



THE DEVELOPMENT OF CAR SEAT ALERT SYSTEM THROUGH TELEGRAM APPLICATION

Khairool Aizat Abd Razak¹, Adam Samsudin², Kamilah Jaafar², Fadzilah Salim², Mohd. Aminudin Razali³, Mohamad Aiman Mohd. Ali⁴ and Ezzatul Farhain Azmi⁵

¹Distribution Automation (DA), Tenaga Nasional Berhad, SS15 Subang Jaya Selangor, Malaysia

²Department of Electrical Engineering Technology, Faculty of Electrical and Electronic Engineering Technology, Universiti Teknikal Malaysia Melaka, Melaka, Malaysia

³Department of Engineering Technology, FX Sanhei Mechatronics Sdn Bhd, Puchong, Selangor, Malaysia

⁴Department of Diagnostic Analysis, Twinoaks Sdn Bhd, Seri Kembangan, Selangor, Malaysia

⁵Department of Mechanical Engineering Technology, Faculty of Mechanical and Manufacturing Engineering Technology, Universiti Teknikal Malaysia Melaka, Melaka, Malaysia

E-Mail: adam.samsudin@utem.edu.my

ABSTRACT

This paper discusses the development of a car seat alert system through telegram application to design and develop a car seat alert system for babies that have been left in vehicles and get heatstroke deaths. This type of accident is called vehicular heatstroke and it is very dangerous to a baby because their body overheats 3-5 times faster than an adult body. Plus, the inside of a vehicle is heating up very quickly and it very concerns parents to bring their child to travel using car. Nowadays, heatstroke deaths of children in vehicles are quite encouraging and every year the number of cases is increasing. In an overwhelming majority of child vehicular heatstroke deaths, it was 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 under any circumstances. To make sure this project system is more practical, NodeMCU is used as a microcontroller to control all the input and output devices in this system. As to alert parents when this carelessness is happening the LED and Buzzer are 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 has been made thoroughly that will act as references throughout these studies for this project.

Keywords: car seat, system, telegram.

INTRODUCTION

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 that is devastating. It unexpectedly affects safe people and many deaths. Those who survive may suffer permanent neurological damage. Heatstroke poses a safety threat worldwide. Heatstroke usually occurs in the summertime in an epidemic fashion. It features a body temperature above 40 degrees Celsius, 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 [1].

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 [2].

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 [3].

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

CHILD IN CAR ALARM SYSTEM USING VARIOUS SENSORS

The previous project by [4] which the main aim of the program is to build a whole network that is able to communicate with humans using a Global Mobile Communication System (GSM). The GSM modem is the contact and communication medium for the module. This is used to send and receive an SMS. As the heart of the entire control scheme, PIC Microcontroller functions. The system can be used at the end of the stage to detect the sound produced by a person with optimal force. This also senses the movement of a human and can sense any sound that comes from inside the vehicle. Figure-1 below shows a block diagram of the project.

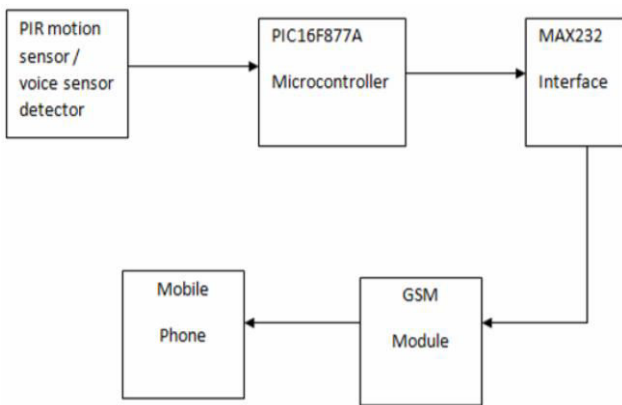


Figure-1. Block diagram of the project [4].

CAR ALERT SURVEILLANCE SYSTEM USING GSM

The previous project by [5] which this project that been developed to react immediately to alert caregivers use message when left car in the parked situation. This project system had built a system to generate an attentive message via GSM and send it to the parents or the numbers stored. It also produces a buzzer when the child is identified. This condition only occurs when the car is in operation. Here we also measure the temperature of the car by using the Arduino Uno and a temperature sensor. PIR and sound sensors are also used. This design is designed to be highly reliable and low-cost in industrial requirements.

The system used Arduino for the brain of the projects. As shown at Figure-2 The input that will channel to the Arduino is a switch, Temperature sensor LM35,

Sound sensor LM386 and PIR sensor that function to be aware of the child behavior. Next, the output device that had been used in this system is the GSM module function to transmit the message to caregiver mobile to alert that the baby had been left in the vehicle.

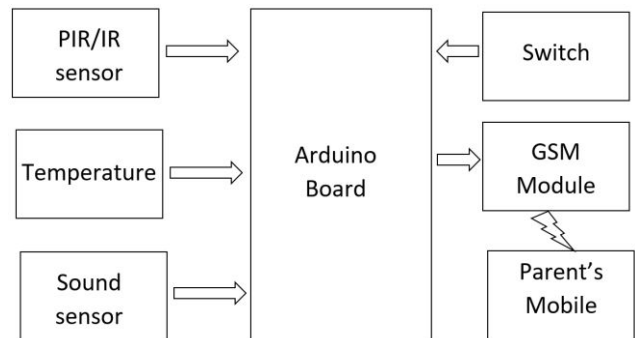


Figure-2. Block diagram of the system.

Development of an Automatic Vehicular Heatstroke Detection System

The previous project [6] is the project to provide a system to children seat that more consistent and reliable. The problem statement of this project is because of the cases of children left in a car and died because of a heat stroke. This also provides a solution for caregivers using multiple sensors to incorporate a child detection system and to assess if the sensors are better position for a more efficient system by compared and experimented between thermal sensors, carbon dioxide sensor, motion sensor, ultrasonic sensor and pressure sensor.

Table-1. Summary results of sensors evaluation.

Criteria	PIR	Ultrasonic	CO2	Melexis
Range	> 2m	> 2m	> 3m	< 0.1m
Average Response Time	5 seconds	2.9 seconds	> 5 seconds	1.8 seconds
False	No	No	No	No
Cost	RM5.30	RM25	RM285	RM137.50

As shown in Table-1 the results of this project show that ultrasonic and motion sensors were emerged from the evaluations and choose the most suitable sensors for build the detection system in the baby car seats. Apart from that, the experiment shows that the best place to position the ultrasound and motion sensors is to be above and center of the baby car seat in the vehicle.

METHODOLOGY

This section discusses the process for the "The Development of Car Seat Alert System through Telegram Application". For more information on the idea of the project, a flowchart and block diagram are used. This consists of two main sections which will be presented in this chapter which are hardware and software implementation.

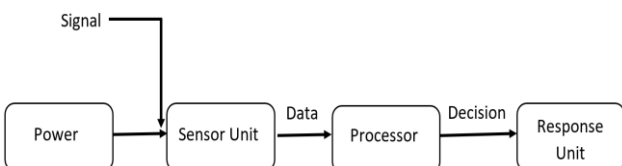


Figure-3. Main system block diagram.



Hardware Implementation

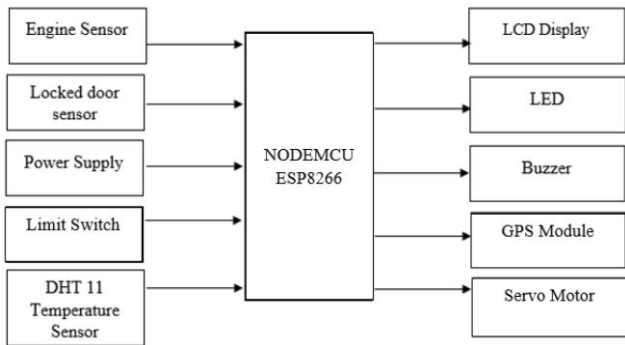


Figure-4. Block diagram of this project.

The DHT 11 temperature sensor and limit switch are the input part in the process along with the door lock and engine status switch. The temperature sensor will sense the closed vehicle temperature and the limit switch would detect the attendance of the baby. This input output voltage will send to NodeMCU Esp8266 microcontroller and with the code that has been implanted inside the microcontroller this the output part will be converted to the LCD display that will show the baby’s presence in the car seat while once the temperature is in danger level, the servo will roll the window down. Apart from that, LED will light up along with the buzzer which produces a continuous beep sound to alert the parents to the baby still inside the vehicle. The function of NodeMCU ESP8266 and GPS module, and warning text message with user coordinates will be sent to the registered person, and half of the car window will be rolled down by the servo motor to reduce the closed car temperature so that the heatstroke does not occur to the baby.

Software Implementation

The NodeMCU microcontroller utilizes an integrated development environment that allows multiple applications to be used. It is designed and implemented so that everyone can program the controller, whether beginners or experts. As the NodeMCU programs are written on paper, using the languages C or C++, which is the programming part is run using the Arduino IDE software.

This software is free to access from the official Arduino website. It is readily accessible for operating systems such as MAC, Windows, Linux, and operates on the Java Platform with built-in functions and commands that play a critical role in the environment for debugging, writing, and compiling code. Arduino Uno, Arduino Mega, Arduino Leonardo, Arduino Micro and many more are available Arduino IDE. Figure-5 and Figure-6 show the full flowchart for this project.

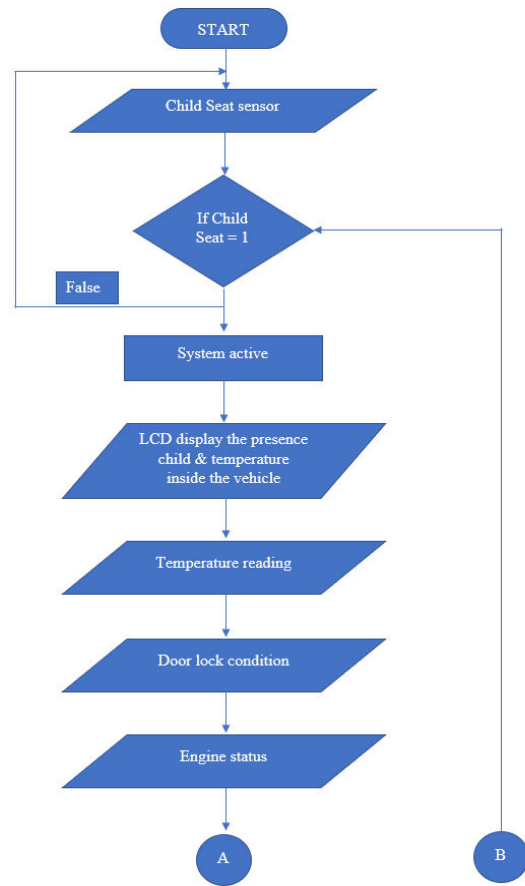


Figure-5.

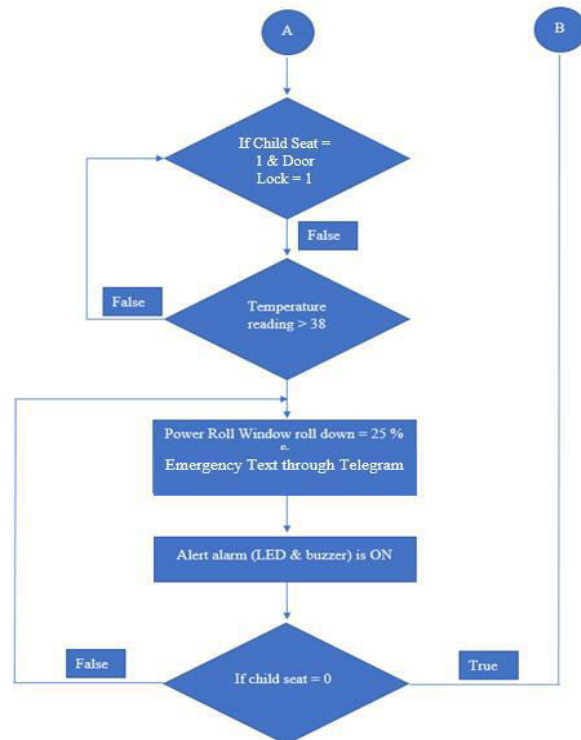


Figure-6.



RESULT AND DISCUSSIONS

Figure-7 and Figure-8 below shows Prototype of the Development of Car Seat Alert System through Telegram Application.



Figure-7. Prototype of the project.



Figure-8. Top view of the prototype.

This unit will begin functioning and send the signal to the microcontroller when the limit switch detects presence of the child in the seat, and the GPS module will then be instructed. Consequently, the user receives the alert from telegram via their mobile phone.

For a maximum rotation of 180° , the servo motor turns 90° in either direction, with a 16x2 LCD display showing the presence of the baby and the temperature inside this box. The servo motor is functional in this project to operate when the temperature is above 38 degrees Celsius. The LED is coded to demonstrate whether the baby is safe or not. Figure-8 shows that the limit switch is used to detect the presence of the baby in the car seat.

For this phase of the analysis, the response time of the NodeMCU Esp8266 link to the Telegram application will be explored. Since NodeMCU Esp8266 sends warning messages to the Telegram application, it will send alert messages. The scenario of this study is the time taken to deliver the alert messages via the Telegram application from NodeMCU Esp8266.

Table-2. The start up time for each attempts.

Attempt	Time
1	10.91
2	11.26
3	16.56
4	15.56
5	11.75
6	11.83
7	15.99
8	15.40
9	11.64
10	11.32
Total Average	13.22

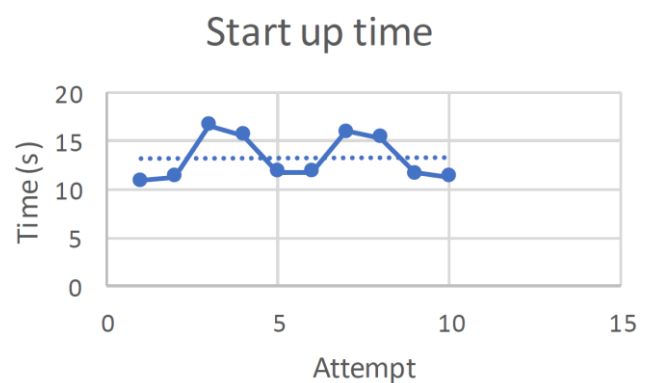


Figure-9. Graph for the start up time.

Step of process

Figure-10 shows that the first step for this project which is put the child at the seat to make limit switch detect the child at the seat inside the prototype.



Figure-10. Child seat at the prototype.



Figure-11 shows that the Liquid Crystal Display would then display the baby's presence and temperature inside the prototype. From the top of Liquid Crystal Display is show the temperature and humidity value and at the bottom of the Liquid Crystal Display is show "YES" if has someone at the seat and "NO" if nobody at the seat.



Figure-11. Liquid display crystal show the temperature and presence of the baby.

Figure-12 indicates the choice that can be tested in the Telegram application for the prototype. The /open is to open the window so that the servo motor turns 180° down the window for rolling. Apart from that, closing the window is for /close. Next is /engine, which is to verify the state of the engine and know the temperature and humidity information inside the prototype for the /sensor. Meanwhile for the /seat is to check the presence at the seat and lastly for the /door is to check whether the door is lock or not lock.



Figure-12. Indicator in telegram application.

If the caregiver left the child at the seat and the temperature is higher than 38°C the LED and Buzzer will be active to alarm the caregiver. Apart from that, the alert messages will be sent to caregiver at the Telegram Bot at the Telegram application, Figure-13 show the alert messages sent by NodeMCU Esp8266 to Telegram application.

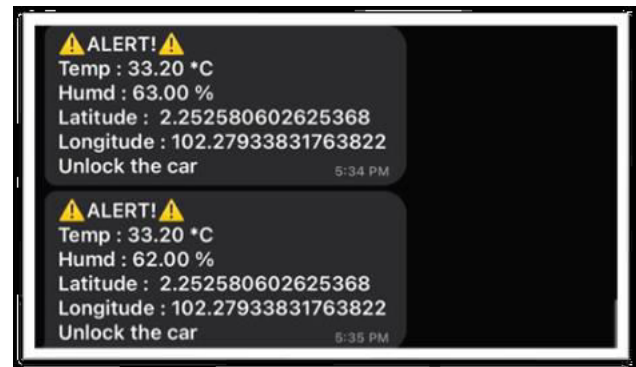


Figure-13 The alert messages at telegram application.

CONCLUSIONS

In the conclusion, the objectives of the detection system are to alert the caregiver about their child to prevent the child from dying because of hyperthermia by sending an alert message through the Telegram Application. The objective of this project was described at the end of this project and it must be achieved by designing a system that can be alert the caregiver which is based on the prototype. With some growth using plywood and Perspex glass, the definition is based on the demand available today. The benefits of the car seat alert system were efficient to remind the child is at the back, most often after getting out from the car hectically. Then, the caregiver did not have to worry for left their child in the car. Although many parents are about to leave their child inside the vehicle, many of them are dead. This device strengthens safety and protection more than ever. This system is going easy to access by smartphone at Telegram application. Even if the transmission medium scope is a bit limited compared to the GSM system, as well as there is a Wi-Fi link inside the project, it will operate all over the world. The model of the detection method using the Telegram application and Wi-Fi coverage was efficiently archived at a fair price. This development also consists of the NodeMCU Esp8266 and the Neo 6m GPS module, as stated before. It is an efficient GPS module since it monitors up to 22 satellites in all areas of the world. Conclude, the goal of this project was successfully accomplished with the main reason which is to develop the alert system through the Telegram application.

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