Department of Electrical and Electronics Engineering

20EEL59BMini Project -III

Report on

DRIVER DROWSINESS DETECTION AND ALERT SYSTEM

Submitted by

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Under the Guidance of
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Dissertation submitted in partial fulfillment of the requirements
For the award of the degree of

BACHELOR OF ENGINEERING
in
ELECTRICAL AND ELECTRONICS ENGINEERING

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"Jnana Sangama", Belgaum – 590018, Karnataka, India

2022-2023

BONAFIDE CERTIFICATE

This is to certify that the project report entitled, "**Driver Drowsiness Detection And Alert System**" is a bonafide record of work of the following candidates who carried out the Mini Project work under my supervision during 2022-2023:

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of New Horizon College of Engineering, Bengaluru of Visvesvaraya Technological University, Belgaum during the odd semester, academic year 2022-23 .

It is certified that all the corrections / suggestions indicated for Internal Assessment have been incorporated in the report deposited in the department library. The project report has been approved as it satisfies the academic requirements in respect of project phase I work prescribed for said Degree.

Signature of the project Guide	Signature of the Head of the Department	Signature of the Principal
Dr. Vinoth Kumar K	Dr. S. Sujitha	Dr. Manjunatha

Semester End Examination held on _____

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(Internal Examiner) (External Examiner)

ACKNOWLEDGEMENT

DECLARATION

We **Kamalesh Badola-1NH20EE048, Kushal Naik K-1NH20EE056, Lava Kumar M N-1NH20EE057, Mohammed Aman-1NH21EE407**students of New Horizon College of Engineering hereby declare that, this project work entitled "**Driver Drowsiness Detection And Alert System**" is an original and bonafide work carried out at New Horizon College of Engineering in partial fulfillment of Bachelor of Engineering in Electrical and Electronics Engineering of Visvesvaraya Technological University, Belgaum.

We also declare that, to the best of our knowledge and belief, the work reported here in does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion by any student.

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PLAGARISM REPORT

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We have verified the contents as summarized above and certified that the statementmade above are true to the best of our knowledge and belief.

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5

ABSTRACT

People are unable to get a full night's rest in today's busy and frantic society. As a result, when they driver after a restless night, they often fall asleep behind the wheel, which is quite dangerous.

Each year, drowsy driving causes numerous accidents that frequently go unnoticed, resulting in significant loss of life and material resources. We are showcasing a technology that recognises driver drowsiness and warns them of it. These systems are exclusively found in luxury vehicles.

CONTENTS

LIST OF FIGURES

AIM

To design a Driver Drowsiness Detection and Alert System.

OBJECTIVE

The sleepiness detection system's goal is to help reduce accidents involving both passenger and commercial vehicles. Before the driver completely loses all attention, the system will recognize the early signs of tiredness and alert them that they can no longer operate the car safely.

CHAPTER 1
INTRODUCTION

Driving while fatigued or after a lengthy period of no sleep is extremely dangerous. Drowsy driving is thought to have contributed to over 70,000 collisions, 50,000 injuries, and about 1000 fatalities. Additionally, there are about 6,000 fatal crashes each year. According to a survey, 37% of respondents said they had fallen asleep behind the wheel in the previous year, and 60% of respondents said they had driven while feeling sleepy. 4% of drivers admitted to being at fault in an accident due to sleepiness.

Today, many of these incidents go unrecognized since the driver doesn't report that they were caused by falling asleep because doing so would make them accountable for the collision, which in the worst situations could also result in fatalities. Therefore, it's crucial to monitor sleepiness detection and warn the driver at the same moment to avoid fatal collisions and life-threatening injuries. The linked risks can also be made more widely known to drivers, helping to improve their driving practices. Only high end, extremely expensive cars have these technologies. These include automatic braking systems in the vicinity of another vehicle detected by radar, ultrasonic sensors and automatic steering control when there is a lot of car drift on straight roads. However, very few cars have these features and it will be a long time before many embedded cars have these features available.

On the other hand, our system is cheap, efficient and easy for many people to use. This problem grows rapidly and often goes undetected. Driving drowsiness is the leading cause of most accidents today, so it is important to avoid drowsiness while driving. It's simply because people's lives get hectic, they have so much to do and they don't have time to rest properly. This is very dangerous. It not only puts their lives at risk, but also those around them and those who depend on them.

CHAPTER 2
PROBLEM STATEMENT

The number of road accidents due to Drowsy Driving is increasing at an alarming rate worldwide. Not having a proper sleep is the main reason behind drowsiness while driving. However, other reasons like sleep disorders, medication, alcohol consumption, or driving during night shifts can also cause drowsiness while driving.

CHAPTER 3
3.1 COMPONENTS REQUIRED

- Arduino Uno - 16mhz Atmega328

- Eye Blink Sensor – IR Sensor

- RF Transceiver Model - 433MHz RSI Wireless

- Voltage Regulator - 7805 IC

- Battery- 9v

- DC Power Supply - 12v

- Buzzer

- Connecting Wires

- Breadboard

- Jumper Wires

3.2 COMPONENTS DESCRIPTION

Arduino Uno

It is a microcontroller board which very easy to use. In this microcontroller we have total of   14 pins with a 16 MHz of ceramic resonator, a USB connection to upload the program and supply power, a power jack, for connection through adapter, an ICSP header and a reset button to reset the program uploaded. It is very easy to use this microcontroller as it can be simply connected to a computer with a USB cable through, we can upload program and power it to or with a AC-to-DC adapter or battery to get it started.

Fig no.1.1

Buzzer

A buzzer or beeper is a device which is used to produce a beeps or buzz sound. It has 2pins cathode and an anode. Mostly buzzers and beepers are used in alarm devices, timers, and confirmation of user input such as a mouse click or keystroke. In this project we are using it as alert system. The buzzer buzzes when the temperature recorded is above 35C.

Fig no.1.2

voltage regulator

The LM7805 is a voltage regulator having an output of +5 volts. It is a three-pin integrated circuit (IC), like the majority of other regulators on the market; the input pin absorbs incoming DC voltage, the ground pin establishes a ground for the regulator, and the output pin supplies the positive 5 volts.

Fig no.1.3

Eye blink sensor

The blink sensor is an infrared sensor. Contains two parts. sender and receiver. The transmitter continuously sends infrared light to the eye. The receiver continuously looks for changes in the reflected wave, which indicate that the eye has blinked. When your

eyes are closed, it means that you are exerting high power. It emits low power when the eye is open. This sensor can be used in a wide variety of robotics and mechatronic projects as it offers excellent results and is very economical. The strobe sensor continuously sends infrared waves that are reflected and detected by the receiver. As soon as the eye blinks, the output of the sensor goes high. This output is sent to the Arduino board.
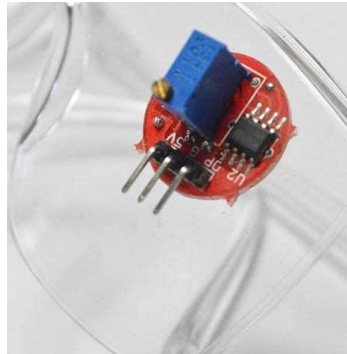

Fig no.1.4

RF Transmitter and receiver module

The RF modules are extremely compact and operate across a wide voltage range, from 3V to 12V.The RF modules are essentially RF transmitter and receiver modules operating at 433 MHz When sending logic zero while completely suppressing the carrier frequency, the transmitter draws no power and uses a very small amount of power during battery operation. Carrier is completely on to roughly 4.5mA with a 3-volt power source when logic one is communicated. Data is transmitted serially from the transmitter to the tuned receiver. Two microcontrollers are properly interfaced with the transmitter and the receiver to transfer data.

Fig no.1.5

Battery

An electric battery that provides a nominal voltage of 9 volts is known as a nine-volt battery or 9-volt battery. Depending on the battery chemistry, the actual voltage ranges from 7.2 to 9.6 volts. Batteries of all shapes and sizes are produced; one popular size is PP3, which was first used in early transistor radios. The PP3 features two polarized snap connectors on the top and is shaped like a rectangular prism with rounded sides.

Fig no.1.6

Breadboard

A breadboard is a board like device which has various pins on it for connecting the components with each other and the components with Arduino microcontroller without any soldering. It is very easy to use because one just needs to connect the pins in breadboard

hole and it even easy to use. The main highlight is that no soldering is required so, it can be reused as many times as you need. Most electronic components in electronic circuits can be interconnected by inserting their terminals into the holes and then making connections through wires wherever needed.
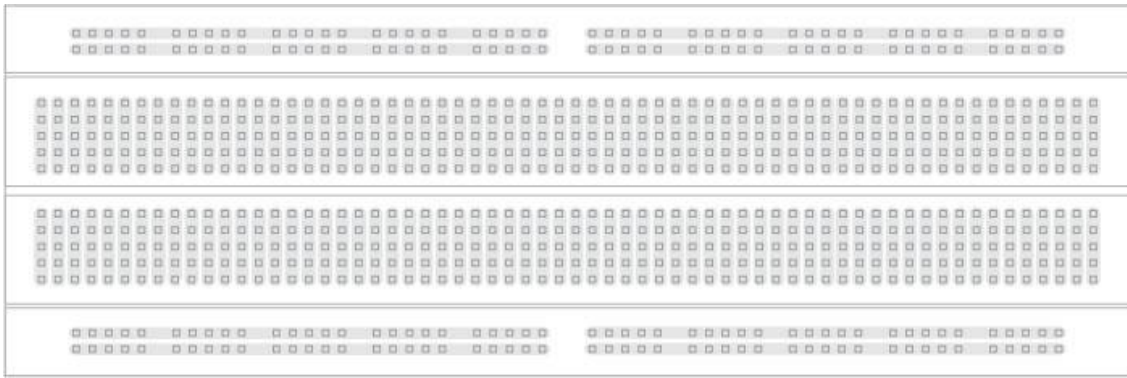
Fig no.1.7

Jump wire

A jumper wire or jump wire is a wire which has a connector or pin at each end, these are used to interconnect the components of circuit with each other internally or with another components, without soldering on breadboard.

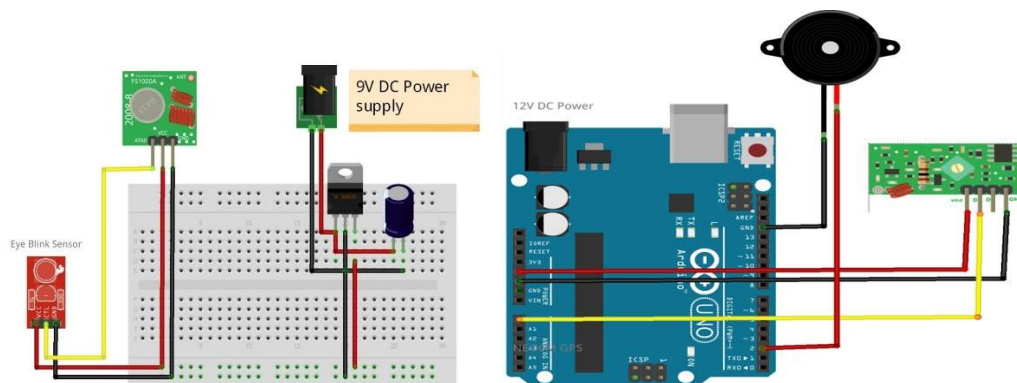Fig no.1.8

CHAPTER 4
4.1 CONSTRUCTION

Fig no.2.1

- First, all the electrical components are gathered together, and all the connection are made as per the above diagram

- The power is supplied to the Arduino through cable connected to laptop.

- The code is uploaded to the Arduino uno and the buzzer and rf receiver are connected to the Arduino.

- For the RF receiver VCC pin, 5v from Arduino is given and the data pin is connected to the analog pin A0 of Arduino. The ground pin is grounded.

- The buzzer positive terminal is connected to the digital pin 2 of Arduino and the ground pin is grounded.

- Now for the transmitter side, 9v supply is converted to 5v using 7805 voltage regulator.

- Form the output pin of voltage regulator the 5v supply is passing to RF transmitter and eye blink sensor VCC pin.

- From the ground pin of 7805 voltage regulator RF transmitter and eye blink sensor is grounded.

- The data pin of RF transmitter and eye blink sensor output pin is shorted.

- The connection are made and the circuit is ready to use.

4.2 WORKING

In this project of driver drowsiness detection and alerting system we are using Arduino uno, RF transmitter and receiver module RSI, buzzer, battery, eye blink sensor and connecting wires.

The program is loaded onto the Arduino through the computer, the power supply id provided by the computer to run the Arduino and all the above components are connected to it. After writing the code on the Arduino the program is compiled for any error. Now, the stimulation starts.

The system's primary function is to monitor the driver's eye movements using an eye blink sensor, and if it detects signs of sleepiness, it will sound a loud buzzer alert as a warning.

The eye blink sensor is used to track eye blinks, which allows us to monitor other behaviors like driver drowsiness during driving. Depending on infrared LED technology, it operates. It has an LED receiver and an infrared transmitter for detecting eye blinks. The 433MHz RF transmitter module employs Amplitude Shift Keying (ASK). The transmitter module converts the serial data supplied into an RF signal for transmission. The receiver module then wirelessly receives the broadcast signals.

The data is obtained by the RF receiver module and sent to the data output pin. The microcontroller may interpret the output data to take further action.

Now if the driver wears the sunglasses with eye blink sensor, and if the eyes are closed more than 2 seconds the eye blink sensor detects the drowsiness and sends the signal to receiver side through RF transmitter and after receiving the signal we will get a loud sound from the buzzer as an alert. So, this is the overall working of driver drowsiness detection and alerting system.
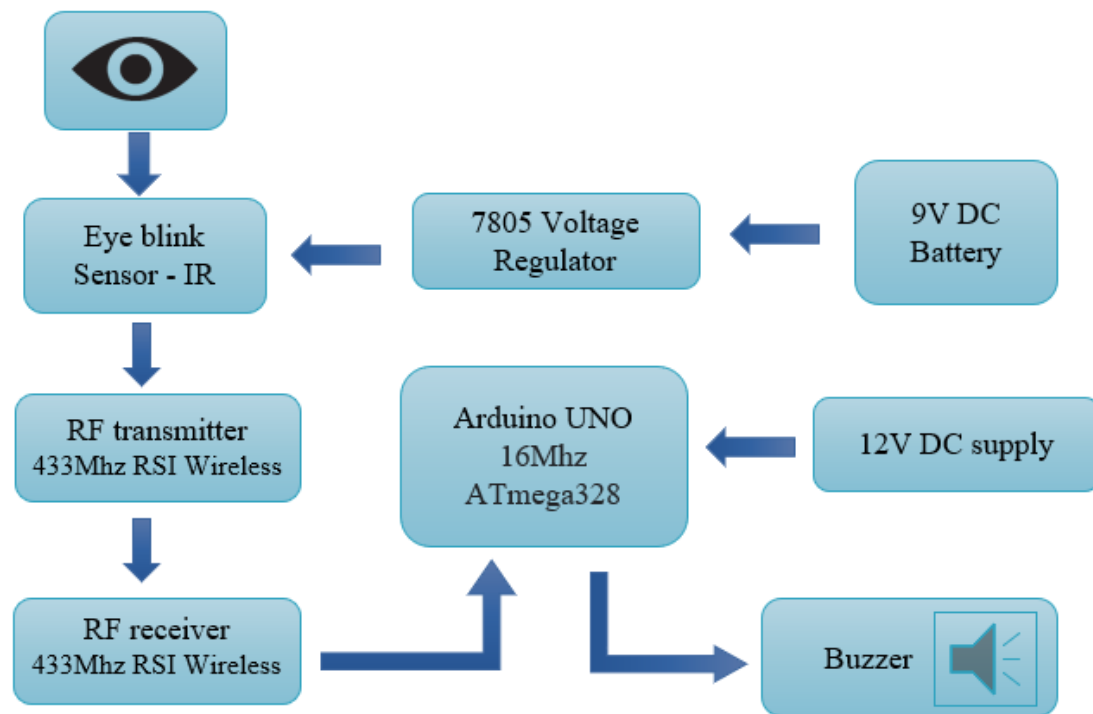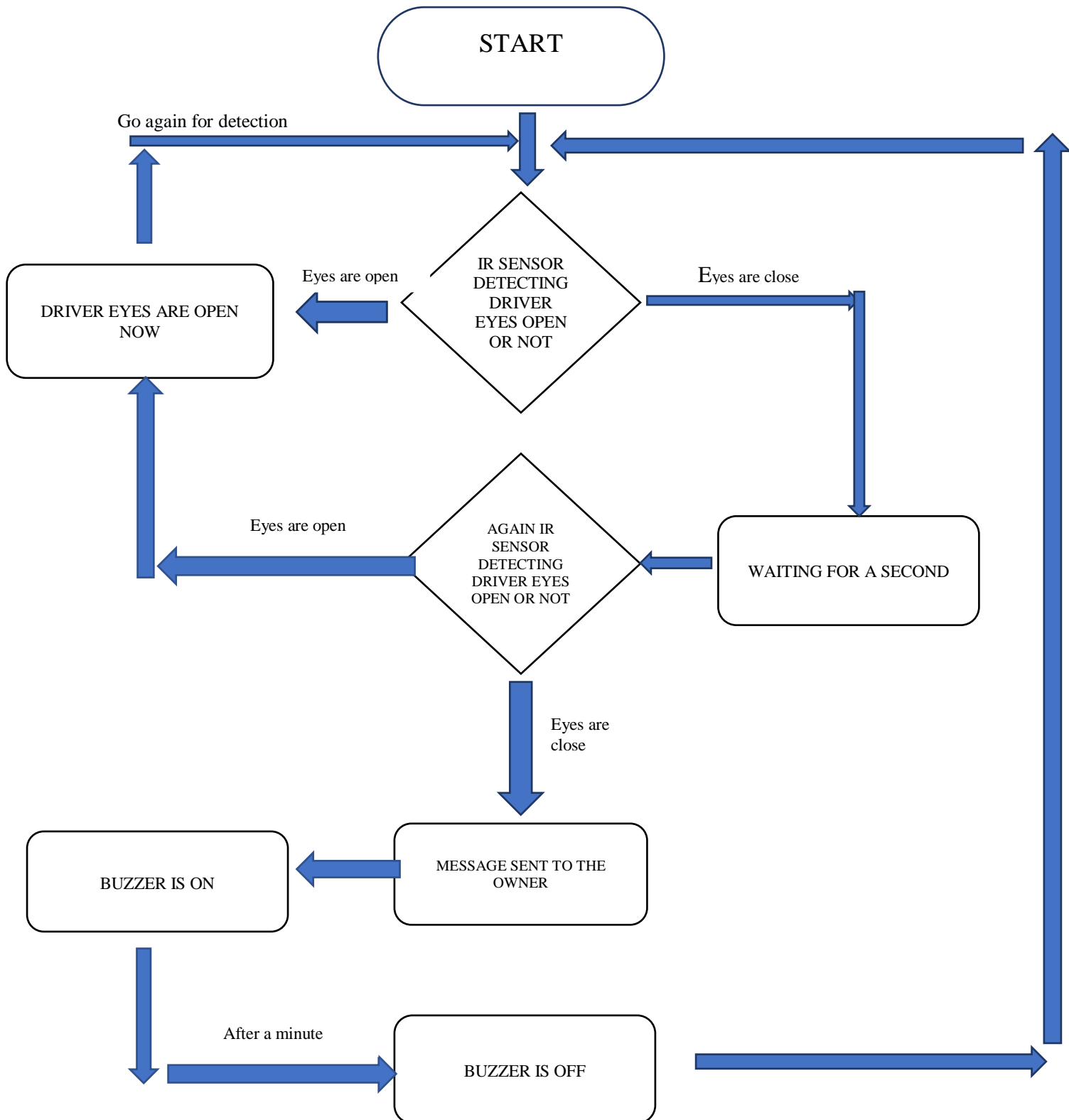
4.3 BLOCK DIAGRAM

Fig no.2.2

4.4 FLOW CHART

Fig no.2.3

Go again for detection

START

IR SENSOR DETECTING DRIVER EYES OPEN OR NOT

Eyes are open

Eyes are close

DRIVER EYES ARE OPEN NOW

AGAIN IR SENSOR DETECTING DRIVER EYES OPEN OR NOT

Eyes are open

WAITING FOR A SECOND

Eyes are close

MESSAGE SENT TO THE OWNER

BUZZER IS ON

After a minute

BUZZER IS OFF

4.5 PROGRAM CODE

```
int flag=0;
int t1=0;
int t2=0;
void setup()
{
Serial.begin(9600);
pinMode(2,OUTPUT);


}
void loop()
{
  int x=analogRead(A0);
  //Serial.println(x);


if(x<400 && flag==0)
  {
    flag=1;
    t1=millis();
  }
  else if(x>400 && flag==1)
  {
    flag=0;
    t2=millis();
Serial.println(t2-t1);
    if((t2-t1)>1000)
    {
digitalWrite(2,HIGH);
Serial.println("Alert2!!!!!!!!!!!!!!!!!!");
delay(2000);
digitalWrite(2,LOW);
    }
    else;
  }
}
```
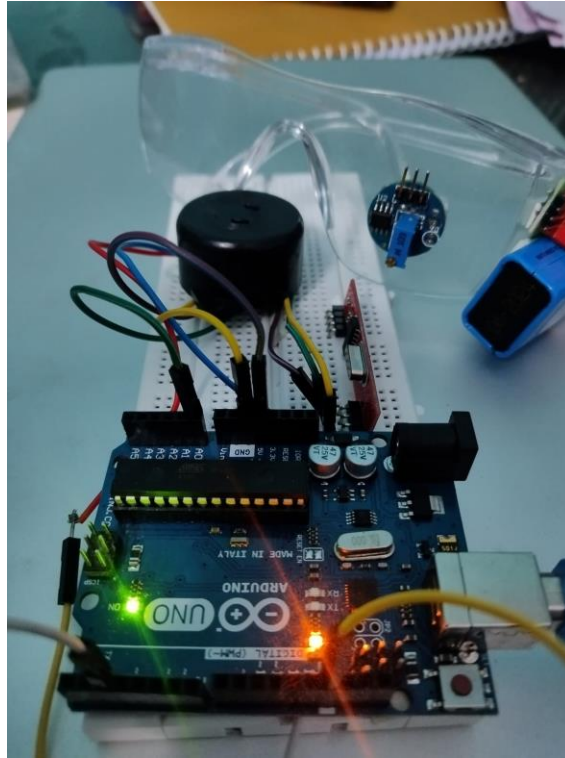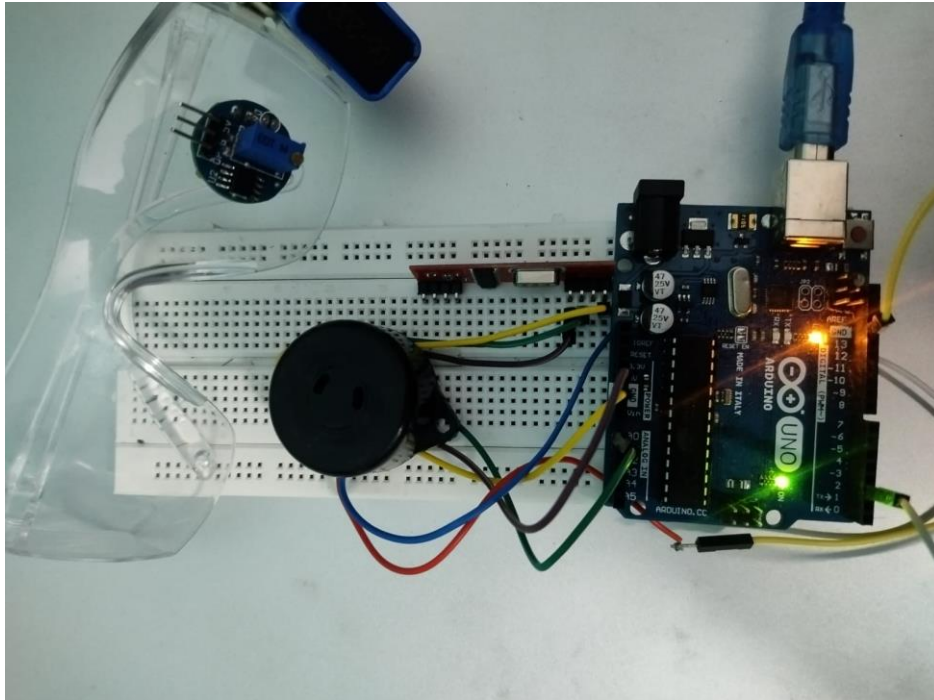
4.6 HARDWARE PICTURE

Fig no.2.4

Fig no.2.5

CHAPTER 5
RESULT

● The developed drowsiness detection and correction system can quickly detect drowsiness.

● The system can distinguish between normal blinking and drowsiness, which can prevent the driver from falling asleep while driving.

● The system works well even when driving with glasses and in low light conditions. During monitoring, the system can decide whether the eyes are open or closed.

CHAPTER 6
APPLICATIONS

- This system can be used in factories to alert the workers.

- If found drowsy, the alarm system gets activated and the driver is alerted.

- This system can also be used for railway.

- It can also be used for commercial vehicles.

REFERENCES

1] R. Knipling, "PERCLOS A Valid Psychophysiological Measure of Alertness as Assessed by Psychomotor Vigilance", *Technical Report*, October 1998.

[2] G. P. Stein, O. Mano and A. Shashua, "Vision-based ACC with a Single Camera: Bounds on Range and Range Rate Accuracy", *IEEE IV '03*, pp. 120-125, 2003.

[3]SitiNuradlinSyahirah Sheikh Anwar, Azrina Abd Aziz, Syed Hasan Adil, "Development of Real-Time Eye Tracking Algorithm", 2021 4th International Conference on Computing & Information Sciences (ICCIS), pp.1-6, 2021.

[4] Ali Ayub Sheikh, Junaid Mir, "Machine Learning Inspired Vision-based Drowsiness Detection using Eye and Body Motion Features", 2021 13th International Conference on Information & Communication Technology and System (ICTS), pp.146-150, 2021.