will automatically play an audio when driver activate it. Thus, by developing this project it might help and directly compliment user knowledge for a better understanding.

1.7 Structure of Report

This report contains three chapters that precisely explaining the idea and theory of the project where it requires all action in order to accomplish the final product. The description of each chapter will be in paragraph as following.

Chapter 1 briefly defines about the background and basic information about the application of automatic doa' recitation with a seat belt remainder buckle up system that is required to develop the system. In addition, problem statements, objectives and scope of this project are also proposed in this chapter.

Chapter 2 describes about literature review that approaching the previous projects that is related to this project. This chapter evaluate in the concept of transmission of audio over wireless connection such as Bluetooth and Wi-Fi that can be implement in this project in efficient way. In addition, this chapter contains the concept of software and hardware requirements towards the system that will be develop,

Chapter 3 alerts more on the methodology of the project from starting point until the end. The methodology consist of software and hardware development of this project.

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The software development consist of the application of automatic audio player that is created by using MIT App Inventor. The hardware development consist of the use of buckle up system of seat belt.

Chapter 4 aim on analysing the result from software and hardware development. The results will be in form of figures and discussion.

Chapter 5 will be the summary of this project along with the discussion and recommendation for future improvements.

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