ZKG INTERNATIONAL ISSN: 2366-1313

DRIVER DROWSINESS DETECTION USING INTERNET OF THINGS

N. Ramanisha[1], B. Pavankumar Yadav[2], K. Bunny Goud[3], N.Tejaswini[4], R. Vinay Venkat Raman[5], B. Vajraiah[6]

[1,2,3,4,5] Diploma Scholar, Department of Computer Science and Engineering, Sanjay Gandhi Memorial Government Polytechnic. Abdullapurmet,(R.R),Hyderabad.

[6] Senior Lecturer, Department of Computer Science and Engineering, Sanjay Gandhi Memorial Government Polytechnic. Abdullapurmet,(R.R),Hyderabad.

Abstract:- Currently, the most important technique to avert any road accidents is undoubtedly the implementation of drowsy driver detection across the globe.The purpose of this study was to develop a smart alert method for creating intelligent cars that can prevent sleepy driving impairment on their own. But fatigue is a normal occurrence in the human bodies that results from a variety of circumstances. Because of this, it's necessary to have a strong alert system in order to prevent the accidents. In this suggested work, we examine a drowsy driver alert system that was constructed utilizing such a technique, whereby the eye blink concept is used to assess the Video Stream Processing (VSP) through an Eye Aspect Ratio (EAR) and the eye's Euclidean distance. Another appropriate method for eye recognition is the face landmark algorithm. Using sensors, the IoT module sends out a warning message when it detects driver tiredness.

The electroencephalogram (EEG) and eye-tracking sensors are employed by the system to track the driver's brainwave patterns and eye movements, respectively. An specialized data processing unit uses an advanced algorithm that uses machine learning methods to find patterns that point to micro-sleep events. Prompt detection is ensured by real-time analysis, which reduces system reaction latency. Next, place a vibrating motor beneath the driver's seat. The motorist is not impacted in any way. These tools—a vibration motor, a raspberry pi, and a pi camera—are utilized in this project to help the driver wake up from sleep by applying the vibrate methodology.

I.INTRODUCTION

Globally, road safety is a major concern, and driver exhaustion and drowsiness are major contributing factors to many accidents. As transportation technology develops, so does the need for creative ways to deal with this problem and improve road safety. One potential solution to this problem is the development of sophisticated Driver Drowsiness Detection Systems, and this can be achieved by integrating Internet of Things (IoT) technology into automobiles. Globally, road safety is a major concern, and driver exhaustion and drowsiness are major contributing factors to many accidents. As transportation technology develops, so does the need for creative ways to deal with this problem and improve road safety.

One potential solution to this problem is the development of sophisticated Driver Drowsiness Detection Systems, and this can be achieved by integrating Internet of Things (IoT) technology into automobiles.

In order to facilitate real-time data exchange and communication, the Internet of Things (IoT) concept entails connecting systems, devices, and sensors to the internet. We suggest a Driver Drowsiness Detection System that utilizes edge computing, smart sensors, and cloud-based analytics to go beyond conventional techniques, all while utilizing the power of the Internet of Things. The purpose of this

ISSN: 2366-1313

technology is to foresee probable accidents by proactively identifying indicators of driver fatigue and promptly issuing warnings. The suggested IOT-based driver drowsiness detection project is extremely pertinent to modern transportation systems and traffic safety. The importance and applicability of this study are highlighted by several important factors: A major risk to road safety is driver drowsiness, which raises the possibility of collisions and fatalities. The traditional approaches to dealing with drowsy driving are frequently inadequate, depending either on subjective evaluations or insensitive in-car indications.

Therefore, a more complete and cutting-edge technical solution is desperately needed to proactively identify and reduce the risks related to driver drowsiness.

II. PRINCIPAL DIFFICULTIES

1. Limited Accuracy of Current Technologies: The sleepiness detection technologies currently in use may lack the accuracy necessary to recognize early indicators of driver weariness. Enhancing these systems' precision and dependability is the difficult part.

2. Variability in Human Physiology: Due to the wide variations in human physiology, standard one-size-fits-all methods might not work well for everyone. The system must take into consideration the variations in each person's physiological reactions to fatigue.

3. Requirements for Real-Time Detection: Real-time analysis and response are necessary due to the vital importance of sleepiness detection. Accident risks may rise if fatigued driving is not detected in a timely manner.

4. Adaptability to Varying Driving Conditions: A variety of weather and road conditions are encountered by drivers, which affects how they behave. The system needs to be accurate to a high degree and flexible enough to work in a variety of driving situations.

5. IoT Integration for Seamless Communication: Ensuring seamless communication between in-vehicle sensors and central servers is a problem posed by IoT integration. For the system to communicate data in real time, the IoT mustbe used efficiently.

6. Cost-Effective Implementation: The affordability of producing cars shouldn't be jeopardized in the process of creating an efficient sleepiness detection system. A major difficulty is striking a balance between price and cutting-edge technology.

A. Inspiration:

Fatigued drivers are a major contributor to accidents and a serious threat to road safety. Typical approaches to identifying drowsiness are restricted to in-car indications or frequently depend on subjective assessments. The goal of this project is to use Internet of Things technology to develop a proactive, all-encompassing system that can track several environmental and physiological elements linked to fatigue. Through the integration of IoT into the detection system, real-time data collection and analysis is made possible, leading to more precise and adaptable sleepiness detection. In the end, this technology-driven strategy aims to lower the frequency of accidents brought on by sleepy driving by offering a strong solution to handle the intricacies of unique driving patterns and variances in human physiology.

2. Edge Computing for Real-Time Analysis: To ensure real-time analysis and lower latency in sleepiness detection, use edge computing approaches to process data locally.

B. Goals for the Initiative:

The main goal is to create and deploy an Internet of Things (IoT)-based driver drowsiness detection system that tackles the aforementioned issues. Among the

ISSN: 2366-1313

specific goals are:

1. Improving Accuracy: Take into account individual variances in physiological responses while developing algorithms and sensor fusion approaches to increase the accuracy of sleepiness detection.

2. Real-Time Analysis: To assure real-time data analysis and reduce delay in the identification of driver drowsiness, implement edge computing technologies.

3. Development of Smart Sensor Integration: Use biometric sensors and face recognition cameras in the car to collect and evaluate driver- specific data on fatigue.

4. Cloud-Based Analytics and IoT Connectivity: Provide strong IoT connectivity to enable smooth communication between central servers and in-car systems. Utilize cloud-based analytics to offer insights for the entire fleet and ongoing enhancements to the detection model.

By tackling these issues and achieving the set goals, the project hopesto aid in the creation of a workable and efficient method for reducing the dangers connected to driver fatigue and improving traffic safety.

C. Anticipated Outcome:

The frequency of accidents resulting from intoxicated driving could be considerably decreased with the effective deployment of an Internet of Things-based driver drowsiness detection system. The system's goals are to increase overall road safety and save lives by giving drivers timely notifications and establishing a networked approach for vehicle-to-vehicle communication. This research contributes to the global drive to increase road safety through technological advancements by addressing a crucial component of smart transportation systems.

D. The project's scope :

The goal of the Driver Drowsiness Detection System utilizing IoT is to offer a comprehensive solution to the issue of drowsy driving. Its scope includes numerous technical, functional, and practical aspects. The scope of the project comprises:

III. EXISTING SYSTEM

Many Branded car companies like:-

1. TESLA
2. AUDI
3. BMW
4. VOLVO

These premium cars contain inbuilt anti sleep system which is high cost about thousands of dollars

Drawbacks of the existing system

- ✓ High cost
- ✓ Not portable
- ✓ Not everyone can afford

IV. PROPOSED SYSTEM

We proposed this system in local companies like MARUTHI,TATA with minimizing of cost which is affordable by everyone so that we assure everyone's safety

Advantages:

- ✓ This system is affordable to everyone
- ✓ It assures everyone's safety
- ✓ This system is implemented with low budget
- ✓ It requires about rs.25000

V. SYSTEM ANALASIS AND DESIGN

Espressif Systems created a line of modules called ESP32-WROOM that use

ISSN: 2366-1313

the ESP32 microcontroller. With its integrated Wi-Fi and Bluetooth capabilities, the ESP32 is a potent and adaptable system-on-a-chip (SOC) that can be used for a variety of applications including Internet of Things (IOT) projects.The following are the main attributes and details of the ESP32-WROOM:

Fig 1 ESP32 WROM

A. Heart rate monitor

Pulse waves are variations in blood vessel volume brought on by the heart's blood-pumping action. A heart rate sensor measures these variations. Using a heart rate sensor to measure the volume change, pulse waves are identified. A person's heart rate will range from 40 to 50 while they are feeling sleepy.

Fig 2 Heart rate sensor

B. Vibration sensor

These glasses monitor the eye movements of the driver using an eye blink sensor. If the driver is found to be acting drowsy, i.e., closing their eyes for more than two seconds, The system will detect that behavior and trigger an alert using a loud buzzer and sending vibrations.

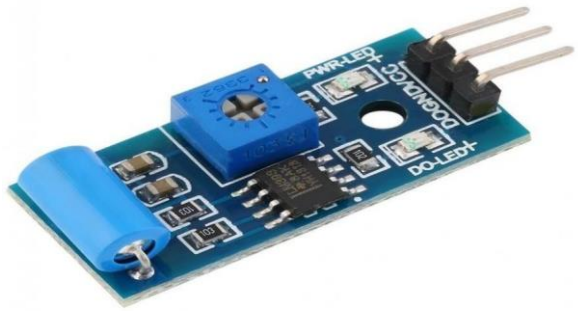

Fig 3 Vibration sensor

VI. TESTING

5.1 Hardware Testing

All the hardware devices are interfaced with the ESP-32 microcontroller as shown in the below figure and then the power supply is given.

Testing is done using the Thonny software. The circuit diagram is made using the ESP32 wroom and a computer display Screen which is used for displaying the information about the parking slots.

The circuit is made according to the above picture. All the devices are connected to the ESP32 microcontroller board. The power supply to the ESP32 board is either using an external 9V battery or can be connected to the PC directly.

Steps:

- ✓ Open Thonny IDE and connect your MicroPython board to your computer.

ISSN: 2366-1313

- ✓ Go to Tools -> Options -> Interpreter and select MicroPython (or any other suitable option) from the list of available interpreters.
- ✓ Click on the 'Install' button to install the MicroPython firmware onto your board.
- ✓ Once the firmware is installed, click on the 'Connect' button to connect to your board.

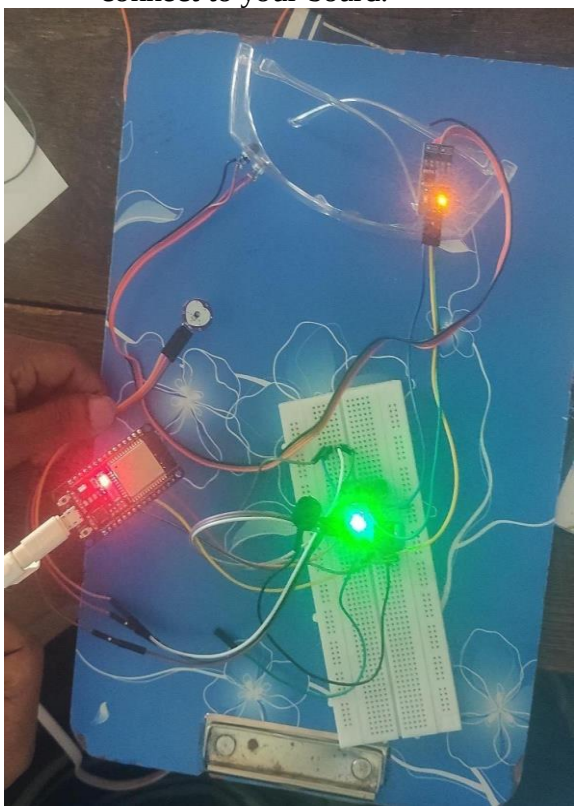

Fig 5 Hardware arrangement

Thonny should now display a prompt indicating that it is connected to your MicroPython board.

Write your MicroPython code in the editor window.

Click on the 'Run' button to execute your code on the MicroPython board.

The output of your program should be displayed in the shell window at the bottom of the Thonny IDE.

Fig 6 Testing

VII. CONCLUSION

Currently, the rate of vehicle utilization is becoming more and more popular. As a result, the number of traffic accidents is also increasing. Many road accidents happen because of driver fatigue or drowsiness. This is a very serious problem causing in hundred thousands of road accidents each year. Therefore, it is necessary to have a warning system so that whenever the driver feels drowsy, the buzzer will activate and alert drivers.

Authors:

N. Ramanisha studying diploma in the Department of Computer Science and Engineering at Sanjay Gandhi Memorial Government Polytechnic. Abdullapurmet, (R.R),Hyderabad.

ISSN: 2366-1313

B. Pawan Kumar Yadav studying diploma in the Department of Computer Science and Engineering at Sanjay Gandhi Memorial Government Polytechnic. Abdullapurmet, (R.R),Hyderabad.

N. Tejeswini studying diploma in the Department of Computer Science and Engineering at Sanjay Gandhi Memorial Government Polytechnic. Abdullapurmet, (R.R),Hyderabad.

K. Bunny Goud studying diploma in the Department of Computer Science and Engineering at Sanjay Gandhi Memorial Government Polytechnic. Abdullapurmet, (R.R),Hyderabad.

R. Vinay Venkat Raman studying diploma in the Department of Computer Science and Engineering at Sanjay Gandhi Memorial Government Polytechnic. Abdullapurmet, (R.R),Hyderabad.

B. Vajraiah, M.Tech, MISTE working as senior lecturer in the Department of Computer Science and Engineering at Sanjay Gandhi Memorial Government Polytechnic. Abdullapurmet, (R.R),Hyderabad.