Maharishi Markandeshwar

(Deemed to be University)

Project Report
On

ANTI SLEEP ALARM
(for drivers)

Submitted to SKILL CENTER MMDU in partial fulfilment of the requirements for the award of the degree of

BACHELOR OF TECHNOLOGY
In
COMPUTER SCIENCE ENGINEERING DEPARTMENT.

Submitted To:

Mr. Gurpreet Singh
Project Coordinator

Sign……

Submitted By:

Roshan Kr Yadav	Abdul Rahman	Beauty Kumari
Rollno : 11212608	Rollno : 11212617	Rollno: 11212820
4th CSE E2	4th CSE E2	4th CSE F
……	……	……

CERTIFICATE

Certified that this project **"Anti sleep alarm for Driver "** is the bonafide work of **" Roshan Kumar Yadav " ,"Abdul Rahman" and "Beauty Kumari"** who carried out the project work in the partial fulfillment for the award of Bachelor of Technology in Computer Science Engineering MMEC MMDU, Ambala during the academic year 2021-2025.

.....

SIGNATURE

Mr. Gurpreet Singh

Project Coordinator

CANDIDATE'S DECLARATION

I hereby declare that the work presented in this Project report entitled **"Anti sleep Alarm for Driver "**, submitted in partial fulfillment of the requirement for the award of the degree of Bachelor of Technology in Computer Science Engineering MMEC MMDU, Ambala is my own work carried out during the period.

The work reported in this project report has not been submitted by me for the award of any other degree or diploma.

Date: May 2023

Roshan Kumar Yadav 11212608

Abdul Rahman 11212617

Beauty Kumari 11212820

Acknowledgement

I hereby Declare that all my efforts to complete my project is become possibleall because of my partners who give their great contribution and support me time to time due to which I will completed my project successfully. I will not have so much courage to Develop a project but due to proper corporation and guidance of my mentors and partner who will show confidence on me and Develop a courage in me to become a Iot coder and to develop a project which will be very helpful for other peoples also in a future life.

I will also very thankful to my mentor who will give their grateful contribution to my project. The stage at which I am standing now to develop a project is due to proper guidance, support and supervision of my mentor who will give a proper direction to my track. I will also very thankful towards my Parents who will develop a feeling in me that I can do something in life and achieve the desired target. They will always support me at every stage and the love and encouragement of them will provided me protection layer around me which will always prevent me from going on a wrong way of life. At last I want to thank to my college department who will give us a platform on which we will provide a shape to our dreams for making our future bright and full of happiness. As everybody knows that the life is full of competition in the today times and everybody want to get success in life and the guidelines and direction required at this stage is very necessary for achievement of the desired objectives.

Roshan Kr Yadav	**Abdul Rahman**	**Beauty Kumari**
Rollno : 11212608	Rollno : 11212617	Rollno: 11212820
4th CSE E2	4th CSE E2	4th CSE F

Abstract

In modern-times, owing to hectic schedules it becomes very difficult to remain active all the time. Imagine a situation where a person is driving home from work, dead tired after facing all the challenges of the day.
His hands are on the wheel and foot on the pedal but suddenly he starts feeling drowsy, his eyes start shutting and his vision blurs and before he knows it, he's asleep.

Falling asleep on the wheel can lead to serious consequences, there may be accidents and people may even lose their lives. This situation is much more common then we notice and hence, it is very important to counter this problem. So to address this issue, we have come up with a Driver Anti-sleep Device.

This system alerts the user if he/she falls asleep at the wheel thereby, avoiding accidents and saving lives. This system is useful especially for people who travel long distances and people who are driving late at night. The circuit is built around Schmitt trigger, timer IC, transistor, a relay and a logic gate. Around half an hour after the reset of timer IC, transistors rive the buzzer to sound an intermediate beep.

If timer IC is not reset at that time, around one minute later the output of gate conducts. Due to this the clock stops counting further and relay energizes to deactivate the load. This state changes only reset switch is pressed. As a result of pressing the reset switch a next timer is set which will trigger the same events after half an hour.

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CHAPTER 1

INTRODUCTION

1.1 Background

Project motivation and purpose the goal of this project is to develop a system that can accurately detect sleepy driving and make alarms accordingly, which aims to prevent the drivers from drowsy driving and create a safer driving environment. The project was accomplished by a eye blink sensor that constantly see the driver eye , a eye blink sensor that implement eye processing algorithm of sleepy detection, and a feedback circuit that could generate alarm and a power supply system. 1.2.Functions and Features This system has many features that make it unique and functional. These features include:

1. Eye extraction, use open and close to determine sleepiness.
2. Real time eye blink determine.
3. Sound and flashing by buzzer warning system to redraw driver's attention.
4. Little inference and potential hazard to driver's normal driving.
5. If the driver's eyes do not open even after the buzzer goes off.
6. Then the wheel of the car stops, preventing the vehicle to be driven in such a state.

1.2 Project Aims

The aim of an anti-sleep alarm for a driver is to help prevent accidents caused by drowsy driving. When a driver is tired and sleepy, their reaction time, decision-making abilities, and overall driving performance can become impaired, increasing the risk of a collision. An anti-sleep alarm helps to alert the driver when they begin to show signs of drowsiness or falling asleep at the wheel, allowing them to take corrective action before an accident occurs.

The anti-sleep alarm typically uses various sensors to monitor the driver's behavior and detect signs of drowsiness or fatigue, such as slow eye movement or a decrease in head posture. When these signs are detected, the device emits an audible or visual alarm to alert the driver and prompt them to take a break or stop driving altogether. Ultimately, the goal of the anti-sleep alarm is to improve road safety and reduce the number of accidents caused by tired drivers.

1.3 Objectives

The objective of an anti-sleep alarm is to help prevent accidents caused by drowsy or fatigued driving. When a driver is tired, their ability to react quickly and make sound decisions while driving is impaired, increasing the risk of a collision. An anti-sleep alarm aims to detect signs of drowsiness or fatigue in the driver and alert them to take a break or stop driving before an accident occurs.

In addition to preventing accidents, an anti-sleep alarm can also help to improve driver awareness and promote safe driving habits. By alerting drivers to the signs of drowsiness, the device can encourage them to take necessary breaks and prioritize their own safety and that of others on the road. Ultimately, the objective of an anti-sleep alarm is to reduce the number of accidents caused by drowsy or fatigued driving and promote safer driving practices.

1.4 Advantages of Anti sleep alarm for drivers

The aim of an anti-sleep alarm for a driver is to help prevent accidents caused by drowsy driving. When a driver is tired and sleepy, their reaction time, decision-making abilities, and overall driving performance can become impaired, increasing the risk of a collision. An anti-sleep alarm helps to alert the driver when they begin to show signs of drowsiness or falling asleep at the wheel, allowing them to take corrective action before an accident occurs.

The anti-sleep alarm typically uses various sensors to monitor the driver's behavior and detect signs of drowsiness or fatigue, such as slow eye movement or a decrease in head posture. When these signs are detected, the device emits an audible or visual alarm to alert the driver and prompt them to take a break or stop driving altogether. Ultimately, the goal of the anti-sleep alarm is to improve road safety and reduce the number of accidents caused by tired drivers.

1.5 Application of Anti sleep alarm

The application of an anti-sleep alarm for drivers is to improve road safety by detecting signs of drowsiness or fatigue in the driver and alerting them to take a break or stop driving before an accident occurs. Some common applications of anti-sleep alarms for drivers include:

1. Commercial trucking: Commercial truck drivers are often required to drive long distances for extended periods, increasing their risk of fatigue and

drowsiness. Anti-sleep alarms can help prevent accidents by alerting drivers to take breaks when necessary.

2. Long-distance driving: Whether it's for work or leisure, long-distance driving can be exhausting and increase the risk of accidents. Anti-sleep alarms can help drivers stay alert and prevent drowsy driving.

3. Shift workers: People who work night shifts or irregular hours may have disrupted sleep patterns, increasing their risk of fatigue and drowsiness. An anti-sleep alarm can help them stay alert during their commute to and from work.

4. Elderly drivers: As people age, their reaction times and ability to stay alert may decline, making them more susceptible to drowsy driving. Anti-sleep alarms can help keep elderly drivers safe on the road.

Overall, the application of an anti-sleep alarm for drivers is to promote safer driving practices and reduce the number of accidents caused by drowsy or fatigued driving.

1.6 Limitations of Anti sleep alarm

While anti-sleep alarms for drivers can be effective in promoting safe driving practices and preventing accidents caused by drowsy or fatigued driving, there are some limitations to their use. Some of these limitations include:

1. False alarms: Anti-sleep alarms can sometimes trigger false alarms, particularly if the driver is momentarily distracted or has a medical condition that affects their eye movements. This can be frustrating for the driver and may cause them to ignore the alarm in the future.

2. Inability to prevent all accidents: While anti-sleep alarms can help prevent accidents caused by drowsy driving, they cannot prevent all accidents. Drivers may still be at risk of accidents caused by other factors, such as distractions or impaired driving.
3. Cost: Anti-sleep alarms can be expensive, particularly if they require specialized installation or maintenance.

4. User compliance: Drivers may choose to ignore the anti-sleep alarm or override it if they feel that they need to get to their destination quickly or if they are under pressure to meet a deadline.

CHAPTER 2

METHODOLOGY

2.1 Design and implementation

In the construction of this project, the modular design is employed, the project is divided into two parts namely hardware and software with each of the section analysed extensively. The block diagram of the Arduino based anti sleep alarm for driver is shown below:

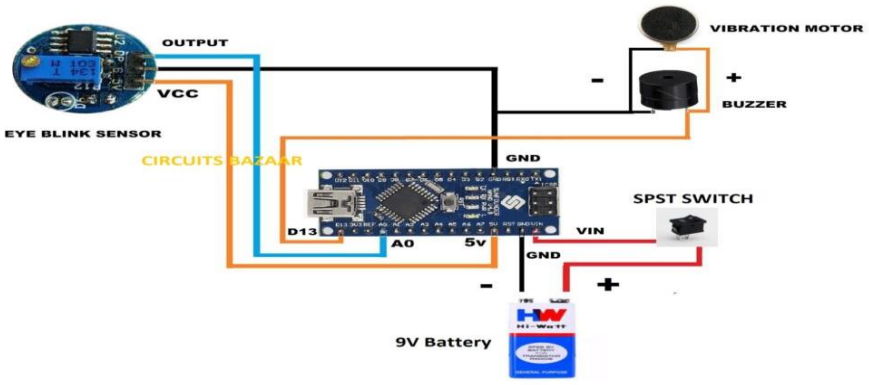


Fig. 1: Block diagram

2.2 Circuit design

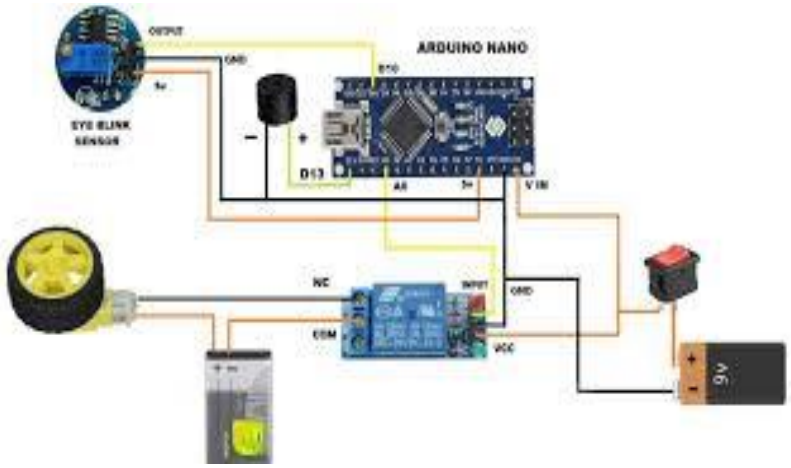


Fig:2

2.3 Hardware requirements

1. Arduino
2. Eye Blink Sensor
3. Gear Motor
4. Piezo Buzzer
5. Relay Module

6. Wheel
7. 9V Battery
8. Wires
9. Switch

1. Arduino

Arduino is open-source hardware. The hardware reference designs are distributed under a Creative Commons Attribution Share-Alike 2.5 license and are available on the Arduino website. Layout and production files for some versions of the hardware are also available.

Although the hardware and software designs are freely available under copyleft licenses, the developers have requested the name *Arduino* to be exclusive to the official product and not be used for derived works without permission. The official policy document on the use of the Arduino name emphasizes that the project is open to incorporating work by others into the official product. Several

Fig:3 Arduino UNO

2. Eye Blink Sensor

An eye blink sensor is a device that can detect and measure the movement of the eyelids, specifically the duration and frequency of eye blinks. There are different types of eye blink sensors, including contact-based sensors that require physical contact with the skin around the eyes and non-contact sensors that use various technologies such as infrared, electrooculography (EOG), or video processing to detect eye blinks.

Overall, eye blink sensors have a wide range of potential uses and are an active area of research and development.

Fig:4 Eye Blink Sensor

3. Gear Motor

A gear motor is a mechanical system consisting of an electric motor and a gearbox containing a series of gears. The function of the gearbox coupled to the motor is to reduce its speed and increase its torque to do a given job at a given speed.

4. Piezo Buzzer

In simplest terms, a piezo buzzer is a type of electronic device that's used to produce a tone, alarm or sound. It's lightweight with a simple construction, and it's typically a low-cost product. Yet at the same time, depending on the piezo ceramic buzzer specifications, it's also reliable and can be constructed in a wide range of sizes that work across varying frequencies to produce different sound outputs.

5. Relay Module

Relay modules are simply circuit boards that house one or more relays. They come in a variety of shapes and sizes, but are most commonly rectangular with 2, 4, or 8 relays mounted on them, sometimes even up to a 16 relays. Relay modules contain other components than the relay unit. These include indicator LEDs, protection diodes, transistors, resistors, and other parts.

6. Wheel

A wheel is a circular component that is intended to rotate on an axle bearing. The wheel is one of the key components of the wheel and axle which is one of the six simple machines. Wheels, in conj unction with axles, allow heavy objects to be moved easily facilitating movement or transportation while supporting a load, or performing labor in machines.

7. 9V Battery

A battery is a source of electric power consisting of one or more electrochemical cells with external connections for powering electrical devices. When a battery is supply ing power, its positive terminal is the cathode and its neg ative terminal is the anode. The terminal marked negative is the source of electrons that will flow through an extern al electric circuit to the positive terminal.

8. Wires

Electrical wiring is an electrical installation of cabling and associated devices such as switches, distribution boards, sockets, and light fittings in a structure.
Wiring is subject to safety standards for design and installation.
Allowable wire and cable types and sizes are specified according to the circuit operating voltage and electric current capability.

9. Switch

In electrical engineering, a switch is an electrical component that can disconnect or connect the conducting path in an electrical circuit, interrupting the electric current or diverting it from one conductor to another. When a pair of contacts is touching current can pass between them, while when the contacts are separated no current can flow.

2.4 Software requrement

1.Arduino IDLE

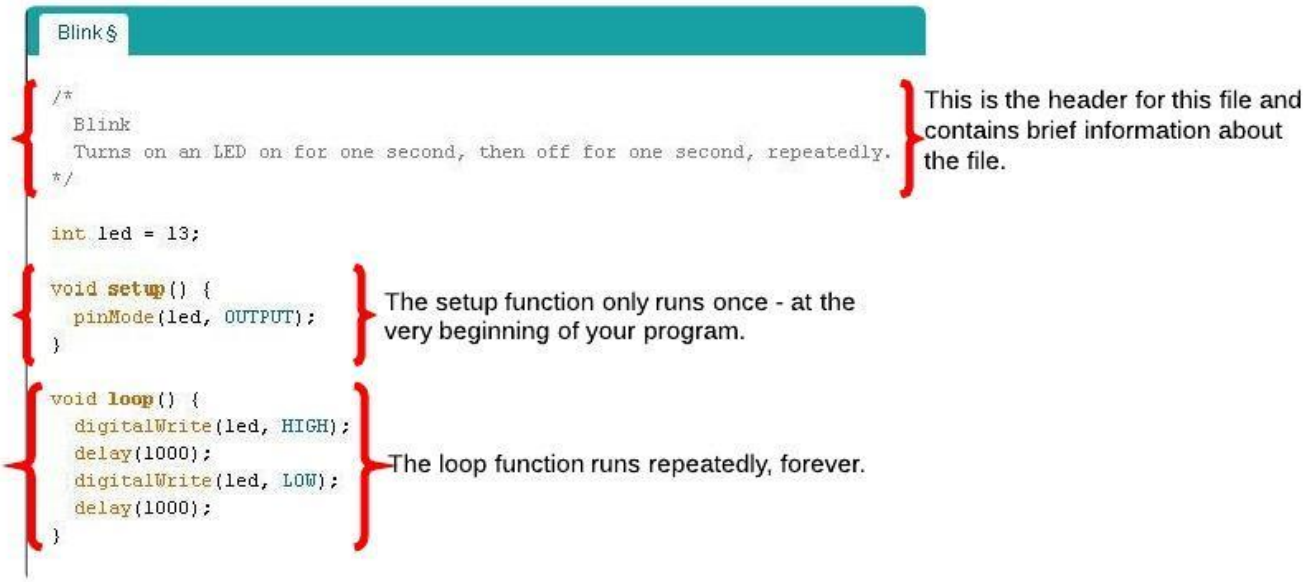
Arduino is an open-source hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices. Its hardware products are licensed under a CC BY-SA license, while the software is licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially from the official website or through authorized distributors.

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards ('shields') or breadboards (for prototyping) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs. The microcontrollers can be programmed using the C and C++ programming languages, using a standard API which is also known as the Arduino Programming Language, inspired by the Processing language and used with a modified version of the Processing IDE.

CHAPTER: 3

CODING FOR HARDWARE

3.1) Coding **for Arduino UNO**



3.2) Coding for Eye Blink Sensor

```
// Arduino Eye Blink Sensor Code

int IRSensor = 9; // connect ir sensor module to Arduino pin 9
int LED = 13; // conect LED to Arduino pin 13
void setup()
{
Serial.begin(115200); // Init Serila at 115200 Baud
Serial.println("Serial Working"); // Test to check if serial is working or not
pinMode(IRSensor, INPUT); // IR Sensor pin INPUT
pinMode(LED, OUTPUT); // LED Pin Output
}
void loop()
{
int sensorStatus = digitalRead(IRSensor); // Set the GPIO as Input
if (sensorStatus == 1) // Check if the pin high or not
{
// if the pin is high turn off the onboard Led
digitalWrite(LED, LOW); // LED LOW
Serial.println("Motion Ended!"); // print Motion Detected! on the serial monitor window
}
else
{
```

```
//else turn on the onboard LED
digitalWrite(LED, HIGH); // LED High
Serial.println("Motion Detected!"); // print Motion Ended! on the serial monitor window
}
}
```

3.3) Coding for Relay Module

```
// constants won't change
const int RELAY_PIN = 3;  // the Arduino pin, which connects to the IN pin of relay

// the setup function runs once when you press reset or power the board
void setup() {
  // initialize digital pin as an output.
  pinMode(RELAY_PIN, OUTPUT);
}

// the loop function runs over and over again forever
void loop() {
  digitalWrite(RELAY_PIN, HIGH);
  delay(500);
  digitalWrite(RELAY_PIN, LOW);
  delay(500);
   }
```

3.4) Coding for Buzzer

```
/* Arduino tutorial - Buzzer / Piezo Speaker
   More info and circuit: http://www.ardumotive.com/how-to-
use-a-buzzer-en.html
   Dev: Michalis Vasilakis // Date: 9/6/2015 //
www.ardumotive.com */

const int buzzer = 9; //buzzer to arduino pin 9

void setup(){
  pinMode(buzzer, OUTPUT); // Set buzzer - pin 9 as an output
}

void loop(){
  tone(buzzer, 1000); // Send 1KHz sound signal...
  delay(1000);        // ...for 1 sec
  noTone(buzzer);     // Stop sound...
  delay(1000);        // ...for 1sec
```

3.4) Final Coding

Arduino code:

```
#define Relay 13
#define buzzer A0
static const int sensorPin = 10;                  // sensor input pin
int SensorStatePrevious = LOW;                    // previousstate of the sensor

unsigned long minSensorDuration = 3000; // Time we wait before  the sensor active
as long
unsigned long minSensorDuration2 = 6000;
unsigned long SensorLongMillis;                // Time in ms when the sensor was active
bool SensorStateLongTime = false;                 // True if it is a long active

const int intervalSensor = 50;                    // Time between two readings sensor
state
unsigned long previousSensorMillis;               // Timestamp of the latest reading

unsigned long SensorOutDuration;                  // Time the sensor is active in ms

//// GENERAL ////

unsigned long currentMillis;          // Variabele to store the number of milleseconds
since the Arduino has started

void setup() {
  Serial.begin(9600);                 // Initialise the serial monitor

  pinMode(sensorPin, INPUT);          // set sensorPin as input
  Serial.println("Press button");
  pinMode(Relay,OUTPUT);
  pinMode(buzzer,OUTPUT);
}

// Function for reading the sensor state
void readSensorState() {

  // If the difference in time between the previous reading is larger than intervalsensor
  if(currentMillis - previousSensorMillis > intervalSensor) {

    // Read the digital value of the sensor (LOW/HIGH)
    int SensorState = digitalRead(sensorPin);

    // If the button has been active AND
    // If the sensor wasn't activated before AND
    // IF there was not already a measurement running to determine how long the
sensor has been activated
    if (SensorState == LOW && SensorStatePrevious == HIGH &&
!SensorStateLongTime) {
      SensorLongMillis = currentMillis;
```

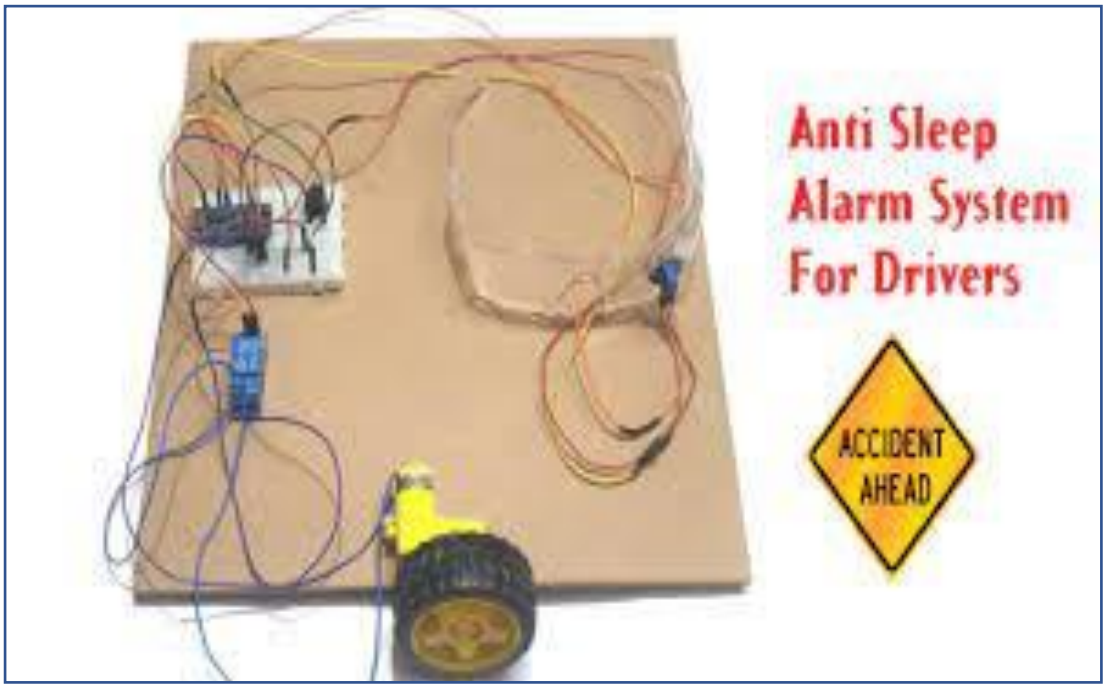
```
      SensorStatePrevious = LOW;

      Serial.println("Button pressed");
    }

    // Calculate how long the sensor has been activated
   SensorOutDuration = currentMillis - SensorLongMillis;

    // If the button is active AND
    // If there is no measurement running to determine how long the sensor is active
AND
    // If the time the sensor has been activated is larger or equal to the time needed
for a long active
    if (SensorState == LOW && !SensorStateLongTime && SensorOutDuration >=
minSensorDuration) {
      SensorStateLongTime = true;
      digitalWrite(Relay,HIGH);
      Serial.println("Button long pressed");
    }
    if (SensorState == LOW && SensorStateLongTime && SensorOutDuration >=
minSensorDuration2) {
     SensorStateLongTime = true;
      digitalWrite(buzzer,HIGH);
      delay(1000);
      Serial.println("Button long pressed");
    }

    // If the sensor is released AND
    // If the sensor was activated before
    if (SensorState == HIGH && SensorStatePrevious == LOW) {
      SensorStatePrevious = HIGH;
      SensorStateLongTime = false;
      digitalWrite(Relay,LOW);
      digitalWrite(buzzer,LOW);
      Serial.println("Button released");

   }
     // store the current timestamp in previousSensorMillis
   previousSensorMillis = currentMillis;

  }

}

void loop() {

  currentMillis = millis();    // store the current time
  readSensorState();           // read the sensor state
  }
```

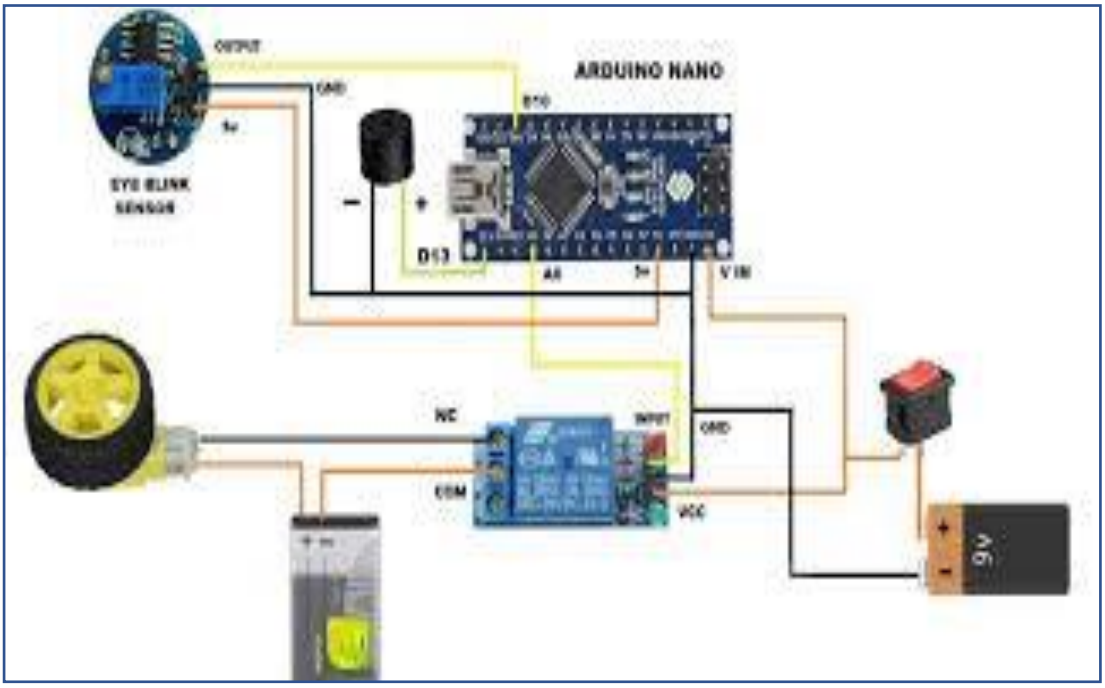
CHAPTER: 4

Result and Result Analysis

4.1) Power Supply Unit.

When the is on of 9v battery then motor will run.





CHAPTER: 5

CONCLUSION

Accomplishments As for the software part, we fulfilled our goal successfully. The detection algorithm could not only work effectively and accurately at daytime, but also at night. The Eye portion extraction is smooth and in real time with no delays on the computer.

In addition, there is a bonus function in the software part – detection with glasses. For the Beagleboard, we achieved two major difficulties. First, we were not able to power up the board with any commercial chargers initially, including the ones for iPhone, for Assume, or the USB charger on car. But later we added DXPOWER battery to power our board and used the power supply we designed to charge the battery to solve the problem.

Second, we experienced a few difficulties while installing the OpenCV library on Beagleboard, but were able to solve it by changing flags in make files to the one corresponding to ARM board architecture. The power supply unit basically completes all its design requirements. By adding the extra USB battery stage, the problem of powering the entire microcontroller and alarming system has been solved. Moreover, the alarming system works as we supposed. The voltage ripple of the power supply unit can be mitigated by applying more resilient capacitor components.

It is apparent that the overall project success is not derived from one team member's mind but the keen coloration within our group. Each part is indispensable and every team member made the great dedication on the completion of this design project.

CHAPTER: 6

FUTURE SCOPE

1) Use OpenGL to control the frame rate more accurately.
2) To achieve a higher accuracy at night.
3) Use parallel programming such as CUDA to make code faster and more efficient.
4) Use bash script to enable our program to auto start after booting.
5) Use parallel programming and multi thread to handle image capturing, sending control signal, and running algorithm separately.
6) Design hardware enclosure for PCB , microcontroller and USB battery
7) Use more advanced components in out/in capacitors to reduce the voltage 28 ripple of the output voltage.