

PROJECT REPORT

Problem statement : Develop a simple Microcontroller based system that can detect drowsiness of drivers and can alert the driver.

Scope of the solution

This microcontroller-based system aims to enhance road safety by detecting driver drowsiness and providing timely alerts.

Key Features:

- **Real-Time Monitoring:** Tracks signs of drowsiness such as eyelid closure, yawning, or head movements.
- **Alert Mechanism:** Issues audible, visual, or haptic alerts to wake the driver.
- **Compact Design:** Lightweight and energy-efficient for easy integration into vehicles.

Components:

- **Microcontroller:** Processes data from sensors.
- **Sensors:** Eye-tracking or infrared sensor for eyelid movement, optional heart rate monitor, and accelerometer for head motion.
- **Output Devices:** Buzzer, LEDs, or vibration motor for alerts.

Use Cases:

- Applicable in commercial vehicles, personal cars, and fleet management systems.

Advantages:

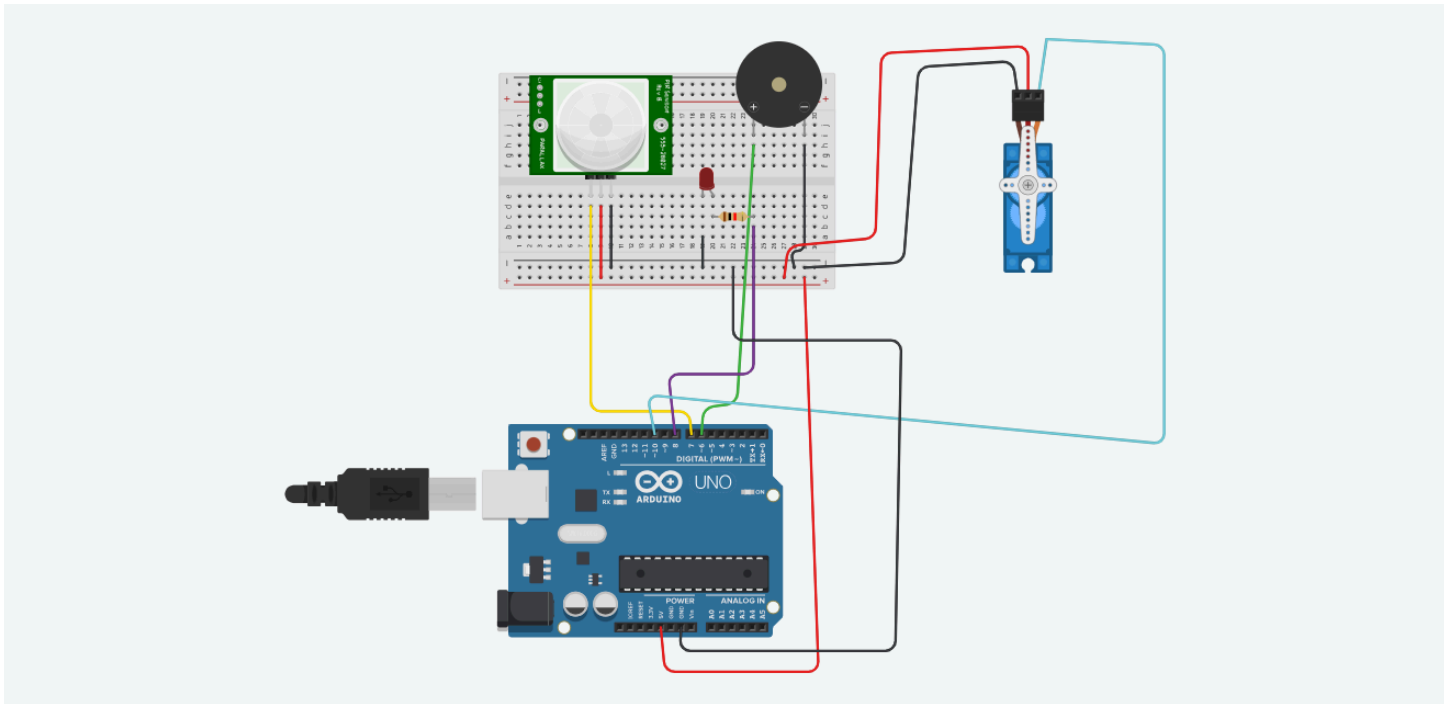
- Enhances safety, is cost-effective, and scalable for future features like AI or GPS integration.

This system offers a practical and accessible solution to mitigate accidents caused by driver fatigue.

Required components to develop solutions:

PIR sensors, buzzer, led, microcontroller, resistors,capacitor

circuit diagram:



Code:

```
#include <Servo.h>

Servo servo;

const int PIRpin = 7;

const int buzzerPin = 6;

const int ledPin = 8;

int sensorValue = 0;

unsigned long lastMotionTime = 0;

const unsigned long drowsinessThreshold = 5000;

void setup() {

  Serial.begin(9600);

  servo.attach(10);

  servo.write(0);

  pinMode(PIRpin, INPUT);

  pinMode(buzzerPin, OUTPUT);
```

```
pinMode(ledPin, OUTPUT);

Serial.println("Driver Drowsiness Detection System Initialized");

}

void loop() {

    sensorValue = digitalRead(PIRpin);

    if (sensorValue == HIGH) {

        Serial.println("Motion detected");

        lastMotionTime = millis();

        digitalWrite(buzzerPin, LOW);

        digitalWrite(ledPin, LOW);

    } else {

        unsigned long currentTime = millis();

        if (currentTime - lastMotionTime > drowsinessThreshold) {

            Serial.println("Drowsiness detected!");

            digitalWrite(buzzerPin, HIGH);

            digitalWrite(ledPin, HIGH);

            servo.write(90);

            delay(1000);

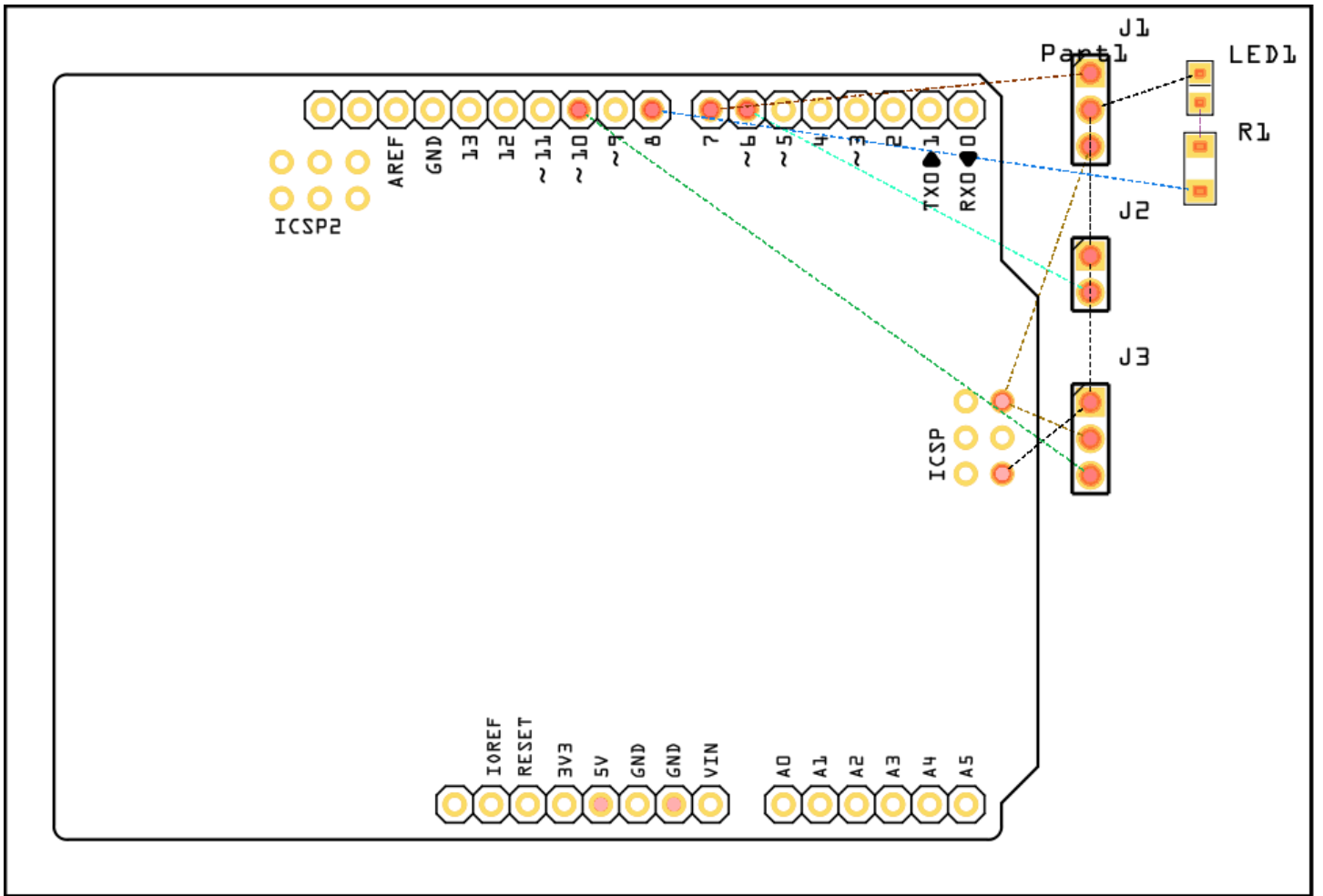
        }

    }

    delay(100);

}
```

Gerber image:



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Video and Gerber file link:

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