

A project-based Report on **Anti sleep alarm for Drivers**

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ABSTRACT

With the predictions of the World Health Organization(WHO) that the number of deaths due to traffic accidents will be around 2 million within less than 15 years, researchers nowadays are paying more attention to how to help prevent traffic accidents and lower the number of occurred fatalities. The purpose of this study is an attempt to prevent traffic accidents due to fatigue or sleepiness. In this report, a portable and low-cost device for the prevention of accidents that happen because of sleepiness or fatigue. The proposed system consists of two main parts that detect eye blinking based on IR sensors mounted on eyewear. Depending on the reflected and absorbed IR radiation, this system detects and classifies the eye blinking into normal blinking(NB).

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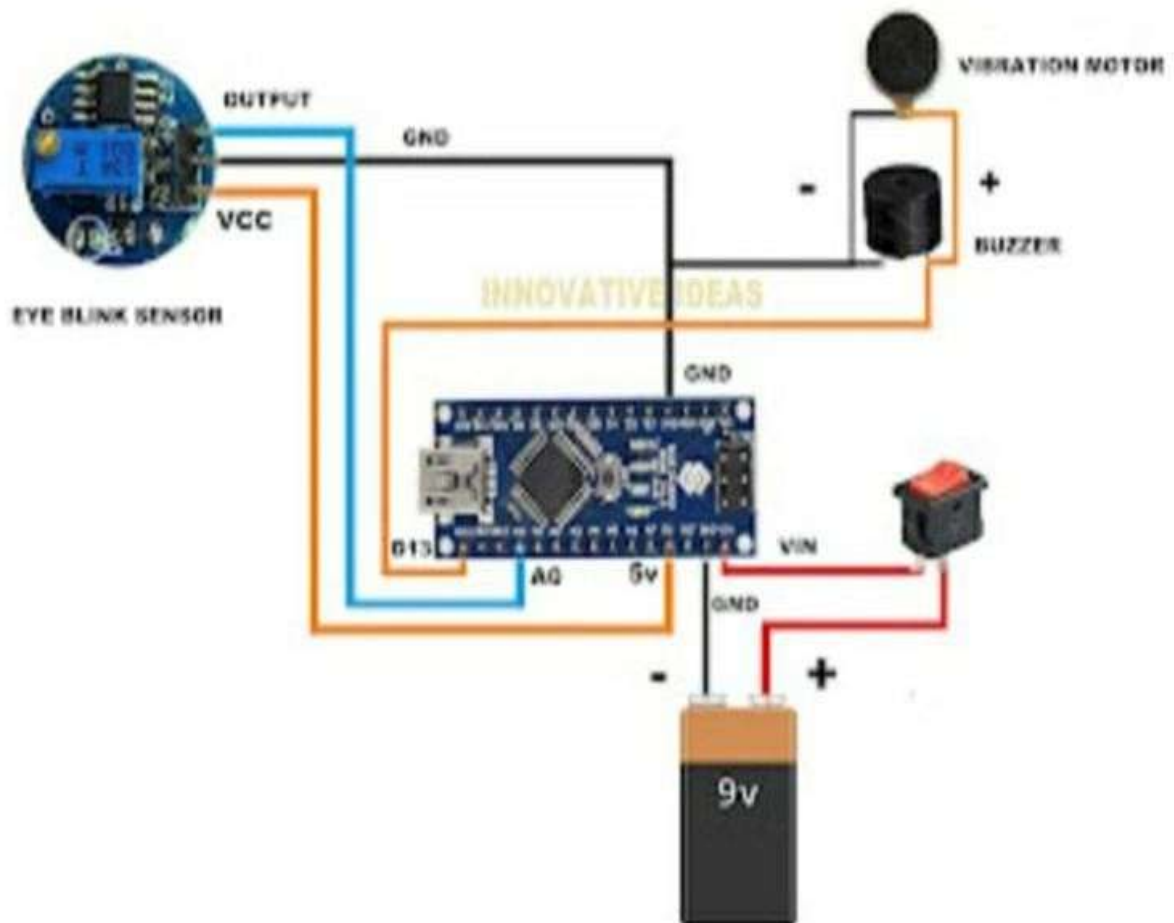
INTRODUCTION

Everyone knows about the alarms that abruptly wake us from our slumbers each morning, but have you heard of alarms that can keep us awake while we're driving? Road traffic injuries and deaths have a terrible impact on individuals, communities, and countries.

Drowsy driving is defined as the operation of a motor vehicle while being cognitively impaired by lack of sleep. According to the National Sleep Foundation, some drowsy driving signs are: difficulty focusing, yawning repeatedly or rubbing eyes, and trouble keeping head up. In recent years, driver drowsiness has been one of the major causes of road accidents and can lead to severe physical injuries, deaths, and economic losses. Annually and worldwide, over 1.3 million people die each year on the road and 20-50 million people suffer non-fatal injuries due to road accidents. According to National Sleep Foundation surveys, half of American adults consistently report that they have driven drowsy and 20% admit that they have fallen asleep at the wheel in the previous year. These statistics suggest that driver drowsiness is one of the most dominant causes of car accidents, injuries, deaths, and economic losses. Hence, developing a system for monitoring drivers' drowsiness and alerting the driver when he/she is not paying enough attention to the road is a fundamental way to prevent accidents to prevent traffic accidents caused by sleepy drivers, many systems have been proposed. In this report, we will study that with the help of a few components we have made an anti-sleep alarm. Here we use components like a relay, piezo buzzer, battery, etc. When he/she falls asleep while driving then due to the piezo buzzer it will alert and the driver will wake up.



CIRCUIT DIAGRAM



COMPONENTS

Relay

Relays are electrically operated switches that open and close the circuits by receiving electrical signals from outside sources. The relays embedded in electrical products work in a similar way; they receive an electrical signal and send the signal to other equipment by turning the switch on and off.



Types of Relays



Piezo Buzzer

In simplest terms, a piezo buzzer is a type of electronic device that's used to produce a tone, alarm or sound. It's lightweight with a simple



construction, and it's typically a low-cost product.

Battery 9V

A container consisting of one or more cells, in which chemical energy is converted into electricity and used as a source of power.



Motor

A machine that converts electrical energy into mechanical energy by means of the forces exerted on a current-carrying coil placed in a magnetic field.



Arduino Uno

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button.

It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.



SPST Switch

An SPST switch embraces a basic "ON/OFF" control of a single circuit and consists of two terminals that serve as electrical connection points.



IR Sensor

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detect the motion.



WORKING

To start the circuit, the driver turns on the **SPST switch**, activating the electrical supply from the **9V battery**. This powers the entire circuit, including the **motor**, **relay**, and **Arduino Uno**. The **IR sensor**, mounted on eyewear, continuously monitors the driver's eyes. It detects whether the eyes are open or closed by analyzing reflected IR radiation. If the driver's eyes remain closed for 5 seconds, the **Arduino Uno** processes this signal and activates the **piezo buzzer**, which produces a loud sound to alert the driver for 2 seconds. If the eyes remain closed even after the alarm, the **relay switch** is triggered to cut off the motor's power supply, stopping the vehicle and potentially preventing an accident. The system can be manually reset by turning the SPST switch off and on again.

ADVANTAGES

1. Accident Prevention:

- The system effectively reduces the risk of accidents caused by driver fatigue or drowsiness by detecting closed eyes and alerting the driver in time.

2. Low-Cost and Portable:

- The device is inexpensive and lightweight, making it accessible to a wide audience and easy to integrate into various vehicles.

3. Early Warning Mechanism:

- By using a buzzer as an alarm, the system provides an early warning, giving drivers a chance to regain attention before the vehicle stops.

4. Energy Efficient:

- The system consumes minimal power due to the use of components like the IR sensor and Arduino Uno, powered by a single 9V battery.

5. Non-Intrusive Design:

- The device is designed to work with eyewear, ensuring it does not distract the driver or interfere with normal driving behavior.

6. Adaptable Technology:

- The system can be customized for different vehicles or upgraded with additional features, such as integrating GPS or automatic messaging to alert emergency contacts.

7. Ease of Use:

- Simple to operate, requiring only a switch to power the system on or off, with automated functions that require no user intervention during operation.

8. Enhanced Safety for All Drivers:

- The system benefits not only long-distance drivers and truckers but also everyday commuters prone to drowsiness during their journeys.

APPLICATIONS

1. Anti-Sleep Alarm for Driver Safety
2. Piezo Buzzers in Alarms and Warning Devices
3. Infrared Sensors for Eye Monitoring
4. Enhancing Road Safety Systems
5. Industrial and Workplace Safety
6. Healthcare Monitoring
7. Educational Demonstrations
8. Public and Commercial Transport

CONCLUSION

In this project a complete driver alert system was implemented. The system is operated by a 9V DC battery. The device is small in size, has a low weight and it is user-friendly and reliable. The device detects the driver's prolonged eye blinking. Consequently, it alarms the driver and woke her/him up and stopped the car. The performance of the system can be enhanced by a smaller IR sensor with lower heating effect. This research achieves good results for the detection and analysis of prolonged eye blinking and may become a universal technique for human life saving in the future.



REFERENCE

<https://www.youtube.com/watch?v=KvXQ-GPyfc4&list=LL&index=6>