ADVANCING ROAD SAFETY:ANTI SLEEP ALARM DETECTORS FOR DRIVERS

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AGENDA

ABSTRACT

- The Anti-Sleep Alarm for Drivers project introduces a cutting-edge system employing eye blink sensors to continuously monitor driver alertness. It distinguishes normal blinks from signs of drowsiness, issuing timely warnings and implementing safety measures such as speed reduction. This breakthrough democratizes advanced safety technology, making it accessible in standard vehicles. We implemented this by integrating Arduino UNO ,Buzzer Single ,channel 5v relay board, Eye blink sensor ,Gear motor wheel ,Jumper wires ,5v Battery and connector. Integration with real-time monitoring and communication systems further bolsters effectiveness, preventing accidents and enabling swift responses in emergencies. This crucial advancement significantly enhances road safety by safeguarding drivers and passengers against the dangers of drowsy driving, ultimately contributing to the creation of safer and more secure roadways for all.

INTRODUCTION

The Anti-Sleep Alarm for Drivers project addresses the critical issue of drowsy driving by employing innovative technology to detect signs of fatigue and alert drivers before they fall asleep at the wheel. Through sensors like an eye blink sensor, it monitors the driver's alertness, triggering an alarm upon detecting drowsiness indicators such as prolonged eye closure or erratic blinking patterns. This system is particularly beneficial for long journeys or late-night driving when fatigue is heightened. By providing timely warnings, it helps drivers maintain focus and prevents accidents. Unlike exclusive to luxury vehicles, this technology's integration allows for widespread implementation, enhancing safety across all vehicles. Ultimately, this project seeks to mitigate the dangers of drowsy driving, prioritizing road safety for all motorists.

OBJECTIVE

- To develop a reliable system to detect signs of drowsiness in real-time using advanced sensors.
- To implement an eye blink sensor and other relevant technologies to monitor driver alertness accurately.
- To design the system to promptly alert drivers upon detecting drowsiness indicators, such as prolonged eye closure or erratic blinking patterns.
- To ensure the system's affordability and compatibility with standard vehicles for widespread adoption.
- To design a user-friendly interface for the alarm system, ensuring easy integration into various vehicle models.

LITERATURE SURVEY

- ASAP: Anti-Sleep Alarm and Prompter System using Image Processing for Drowsy Drivers .The research paper published in 2023 [1] have focused on developing a system that combines drowsiness detection and collision prevention by integrating facial recognition, object detection, and automatic braking mechanisms. Using Raspberry Pi and Arduino, the system activates brakes when detecting drowsiness or obstacles, showing promising results in test drives, addressing the urgent need for enhanced road safety.

- Robotic Wheelchair Using Eye Blink Sensors and Accelerometer Provided with Home Appliance Control [2] Recent assistive technology advances include a robotic wheelchair employing eye blink and head tilt for steering, enhancing mobility for severely disabled individuals. This innovation also enables communication with household devices through head-tilt movements, offering greater independence.

- A smart vehicle for accident prevention using wireless blackbox and eyeblink sensing technology along with seat belt controlled ignition system published in 2016 [3] presents an advanced smart vehicle system aimed at enhancing vehicle security and reducing accidents by integrating speed and parameter sensing mechanisms with GSM/GPRS technology for automatic messaging to authorities during accidents. Leveraging sensors like seat belt and eye blink sensors, along with a microcontroller, it provides real-time notifications to emergency services and relatives, improving response times and safety measures.

KEY CHALLENGES

- Drowsiness Detection
- Timely Alerts
- Safety Measures Activation
- Integration Accessibility
- Preventive Action

MOTIVATION

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.

• Safety Enhancement: The primary motivation behind this project is to enhance road safety by preventing accidents caused by driver drowsiness.

• Life-saving Potential: By alerting drivers when they are getting drowsy, the alarm could potentially save lives by preventing accidents.

EXISTING SYSTEM

- Existing systems for detecting driver drowsiness and preventing accidents include Lane Departure Warning Systems (LDWS), which use cameras or sensors to monitor lane position and issue alerts for drifting without signaling. Driver Drowsiness Detection Systems analyze behavior through steering angle sensors, vehicle speed sensors, and infrared cameras to detect signs of drowsiness, triggering alerts. Facial Recognition Systems use cameras to analyze facial expressions and eye movements for signs of drowsiness. Wearable devices like smartwatches monitor biometric data to detect drowsiness and issue alerts. Smartphone apps utilize phone sensors to detect drowsiness based on movement patterns and issue alerts. These technologies aim to enhance road safety by preventing accidents due to drowsy driving through timely driver alerts.

PROPOSED SOLUTION

- We propose this project of anti sleeping alarm for drivers by using battery, Arduino UNO device and eye blink sensor. As existing project is developed using Schmitt trigger, timer IC, transistor, a relay and a logic gate For future safety and development of our society using latest technologies. we are designing this product using embedded C programming and Arduino IDE studio for dumping code into microcontroller The eye blink sensor we are using has a very high accuracy value in detail sensing. This project will give a buzzer sound whenever the driver falls asleep which was detected by the eye blink sensor connected to the Arduino controller.

- Advantages:

- Cost-Effective

- Ease of Development

- High Accuracy Eye Blink Sensor

MODULES

- Arduino UNO

- Buzzer Single

- channel 5v relay board

- Eye blink sensor

- Gear motor wheel

- Jumper wires

- 5v Battery and connector

- Arduino IDE

SYSTEM ARCHITECTURE

Anti sleep alarm
detector for drivers
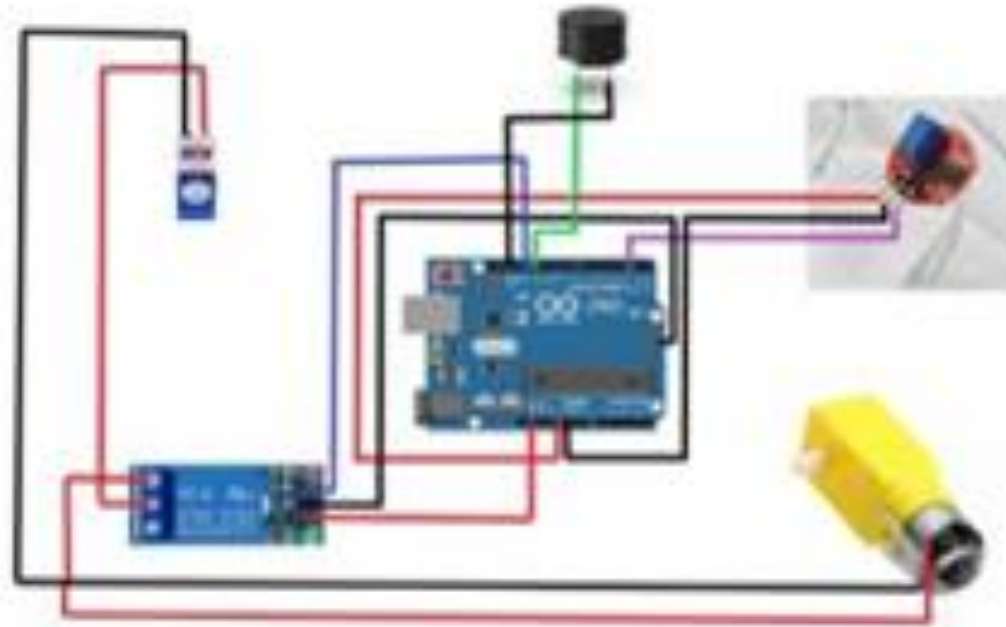
CONCLUSION

This Project "ANTI-SLEEP ALARM FOR DRIVERS" is successfully designed, and tested and demo unit is fabricated. The goal of this project is to develop a device 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 an IR sensor. This system detects the drowsiness in quickly. This system which can differentiate normal eye blink and drowsiness can prevent the driver from entering the state of sleepiness while driving. Whenever a driver asleep due to drowsiness, the buzzer continuously starts beeping unless the driver gets back to his/her normal position. The ultimate goal of the system is to prevent the road accident, where the values measured in life.

FUTURE ENHANCEMENTS

- **Integration with Vehicle Systems:** Integrate the system with the vehicle's existing safety features, such as automatic braking or lane-keeping assistance, to enhance overall safety.

- **Sensor technology:** Upgrade the eye blink sensor to a more advanced camera-based system that can monitor additional signs of drowsiness, such as head nodding or yawning.

- **Wireless Communication:** Develop a wireless version of the system using Bluetooth or Wi-Fi, allowing for easier installation and integration with mobile applications..

- **Energy Efficiency:** Improve the power management of the system to extend battery life

REFERENCES

[1]González-Ortega, D., et al. "Real-time vision-based eye state detection for driver alertness monitoring." *Pattern Analysis and Applications* 16.3 (2013): 285-306.

[2]https://www.academia.edu/34469825/A_Survey_Paper_On_Drowsiness_Detection _and_ Alarm_System_for_D rivers.

[3] D.Jayanthi, M.Bommy. : Vision-based Real-time Driver Fatigue Detection System for Efficient Vehicle Control. In: International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 - 8958, Volume-2, Issue-1, October 2012.

[4] Amol M. Malla, Paul R. Davidson, Philip J. Bones,Richard Green and Richard D. Jones, Automated Video-based Measurement of Eye Closure forDetecting Behavioral Microsleep presented at 32nd Annual International Conference of the IEEE EMBSBuenos Aires, Argentina, August 31 -- September 4,2010.

[5] P. D. Minns, C Programming for the PC the MAC and the Arduino Microcontroller System. Author House, 2013.