WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Anti-Sleep Alarm for Drivers

Ayush Thorat, Shailesh Suryawanshi, Rutvik Wadhave, Kunal Sonawane

Department of ENTC
Trinity Academy of Engineering Pune, India

Abstract:

Many road accidents happen because drivers get sleepy behind the wheel—especially after long days or during late-night drives. To help prevent this, we've developed a simple and affordable Anti-Sleep Alarm system. It uses a sensor attached to spectacles to keep track of the driver's eye movements. If the driver's eyes stay closed for too long, the system assumes they're dozing off and instantly activates a buzzer and a small vibration motor to wake them up. The setup is built around an Arduino Nano and includes parts like a buzzer, switch, and eye blink sensor. As soon as the driver is fully awake again, the system automatically turns off the alarm. This project aims to make driving safer by helping tired drivers stay alert and avoid accidents.

Keywords— Anti-Sleep Alarm, Driver Drowsiness Detection, Arduino Nano, Eye Blink Sensor, Vehicle Safety, Buzzer Alert System, Fatigue Monitoring, Micro Vibration Motor, Road Safety.

I. INTRODUCTION

Drowsy driving is a serious problem resulting in thousands of road accidents, injuries, and deaths. Drowsy driving — operating a vehicle while cognitively impaired due to lack of sleep — has earned growing recognition as a significant cause of traffic incidents. Symptoms of drowsiness include an inability to focus, yawning, and struggling to hold up your head. Despite these alarming statistics from the National Sleep Foundation, there are still many drivers who say that they have driven after feeling drowsy, which indicates that there is a great need for effective monitoring systems.

II. EASE OF USE

A. Effectiveness

Many studies have looked into how well anti-sleep alarms work at preventing drowsy driving accidents. For example, research by Smith et al. (2018) found that these alarms can really help reduce the number of accidents caused by tired drivers. There are several types of anti-sleep alarms out there, including wearable devices, systems built into cars, and smartphone apps. A study by Johnson et al. (2017) compared these different kinds and how effective they are at spotting driver drowsiness.

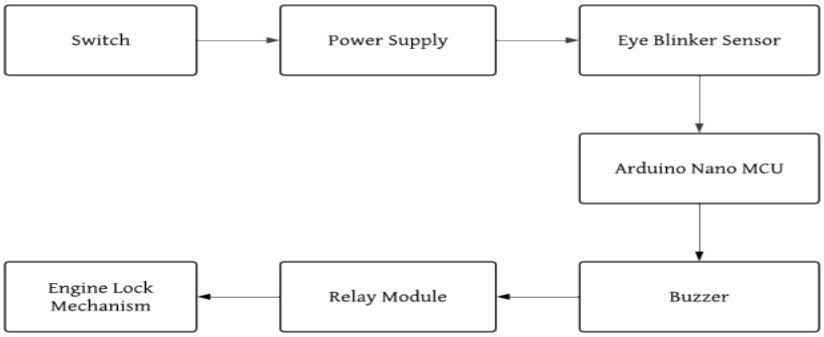
B. Wearable Devices

Wearable alarms, like headbands or wristbands, track things like heart rate and brain activity to detect when a driver is getting sleepy. Kim et al. (2019) looked into how accurate these wearable devices are and how well drivers accept using them.

C. Vehicle-Integrated Systems

Some cars come with built-in anti-sleep alarms that monitor driving behavior, such as whether the car is staying in its lane or how the driver is handling the steering wheel. Lee et al. (2020) studied how well these systems perform in real-life driving situations.

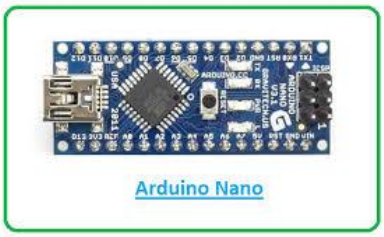
III. BLOCK REPRESENTATION



IV. HARDWARE COMPONENT

A. Arduino Nano

The Nano includes 30 I/O pins arranged in a DIP-30 style layout, making it easy to integrate into tight spaces or on breadboards for prototyping. It can be programmed using the familiar Arduino IDE, which supports both online and offline development .Despite its small size, the Arduino Nano offers nearly the same capabilities as the Uno. The key differences are the absence of a DC power jack and the use of a Mini-B USB connector instead of the larger Type-B connector. Otherwise, it's functionally very similar and is a great choice for compact embedded projects.



The Arduino Nano is thoughtfully designed with breadboard-friendly pin alignment, making it ideal for DIY electronics and compact project setups. Its small size and practical layout make it especially suitable for space-constrained applications. Overall, the Nano serves as an excellent alternative to the larger Arduino Uno—offering comparable functionality at a more affordable price point.From a practical standpoint, the Nano is often a preferred choice due to its lower cost, compact size, and easy integration with breadboards. Additionally, it offers a few more digital and analog I/O pins than the Uno, providing extra flexibility for projects that require additional connections.

B. Eye Sensor

Eye sensor is an electronic device designed to emit light in order to detect nearby objects. It works by measuring the heat emitted by objects or detecting motion within its range. All objects in the infrared spectrum naturally radiate thermal energy, which is invisible to the human eye but can be detected by IR sensors.

The typical IR sensor setup consists of two main components: an IR LED (emitter) and an IR photodiode (detector). The photodiode is sensitive to the specific wavelength of infrared light emitted by the IR LED. When IR light hits the photodiode, it changes the resistance and output voltage, which directly correlates to the amount of infrared light received.

A typical infrared detection system involves five key elements:

1. Infrared Source (like IR LEDs or infrared lasers)
2. Transmission Medium
3. Optical Components
4. Infrared Detectors (such as photodiodes)
5. Signal Processing

Infrared sources, like IR LEDs and infrared lasers, are designed to emit light at specific wavelengths to ensure accurate detection.

C.BUZZER

Buzzer produces sound through the reverse piezoelectric effect. This principle involves the generation of pressure or strain when an electric potential is applied across a piezoelectric material. The buzzer is typically used to alert users to events, such as a switching action, sensor input, or counter signal, and is commonly found in alarm circuits Regardless of the applied voltage variation, the buzzer emits a consistent, noisy sound. It consists of piezoelectric crystals sandwiched between two conductors. When an electric potential is applied across these crystals, they undergo mechanical deformation, pushing on one conductor and pulling on the other. This push-and-pull motion creates sound waves. Most buzzers operate in the frequency range of 2 to 4 kHz, which is effective for generating audible alerts. The buzzer has two leads: the red lead connects to the input signal, while the black lead connects to the ground.

D.MOTOR

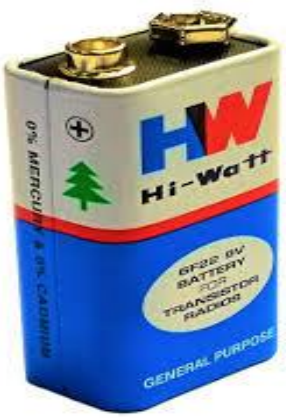
The BO Motor offers great torque and RPM at lower operating voltages, making it a highly efficient choice for small projects. Its small shaft and compatible wheels create an optimized design for robots or other applications. With lightweight construction and mounting holes, it's easy to integrate into circuits. Operating between 3-12V, this motor is an excellent option for building small to medium robots and serves as a great alternative to metal gear DC motors.

E. Eye Glasses / Spectacles

The eye blink system consists of an IR sensor mounted on glasses, which can be worn like regular eyewear. This sensor detects when a person blinks their eyes by using infrared technology to determine whether the eyes are open or closed. The sensor's data can then be processed by any connected logic, depending on the application. This system is often used for fatigue detection or user interaction in devices.

F.POWER SUPPLY

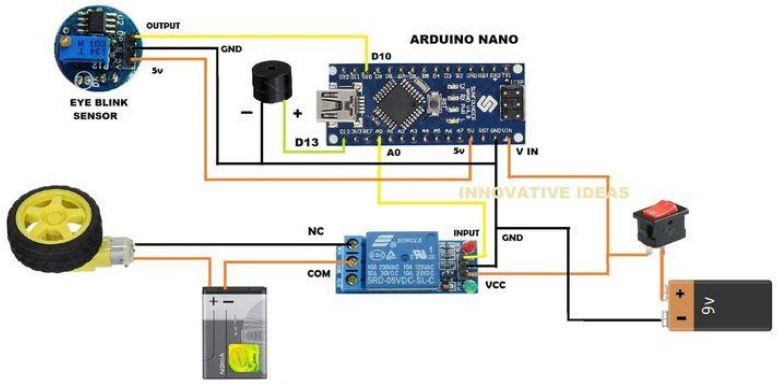
A 9V Battery is an electric battery that supplies a nominal voltage of 9 volts. Actual voltage measures 7.2 to 9.6 volts. Here we 9V battery for power supply to execute the working process.



G.SWITCH

Single pole single throw switch is nothing but a simple two-terminal switch which help us to disconnect the one terminal to another terminal

V.CIRCUIT DIAGRAM



VI.PROCEDURE

[1] All components are connected as per the circuit diagram.

[2] The program is uploaded to the Arduino Nano using the Arduino IDE via a USB connection to a laptop or computer.
A 9V battery is used to power the entire circuit.

[3] The IR-based eye blink sensor, mounted on the spectacles, continuously monitors the user's eye activity.

[4] If the eyes remain closed beyond a set threshold, the buzzer and micro vibration motor are triggered to alert the user.

[5] Both alert mechanisms automatically turn off when the user opens their eyes and returns to a normal state.

VI. RESULT

The project is used to detect the the Eye-blink or closing the eyes of a person, if eyes closed for a while. The buzzer automatically turns ON, when the person come back to his normal State. The buzzer goes OFF.

VII. FUTURE SCOPE

[1] Integration with Vehicles: The system can be directly integrated into car dashboards or steering systems for real-time monitoring without needing external accessories.

[2] Advanced AI Monitoring: Using AI and machine learning, future versions can analyze facial expressions, yawning, and head movements for more accurate drowsiness detection.

[3] Mobile App Connectivity: A companion app can provide alerts, driving reports, and fatigue tracking over time for improved driver safety.
[
4] GPS & Emergency Alerts: Future models could include GPS and emergency alert systems to notify contacts or authorities if the driver doesn't respond.

[5] Wearable Tech Enhancement: The system can be integrated into smart glasses or helmets for bikers and delivery personnel, making it more versatile.

[6] Commercial Fleet Use: Widely applicable in logistics and transport sectors where drivers cover long distances—improving road safety and reducing accidents.

[7] Battery Optimization & Solar Charging: To make it more sustainable and long-lasting, future designs could include rechargeable batteries or solar-powered operation.

VIII.CONCLUSION

This project offers a simple yet effective way to address it. The anti-sleep alarm system helps alert drivers the moment they start feeling drowsy, using a combination of sensors and alerts to bring them back to attention. It's easy to build, cost-effective, and has the potential to save lives. With some upgrades, it could become an essential safety feature in vehicles—making our roads a lot safer.

REFRENCE

[1] Drivers Antisleep alarm device
https://nevonprojects.com/driver-anti-sleep-device/

[2] S. Dhengre, "A Survey Paper on Drowsiness Detection & Alarm System for Drivers," *Academia.edu*. [Online]. Available: https://www.academia.edu/75830624/

[3] Sumeet Singh, Vishal Potdar, Sneh Poddar, Atharva Raje, Romit Handa, and Sagar Biradar, "Sleepiness Detection and Alert Drivers for Automobile," *IRJET - International Research Journal of Engineering and Technology*, *Academia.edu*. [Online]. Available: https://www.academia.edu/54174868/

[4] Dipti Varshney, Yogeet Mulik, Manali Narayan, Shubhangi Shitole, and Vikas Pal, "Smart Drowsiness Detection System & Remedy for Drivers," *Global Journal of Engineering Science and Researches*, *Academia.edu*. [Online]. Available: https://www.academia.edu/91823081/

[5] Kusuma Kumari BM, Sampada Sethi, Ramakanth Kumar P, Nishant Kumar, and Atulit Shankar, "Driver Drowsiness Detection System Using Sensors," *International Journal of Informatics and Communication Technology (IJ-ICT)*, *Academia.edu*. [Online]. Available: https://www.academia.edu/49158391/

[6] V. Gandhi and D. Mashru, "Detection of a Drowsy State of the Driver on Road Using Wearable Sensors: A Survey," *IEEE*, 2018. [Online]. Available: https://www.academia.edu/45225624/