

DEVELOPMENT OF ALARM SYSTEM FOR LEFT CHILD IN CAR

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LIST OF ABBREVIATIONS

DC	-	Direct Current
V	-	Volt
A	-	Ampere
FSR	-	Force Sensitive Resistor
IR Sensor	-	Infrared Sensor
GSM	-	Global System for Mobile Communication
LED	-	Light Emitting Diode
PIC	-	Peripheral Interface Controller
PLC	-	Programmable Logic Controller
PIR Sensor	-	Passive Infrared Sensor
IoT	-	Internet of Things
LCD	-	Liquid Crystal Display
SIM	-	Subscriber Identification Module
cm	-	Centimetre
TELCO	-	Telephone Company

ABSTRACT

Nowadays, parent are busy with their work and sometimes forget about their child in car. When reach destination, parent will go to another place without noticing about their child at the rear seat of the car. Currently, there are many serious cases involving babies and toddlers who died due to trapped inside the car. So in order to prevent this situation happen, a device or mechanism which can alert parents whenever their children been left inside the car is developed. This device will alert parents by sending message to their phones. This device will use Infrared Sensor, Global System for Mobile Communication Module, Buzzer, Force Sensitive Resistor (FSR) and Arduino as the processor of the system. It is use to give notification to parent so that the parent can take action and prevent something bad to happen. This device are focusing on the prevention of children left inside the car and to apprise parents about their trapped children. This device also meaningful to ensure the children safety.

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CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

“Development of Alarm System for Left Child in Car” is the name of this project. This project use sensor to detect the present object and sent the sensor data to phone and buzzer. Global System for Mobile Communication (GSM) is use in order to send alert message thru phones. To run this project, all the sensor and other parts need to be connected with Arduino as the main processor of the project. This device is use to alert parents about their children which has been left inside car.

Nowadays, people are so busy with their work. Sometimes people forget about most important things such as their children and many more. Pressure at workplace may be the main cause for people to forget something in their daily life. Parents will take their children from nursery and go back home after work and when reach destination they forgot to get their children out of the car and enter their home quickly and restlessly. It might be very dangerous for the children who was left inside car because of many reason such as lack of oxygen and high temperature. It also can causes death because children are left for a long period of time in car. So, an action must be taken to prevent this thing to happen before it is too late. For example, the action that can be taken is we must use an alarm system in car that can detect the movement of parents when leaving the car and alert us.

In Malaysia, the government is very concern about this cases and through the Minister of Women, Family and Community Development has figure out some simple solution in order to prevent this incident to happen. Some of the solutions are puts the baby seat behind the front passenger seat in order to prevent from blind spot if the seat is placed behind the driver seat. Next, puts something that is valuable and useful such as handbag or shoes at the behind passenger seat or puts the baby needs such as bottle at the front passenger seat in order to remind the parents about their children at the back.

Furthermore, parents also recommended to use tags and hold up it at the signal stick in order to remind parents about their children. Lastly, parents is advised to inform their partner, baby's caretaker or school or remind them if their children is not at their place at the time [1] [2].

1.2 PROBLEM STATEMENT

People tends to forget something especially when they are in hurry. For example, parents forget about their children who left inside the car when they went home late after work. Currently, there are many serious cases involving babies and toddlers who died due to trapped inside the car. So, there will be danger if the children are left inside car for long period of time. The most worrying matter is about the safety of the child who has been left in car.

To overcome this issues, there are many ways or methods that can be used as alert devices or alarm such as buzzer, GSM, Blynk application notification and light for alerting purpose. In this cases, GSM and buzzer can be used to alert the parents. Proximity sensor sent data to buzzer and GSM module in order to send notification to parent hand-phone and beeping the buzzer. The effectiveness of this device to alert parents also important because it will help to reduce the time to save the children which has been left inside car.

1.3 OBJECTIVES OF THE PROJECT

Studies carried out to successfully build this project based on the expected objectives:

- To developed an alarm system which can reduce the risk of danger that involved the children which left in car.
- To alert caretaker or parents when forget about their children in car.
- To apply the functionality of connecting Arduino with various types of module.

1.4 SIGNIFICANCE OF THE PROJECT

The purpose of this project is to develop a device or mechanism which can alert parents whenever their children been left inside the car. This device are focusing on the prevention of children left inside the car and to alert their parents. Technically, this device is meaningful to ensure the children safety and to notify the parents through signals or alarm which could apprised them about their trapped children. Basically, this device has been develop to be use by all parents which has children especially baby and have high possibility to forget something when in pressure condition. This device is easy to use and only need to be install in the car.

1.5 SCOPE AND LIMITATIONS OF THE PROJECT

The scope of this project are this device can be used by parents who have children to ensure the safety of their kids. It is also suitable for parents who is busy with their works and tent to forget something especially their children inside car when going back home after works.

The limitation of this project are this device use battery as the power supply and need to be charged after some period of time. Next, sending message to parent phone from GSM module required active registered number and will be charges based on telecommunication company services used. Some telco did not charged for the text message and parents can choose their telco plan to be use in the GSM module.

1.6 SUMMARY OF CHAPTER

From this chapter, there are six subtopic that have been discussed wisely which are introduction, project background, project objective, significant of project, project scope and limitation. All of this topic are importance for the basic explanation about this project.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

The initial steps were taken prior to commencement of construction of this project is to conduct background research or literature review. This study intends to add further knowledge about the project and increase the knowledge during the study. In this process, the source of materials was gathered from the internet, book and information from lecturer and supervisor. This chapter are discussing about a study on the previous project based on fire fighter robot project and thesis.

2.2 ALARM SYSTEM

Alarm system is a system designed to give notification or signal in order to alert human [3]. Alarm system works with simple mechanism which are the input data will be processed and the data will be transmitted to the output devices which will give the notification or alert signal [4]. Most of the alarm system that have in the world will use sensor or detector as the input devices in order to get input data. The input data then will be processed using processing devices or microcontroller such as Arduino, Raspberry Pi, Peripheral Interface Controller (PIC), Programmable Logic Controller (PLC) and many more. Lastly, the processed data will be sent or transmitted to the output devices such as buzzer, phones, lighting device (lamp) and many more which could alert or attract human attention. There are many types of alarm such as security alarm, baby care alarm, car alarm and many more.

2.3 PREVIOUS PROJECT

2.3.1 Child in Car Alarm System Using Various Sensors

This project is designed to detect sound and movement made by children which left inside car and send the signal or notification using Global System for Mobile Communication (GSM) to parent phone. The objective of this project are to design a system in order to overcome this unwanted incident from happening and to alert the driver before their leave the car [5]. Input data can be get by using the sound sensor which will detect sound and also Passive Infrared sensor (PIR) which will detect movement. The input data then will be processed by Peripheral Interface Controller (PIC) which will act as the brain or the processor in the system. Lastly, it use GSM which can communicate with human by sending text messages to parent phone.

The advantages of this project are it use many sensor in order to get input data such as sound sensor and PIR sensor. So, the input data that will processed is precise because it use many sensor before transmitted to the GSM. This project also only works when the car engine is off. The disadvantages of this project are cannot works or run when the phone is out of battery and it is too complex.

Figure 2.1 shows the block diagram and the final project. This project will be installed inside car.

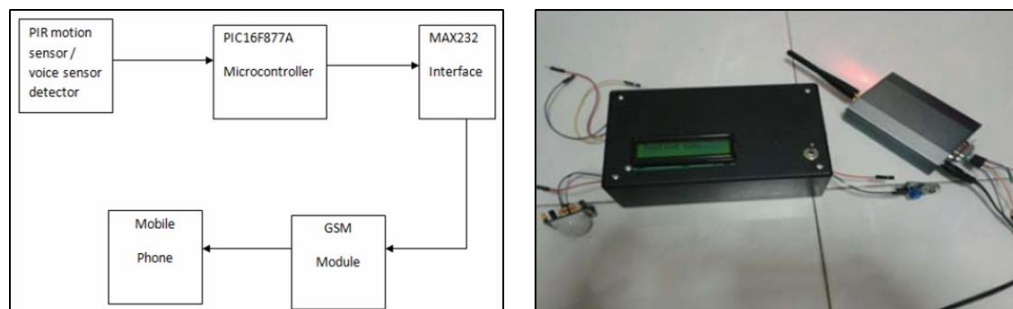


Figure 2.1 Block Diagram and Final Project

2.3.2 Babycare Alert System for Prevention of Child Left In a Parked Vehicle

This project is designed to a notification or an alert to parent using smartphone via Internet of Things technology (IoT). This project consists of two parts which are the main part and the keychain alarm device part. Main part consists of safety pad which contains load sensor in order to sense the presence of child inside the child car seat and notify parents through smartphone. The keychain alarm device will turn on the buzzer when the Radio Frequency (RF) signal is out of range. This keychain will act as backup device when parent phone is out of battery. The objective of this project are to prevent children left inside parked vehicle and to design backup safety features for children in case when the parents' smartphone is missing or run out of battery [6].

The advantages of this project are it use IoT technology which can sent notification or alert signal for free of charge instead of using GSM and has a backup devices which can also alert parent when their phone is out of battery. The disadvantages of this project are it required internet connection in order to use IoT technology and the project is high cost.

Figure 2.2 shows the final project consist of main part and keychain alarm device part. This is functionality testing process before it is installed inside car.

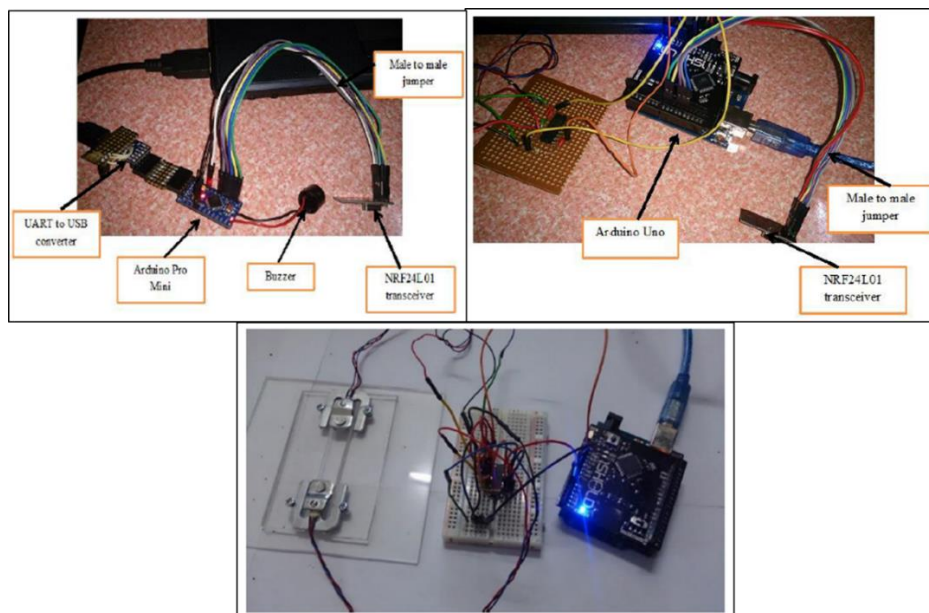


Figure 2.2 Main Part and Keychain Alarm Device

2.3.3 Intelligent Baby Monitoring System

This project is designed to monitor baby vital sign and alert parent when the vital sign change to abnormal condition through GSM. The objective of this project are to alert parent about vital sign of baby and to provide better infant care [7]. This project using many type of sensor in order to get input data such as temperature sensor, pulse rate sensor, motion sensor and moisture sensor. Then the input data will be processed using PIC microcontroller which will act as the brain of the project. Lastly, the processed data will be transmitted to output device such as Liquid Crystal Display (LCD) which will display the output data and GSM which will sent text messages to parent phone.

The advantages of this project is it use many sensor in order to get input data, so that the input data that will be transmitted to GSM is precise. The disadvantages of this project is it only works at home but not inside the car.

Figure 2.3 shows the block diagram of the project. This block diagram will explain on how the project will works.

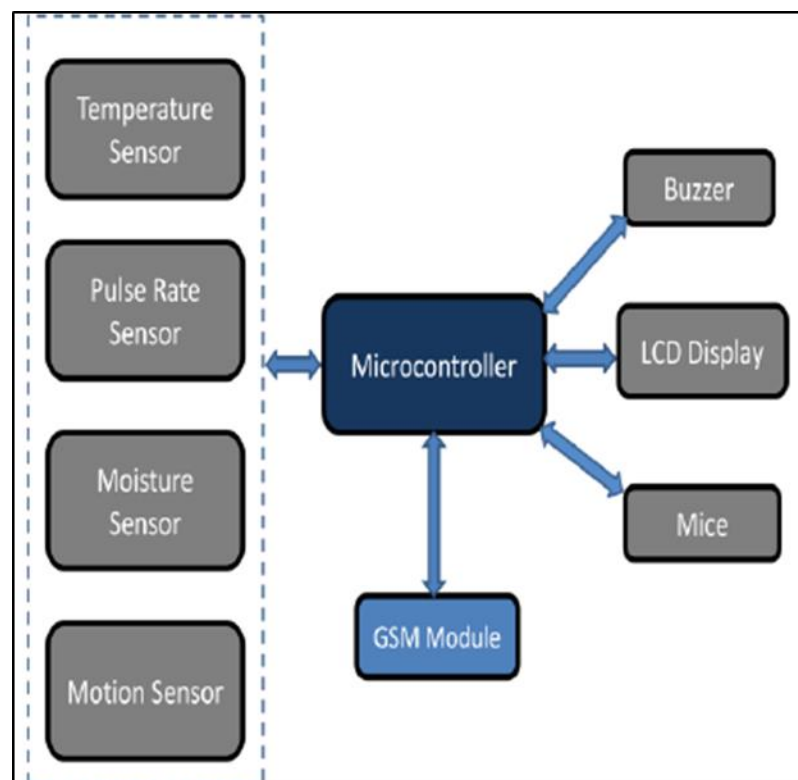


Figure 2.3 Block Diagram

2.4 ALARM SYSTEM FOR CHILD LEFT IN CAR

For this project, the concept is same as the previous project which is to apprise parent about their children which left inside the car. Most of the projects used to detect the presence of children in order to send alert signal to parents while this project will detect the presence of parents and children in order to activate the alert signal.

This project use Arduino as the processor or brain to process the input data. This project also use Infrared (IR) sensor and Force Sensitive Resistor (FSR) sensor in order to get input data. This project also used GSM and buzzer as output device to alert or notify parents. GSM will sent text messages to phone and buzzer will be sound when received processed data from Arduino.

Figure 2.4 shows the prototype of the project. This is the functionality testing process of the project.

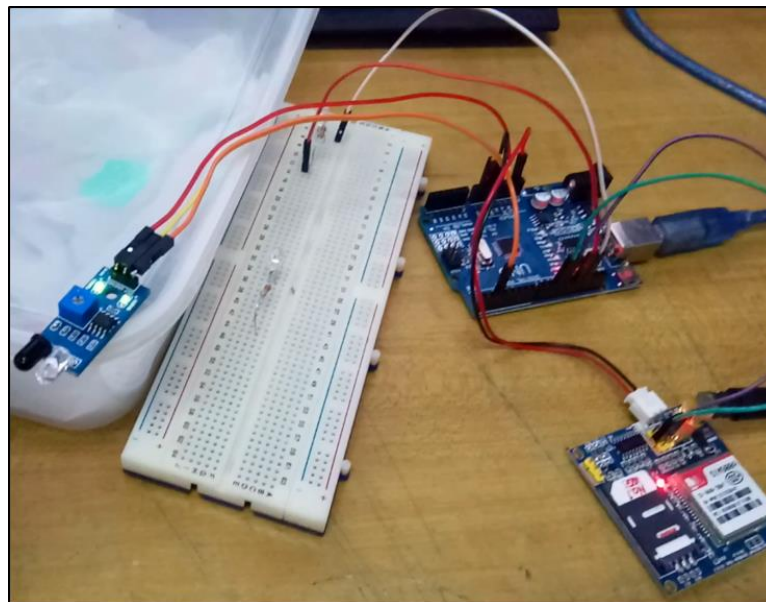


Figure 2.4 Prototype of the Project

2.5 SUMMARY OF THE CHAPTER

For this chapter, it is already proved that this kind of project had been done before. “Development of Alarm System or Left Child in Car” is slightly different from the previous project because it has two types of sensor which will detect the presence or parent and children simultaneously.

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

This chapter explains the methodology of this project to ensure the successfulness and accordance with the objectives of the project. The methodology adopted in conducting research greatly impacts its outcome. This chapter also explains the details on how the electronic hardware and electrical connection to make the circuit and this project works. The hardware of electronics and electrical and also the testing will be described at the end of this chapter.

3.2 LIST OF COMPONENTS

3.2.1 Arduino

Arduino is an open source platform normally use to build an electronic project [8]. It is consists of two parts which are programmable circuit board (microcontroller) and the software (integrated development environment) which is use to program the codes. There are many types of Arduino board such as Arduino Uno, Arduino Nano, Arduino Mega and many more but the one that we use in this project is the common Arduino which is Arduino Uno. Arduino Uno is use as the processor in this project. It will process the input data from sensor and transmit it to the output device. The Arduino Uno will be programmed using it software in order to tell the Arduino what to do in order to analyse, receive and transmitted the data.

Figure 3.1 shows the Arduino Uno. In this project, it will be use as a processor of the project.



Figure 3.1 Arduino Uno

3.2.2 Infrared Sensor

Infrared sensor (IR sensor) is an electronic device that is use to sense the characteristic of its surrounding [9]. It can measure the heat of an object and detect the motion. IR light emitting diode (LED) will fire the IR spectrum or light which is invisible to our eyes and the reflected IR spectrum or light will be received by the IR photodiode. When the IR photodiode is trigger, it will change the sensor data to the other. In this project, the change of the IR sensor data is important in order to alert the parents. This project will use IR sensor with the model of E18-D80NK. This model can detect the obstacle in range from 3cm to 80cm. This IR sensor will be placed inside the car at the driver seat.

Figure 3.2 shows E18-D80NK IR sensor. It is use to detect the presence of parents inside car.



Figure 3.2 Infrared Sensor

3.2.3 Force Sensitive Resistor

Force sensitive resistor (FSR) is a material which resistance changes when a pressure, force or mechanical stress is applied [11]. It is also known as force sensing resistor. In this project, it will act as to detect the presence of children inside the car and to become switch in order to turn on the project circuit.

Figure 3.3 shows the Force Sensitive Resistor. This FSR will be placed under the baby seat.

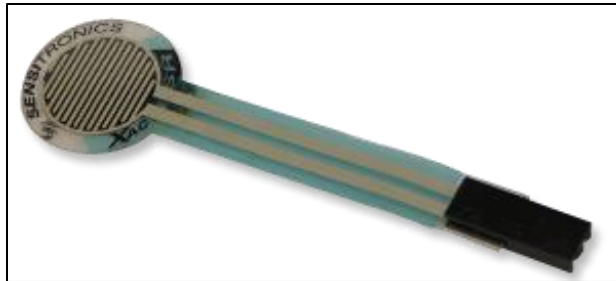


Figure 3.3 Force Sensitive Resistor

3.2.4 Buzzer

Buzzer is an audio signalling device which will be beeping or buzzing when it is turn on or triggered by something such as sensor output data [10]. There are many type of buzzer such as piezoelectric, mechanical and electromechanical. In this project, passive buzzer will be use as the output device in order to send an alert signal to parents about their trapped children inside the car.

Figure 3.4 shows the buzzer. The sound of the buzzer can alerting parents.



Figure 3.4 Buzzer

3.2.5 Global System for Mobile Communication (GSM) Module

European Telecommunication Standard Institute (ETSI) has developed Global System for Mobile Communication (GSM) to describe the protocols for second generation (2G) digital cellular networks normally use by mobile devices such as phones or tablet [12]. GSM module is a compile chip or circuit that has been created which will be used to established communication between a mobile devices or computing machines with the GSM system. In this project, GSM module will be use as output device which will act to send alert notification by sending text messages to parent phone. The GSM module that will be use is from the model of GSM SIM 900A Mini. GSM Module must be connected to Arduino and need to be programmed whether to make a phone call or sending text messages. GSM module required an active register number subscriber identification module (SIM) card to be slot in inside the module. The text messages that is send to parent phone will be charge based on the telephone company (TELCO) use.

Figure 3.5 shows the GSM Module. This module will sent text messages to phone.

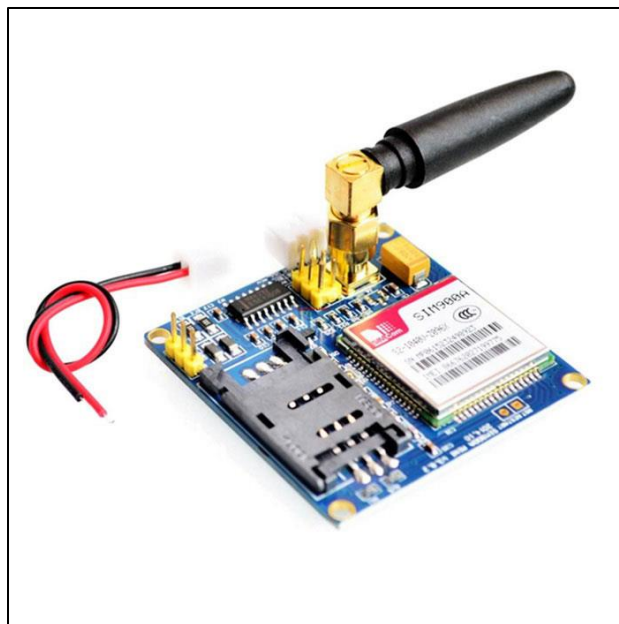


Figure 3.5 GSM Module

3.2.6 Buck Converter Module

Buck converter is direct current (DC) power converter [13]. It will step down the input voltage to become low voltage at the output. In this project, buck converter is use because the power supply that is use is battery which is 12 Volts. The input voltage will be drop or convert to 5 Volts in order to power up the Arduino. The buck converter that is use in this project comes from the model of LM2596 DC-DC Module with display.

Figure 3.6 shows the Buck Converter. It is use to step down the input voltage to some value that is need at the output.

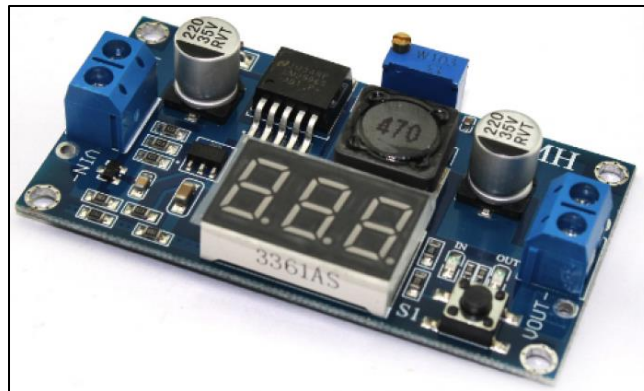


Figure 3.6 Buck Converter

3.3 COMPONENT OPERATION

3.3.1 Infrared Sensor

Basically, the usage of infrared sensor is to detect the present of parents inside the car. The sensor will be place under the car headrest at driver seat. When the sensor detect that there are no parents inside the car, it will sent the data which is LOW to the microcontroller. Next the microcontroller will process the data for the action. Then the serial monitor will display the text “parent left the car”.

The same thing goes to when the sensor detect there are parents inside the car. When the sensor detect that there are parents inside the car, it will sent the data which is HIGH to the microcontroller. Then the serial monitor will display the text “parent inside the car”.

Figure 3.7 shows the block diagram of infrared sensor operation. It shows the function of the infrared sensor from the beginning until the end.



Figure 3.7 Block Diagram of Infrared Sensor

The IR sensor operation has been simulated to test for the functionality by using Proteus software. The LED indicator will represented the sensor input data which are HIGH will defined as parent inside the car and LOW will defined as parent left the car.

Figure 3.8 shows the Infrared Sensor which is in LOW condition.

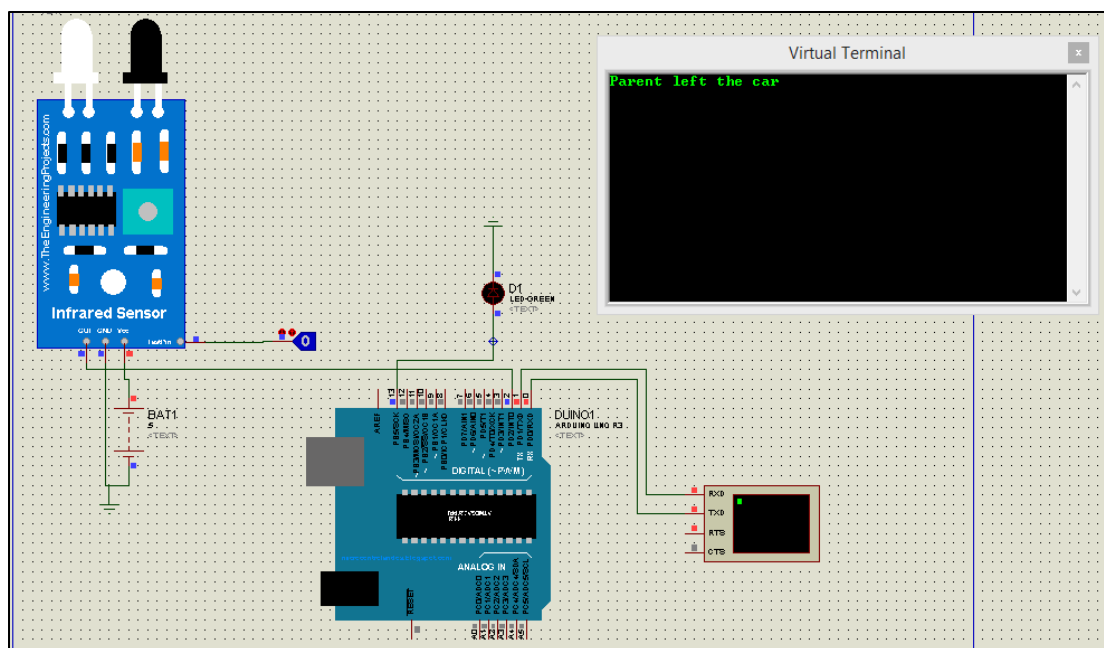


Figure 3.8 Infrared Sensor in LOW Condition

Figure 3.9 shows the Infrared Sensor which is in HIGH condition.

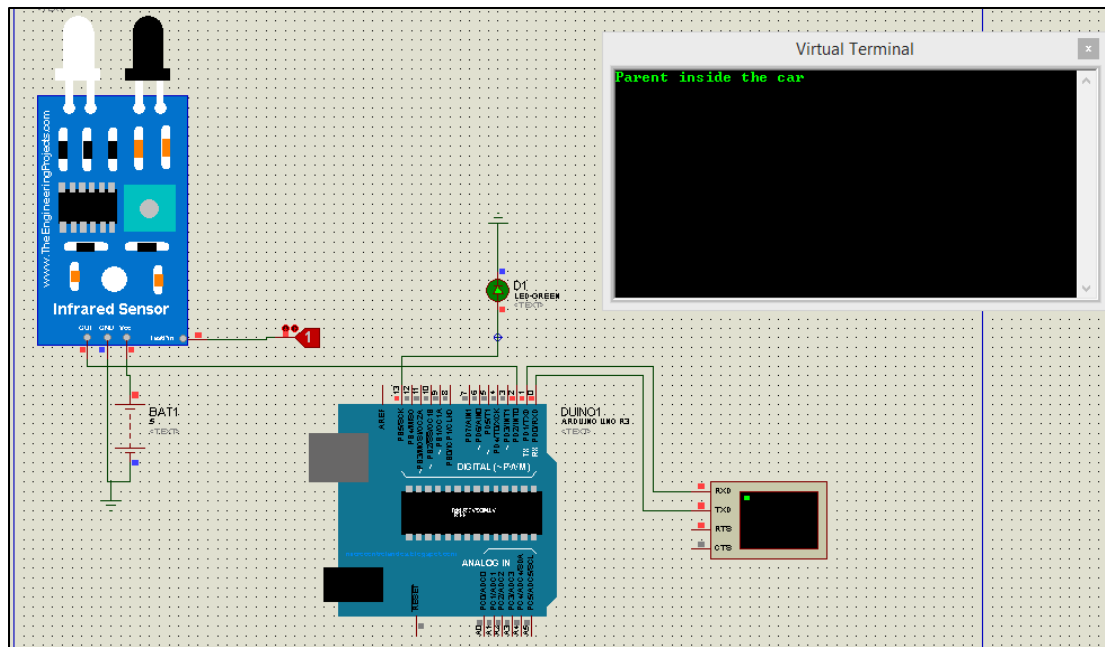


Figure 3.9 Infrared Sensor in HIGH Condition

3.3.2 Force Sensitive Resistor (FSR)

Force sensitive resistor will work as a switch in this project. It will be placed under the baby seat. When the sensor receives some pressure, it will send the input data which is HIGH to the microcontroller. Next, the microcontroller will process the data for the action. Then the serial monitor will display the text “baby seated”.

The same thing goes to when the sensor did not receive pressure, it will send the input data which is LOW to the microcontroller. Next, the microcontroller will process the data for the action. Then the serial monitor will display the text “please put the baby”. This sensor data will be combined with infrared sensor data in order to get the input data. The operation will be done simultaneously.

Figure 3.10 shows the block diagram of force sensitive resistor operation. This sensor will work as switch.



Figure 3.10 Block Diagram of Force Sensitive Resistor

The force sensitive resistor operation has been simulated to test for the functionality by using Proteus software. The LED indicator will represent the sensor input data which are HIGH will be defined as baby seated and LOW will be defined as parents need to put the baby.

Figure 3.11 shows the force sensitive resistor operation in LOW condition.

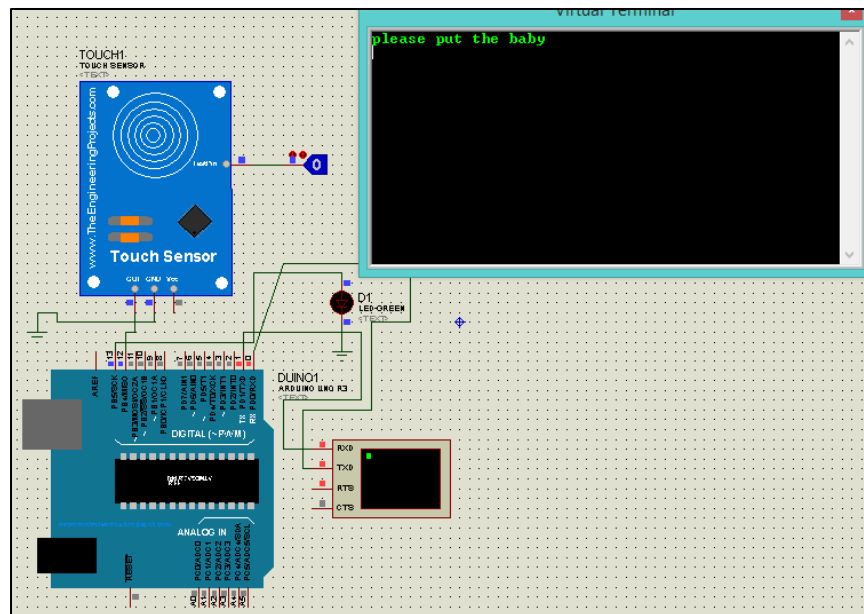


Figure 3.11 Force Sensitive Resistor in LOW Condition

Figure 3.12 shows the force sensitive resistor operation in HIGH condition.

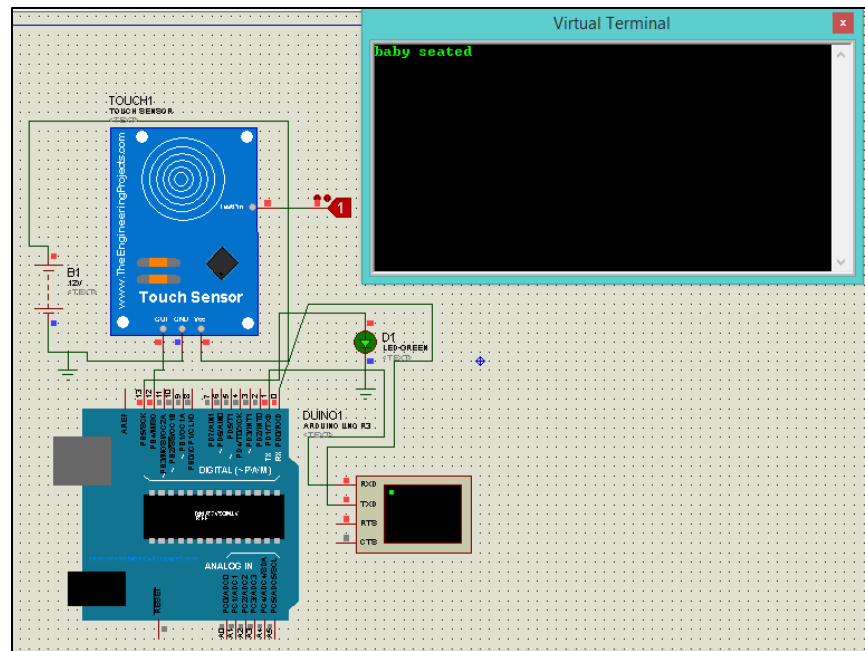


Figure 3.12 Force Sensitive Resistor in HIGH Condition

3.3.3 Global System for Mobile Communication (GSM)

In this project, Global System for Mobile Communication (GSM) is used to send the output data to parents' phones. It will send a text message to the parent's phone number that has been set or programmed. The global system for mobile communication operation has been simulated to test for the functionality by using Proteus software. The testing has been done to test whether this GSM module can send the text messages or not. The input data for the GSM module in this testing simulation is given by the letter of the alphabet "s". The text message that will be sent in this simulation is "Testing GSM module functionality?". But in the final operation of the project, the input data will be given by the input sensor which is an Infrared sensor. The text message that will be sent is "child in car!!!"

Figure 3.13 shows the block diagram of Global System for Mobile Communication operation.



Figure 3.13 Block Diagram of Global System for Mobile Communication

Figure 3.14 shows the Global System for Mobile Communication operation. In this test, GSM will send text messages when receive the input of “s” letter.

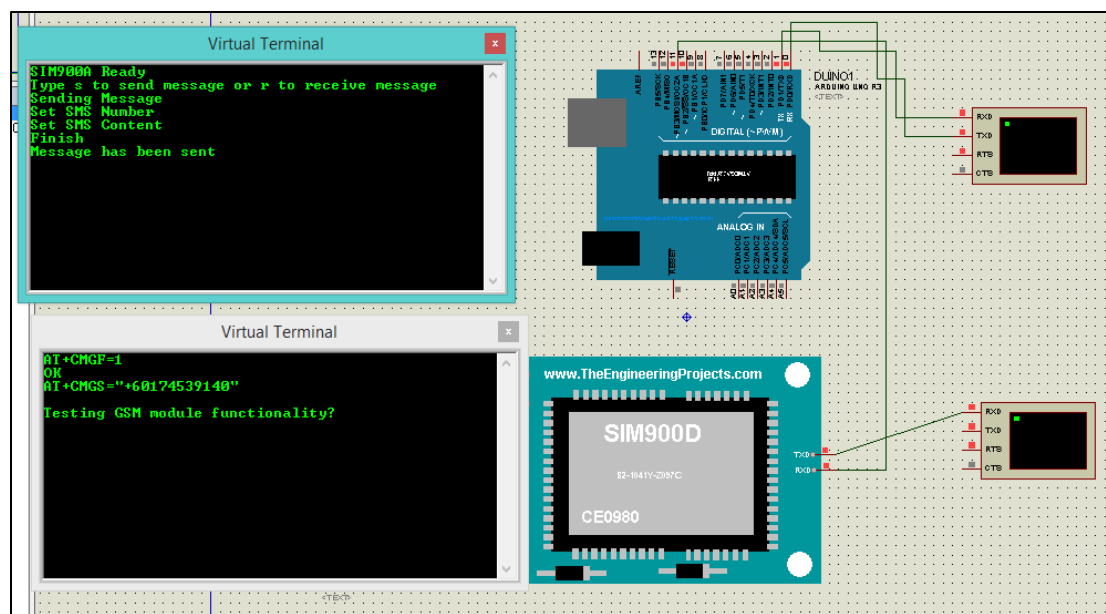


Figure 3.14 Global System for Mobile Communication Functionality Testing

3.4 PROJECT OPERATION

All of the components need to be assemble in order to run the project. Arduino Uno will be the processor of this project. Two types of sensor which are infrared sensor and force sensitive resistor need to be connected to Arduino as input parts in order to get the input data. Infrared sensor will works to detect the present of parents while force sensitive resistor will works as switch in order to turn on the circuit. Next, the GSM module and the buzzer need to be connected to Arduino as output parts in order to transmit the output data to parents phone and alert them by using buzzer beeping sound. Lastly, buck converter will be connected to external power supply which is battery with

capacity of 12 Volt. This buck converter will step down the input voltage from battery to 5 Volts which is needed by the Arduino.

This project will start working when the baby is placed inside the baby seat. The baby will seated on the force sensitive resistor and then will turn on the circuit. Next, when the infrared sensor detect that there is no parents inside the car or parents left the car, it will sent the data to the Arduino to be processed. Arduino will sent the data to the GSM module in order for GSM module to send text message to parent phones. At the same time, Arduino also will sent the data in order to turn on the buzzer. If the sensor detect that there are parents inside the car, the GSM module and buzzer will do nothing or will not operate.

3.5 BLOCK DIAGRAM OF THE PROJECT

Figure 3.15 shows the block diagram of this project operation. All of this components need to be assemble perfectly in order to get best results.

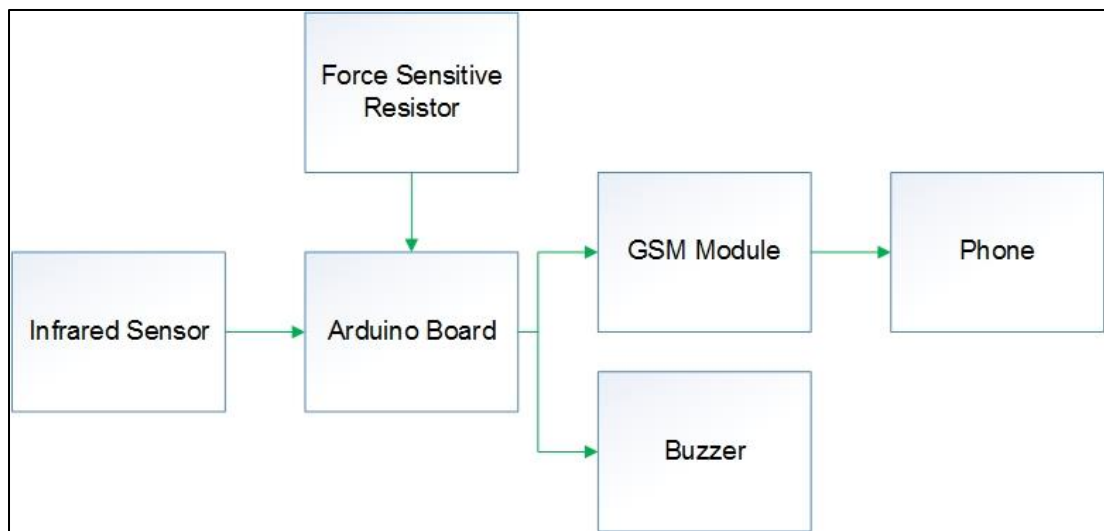


Figure 3.15 Block Diagram of Project Operation

3.6 CIRCUIT DIAGRAM OF THE PROJECT

Figure 3.16 shows the circuit diagram of the project. This circuit diagram shows all of the component is connected to Arduino board.

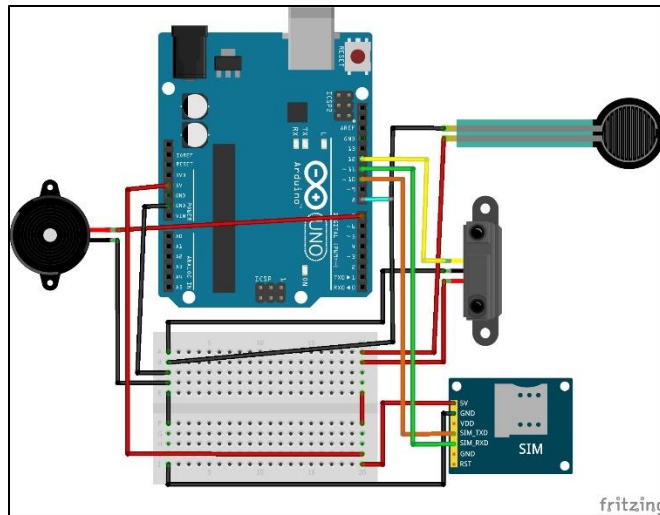


Figure 3.16 Circuit Diagram of the Project

3.7 FLOW CHART OF THE PROJECT

Figure 3.17 shows the flow chart of the project. This flow chart can shows how the project is works starting from the beginning till the end.

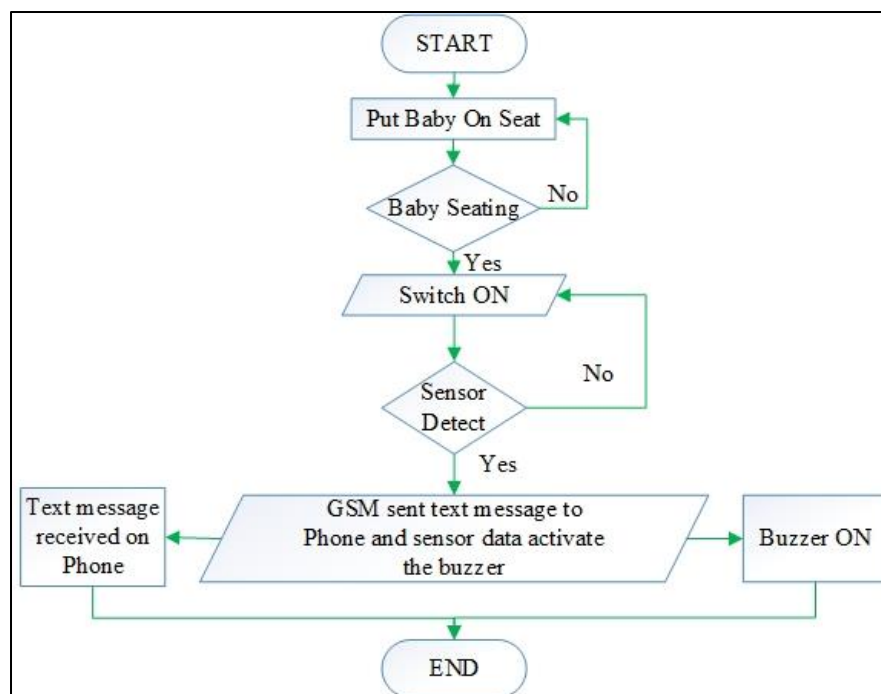


Figure 3.17 Flow Chart of the Project

3.8 DESCRIPTION OF THE FLOW CHART

3.8.1 Put Baby on Seat

Parents must put the baby on the baby seat in order to turn on the project. This is because when the baby is seated on the baby seat, it will apply some pressure on the force sensitive resistor sensor which is located under the baby seat. The project will turn ON when the force sensitive resistor detects some pressure on it. If the baby is not seated on the baby seat, the project or device will not operate.

3.8.2 Sensor Detection

Infrared sensor will start working automatically when the project is turned ON. Infrared sensor will detect the presence of parents inside the car. Infrared sensor will send the input data to Arduino to be processed. Infrared sensor will send input data to Arduino every two minutes.

3.8.3 GSM and Buzzer Activation

GSM and buzzer will be activated when it receives the processed data from Arduino. When the data from Arduino is HIGH, GSM will send an alert notification text message to the parent's phone which has been programmed and the buzzer will start beeping in order to alert the parents if the phone is out of battery. If the data from Arduino is LOW, GSM and buzzer will do nothing.

3.9 GANTT CHART OF THE FINAL YEAR PROJECT 1

Table 1 shows the Gantt chart of final year project 1. This Gantt chart is a guide in order to monitor the project progress. It is also an indicator to ensure that the task need to be complete before the dateline.

Table 1 Gantt Chart

Final Year Project 1																	
Activities	Week																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Briefing																	
Briefing 1																	
Briefing 2																	
Briefing 3																	
Briefing 4																	
Project																	
Find and Meet Supervisor																	
Title Selection																	
Title Registration																	
Blog Writing																	
Objective of Project and Problem Statement																	
Research on Literature Review																	
Research on Block Diagram and Flow Chart																	

CHAPTER 4: RESULT AND DISCUSSION

4.1 INTRODUCTION

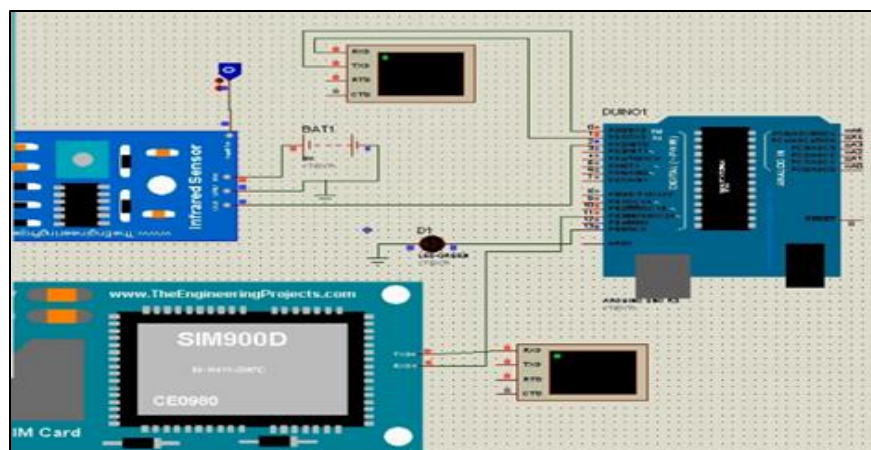
The “Development of Alarm System or Left Child in Car” is use to alert parents about their trapped children inside car. GSM is use to send alert notification text message to parents phone. Besides that, a buzzer also be use in order to alert parents using beeping sound of the buzzer in case when parent phone is out of battery. In this chapter, it will discuss about the results that have been obtained through this project.

4.2 PRELIMINERY RESULTS (SIMULATION)

4.2.1 Parent inside Car

This simulation will show the functionality of connecting infrared sensor with Arduino and GSM module when parent is inside the car. So, this simulation will prove that this project can be done by using hardware component and work or running just like the simulation. The software use in this simulation is Proteus. When infrared sensor detect parents inside the car, the LED will turn OFF.

Figure 4.1 shows the simulation of project when parent is inside the car.



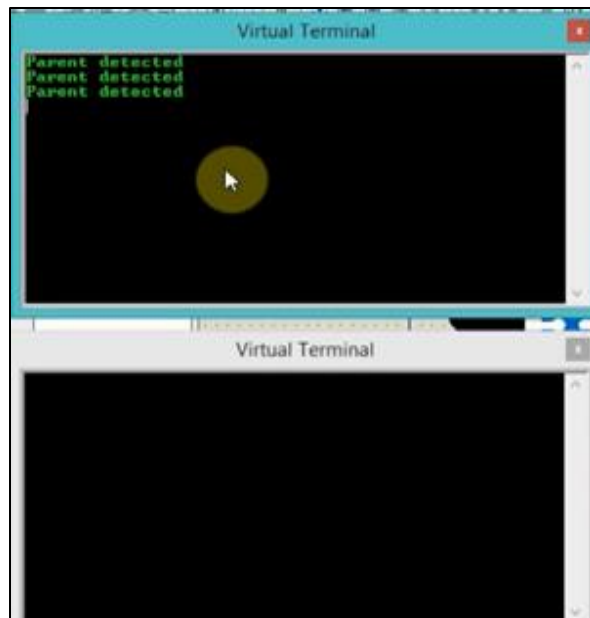
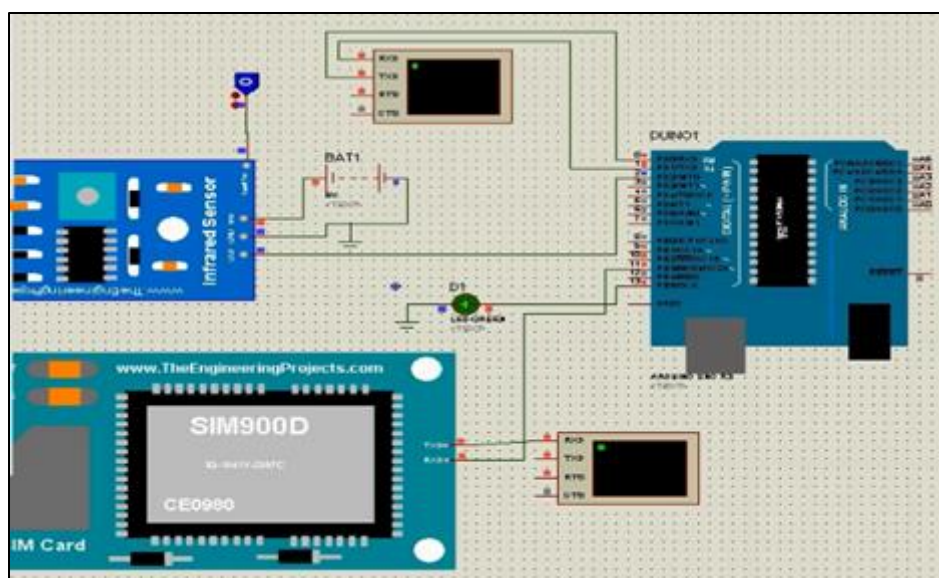


Figure 4.1 Simulation Result When Parents Inside Car

4.2.2 Parent Left the Car

This simulation will show the functionality of connecting infrared sensor with Arduino and GSM module when parent left the car. So, this simulation will prove that this project can be done by using hardware component and work or running just like the simulation. The software use in this simulation is Proteus. When infrared sensor detect parents left the car, the LED will turn ON.

Figure 4.2 shows the simulation of project when parent left the car.



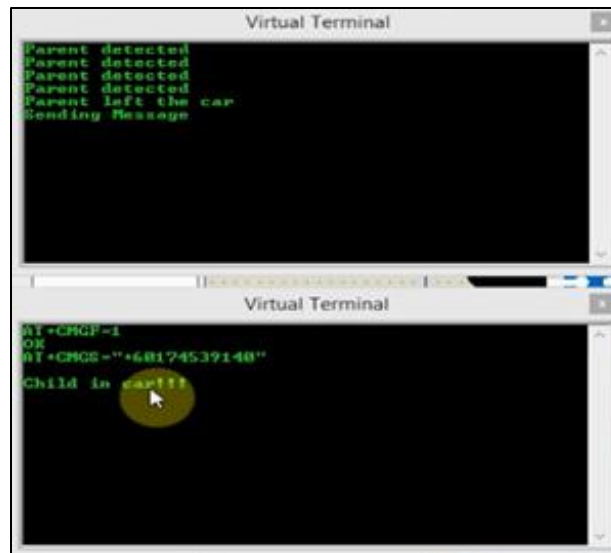


Figure 4.2 Simulation Result When Parents Left the Car

4.3 PRELIMINARY RESULTS (PROTOTYPE)

4.3.1 Parent inside Car

This prototype will show the functionality of connecting infrared sensor with Arduino and GSM module when parents inside the car. When infrared sensor detect parents left the car, the LED will turn OFF. In this situation, GSM will do nothing.

Figure 4.3 shows the prototype of the project when parents inside the car.

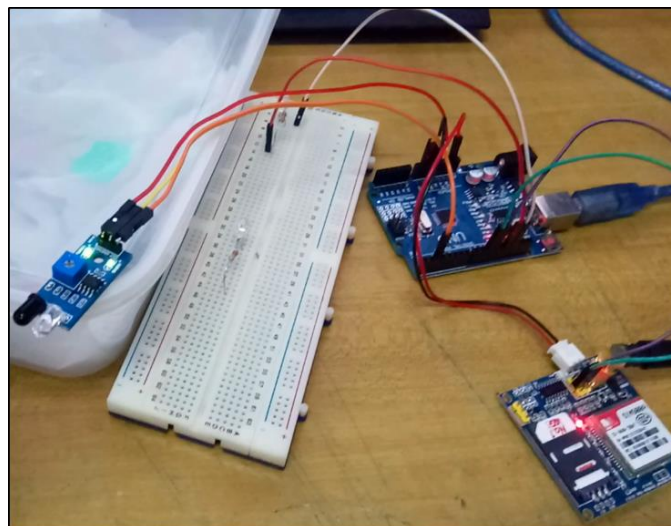


Figure 4.3 Project Prototype When Parents Inside Car

4.3.2 Parent Left the Car

This prototype will show the functionality of connecting infrared sensor with Arduino and GSM module when parents left the car. When infrared sensor detect parents left the car, the LED will turn ON. In this situation, GSM will send the alert notification text message to parent phone.

Figure 4.4 shows the prototype of the project when parent left the car.

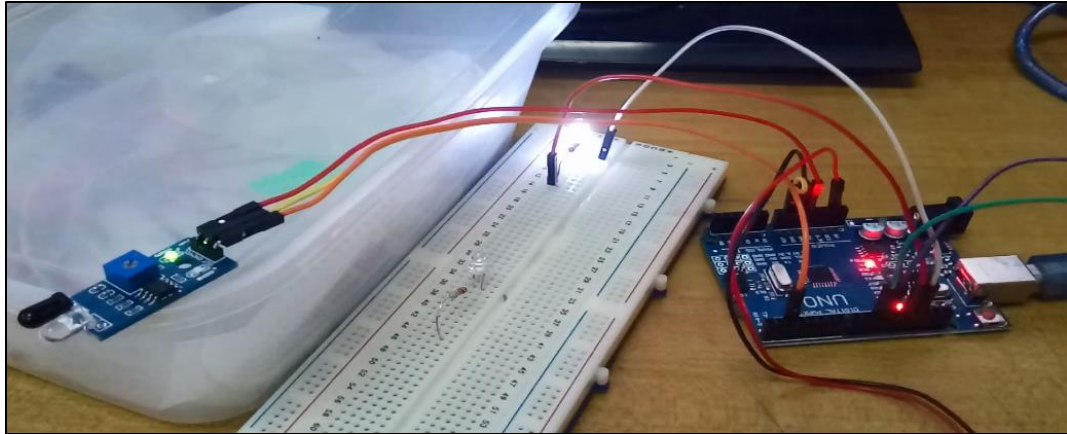


Figure 4.4 Project Prototype When Parents Left the Car

Figure 4.5 shows the alert notification text message received by parent phone.

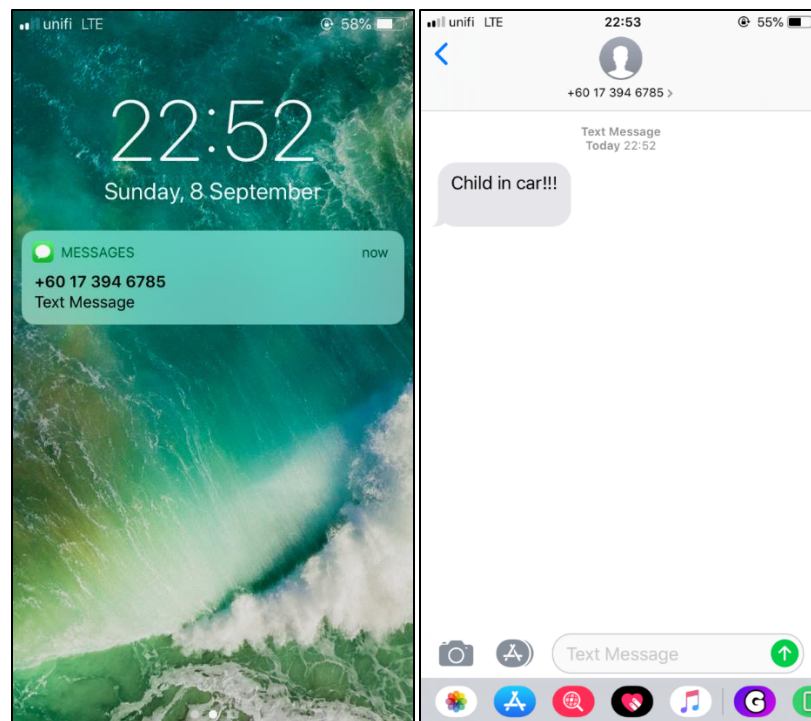


Figure 4.5 Alert Notification Text Message Received By Parent Phone

4.4 ANALYSIS AND DISCUSSION

This slot will discuss about the problems encountered during the process of finishing this project. There are a few mistakes during the development of hardware and circuits. The first problem is the circuit of the project is not functioning. The problem is due to low voltage supply. To troubleshoot this problem, I use an external power supply which is a battery with 12Volts capacity.

Another problem is the coding of the Arduino is not work on the project. The coding only work on infrared sensor in order to get input data but not work on GSM which is to transmit the output data to parent phone. To overcome this problem, I have rewrites the coding and test it until I got the result that I want.

4.5 SUMMARY OF THE CHAPTER

This chapter has discussed about the result and analysis that had been done during finishing the project. Besides that, the explanation in this chapter will make people more understand on how to use this project and indicates that the project was successfully built. The expected outcome had totally followed the objectives that had been set.

CHAPTER 5: CONCLUSION

5.1 CONCLUSION

The objective of this project are to reduce the number of children left inside car and to apprise parent about their trapped children. This project has two parts which are the hardware part and the software part. For hardware part, IR sensor, FSR sensor, GSM Module, buzzer will be connected with Arduino. For the software part, Arduino will be programmed by using it software in order to give instruction to the processor in order to process the data. This two parts are quiet important and related to each other. The project is successfully construct and producing good preliminary result which is it can sent text messages to parent phone when the sensor detect the presence of parent not inside the car.

5.2 RECOMMENDATION

This project can be improved in the future. There are several recommendations that can make this project more useful. This project can use Internet of Things (IoT) technology which means this project can be control or setting by using phone application. Next, this project also can be connected to the power supply which have inside the car such as car battery instead of using external battery. Lastly, this project also can be run using Bluetooth module instead of using GSM module in order to receive the alert notification.

5.3 SUMMARY OF THE CHAPTER

From this chapter, it explains about the conclusion and recommendation to improve the project in the future. The recommendation discuss about future suggestion to improve and upgrade the project.

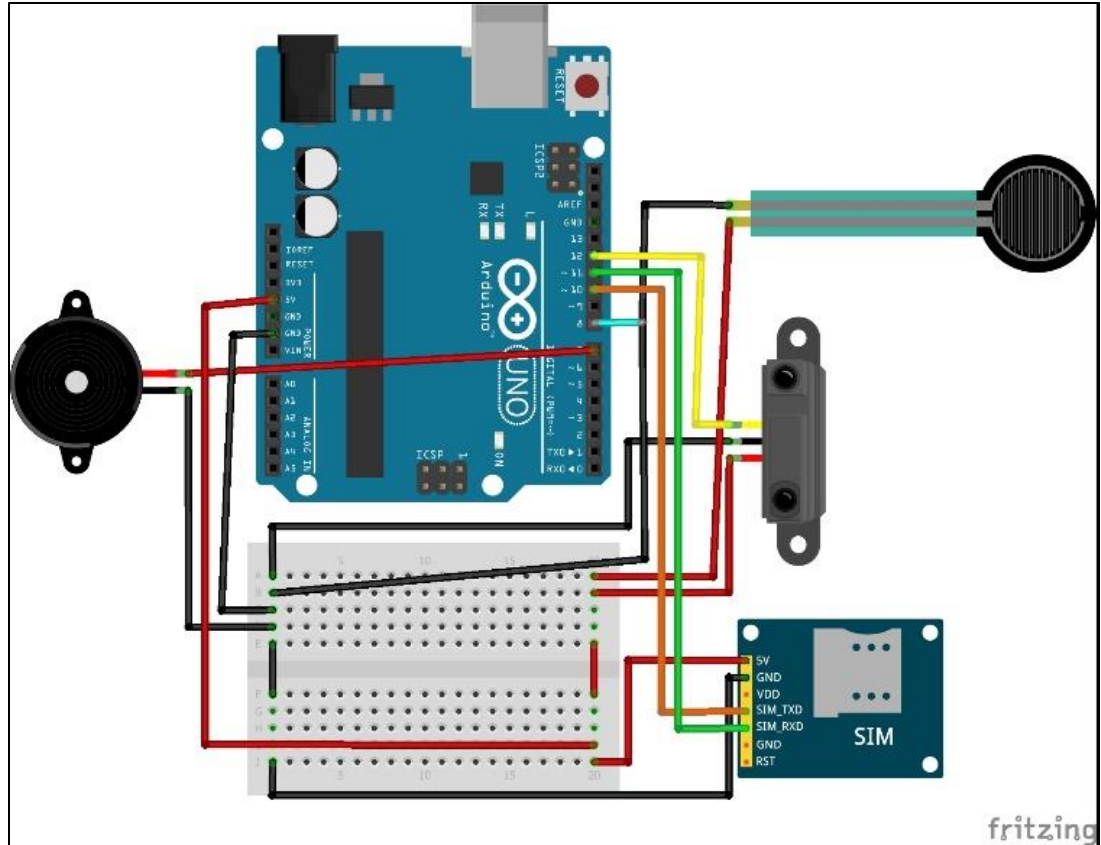
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APPENDICES

APPENDIX A- Circuit Wiring Diagram



APPENDIX B- Presentation Slide

DEVELOPMENT OF ALARM SYSTEM FOR LEFT CHILD IN CAR

PROJECT PROPOSAL PRESENTATION

MUHAMMAD LUQHMAN BIN MUSTAFA
51211117084
BET ELECTRICAL
SUPERVISOR: DR SUHAIRI RIZUAN BIN CHE AHMAD

PROBLEM STATEMENT

People tend to forget something especially when they are in hurry. For example, parents forget about their children who left inside the car when they went home late after work. Currently, there are many serious cases involving babies and toddlers who died due to trapped inside the car.

The purpose of this project is to develop a device or mechanism which can alert parents whenever their children been left inside the car.

INTRODUCTION

This project use IR sensor, GSM Module, buzzer, Force Sensitive Resistor (FSR) and Arduino as the processor of the project.

This device are focusing on the prevention of children left inside the car and to alert their parents by sending message to parents phone. Technically, this device is meaningful to ensure the children safety and to notify the parents through signals and alarm which could apprised them about their trapped children.

OBJECTIVES

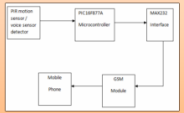
- 1 To reduce the numbers of children which left inside car.
- 2 To alert caretaker or parents when forget about their child in car.
- 3 To apply the functionality of connecting Arduino with various types of module.

SCOPE AND LIMITATION

Scope	Limitation
<ul style="list-style-type: none"> Can be used by parents who have children to ensure the safety of their kids. 	<ul style="list-style-type: none"> Battery – Need to charged GSM Module – Required active register number, text message will charge based on telco used.

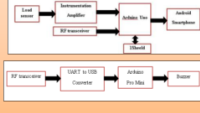
LITERATURE REVIEWS

JOURNAL 1: CHILD IN CAR ALARM SYSTEM USING VARIOUS SENSORS

- Method: Use various type of sensor and sent data through GSM. PIC microcontroller is the brain of the project.
- Block diagram:
 

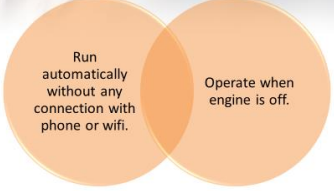
Pros	Cons
<ul style="list-style-type: none"> Precise input data sent to GSM module. 	<ul style="list-style-type: none"> Too complex

JOURNAL 2: BABYCAR ALERT SYSTEM FOR PREVENTION OF CHILD LEFT IN A PARKED VEHICLE

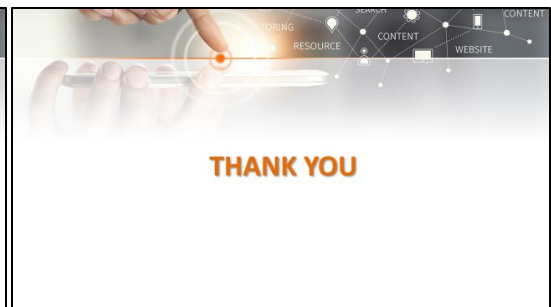
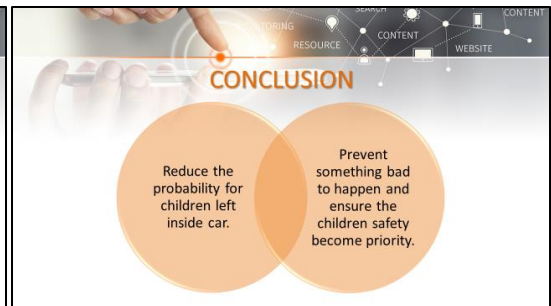
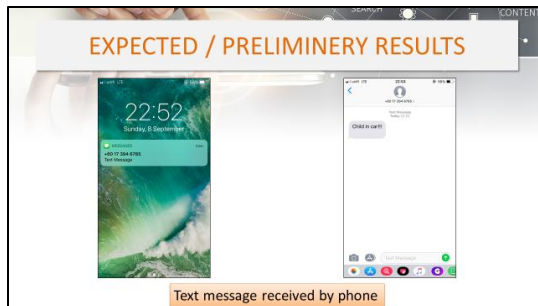
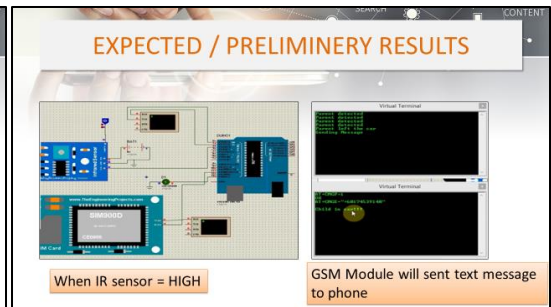
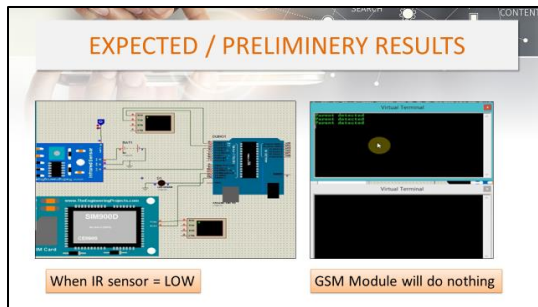
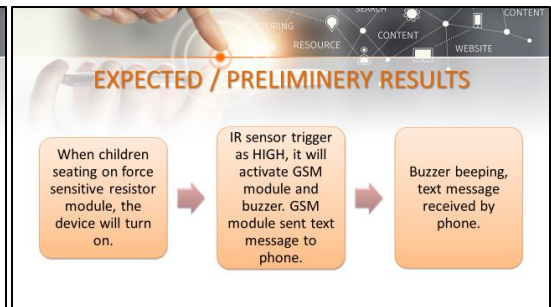
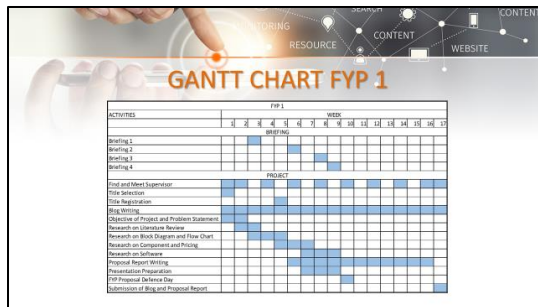
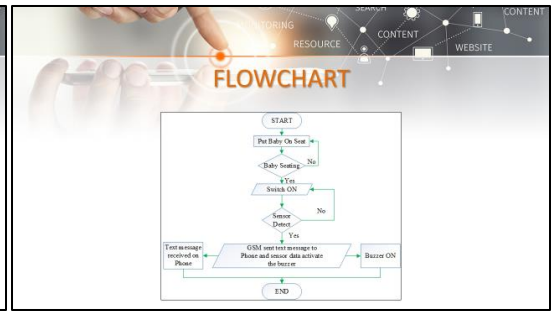
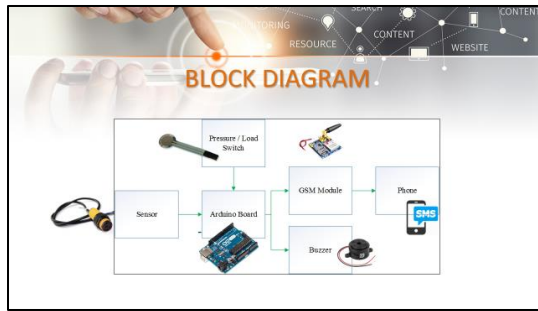
- Method: Use various type of sensor with IoT Module. Sent data to phone and alert using buzzer.
- Block diagram:
 

Pros	Cons
<ul style="list-style-type: none"> Precise input data sent to IoT module. Backup devices when phone is out of battery. 	<ul style="list-style-type: none"> Too complex and high cost

IMPROVEMENT PLANNING



METHODOLOGY



APPENDIX C- Arduino Coding

```
File Edit Sketch Tools Help
combination_irsensor_gsm $
#include<SoftwareSerial.h>

SoftwareSerial SIM900A(10, 11); //10tx green, 11rx purple GSM Module
const int ProxSensor=4; //IR Sensor
int inputVal = 0;

void setup()
{
  pinMode(13, OUTPUT); // Pin 13 has an LED connected on most Arduino boards:
  pinMode(ProxSensor, INPUT); //Pin 2 is connected to the output of proximity sensor
  Serial.begin(9600);
  SIM900A.begin(9600);
}

void loop()
{
  delay(1500); //sensor will send data every 1 minutes
  if(digitalRead(ProxSensor)==HIGH) //Check the sensor output
  {
    digitalWrite(13, HIGH); // set the LED on if sensor trigger no parent
    Serial.println("Parent left the car");
    delay(30000); //time for parent to take the baby
    Serial.println("Sending Message");
    SIM900A.println("AT+CMGF=1"); //set GSM in text mode
    delay(1000);
    SIM900A.println("AT+CMGS=\"+60174539140\"\r"); //parent phone number
  }
```

```
File Edit Sketch Tools Help
combination_irsensor_gsm $
delay(1500); //sensor will send data every 1 minutes
if(digitalRead(ProxSensor)==HIGH) //Check the sensor output
{
  digitalWrite(13, HIGH); // set the LED on if sensor trigger no parent
  Serial.println("Parent left the car");
  delay(30000); //time for parent to take the baby
  Serial.println("Sending Message");
  SIM900A.println("AT+CMGF=1"); //set GSM in text mode
  delay(1000);
  SIM900A.println("AT+CMGS=\"+60174539140\"\r"); //parent phone number
  delay(1000);
  SIM900A.println("Child in car!!!"); //message that gsm module will sent
  delay(100);
  SIM900A.println((char)26); // ASCII code of CTRL+Z
  delay(1000);
  Serial.println("Message has been sent");
}
else
{
  digitalWrite(13, LOW); // set the LED off if sensor trigger parent
  Serial.println("Parent detected");
}
//inputVal = digitalRead(ProxSensor);
//Serial.println(inputVal);
//delay(10000); // wait for a second
}
```