Anti-Sleep Detector for Drivers Using IOT

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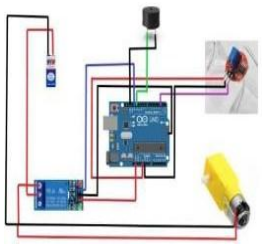
***Abstract*—The anti-sleep alarm detector for drivers utilizes an Arduino uno as its core component along with an eye blink sensor. The system aims to prevent accidents caused by driver drowsiness. During driving, the driver wears the eye blink sensor frame, which continuously monitors eye blinks. If the driver's eyes remain closed for a specific duration, indicating drowsiness or sleep, the system triggers both audio and vibration alerts. A buzzer sounds, and a vibrator attached to the eye blink sensor vibrates to wake up the driver. To address this critical safety concern, an innovative anti-sleep alarm system has been developed using an Arduino Uno microcontroller. The system employs an eye blink sensor mounted on the user's spectacles to detect drowsiness. The eye blink sensor continuously monitors the driver's eye blink patterns. When the driver's eyes remain closed for a specific duration (indicating drowsiness), the system activates. Simultaneously, a vibration sensor attached to the eye blink sensor frame vibrates, providing tactile feedback to the driver. Additionally, an audible buzzer emits a sound, ensuring that even if the driver misses the vibration, the vehicle goes slowdown. By promptly detecting drowsiness, it significantly reduces the risk of accidents caused by driver fatigue. Feeling sleepy while driving can lead to hazardous traffic accidents. To address this critical safety concern, an anti-sleep alarm system has been developed using an Arduino Uno. The key components include an eye blink sensor, Arduino Uno, vibration sensor, buzzer and 9V battery. The eye blink sensor, mounted on the user's spectacles, detects drowsiness based on eye blink patterns.**

INTRODUCTION

Everyone knows about the alarms that abruptly wake us from our slumbers each morningbut have you heard of alarms that can keep us awake while we're driving? Road trafficinjuries and deaths have a terrible impact on individuals, communities and countries.Drowsy driving is defined as operation of a motor vehicle while being cognitively impairedby lack of sleep. According to the National Sleep Foundation, some of the drowsy drivingsigns are:difficulty focusing, yawning repeatedly or rubbing eyes and trouble keeping headup. In recent years, driver drowsiness has been one of the major causes of road accidentsand can lead to severe physical injuries, deaths and economic losses. Annually andworldwide, over 1.3 million people die each year on the road and 20-50 million peoplesuffer non-fatal injuries due to road accidents. According to National Sleep Foundationsurveys,half of American adults consistently report that they have driven drowsy and 20%admit that they have actually fallen asleep at the wheel in the previous year. Thesestatistics suggest that driver drowsiness is one of the most dominant causes for caraccidents, injuries, deaths and economic losses. Hence, developing a system for monitorindrivers' drowsiness and alerting the driver when he/she is not paying enough attention tothe 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 componentslike relay, piezo buzzer, battery, etc. When he/she falls asleep while driving then due tothe piezo buzzer it will alert and the driver will wake up.

LITRATURE SURVEY

Our safety is the first priority while travelling or driving. One mista ke of the driver can lead to severe physical injuries, deaths and significant economic losses. Nowadays there are many systems available in market like navigation systems, various sensors etc. to make driver's work easy.There are various reasons especially human errors which give rises to the road accidents. Reports say that there is a huge increment in the road accidents in our country since last few years. The main reason occurring from the highway accidents are the drowsiness and sleepiness of driver while driving. It is a necessary step to come with an efficient technique to detect drowsiness as soon as driver feels sleepy. This could save large number of accident to occur.we conduct the surey on various design on drowsiness detection methods to reduce the accidents.



1 Block diagram

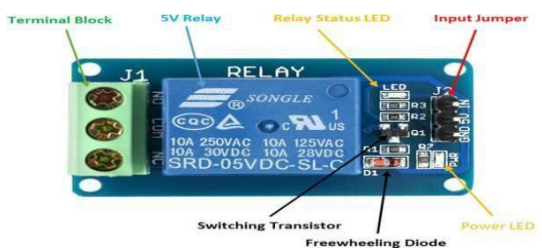
ARDUINO UNO

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller (MCU) .The microco ntroller board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by a USB cable or a barrel connector that accepts voltages between 7 and 20 volts, such as a rectangular 9-volt battery.

2 ARDUINO UNO

SINGLE CHANNEL 5V RELAY:

Relay is an electromechanical device that uses an electric current to open or close the contacts of a switch. The single- channel relay module is much more than just a plain relay, it comprises of components that make switching and connection easier and act as indicators to show if the module is powered and if the relay is active or not.



Single -channel 5v Relay Module Pin Description:

Internal structure of single channel 5v Relay

The single-channel relay module is much more than just a plain relay, it contains components that make switching and connection easier and act as indicators to show if the module is powered and if the relay is active.

First is the screw terminal block. This is the part of the module that is in contact with mains so a reliable connection is needed. Adding screw terminals makes it easier to connect thick mains cables, which might be difficult to solder directly. The three connections on the terminal block are connected to the normally open, normally closed, and common terminals of the relay. The second is the relay itself. Lots of information can be gleaned from the markings on the relay itself.

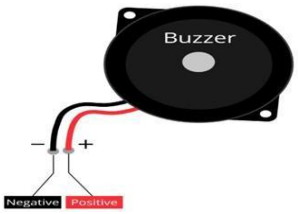
2 Internal structure of single channel 5v Relay

Single-Channel 5v Relay Module Specifications

- Supply voltage – 3.75V to 6V
- Quiescent current: 2mA
- Current when the relay is active: ~70mA
- Relay maximum contact voltage – 250VAC or 30VDC
- Relay maximum current – 10A

BUZZER:

An audio signaling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren



3 buzzer.

The specifications of the buzzer include the following.

- Color is black

- The frequency range is 3,300Hz
- Operating Temperature ranges from – 20° C to +60°C
- Operating voltage ranges from 3V to 24V DC
- The sound pressure level is 85dBA or 10cm
- The supply current is below 15mA

Gear Motor:

A DC gear motor with a wheel is a motor and gearbox combination that can be used in robotics projects for smooth, reliable movement.

The gearbox reduces the speed of the motor while increasing its torque output, allowing the motor to operate at a certain speed and deliver high torque at low speeds. The design of the gearbox, type of gears, lubrication, and type of coupling can all affect the performance of the motor.

4 Gear Motor

Specification of Gear Motor:
Operating Voltage: 3-9V (Rated 6V) Speed: 200RPM+- (6V)
Torque: 0.8kg.cm9 (6V) Ampere: 0.3A (6V) Gear ratio: 1:48
Wheel Size: 68mm+-

9v Battery:

The 9V battery is an extremely common battery that was first used in transistor radios. It features a rectangular prism shape that utilizes a pair of snap connectors which are located at the top of the battery. A wide array of both large and small battery manufacturers produce versions of the 9V battery. Possible chemistries of primary (non-rechargeable) 9V batteries include Alkaline, Carbon-Zinc (Heavy Duty), Lithium.

5 9v Battery

Voltage	9W
Brand	Hi-Watt
Battery Type	Lithium-Ion
Usage/Application	DJ Products
Capacity	600 mAh
Size	6F22 006P
Colour	White, Blue
Power Source	DC
Feature	High Quality long durability
Discharge Resistance	620 Ohm
Minimum Order Quantity	10

Eye Blink Sensor:

The eye blink sensor is an infrared sensor. It contains two parts a transmitter and a receiver. The transmitter continuously emits infrared waves onto the eye.While the receiver continuously looks for variations in the reflected waveswhich indicates that the eye has blinked.If the eye is closed that means it will give high output. If the eye is open then it will give a low output. This sensor can be used in a very different variety of robotics and mechantronics projects as it provides excellent results and is very economical.

6 Eye Blink Sensor

Specification for Eye Blink Sensor: Working voltage: +5V DC
Output: TTL output 5V or 0V

Digital signal: Instant output digital signal for directly connecting to a microcontroller

Compatibility: Compatible with boards compatible with Arduino, Raspberry Pi.

CONCLUSION

Recap the main points from the literature survey.
Significance: Reiterate the importance of eye blink sensors in various applications and the role of Arduino Uno in making such projects accessible.

The analysis and design of driver drowsiness detection and alert system is presented. The proposed system is used to avoid various road accidents caused by drowsy driving. And also this system used for security purpose of a driver to caution the driver if any fire accident or any gas leakage .This paper involves avoiding accident to unconsciousness through Eye blink. Here one eye blink sensor is fixed in vehicle where if driver lose his consciousness, then it alerts the driver through buzzer to prevent vehicle from accident. The alcohol and temperature sensor are used for further safety system in the vehicle. Development of a hybrid micro controller for a vehicle which also consists of an alcohol and temperature detector which will sense if the driver is drunk and would not start the vehicle. A complete study on road safety is going to be the next boom for the automobile industry for it to flourish and survive every human from the risk

REFERENCES

List all the research papers, articles, and other sources referenced in the survey.

[1] Example References:
   a. Arduino Uno technical documentation.
   b. Research papers on eye blink detection using IR sensors.
   c. Articles on DIY projects involving eye blink sensors and Arduino.

This structured outline will help you systematically review the existing literature and present a comprehensive survey on the use of eye blink sensors with Arduino Uno.

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