A project report on

ANTI SLEEP ALARM FOR DRIVERS

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In

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ANTI SLEEP ALARM FOR DRIVERS

OBJECTIVE:

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 feel bored and sleepy, or even fall asleep. Nowadays most of the products of driver anti-sleep detection sold in the market are simply earphone making intermittent noises, which is quite annoying and inefficient. As such, there is a high demand for cheap and efficient driver sleep detection. Therefore, we came up with an idea and successfully developed a sleepy detection and alarming system, which could effectively meet this demand.

INTRODUCTION:

1.1. 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 Webcam that constantly takes image of driver, a beagle board that implement image 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. Daytime and night detection 3. Real time image processing and detection 4. Sound and flashing LED warning system to redraw driver's attention 5. Little inference and potential hazard to driver's normal driving 6. Portable size with car cigarette charger socket power supply 1.3 Hardware system overview/ block diagram

Components required:

1. Relay
2. Piezo buzzer
3. Gear Motor
4. Wheel
5. Arduino Nano
6. Jumper wires
7. SPST Switch
8. Eye blink sensor
9. Battery

Components Specifications:

- **Arduino NANO:**

The Arduino Nano has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An FTDI FT232RL on the board channels this serial communication over USB and the FTDI drivers A Software Serial library allows for serial communication on any of the Nano's digital pins. The ATmega328 also supports I2C and SPI communication. The Arduino software includes the Wire library to simplify use of the I2C bus.

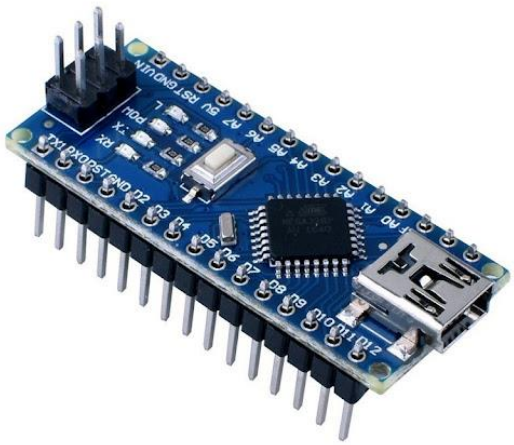


Fig: Arduino NANO

- **Piezo Buzzer:**

Buzzers are electric sounding devices that generate sounds. Typically powered by DC voltage, they can be categorised as Piezo buzzer and magnetic buzzer. They come in different designs and uses as well, and based on that, they can produce different sounds!

Fig: Piezo Buzzer

- **Eye Blink Sensor:**

This eye blink sensor is based on IR. It consists of an IR transmitter and IR receiver. The eye blink sensor illuminates the eye with infrared light and monitors the changes in the reflected light. The infrared light reflected from the eye is used to determine the results. Robo Craze Eye Blink Sensor EYE Sensor kit consists of a 3-pin female header. This eye blink sensor senses the eye blink 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.

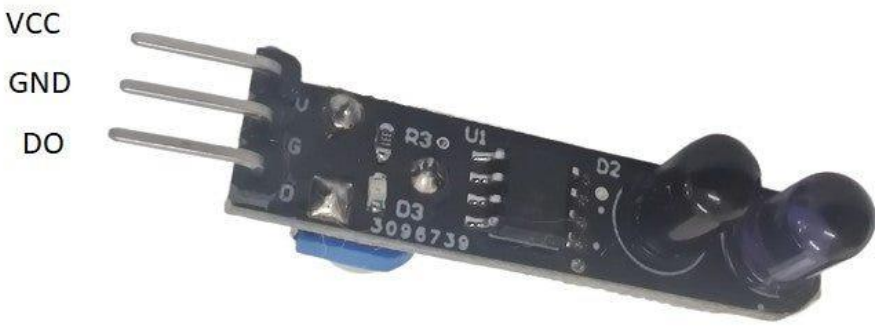
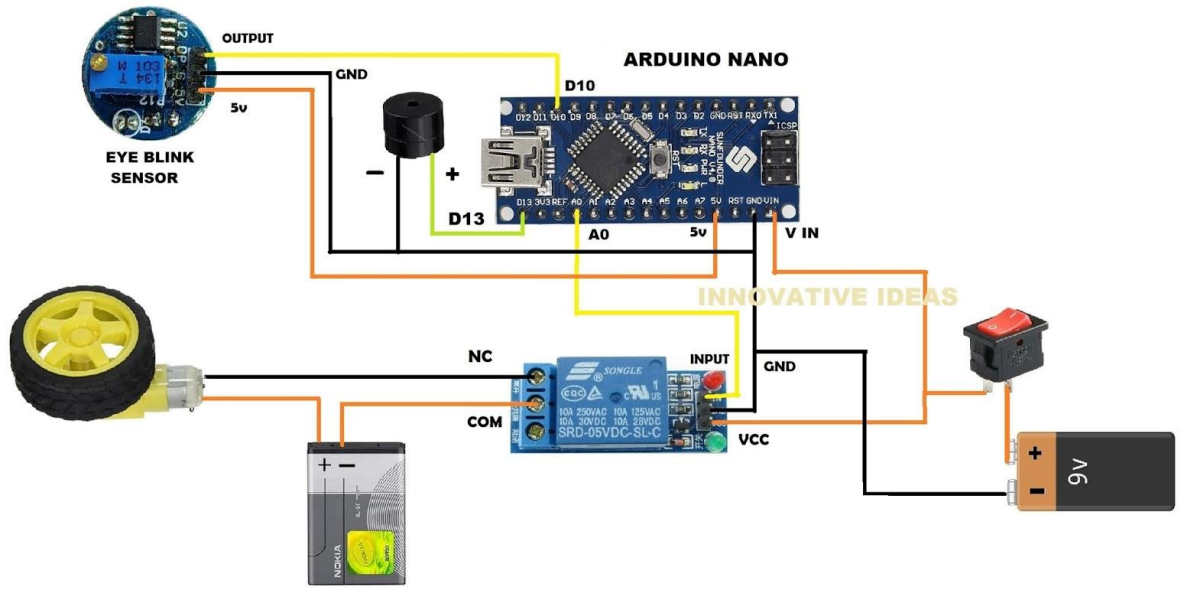


Fig: Eye Blink Sensor

Circuit Diagram:



Procedure:

Step 1: Connect “VCC” pin of the sensor to the 5V pin to the Arduino.

Step 2: Connect “GND” pin to GND pin of the Arduino.

Step 3: Connect “TRIGPIN” pin to the 3pin and
“ECHOPIN” to the 2 of the Arduino.

Step 4: Fix dc motor in to the hand wash.

Step 5: Connect pins to the ground of a Arduino pin GND.

Step 6: Connect one pin to the 4 pin of Arduino.

Step 7: Now write the code in Arduino NANO and compile.

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

}
```

CONCLUSION:

To accept responsibility in making decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public or the environment ; By using our Driver Sleep Detection and Alarming System, customers would be warned when his/her physical condition is not good enough for driving and thus 27 prevents dangerous behaviours from happening. It is consistent with the safety and welfare of the public. To improve the understanding of technology; its appropriate application, and potential consequences; By using open CV and related libraries, we try to develop and improve algorithm for eye closeness detecting.

We then apply this technology to our application in order to help drivers achieve a better and safer driving condition. To seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others; We consult Professor and TAs for review advices and improve, seek online resources to help correcting errors, and properly cite the contributions of other people.