DROWSINESS DETECTION FOR CAR DRIVERS

A MINI-PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that this project **"DROWSINESS DETECTION FOR CAR DRIVERS**" is the bonafide work of "**KISORE R G (210701124) , KARTHICK S(210701109) and KARTHIK R M (210701110) "** who carried out the project workunder my supervision.

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INTERNAL EXAMINER **EXTERNAL EXAMINER**

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LIST OF ABBREVIATION

ABBREVIATION	ACRONYM
IR - Sensor	Infra-Red Sensor
LCD	Liquid Crystal Display
I2C - Module	Inter Integrated Circuit
RFID	Radio Frequency Identification

ABSTRACT

This project introduces an advanced Drowsiness detection for car drivers system by using Arduino and infrared sensor technology. Statistics highlight the substantial impact that fatigued driving plays in a number of traffic incidents that result in serious injuries and fatalities. Fatigued driving is a major cause of road accidents. To avoid potential accidents caused by drivers falling asleep, a great deal of testing has been conducted to develop systems that can assess driver tiredness and send out alerts beforehand. Vehicle-based measurements have been the focal point of many conventional techniques' system designs; nevertheless, these metrics are heavily impacted by variables including road conditions, vehicle type, and driving skill. On the other hand, other approaches have included psychological tests in their systems, which leads to a more accurate determination of the driver's level of exhaustion. In our suggested method, we measure the driver's level of exhaustion by using the eye closure ratio as an input parameter. When the eye closure ratio deviates from the expected value, a buzzer is used to notify the driver. The main component of the system is a Raspberry Pi, which is used to take pictures of the driver's eyes using a Raspberry Pi cam.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The project “DROWSINESS DETECTION FOR CAR DRIVERS” presents a solution for the drowsiness for car driver problems faced in urban cities especially metropolitan cities. We address this urgent problem and lessen the risks related to driver weariness by utilizing cutting-edge technologies. Our mission is to revolutionize driver fatigue detection and treatment by utilizing state-of-the-art hardware and creative approaches.

1.2 SCOPE OF THE WORK

The “DROWSINESS DETECTION FOR CAR DRIVERS” project uses modern technologies to address the crucial problem of driver drowsiness with the goal of transforming road safety. Our services include designing and developing hardware and software components, careful testing and assessment, integration with vehicles, validation and certification, design and development of user-friendly interfaces, deployment, maintenance, and broad outreach and awareness campaigns.

1.3 PROBLEM STATEMENT

Drowsy driving remains a significant global concern, posing a grave threat to road safety with its association to numerous accidents. Detecting and treating driver fatigue properly is still difficult, despite extensive awareness campaigns. Current solutions frequently fall short because they are difficult to use, unreliable, or ineffectual. The lack of complete systems designed with drivers of automobiles in mind exacerbates the problem. Therefore, it's critical to develop a cutting-edge and effective drowsiness detection system specifically for drivers. In order to properly measure driver weariness, send out timely notifications, and smoothly interface with already-installed car systems, this system needs to make use of contemporary technologies. Improving road safety and lowering accidents brought on by sleepy driving need addressing these issues.

CHAPTER 1

1.4 AIM AND OBJECTIVES OF THE PROJECT

The goal of this project is to create a sophisticated system for detecting tiredness in drivers of automobiles that uses the latest technologies to improve road safety and lessen the risks related to drowsy driving. To accomplish this goal, a number of goals have been listed. The device will be seamlessly integrated with current automotive technologies to minimize inconvenience to the driver. Thorough testing and assessment conducted in both simulated and actual driving environments will closely examine accuracy, dependability, and efficiency.

CHAPTER 2

LITERATURE SURVEY

This paper [1] proposes usage of RFID in car detection system to upgrade the user experience and elevate the control the accidents in the cars in an efficient way. The principal objectives of the study were to identify the most important methods, tools, and difficulties in detecting and treating driver fatigue.

This research [2] paper provides Several methods for detecting drowsiness have been investigated in research studies; these methods include physiological monitoring, behavioral analysis, and vehicle-based metrics. Techniques for physiological monitoring, such as measuring heart rate variability, brain activity, and eye movements, have demonstrated potential for precise assessment of driver weariness. Furthermore, lane departure analysis, steering pattern analysis, and facial expression analysis have all been studied as possible markers of tiredness in behavioral analysis methodologies

This project paper[3] improve accuracy by combining several data sources, some researchers have created sleepiness detection systems that use computer vision, Internet of Things (IoT), and sensor fusion approaches. To collect pertinent data and assess driver behavior in real-time, these systems frequently make use of cameras, infrared sensors, and steering wheel sensors.

This research [4] focuses on recognized a number of difficulties, such as the fact that tiredness symptoms vary from person to person, that outside variables like the surroundings and driving circumstances might have an impact, and that reliable algorithms that can function in a variety of scenarios are required.

This thorough [5] literature analysis emphasizes the value of ongoing research and development projects meant to improve the precision, dependability, and efficiency of sleepiness detection systems for motorcycle riders. Future developments in this area could address these problems and greatly improve road safety by lowering the number of incidents brought on by tired drivers. notes existing problems in the manual parking system that involves lot of manual works and also prone to human errors in identifying empty parking slots. The proposed system seems to claim that the maintenance cost is low compared to other systems.

CHAPTER 3

SYSTEM SPECIFICATIONS

3.1 HARDWARE SPECIFICATIONS FOR APPLICATION

Processor	:	Pentium IV Or Higher
Memory Size	:	256 GB (Minimum)
HDD	:	40 GB (Minimum)

3.2 SOFTWARE SPECIFICATIONS

Operating System	:	WINDOWS 10 AND PLUS
Application	:	ARDUINO IDE

3.3 HARDWARE COMPONENTS FOR PROTOTYPE

Sensor	:	IR-Sensor
Board	:	Arduino Uno
Actuator	:	Micro Servo Motor 9g
Screen	:	16x2 LCD Display & I2C Module

CHAPTER 4

MODULES DESCRIPTION

Arduino Uno

This is microcontroller setup for the drowsiness detection for the car drivers which acts as the CPU of thewhole system. This takes inputs from the Sensors and triggers the actuators.

Eye blink sensor

This eye blink sensor detects fluctuations in the eye with each blink by using infrared technology to identify eye blinks. When the eye is closed, its output registers as high; otherwise, it registers as low.

Buzzer

An audio signaling device such as a buzzer, beeper, or other similar device can be electromechanical, piezoelectric, or mechanical. Its main job is to transform audio impulses into sound. Depending on the design, it can produce a variety of sounds, including sirens, music, bells, and alarms.

LED light

Light-emitting diodes, or LEDs, are a commonly used standard light source in electrical equipment. They are used in anything from cell phones to enormous billboard advertisements.

5v relay

A 5-volt relay is a common component in automated control circuits because it can regulate high currents by using a low-current signal.

Gear motor

A gear motor is a motor that has an inbuilt gearbox installed. Gear motors use less energy to move a given weight because they double as torque multipliers and speed reducers.

CHAPTER 5

SYSTEM DESIGN

5.1 FLOW CHART

A flowchart is a type of diagram that represents an algorithm, workflow or process. The flowchart shows the steps as boxes of various kinds, and their order by connecting the boxes with arrows. This diagrammatic representation illustrates a solution model to a given problem.

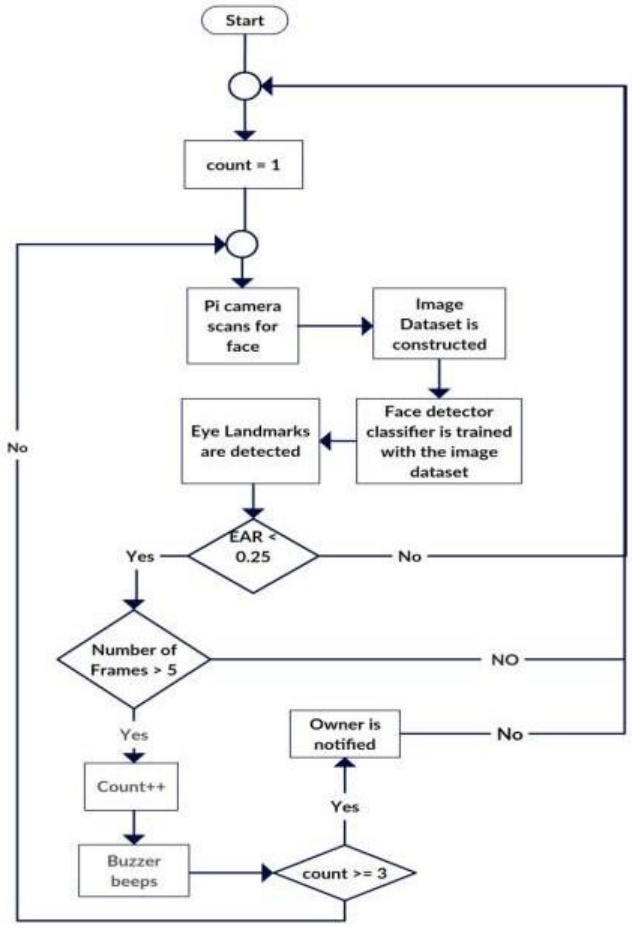

Figure 5.1 Flow Chart

5.2 CIRCUIT DIAGRAM

The circuit diagram explains the connections made with the hardware components and the board. The Arduino uno is connected with the breadboard as the VCC and GND are connected with the rails. The Sensors, LCD and Servo motor is given connection with the rails and the other input/output pins are connected to digital as per the requirements.

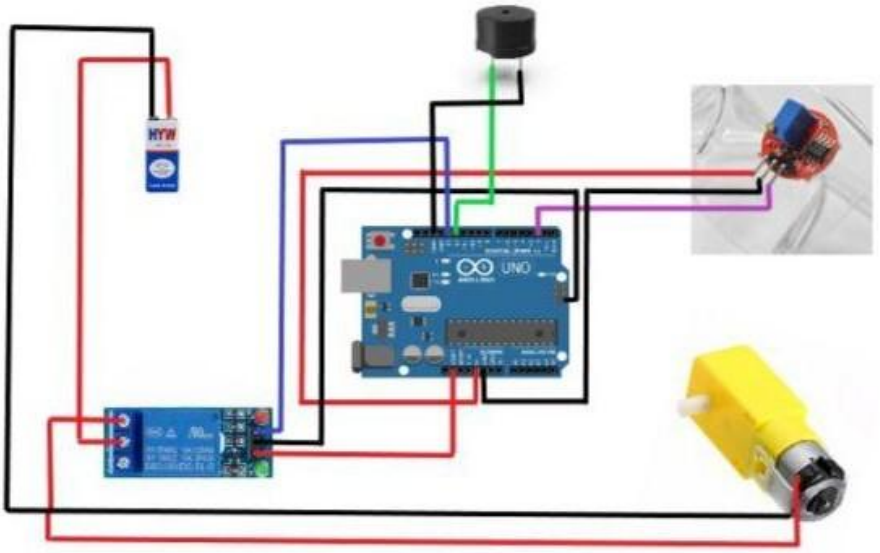

Figure 5.2 Circuit diagram

From the above figure 5.2, the connections are made

CHAPTER 6

CODING

1. Setup

```
 const int blinkPin = 2;

const int motorPin = 13;

const int buzzerPin = 12;

long time;

void setup() {

        pinMode(motorPin,  OUTPUT);

        pinMode(buzzerPin, OUTPUT);

        pinMode(blinkPin, INPUT);

        digitalWrite(motorPin, HIGH);
  }
```

2. Loop

```
void

loop(){ if(digitalRead(blinkPin)){ tim

e=millis();

while(digitalRead(blinkPin)){ digital

Write(buzzerPin, LOW);

digitalWrite(motorPin, LOW);

  delay(1000);
   }
}
 else {

      if(TimeDelay()>=3)digitalWrite(buzzerPin,
HIGH);

      if(TimeDelay()>=4)digitalWrite(motorPin, HIGH);
 }
}

int

TimeDelay(){ long

t=millis()-time;

t=t/1000;

 return t;
}
```

CHAPTER 7

SCREEN SHOTS

OUTPUT

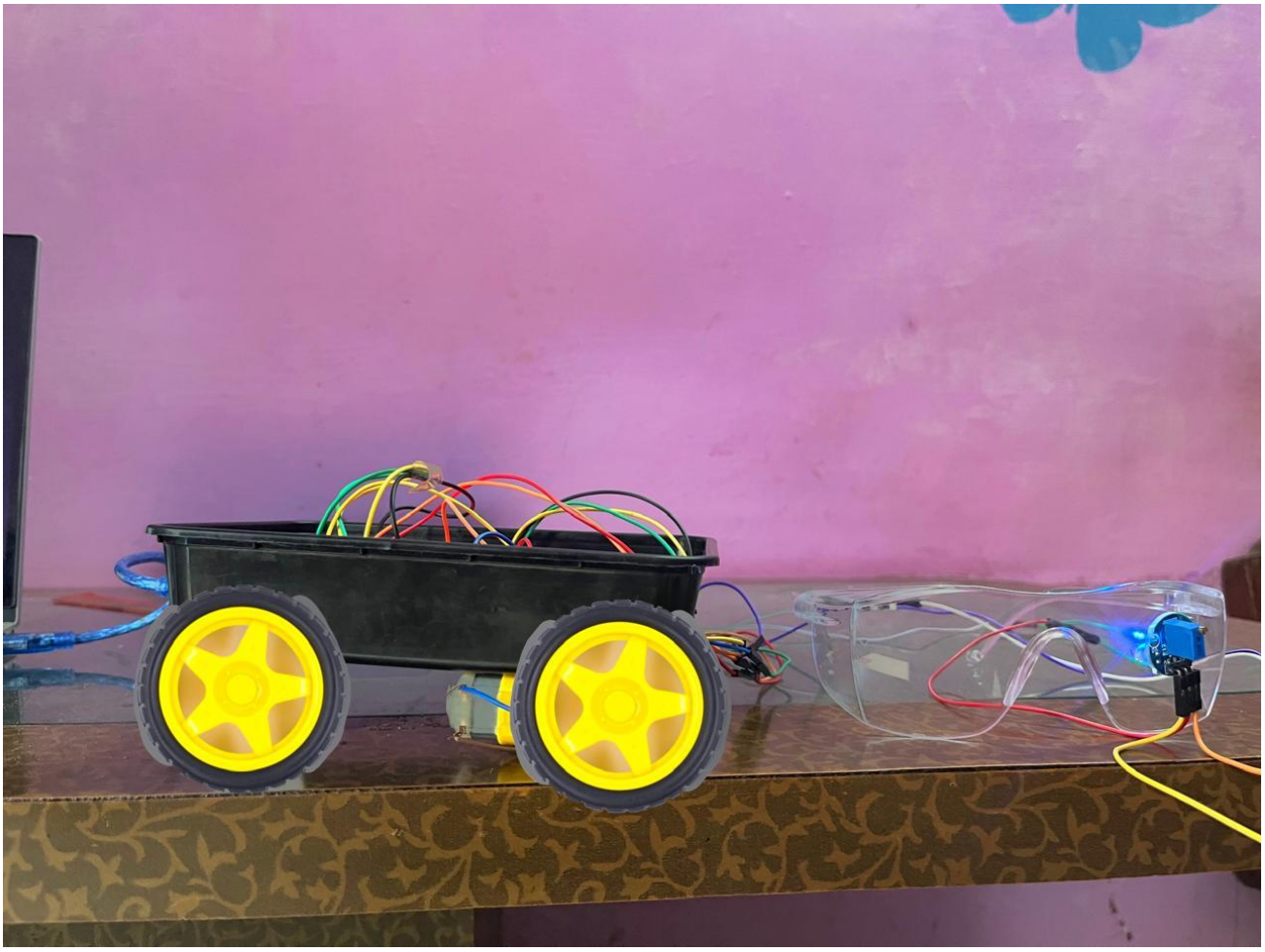

Figure 7.1 Output

CHAPTER 8

CONCLUSION AND FUTURE ENHANCEMENT

In conclusion, the implementation of a real-time drowsiness detection system and methodology for drivers is the primary goal of this project. In the past, methods for identifying driver weariness have included psychological and vehicle-based evaluations, which may be quite invasive and frequently depend on the physical features of the surrounding area. Unlike these traditional approaches, our suggested solution uses a non-intrusive method to assess the driver's fatigue state.

For future enhancements, We want to improve our system in the future by making it smaller and making sure it can be used in other physical settings, like Middlesex University, which is the only place that is legally permitted to utilize it. We are committed to improving our system in spite of the restrictions imposed by the source of our research. Our aim is to go deeper into the fields of image processing, computer science, and information technology, specifically focusing on Track 1 of ICIIBMS 2018, which will take place in Bangkok, Thailand. Furthermore, our goal is to look into ways to determine the driver's sleep habits in order to forecast their degree of fatigue in the future. We think that by combining our current eye-closing pattern detection with sleep pattern analysis, we can develop a reliable sleepiness detection system that approaches.

REFERENCES

[1] "Drowsy Driving," National Highway Traffic Safety Administration (NHTSA), 04-Oct-2019. Available: https://www.nhgsa.gov/risky-driving/drowsy-driving.

[2] "Drowsy Driving: Asleep at the Wheel," Centers for Disease Control and Prevention, 07-Nov-2017. [Online]. Available: https://www.cdoc.gov/features/dsodrowsydriving/index.html.

[3] D. C. Lin, R. G. Mosking, and M. K. Len, "Predicting driver drowsiness using vehicle measures: Recent insights and future challenges," Journal of Safety Research, vol. 20, no. 5, ppy. 2006.

[4] R. S. Forssman, B. D. Villa, E. A. Short, T. G. Mot, and K. P. Wan Dong, "Efficient driver drowsiness detection at moderate levels of drowsiness," Accident Analysis & Prevention, vol. 20, ppy,2011

[5] D Otmani, H Pebale, L. Son, and M. Vuzet, "Effect of driving duration and partial sleep deprivation on subsequent alertness and performance of car drivers," Physiology & behavior, vol. 94, no. 7, ppy, 2004.