UNIVERSITI TEKNIKAL MALAYSIA MELAKA

THE DEVELOPMENT OF CAR SEAT ALERT SYSTEM THROUGH TELEGRAM APPLICATION

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

By

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I declare that this Choose an item. entitled "THE DEVELOPMENT OF CAR SEAT ALERT SYSTEM THROUGH TELEGRAM APPLICATION" is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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APPROVAL

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the Bachelor of Electrical Engineering Technology (Industry Power) with Honours

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DEDICATION

This was dedicated to my beloved father, Mr. Abd Razak bin Abd Rahman, my beloved mother, Mrs. Noridah binti Zainuddin and my siblings, Khairunisa Izzaty, Khairul Aidid, Khairul Eizlan Naim. Praise is to Allah S.W.T that I get family that very understand and always give me some idea that might help this project. Thankful for all advices I am very blessed.

ABSTRACT

The general target or purpose that has been authorized throughout this report was to design and develop a car seat alert system for baby that been left in vehicle and get heatstroke deaths. This type of accident called as vehicular heatstroke and it is very dangerous to a baby because of their body overheats 3-5 times faster than an adult body. Plus, the inside of a vehicle is heat up very quickly and it very concerns parents to bring their child to travel using car. Nowadays, heatstroke deaths of children in vehicles quite encouraging and every year the number of cases is increasing. In an overwhelming majority of child vehicular heatstroke deaths, it was a loving, responsible parents that unknowingly left the child. This project was created to inform and alert the parents out there when they might forget their child is left at any circumstances. To make sure this project system more practical, NodeMCU is used as microcontroller to control all the input and output devices in this system. As to alert parents when this carelessness is happens the LED and Buzzer is provided in this system. Apart from that, LCD is used to display the presence of the child at the seat and temperature value inside. GPS module is used to give the location to inform the driver that the child was been left in the car. As to ensure the goals stated will be achieved, significant research have been made thoroughly that will acts as references throughout these studies for this project.

ABSTRAK

Sasaran atau tujuan umum yang telah disetujui dalam laporan ini adalah merancang dan mengembangkan sistem peringatan tempat duduk kereta untuk bayi yang ditinggalkan di dalam kenderaan dan mendapat kematian akibat panas. Jenis kemalangan ini disebut sebagai serangan panas kenderaan dan sangat berbahaya bagi bayi kerana badan mereka terlalu panas 3-5 kali lebih cepat daripada badan orang dewasa. Selain itu, bahagian dalam kenderaan menjadi panas dengan cepat dan sangat menyusahkan ibu bapa untuk membawa anak mereka pergi menggunakan kereta. Pada masa kini, kematian anak-anak di dalam kenderaan akibat angin ahmar cukup memberangsangkan dan setiap tahun jumlah kes meningkat. Dalam sebilangan besar kematian akibat strok panas anak-anak, ibu bapa yang penyayang dan bertanggungjawab yang tanpa sedar meninggalkan anak itu. Projek ini dibuat untuk memberi tahu dan memberi amaran kepada ibu bapa di luar sana apabila mereka mungkin lupa bahawa anak mereka ditinggalkan dalam keadaan apa pun. Untuk memastikan sistem projek ini lebih praktikal, NodeMCU digunakan sebagai mikrokontroler untuk mengawal semua peranti input dan output dalam sistem ini. Untuk memberi amaran kepada ibu bapa apabila kecuaian ini berlaku, LED dan Buzzer disediakan dalam sistem ini. Selain itu, LCD digunakan untuk memaparkan kehadiran anak di tempat duduk dan nilai suhu di dalamnya. Modul GPS digunakan untuk memberi lokasi untuk memberitahu pemandu bahawa anak itu ditinggalkan di dalam kereta. Untuk memastikan matlamat yang dinyatakan akan tercapai, beberapa kajian penting telah dibuat secara menyeluruh yang akan menjadi rujukan sepanjang kajian ini untuk projek ini.

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LIST OF SYMBOLS AND ABBREVIATIONS

LED	-	Light Emitting Diode
LCD	-	Liquid Drystal Display
GPS	-	Global Positioning System
GPIO	-	General Purpose Input Output
IDE	-	Integrated Development Environment
PWM	-	Pulse Width Modulation
ADC	-	Analog to Digital Converter
DAC	-	Digital to Analog Converter
PIR	-	Passive Infrared
CNS	-	Central Nervous System
IOT	-	Internet of Thing
API	-	Application Programming Interface
Wi-Fi	-	Wireless Fidelity
CPU	-	Control Process Unit
GSM	-	Global System for Mobile Communications
SMS	-	Short Message Service

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CHAPTER 1

INTRODUCTION

1.1 Background

Recent years have seen a rise in the number of children who die from heatstroke after being left alone in a car. Heatstroke is a drastic medical disorder which is devastating. It unexpectedly affects safe people and many death. Those who survive may suffer permanent neurological damage. Heatstroke poses a safety threat worldwide. Heatstroke usually occurs in summertime in an epidemic fashion. It features a body temperature above 40 degree Celcius, anhydrosis, extreme disorientation, coma and delirium. The elderly and young children are the ones who are most at risk for heatstroke. Children are especially vulnerable to experiencing heatstroke, because their body temperatures rise three to five times faster than that of an adult (Soto et al., 2014).

The susceptibility of children to a classic heat stroke is due to a high ratio of surface area to mass, which results in an increased heat absorption rate. Besides that, Small blood volume relative to body size which limits the potential for heat conductivity and results in higher heat accumulation and low sweating levels which reduce the potential for heat dissipation through sweat evaporation. For children, trapping in a closed car is a significant risk factor for death during hot weather, where death will occur within a few hours (Epstein & Yanovich, 2019).

Additionally, due to climate change, the number of deaths from heat stroke has been reported to increase. By the 2050s, heat-stroke-related deaths are bound to grow by almost 2.5 times the current annual level of about 2000 deaths (Mittal & Gupta, 1986).

The project aims to developing a reliable system for alerting parents who mistakenly leave their children in a car seat inside a vehicle using NodeMCU Esp8266 via Telegram Messenger application.

1.2 Problem Statement

Heat stroke is a disease in which the body overheats itself to some degree through prolonged exposure in high temperature conditions and eventually leads to permanent damage and even death. Warm weather in countries like Malaysia simplifies heating the baby and causes hyperthermia. Many incidents have occurred over the years where a infant or a boy in the car has died of the hot weather (David Chua et al., 2018).

Child heat deaths in vehicles occur nearly every year due to neglect and misinformation by parents who frequently leave their children in their car alone (Diamond, 2019). A parked vehicle will be in the light reaching 51 degree Celsius in minutes, including at minimal windows open (Soto et al., 2014). The infant will not stand with this number of temperature and the effects is the baby will influence to dehydration and if this occurs prolonged it can cause then to coma or something bad that will affect baby to death. Statistics from January 1990 to December 2014 showed that 3115 unattended children in hot cars with 729 fatalities were involved in the accidents (Zonfrillo et al., 2018).

Because of this, a project title “The Development of Car Seat Alert System Through Telegram Application” is proposed to prevent this type of accident occurs by generating safety alert signal to alert the parents or caregiver. NodeMCU Esp8266 is use as a microcontroller acting as the heart in this system which is control all the input or output devices. A Limit switch function to detects the infant that can be placed under or on the seat

to detect appearance of the baby in the seat. Next, the Temperature Sensor for knowing of temperature inside the car.

Apart from that, servo is used to roll down the window automatically when the temperature is above 38 degrees. LCD will display all the appearance baby in the seat and temperature inside the car. Alarm and LED is functionally acted as alert signal. The NEO-6M GPS module is used to send message the location to caregiver through Telegram application along with alert messages. This is alternative way to remind the driver if the alarm alert and LED is broken.

1.3 Research Objective

The purpose for this project are:

a) To study the existing infant car alert detection system

b) To design a temperature level detection system with automatic roll down window and safety alert system in vehicle

c) To develop an infant car seat alert system through Telegram Application.

1.4 Scope of Research

The The combination between hardware and software devices is applied in this project to success. Example of hardware part that use in this project such as NodeMCU as microcontroller, Limit Switch, Temperature Sensor, Servo Motor, LCD display, Buzzer, and LED. All this hardware part is being manipulate by the microcontroller as a brain for this system. The Limit Switch is used to track the presence the baby in the seat. The Temperature sensor is used to sense temperature level inside the car. Next the LCD used to show the display about temperature degree and will inform the presence the baby in the seat. The LED and alarm used to notify the driver if they left the child in the seat. Apart from that, GPS

technologies is used to send an alert message with a real-time tracking system where the location will be informed in state of longitude and latitude to the authorized user through Telegram application. For the software part, Arduino integrated development environment (IDE) is used to program the system.

1.5 Thesis Outline

This report consists of five chapters. All these chapters are discussed about the implementation of this project system, which about "The Development of Car Seat Alert System Through Telegram Application". Based on the objectives previously presented and, on the approach, proposed before, this thesis is made up of five (5) chapters, which contents are summarized as follows:

- Chapter 1 introduces about the overview of this project system that include background, problem statement, objective, scope of projects and thesis outline of this project.

- Chapter 2 consists of literature review. In this section, is about the discussion of related previous journal or article that have been conducted by other researchers for the improvement of the project. The information about several part of components, equipment that been used and technology will be discussed in detail at this chapter.

- Chapter 3 consists of the methodology used to implement this project. The method and procedure as the guide and apparatus is stated with clear flow of this research. A block diagram will illustrate the whole function of this project

system. The flow chart is used as well as the operation of this project will be discussed in this chapter.

- Chapter 4 consists of result obtained regarding to the performance of this project will be discussed. Moreover, the discussion on the analysis based on the project result and findings is being concluded clearly in this chapter.

- Chapter 5 consists conclusion and future works. The key findings and accomplishments of the studies conducted in this review are outlined in this chapter and areas are suggested for future analysis.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter addresses preceding literature studies and research on baby car seat warning system development. In this chapter were covered the theoretical research, feature, and components of the system in baby car seat alert system development. This research also leads to a deeper understanding of project management and offers an explanation as to how they can support the current project to be implemented.

2.2 Statistics Analysis on Child Being Left in Unattended Car

The statistics are from (Alowirdi et al., 2019) was conducted in Saudi Arabia that use questionnaire method to 209 participants. The questionnaire has two section. First section was designed to gather demographic data from adults, and second section was asked to review parental perceptions and attitudes towards vehicle heat strokes, as well as their understanding of the risks of keeping the child alone in a closed car. As much 52 participants were left their children alone in the car during sunny day and it shows as 25 percent to all participants. Besides that, as much 44 participants do not hear about death accidents due to left children in the closed car. Apart from that, 90 participants that answer the questionnaire do not place children in the child car seat during outing.

Figure 2-1 shows that result of the percentage of parents leaving their children inside car. The bars at right show parents who use a car seat and the percentage of parents leaving their children inside a car, and the left bars show parents who do not use a car seat and the

percentage of parents leaving their children inside a car. Although the percentage of the parents leaving the children in closed car has insignificant value but that shows that not all parents or caretakers are aware the matter that children cannot be left alone in a closed vehicle even for a few minutes.

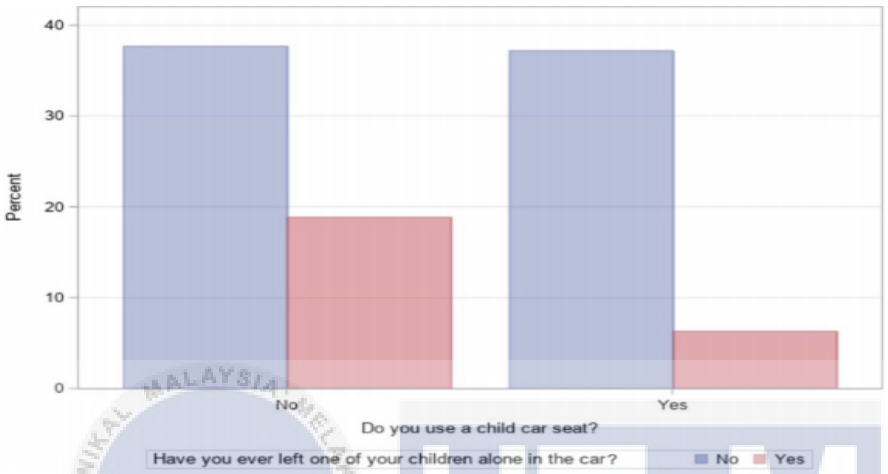

Figure 2-1 The Percentage of Parents Leaving Their Children Inside Car (Alowirdi et al., 2019)

2.3 Effect of Hyperthermia

According to (Messages, 2018) hyperthermia is a physiological reaction to intensive exercise and a mild temperature of 39°C to 40°C can be seen in athletes during intensive exercise. Hyperthermia, especially when excessive, can cause cell damage. The brain is particularly sensitive to body high temperatures. Problems and risk of death above this temperature are more linked to the severity of the underlying disease than to the height of the temperature. The upper thermal limit for ability to survive of most organisms is approximately 45°C, as proteins tend to denature beyond this temperature.