REVA UNIVERSITY
Bengaluru, India

SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING

MINI PROJECT REPORT
ON

"Anti sleep alarm detection"

Submitted in partial fulfillment of the requirements for the award of the Degree of

Bachelor of Technology
In
Electrical and Electronics Engineering

Submitted by

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DECLARATION

We,**Ms.Bhumika.m(R20EL010),Ms.Bindhu.r(R20EL011),Ms.Kareeshma.b(R20EL024)** students of B. Tech, belongs to the School of Electrical and Electronics Engineering, REVA University, declare that this Project Report entitled **"anti sleep alarm detection"** is the result the of project work done by me under the supervision of **Prof. Jaya Krishna** in School of Electrical and Electronics Engineering.

We are submitting this Project Report in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Electrical and Electronics Engineering by the REVA University, Bengaluru during the academic year 2022-23.

We further declare that this project report or any part of it has not been submitted for the award of any other Degree / Diploma of this University or any other University/ Institution.

(Signature of the Students)

Certified that this project work submitted by ***student Bhumika.m, Bindhu.r, kareeshma.b,*** has *been carried out under my / our guidance and the declaration made by the candidate is true to the best of my knowledge.*

Signature of Guide
Date ……..

Signature of Director
Date ……..
Official Seal of the School

REVA UNIVERSITY
Bengaluru, India

SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING

CERTIFICATE

Certified that the project work entitled **"Anti sleep alarm detection"** carried out under my / our guidance by **Bhumika.m(R20EL010), Bindhu.r (R20EL011), Kareeshma.b (R20EL024),** are bonafide students of REVA University during the academic year 2022-23, are submitting the project report in partial fulfillment for the award of **Bachelor of Technology in Electrical and Electronics Engineering** during the academic year **2022–23**. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the said Degree.

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ABSTRACT

Feeling sleepy while driving could cause hazardous traffic accident. However, when driving alone on highway or driving over a long period of time, drivers are inclined to being bored and feel sleepy, or even fall asleep.Nowadays most of the products of driver anti-sleep detection sold in the market is quite annoying and inefficient and costly. As such, there is a high demand for cheap and efficient driver sleep detection. Therefore, we came up with an idea to develop a anti sleep alarm system, which could effectively meet this demand.The goal of this project is to develop a system that can detect the sleepiness of the driver and make alarms accordingly.For years, science fiction has been promising to come up with devices to make our lives more interesting and easier and hence, the wants and desires of number of people who really believed that the future is now possible. In this project we have came up with a pair of glasses that would prevent the user from sleeping in case if the user falls asleep it would effectively wake them up by making appropriate noises.

In this project the glasses we have developed can serve multiple purposes other than it being used by drivers it can also be used by students during examination. Imagine a college or school student studying late night this can help them to stay awake.The need for anti-sleep alarms is no joke. A poll conducted by the National Sleep Foundation showed that 60 percent of Indians have driven while feeling sleepy, and 37 percent admit to falling asleep at the wheel in the past year. In fact, sleepy driving can be deadly: The National Highway Traffic Safety Administration (NHTSA) reports that drowsy driving causes more than 100,000 car crashes -- and kills more than 1,500 people – each year.

some high-end manufacturers are adding sleep sensors to their cars right at the factory, a few notable systems are Mercedes-Benz Attention Assist,Lexus,Volvo's Driver Alert Control,Saab.In-car systems can be expensive, especially those that involve in-dash cameras to monitor drivers instead of sensors that are already in place.Hence the glasses designed by us would be a great cheaper alternative which would work as effectively as those high end devices in saving lives.

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CHAPTER 1

INTRODUCTION

1.1 HISTORY

Nowadays There has been a very large increase in road accident due to drowsiness of driver while driving which leads to enormous fatal accidents .The driver lose his control when he falls sleep which leads to accident .This is because when the driver is not able to control his vehicle at very high speed on the road. Driver in-alertness is an important cause for most accident related to the vehicles crashes. Driver fatigue resulting from sleep deprivation or sleep disorders is an important factor in the increasing number of the accidents on today's roads. Drowsy driver warning system can form the basis of the system to possibly reduce the accidents related to driver's drowsiness. This project can generate a model which can prevent such accidents. To prevent this, we outlined a very simple and economical system which deals with this issue. In this project, when a driver falling asleep, an alarm is raised to warn the driver attached to the rear of the vehicle. The alarm continues untill the driver turns it off so that the driver wakes and get ready to steady the vehicle he drives. Thus we can control the major accidents.

1.2 PROJECT OVERVIEW

In this project the glasses we have developed can serve multiple purposes other than it being used by drivers it can also be used by students during examination.The goal of this project is to develop a system that can detect the sleepiness of the driver and make alarms accordingly.it can be used as a cheaper alternative for high end devices manufactured by automobile industries.the main aim of this project is save to human lives by preventing road accidents and also make it affordable so that each and every person can afford it and make best use of it.

CHAPTER 2

LITERATURE SURVEY

1.A Dedicated System for Monitoring of Driver's Fatigue K.Subhashini Spurjeon, Yogesh Bahindwar:

Describe about the road accidents. The road accidents happen due to the lack of attention of the driver. In this paper author describes a real time system for analyzing video sequences of a driver and determining the Level of attention. For this purpose, author uses the computation of percent of eyelid closure. The eye closure Acts as an indicator to detect drowsiness. Driver's fatigue and drowsiness are the major causes of traffic Accidents on road. It is very necessary to monitor the driver's vigilance level and to issuing an alert when he/she Is not paying enough attention to the road is a promising way to reduce the accidents caused by driver factors.The fatigue monitoring can be starts with extracting visual parameters. This can be done via a computer vision System. In the purposed work, author purpose a real time robust methods for eye tracking under variable lighting

Conditions and facial orientations. In this paper the latest technologies in pattern classification recognition and in Object tracking are employed for eye detection. [4] The tracking is based on the eye appearance. Visual Information is acquired using a specially designed solution combining a CCD video camera with an IR Illumination system. The system is fully automatic and detects eye position and eye closure and recovers the Gaze of eyes. Experimental results using real images demonstrate the accuracy and robustness of the proposed solution. This Could become an important part in the development of the advanced safety vehicle.

2.Drowsiness Warning System Using Artificial Intelligence, Nidhi Sharma, V. K. Banga:

In this paper author discuss about the various artificial intelligence methods for detecting the drowsiness of System. Driver's drowsiness is an important factor in motoring of vehicle from accidents. The driving Performance deteriorates with increased drowsiness with resulting crashes constituting morel vehicle accidents. In recent years, there has been growing interest in intelligent vehicles. The ongoing intelligent vehicle research will revolutionize the way vehicles and drivers interact in the future.

The detection mechanism into vehicles may help prevent many accidents. There are various techniques used for Analyzing driver exhaustion. Most of the published research on computer vision approaches to detection of Fatigue has focused on the analysis of blinks and head movements. After long hours of driving or in absence of mental alert state, the attention of driver starts to loose and that Creates risks of accidents. These are the typical reactions of fatigue, which are very dangerous. In image fatigue Detection, correct and real time decision is very important. In this paper, author discusses the various artificial Detection.

3.A Yawning Measurement Method to Detect Driver Drowsiness, Behnoosh Hariri, et.al:

Describe that the drowsy is the major issue behind the road accidents. The use of assistive systems that Monitor a driver's level of vigilance and alert the driver in case of drowsiness can be significant in the Prevention of accidents in this paper author purposed a new approach towards detection of drives drowsiness based on yawning Measurement. This involves several steps including the real time detection and tracking of driver's face, Detection and tracking of the mouth contour and the detection of yawning based on measuring both the rate and The amount of changes in the mouth contour area. In this paper several techniques are used, that are applied Several techniques to ensure the robust detection of yawning expression in the presence of variable lighting Conditions and facial occlusions. Test results demonstrate that the proposed system can efficiently measure the Aforementioned parameters and detect the yawning state as a sign of driver's drowsiness.

4.DEVELOPMENT OF A DROWSINESS WARNING SYSTEM USING NEURAL NETWORK, Itenderpal singh1, Prof. V.K.Banga:

Describe the facial image analysis. As due to the increase in the amount of automobile the problems Created by accidents have become more complex. The transportation system is no longer sufficient. Hence the Research upon the safety of the vehicles is the recent topic nowadays. In this paper author discuss about the Safety warning systems.

This system is active warning systems for preventing traffic accidents have been attracting much public Attention. Safe driving is a major concern of today's societies. There are thousands of accidents are happen in aDay. [7] Due to which many people get injured and many out of them got die. The aim of this paper is to develop A prototype drowsiness detection system. The main focus is on designing a system that are used for l accurately

Monitor the open or closed state of the driver's eyes in real time. By monitoring the eyes, it is believed that the Symptoms of driver fatigue can be detected early enough to avoid a car accident. The author purposed a vehicle driver drowsiness warning system using image processing technique With neural network. It is based on facial images analysis for warning the driver of drowsiness or inattention to Prevent traffic accidents. The facial images of driver are taken by the video camera that is installed on the Dashboard in front of the driver. A Neural network based algorithm is proposed to determine the level of fatigue. It measures by the eye opening and closing, and warns the driver accordingly.

CHAPTER 3

PROPOSED WORK

Block diagram of anti sleep alarm detection:-

Components used:-

- Eye blink sensor
- Arduino nano
- Vibration sensor
- Buzzer
- Spst switch
- 9v battery
- Ribbon wire
- Soldering iron/Glue gun

Components description:-

- **Arduino nano**

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P released in 2008. It offers the same connectivity and specs of the Arduino Uno board in a smaller form factor.The Arduino Nano is equipped with 30 male I/O headers, in a DIP-30-like configuration, which can be programmed using the Arduino Software integrated development environment (IDE), which is common to all Arduino boards and running both online and offline.The board can be powered through a type-B mini-USB cable or from a 9 V battery.

Specifications of Arduino nano

Microcontroller	ATmega328P
Operating voltage	5v
Input voltage	7-12v
Digital i/o pins	14 (of which 6 provide PWM output)
Analog Input Pins	6
DC Current per I/O Pin	20ma
DC Current for 3.3V Pin	50ma
Flash Memory	32 KB (ATmega328P) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock speed	16mhz
Length	68.6 mm
Width	53.4 mm
Weight	25 g

- **Eye blink sensor**

Eye Blink Sensor is compatible with Arduino, Raspberry Pi, AVR, PIC. This Eye Blink sensor senses the eyeblink using infrared. The Variation Across the eye will vary as per eye blink. If the eye is closed the output is high otherwise the output is low.The eye blink sensor is an infrared sensor. It contains two parts. A transmitter and a receiver. The transmitter continuously emits infrared waves onto the eye. While the receiver continuously looks for variations in the reflected waves which indicates that the eye has blinked.

- **Vibration sensor**

A vibration sensor is a device that measures the amount and frequency of vibration in a given system, machine, or piece of equipment. Those measurements can be used to detect imbalances or other issues in the asset and predict future breakdowns.

- **Buzzer**

A buzzer or beeper is an audio signaling device,[1] which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, train and confirmation of user input such as a mouse click or keystroke. In our project we have used it to alert the driver

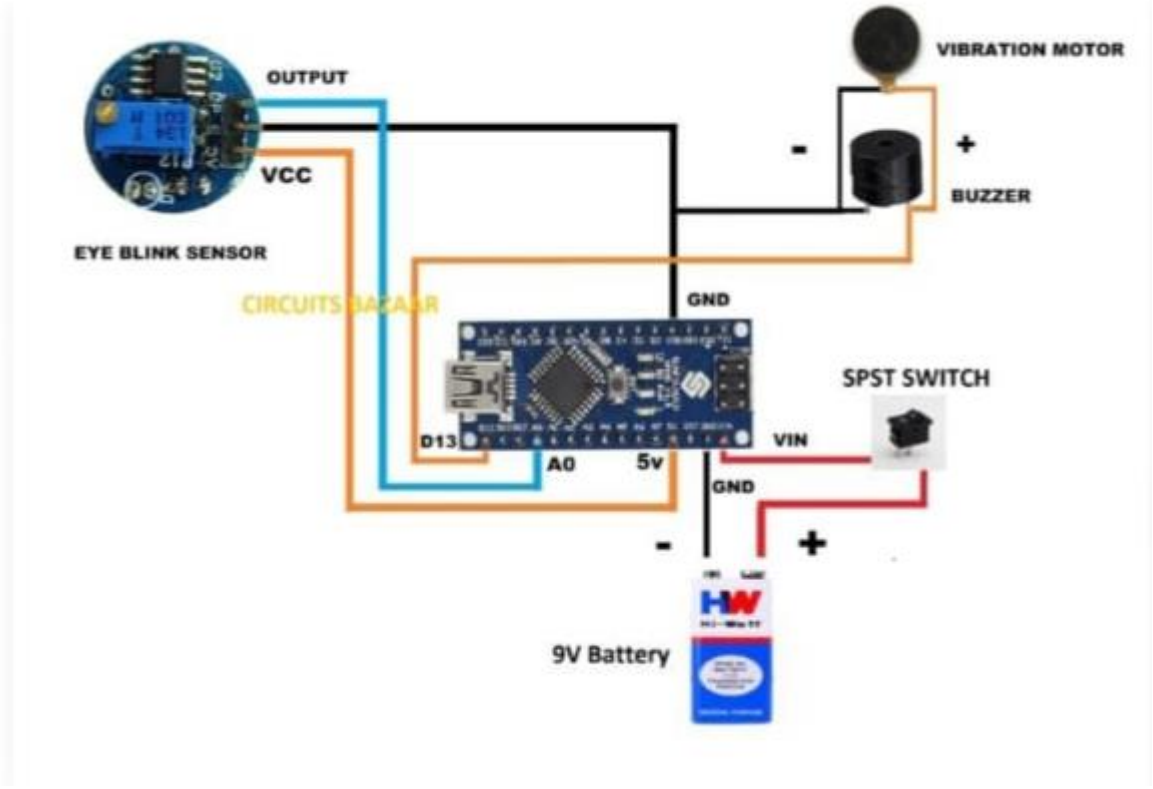
- **Spst switch**

The term “SPST” in an SPST switch stands for “Single Pole Single Throw” which includes a single input and a single output. Here, a single input is directly connected to a single output. The main function of this switch is to control the circuit by turning ON/OFF.Once the switch in the circuit is closed, then the circuit will be turned ON whereas the switch is not closed or open, then the circuit will be turned off.

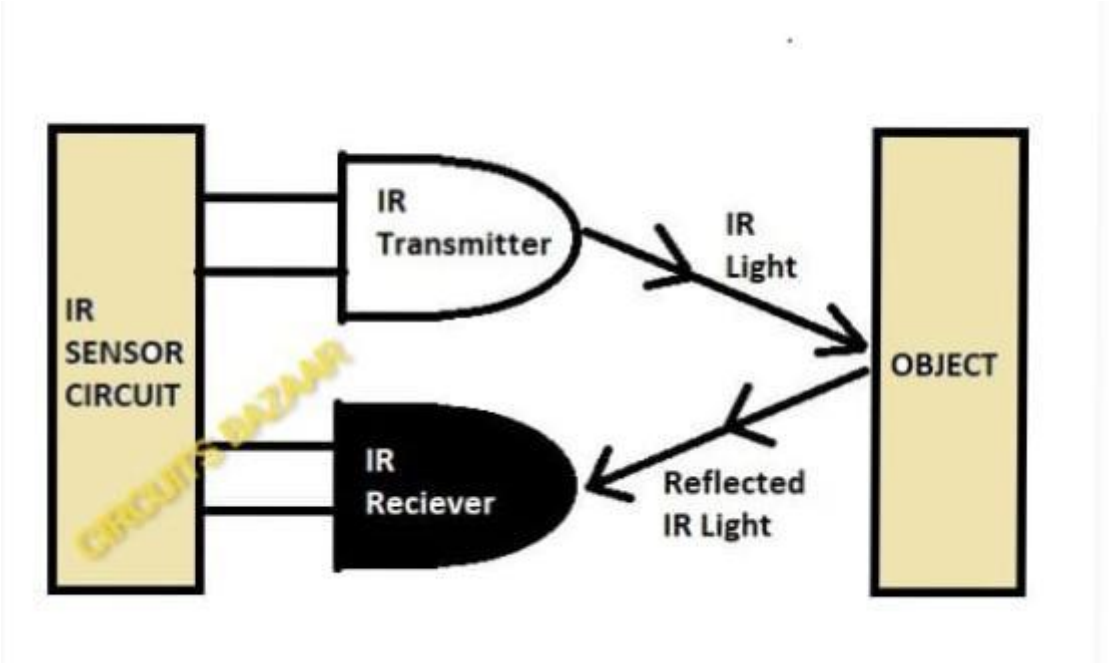
- **9v battery**

9-volt battery, is an electric battery that supplies a nominal voltage of 9 volts. Actual voltage measures 7.2 to 9.6 volts, depending on battery chemistry. Batteries of various sizes and capacities are manufactured; a very common size is known as PP3, introduced for early transistor radios.

- **Circuit diagram**



- **Working principle of ir sensor**



CHAPTER 4

RESULT ANALYSIS

CHAPTER 5

CONCLUSION AND FUTURE SCOPE

Work conclusion:-

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 aurdino we faced two major difficulties. First, we were not able To power up the board with any commercial chargers initially, including the ones for Iphone, . But later we added usb cable 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 and dumping our code to aurdino uno but were able to solve it by changing Flags in makefiles to the one corresponding to board architecture and choosing appropriate ports 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.

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 pace is intense, the learning, immense.

Future scope of work:-

- To achieve a higher accuracy at night
- Use parallel programming such as CUDA to make code faster and more

efficient

- Use bash script to enable our program to auto start after booting.
- Use parallel programming and multi thread to handle

sending control signal, and running algorithm separately.

- Design hardware enclosure for PCB , microcontroller and USB battery
- Use more advanced components in out/in to reduce the errors
- Trying to make it more compact

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APPENDIX

Program 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

}
```