

Drowsy Driver Detection Using Eye Blink Sensor

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VISVESVARAYA TECHNOLOGICAL UNIVERSITY



MINI PROJECT REPORT ON

“Drowsy Driver Detection Using Eye Blink Sensor”

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CERTIFICATE

Certified that the mini project work entitled “**Drowsy Driver Detection Using Eye Blink Sensor**” carried out by **Chandana.J (1NH18EC719), Swathi.A(1NH18EC752), Subhashini.S (1NH18EC750), Naga seshu.A (1NH18EC704)**, bonafide students of Electronics and Communication Department, New Horizon College of Engineering, Bangalore.

The mini project report has been approved as it satisfies the academic requirements in respect of mini project work prescribed for the said degree.

Project Guide

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1.

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ACKNOWLEDGEMENT

The satisfaction ¹³ that accompany the successful completion of any task would be, but impossible without the mention of the people who made it possible, whose constant guidance and encouragement helped us succeed.

We thank ¹⁸ **Dr. Mohan Manghnani**, Chairman of **New Horizon Educational Institution**, for providing necessary infrastructure and creating good environment.

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² **ABSTRACT**

Accidents due to drowsiness can be controlled and avoided using an eyeblink sensor using its rays, it consists of an IR emitter and an IR receiver, the sensor is fixed in glasses.

When the transmitter transmits IR rays into the eyes.¹ If the eye is closed, the output is high. If the eye is open, the output is weak.

This model can be connected to the vehicle brake system and can be used to reduce the vehicle speed. The alarm inside the vehicle is declining with a number of temptations that lead to regaining consciousness.

CHAPTER 01

INTRODUCTION

For any vehicle accident, the faults of the drivers are the action most responsible for the dangerous problem to society. Driver drowsiness on the road is the main routes of accidents on the road.

This represents ¹ 20% of road accidents and it gradually increases each year. The investigation highlights the fact that the full name of traffic fatalities is excessive due to the driver's drowsiness.

Tackling these issues can be difficult when our values often don't match to avoid drowsy driving. In a 24/7 society with an emphasis on work, longer journeys and exponential advances in technology, so-called people don't get the sleep they need. To effectively deal with the problem of drowsy driving, fundamental changes need to be spread to societal norms and in particular to attitudes towards drunk driving.

² Accidents due to drowsiness can be controlled and prevented using the eye blink sensor using an IR transmitter and IR receiver.

The IR emitter radiates into the eye,

²⁰ 1. If the eye is closed, the output is high.

2. If the eye is open, the output is weak. This output is interfaced with a buzzer. The buzzer will continue as a pendant with certain moments which will lead you to reprimand your spirits.

CHAPTER 02

LITERATURE SURVEY

The driver's automatic ² drowsiness can be detected using artificial intelligence and visual information.

The system consists of character, examination and examination of the face and rules of conduct for which the image is different from the conductors of the price for the value of the algorithms. According to experts, it has been found that drivers are the most frequent, they tend to become drowsy. Accidents happen due to drowsiness.

Drivers needing rest, the researchers tried to determine the drowsiness of drivers by using the following measures: depending on the vehicle, behavioral measures and physiological measures.

The project represents a way to develop an interface to detect driver drowsiness based on continuous eye monitoring, micro sleep is the short sleep period of 2 to 3 seconds, are a good indicator of the state of fatigue.

Arduino is open source software.

Company, project and community of users who design and manufacture signal sign²² microcontroller kits for the construction of digital devices. Its products are licensed under the GNU Lesser General Public License (LGPL) or General Public License.

⁷ The detection of fatigue based on physiological signals such as electroencephalogram (EEG), electrocardiogram (EOG), electromyogram (EMG) and electrocardiogram (ECG) has been more and more studied in the domain . Among them, the EEG has major advantages in the detection of ⁷ driving fatigue due to the high temporal resolution, the high portability and the good sensitivity to fatigue. With this in mind, various studies have attempted to obtain an EEG-based classification using different signal processing techniques to accurately detect fatigue while driving.

CHAPTER 03

Existing system and problem statement

A driver who is in control and in control, who is involved in future accidents. The following steps are widely taken to monitor drowsiness.

1. Behavioral measures, driver behavior, including yawning, closing your eyes, putting your head down, etc. are monitored by a sensor to alert the drowsy driver.
2. Physiological measures, the correlation between physiological signals (ECG, EMG, EOG and EEG).

Audi: rest recommendation system, its analysis pilots starting the movement. Among other things, at a speed includes between 65 and 250 km / h.

BMW: the Active Driving Assistant with Attention Assistant analyzes driving behavior and, if necessary, advises the driver when at rest.

Bosch: "Driver detection system". Etc.

CHAPTER 04

PROPOSED METHODOLOGY

A drowsiness ² detection system based on a new method for estimating head posture is proposed.

Test results should be performed in accordance with the parameter requirements and status characteristics as a sign of drowsy driving.

The methodology of the study on five suburban drivers using a driver simulator based on the virtual reality laboratory of the Khaje-Nasir-Toosi University of Technology in 2015. The duration of eye closure and the frequency of blinking eyes have to do with the driver's sleepiness level.

It has a deduction accuracy of 93%. Keywords: driver drowsiness, facial expressions, driving simulation, road safety. The drowsiness of the driver who is on the road are one of the main causes of accidents on the road.

CHAPTER 5

PROJECT DESCRIPTION

SWITCH :



Figure 2 :

Toggle Switch

Introduction of Toggle Switch

The circuit breaker is based on a type of electronic circuit breaker identified by the presence of a handle or by a lender authorized to control the flow of current / electrical signal from a power supply to a device or inside a device.

It is a hinged switch which can take one of two positions i.e. On or off. It is used for displacements between two conditions in a circuit.

Toggle switches using a toggle contact mechanism.

It is housed in a molded anti-tracking case for dust-free operation

Being easy to use, the toggle switch can be used in some different applications, both in commercial and domestic devices.

So last many years before being replaced.

For our protection against false switching, a hinged cover is used as a switch guard.

Rocker switch with hinged cover

Some toggle switches come with a short handle length, which makes their operation difficult. Thus, to overcome this drawback, handle extensions are used.

Toggle Switch with Handle Extension

They are available in SPST, SPDT, DPST, DPDT contacts terminology.

Now a days in home applications like for switching lights/fans Rocker Switches are used instead of Toggle Switch.

Toggle Switch Vs Rocker Switch

Specifications of Toggle Switch

Mechanical life: 40,000 make and break cycles.

Maximum contact resistance: 10MOhms.

Initial voltage: 2 to 4V dc.

Current: 10mA for both silver- and gold-plated contacts.

Minimum Insulation resistance: 1,000MOhms.

Dielectric strength: 1,000Vrms at sea level.

Operating temperature: -30 Degree Celsius to 85 Degree Celsius.

NOTE: This specifications changes with different manufacturers, requirements, etc.

BATTERY:

The battery is a device that stores chemical energy and transforms it into electrical energy. Chemical reactions in a battery involve the flow of electrons from one material (electrode) to another, through an external circuit. The flow of electrons provides an electric current which can be used for work.

A battery converts chemical energy into electrical energy by a chemical reaction. Usually, chemicals are kept inside the battery. It is used in a circuit to power other components. A battery produces direct current (DC) electricity (electricity that flows in one direction and does not switch back and forth).

BATTERY

FIGURE 3 :



Arduino nano:

FIGURE 4



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The Arduino Nano is a small, complete and user-friendly board based on the ATmega328 (Arduino Nano 3. ... It has more or less the same functionality as the Arduino Duemilanove, but in a different case. DC power cable and works with a USB Mini-B cable instead of a standard cable.

The Arduino Nano is free with a 16 MHz crystal oscillator. It is used to produce a clock with a specific frequency using a constant voltage. The usage limit for the Arduino Nano is already underway, which is the most important part of the price for CC food, which means that you have used the food source. external power supply via a battery. 25 June 2018

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The Arduino Nano can be powered via the USB Mini-B connection, an unregulated 6-20 V external power supply (pin 30) or an external regulated 5 V power supply (pin 27)

According to v2. 3 schematic, the Arduino Nano 3.3v regulator is the USB FTDI in series ie. This has a maximum rated current of 50mA.

The card can operate on an external power supply from 6 to 20 volts. If supplied with less than 7 V, the 5 V pin may supply less than five volts and the card may become unstable. If you use 12V plus, the voltage regulator will overheat and damage the card. The recommended range is 7 to 12 volts

This name card uses functions and features like an Arduino Duemilanove card. However, this Nano card is different in its packaging. It does not have a DC socket, so power can be supplied using a small USB port, otherwise directly connected to pins like VCC and GND. This card can be supplied with 6 to 20 volts using a mini USB port on the card.

Arduino-nano-board

Arduino Nano is a type of microcontroller board, and it's for Arduino.cc. It can be built with a microcontroller like Atmega328. The microcontroller is also used in Arduino UNO. It is a small card and also flexible with a wide variety of applications.

The other Arduino boards are mainly Arduino Mega, Arduino Pro Mini, Arduino UNO, Arduino YUN, Arduino Lilypad, Arduino Leonardo and Arduino Due. And the other development boards are the AVR development board, the PIC development board, the Raspberry Pi, Intel Edison, the MSP430 Launchpad and the ESP32 board.

Eye Blink Sensor:

FIGURE 5



Blinking is a sensor that is placed in front of the driver on the top. During driving time, the eye blinks normally means it checks when the eye near the second buzzer will be indicated to alert it to wake up

An infrared sensor is an electronic instrument used to detect certain characteristics of its environment. To do this, it emits or detects infrared radiation. Infrared sensors are able to measure the heat emitted by an object and detect movement.

This sensor module makes up the frame² of the blink sensor, the infrared sensor and a relay. The vibrator is connected to the eye

flashing sensor frame to be worn by the driver. Vibrator vibrates whenever an accident occurs or the driver falls asleep.

The plot consists of the IR emitter which transmits the IR rays to the driver's eyes and an infrared receiver that receives the reflected rays when the eyes are closed. The relay provides the additional current required by this module and is therefore also connected à la carte SST microcontroller .

¹ Eye blink sensor. Blinking is mandatory in this job because it is used to boost the device and activate events. Instructions on written in image processing only if there is no eyelid

The most important thing to do is to define the phase of the process, which is a higher level of time than the normal period of human beings, which is considered to be a "term". On this paper, the time should be set to 5 seconds or more, the car "blinking event" is distinct from "normal blinking of the eyes". The test should be performed for normal human blinking.

To identify drowsiness, a blink sensor is used, which is based on the IR. The infrared sensor consists of an infrared transmitter and receiver. The infrared transmitter emits infrared rays. IR rays are transmitted by the IR receiver.

The IR emitter and the IR receiver are arranged in parallel. When the signal is given, the IR sensor launched operation and the IR emitter emits infrared rays to the receiver. The comparator is coupled to an IR receiver. you the operational amplifier is attached to the comparator. To the inverting input terminal of the comparator, the reference the voltage is given, the comparator is connected to the receiver. In the event of a disturbance of infrared rays between the sender (sender) and recipient (receiver), the IR receiver will not drive. Therefore, the voltage at the inverting input terminal is lower than the voltage at the non-inverting input. Consequently, the comparator output is high. The output voltage off.

The comparison is made with the microcontroller. When the IR recipient receives the rays from the transmitter, the IR recipient receives

The conductor can apply the voltage to the non-inverting terminal is less than the voltage to the inverting terminal. So the comparator output is weak. Therefore, the comparator output is defined on the controller. This circuit is used to count the movement of the eyelids.

Buzzer:

FIGURE 6



Description

A buzzer or beep is an audio signaling device, which is mechanical, electronic and mechanical (piezo for short). Typical uses for audible alarms and beeps include alarm devices, timers, and confirmation of user input, such as a mouse click or a keystroke.

A buzzer **is** a device that has a buzzing or beeping sound. The more complex buzzers include the oscillator circuit and the piezoelectric element or the speaker in one package, so all you have to do is apply a voltage and you get a boring buzzing beeping beep.

The buzzer is composed of an external box with two pins for the fixing to the power supply and to the ground. Inside there is a piezo element, which consists of a central ceramic disc surrounded by a metal vibration disc (often bronze). When the current is applied to the buzzer, use ceramic to contract or expand.

When a voltage is applied, the coil produces a magnetic field and then allows the diaphragm to vibrate and produce sound. This type of buzzer has a possible operating voltage ranging from 1.5 to 12 V and a high current consumption, generally > 20 mA.

The most common sizes for noise level are 80 dB, 85 dB, 90 dB and 95 dB. We also offer buzzers with a sound level up to 105 dB. There are several types, including electro-acoustic, electromagnetic, electromechanical, magnetic and piezoelectric.

Connecting wires :

FIGURE 7



Connecting Wires Means those wires that connect the leg wire of one electric blasting cap or with the leading wires, when blasting in series.

Color Codes – Different color wires serve different purposes, like.

Black : Hot wire, for switches or outlets.

Red : Hot wire, for switch legs.

Blue and Yellow : Hot wires, pulled in conduit.

White : Always neutral.

Green and Bare Copper : Only for grounding

The electrical wire is the backbone of our society. ... The film is used to benefit the circuit from place to place to an author. Most wires on insulation surrounding the

metal core. An electrical insulator is a material whose internal electrical charges do not circulate freely and, therefore, do not conduct electric current.

A wire is a simple wire or metal rod, generally cylindrical and flexible. Wires are used to support mechanical loads or electrical and telecommunications signals. The wire is generally that I formed in pulling the metal through a hole in a die or a drawing plate. Wire gauges are available in different standard sizes, pressed in terms of gauge number. The term "wire" is also loosely used to denote a bundle of such strands, as in "multi-strand wire", which is more correctly applied to a metal in mechanics or to an electric cable.

The wire is in the form of a solid core, stranded or braided. Well, in general, in circular cross-section, the wire can be made in square, hexagonal, rectangular applause or other sections, either for decorative purposes or for technical purposes such as high performance coupons in speakers. Coiled coil springs , such as the Slinky toy, are made of special flattened wire.

The names thread uses. It is the raw material of many important manufacturers, such as the wire manufacturing industry, engineering springs, the manufacture of wire cloth and the spinning of wire cables, in which it occupies a place analogous to a fiber. textile. Wire mesh of all degrees of strength and fineness of mesh is used for sieving and sieving machines, for draining paper pulp, for window screens and for many other purposes. Large quantities of aluminum, copper, nickel and steel wire

are used for telephone and data cables, and as conductors in the transmission of electrical energy and heating. It is also in demand for fences, and a large part is consumed in the construction of suspension bridges, cages, etc. In the manufacture of musical instruments for scientific instruments, the wire is new and widely used. Carbon steel and stainless steel wires for major applications in engineering springs for critical automotive or industrial parts / components. Manufacture of pins and hairpins; the needle and hook industries; manufacture of nails, dowels and rivets; and carding machines consume large amounts of yarn as raw material.

Not all metals and metal alloys have the physical properties necessary to make useful wires. Metals must first be ductile and tensile resistant, the quality does not mainly depend on the usefulness of the wire. The main metals suitable for wire, with almost equal ductility, are platinum, silver, iron, copper, aluminum and gold; and it is only from these and from some of their alloys with other metals, mainly brass and bronze, that wire is prepared.

Careful processing can produce an extremely fine wire. The special purpose wire is however manufactured by the metal authors (for example, tungsten wire for ampoules and vacuum tube filaments, due to the high melting temperature). The copper wires are also plated with other metals, such as tin, nickel and silver to manage different temperatures, provide lubrication and facilitate the stripping of the rubber insulation of the copper.

Wire is often used for "strings" producing a lower sound in string instruments, such as violins, cellos and guitars, and percussion string instruments such as pianos, dulcimers, dobros and cimbals. To increase the mass per unit of length (and thus further reduce the pitch), the main wire can sometimes be wound in a helix with another thinner wire. Musical lines, would be "exceeded"; the added wire may be of circular section ("wound round"), or flattened before winding ("wound flat").

Software Description :

What is Arduino?

¹⁰ Arduino is an open source electronic device based on hardware and easy to use software. Arduino boards are capable of direct communication - light on a sensor, a finger on a button or a Twitter message - and the transformer output - activate a ³ motor, turn on an LED, publish something chosen online. You can tell your card what to do by sending a set of instructions to the card's microcontroller. To do this, you use the Arduino programming language (based on wiring) and Arduino software (IDE), based on processing.

Over the years, Arduino has been the beer of thousands of projects, from everyday objects to complex scientific instruments. A global community of creators - students, hobbyists, artists, programmers and professionals - has gathered around this open

source platform, their contributions have added an incredible amount of accessible knowledge that can be of great help to them. novices and experts.

Arduino was born at the Ivrea Interaction Design Institute as an easy tool for rapid prototyping, aimed at students with no training in electronics and programming. As soon as it reached a larger community, the Arduino board began to change ¹¹ to adapt to new needs and challenges, differentiating its offer of 8-bit boards to products for IoT applications, portable clothing, Printing. 3D and integrated environment. All Arduino boards are fully open-source, allowing users to build separately and optionally the adapter to their particular needs. The ¹¹ software is also open-source, and it grows thanks to contributions from users around the world.

Arduino is used in thousands of ¹⁷ different projects and applications. Arduino logic is easy to use for beginners, more flexible for advanced users. It works on Mac, Windows and Linux. Teachers and students are useful for building scientists' instruments well enough, for the princes of chemistry and physics, or for launching programming and robotics. Designers and architects

The creators, of course, use it to build many projects exhibited at the Maker Faire, for example. Arduino is a key tool for learning new things. Anyone - kids, hobbyists, artists, programmers - can start tinkering by simply following the step-by-step instructions in a kit or sharing ideas online with other members of the Arduino community.

There are names of other microcontrollers and microcontroller platforms available for physical computing. Parallax Basic Stamp, BX-24 from Netmedia, Phidgets, Handyboard from MIT and many more offer similar functionality. All of these tools take the messy details of microcontroller programming and bundle them into an easy-to-use package. ¹⁵ Arduino also simplifies the process of working with microcontrollers, but it offers certain advantages to teachers, students and amateurs interested in compared to other systems:

¹⁵ Inexpensive - Arduino boards are relatively inexpensive compared to other microcontroller platforms. The cheapest version of the Arduino module can be assembled by hand, and even pre-assembled Arduino modules cost less Cross-platform - Arduino software (IDE) works on Windows, Macintosh OSX and Linux operating systems. The plugin for microcontroller systems is limited to Windows.

CHAPTER 6

RESULT AND DISCUSSION :

Different easy detection methods are proposed for researchers and some ⁵ systems are available on the commercial market. In general, methods of detecting drowsiness fall into two broad categories of monitoring drivers' physiological and physical conditions and monitoring vehicle-related variables based on driver control functions that correlate with the level of drowsiness of the driver. Each method has its advantages and disadvantages. A reliable detection method integrated into a security system which can include an advisory warning, unifies a semi command or total control of the vehicle, the steering and the direction of obtaining the safety conditions.

¹ Advantages:

The different advantages of the implemented system are:

- Drowsiness detection.
- Reduction in road accidents
- No need for surveillance cameras.

Fatigue and micro-sleep driving are often the cause of serious accidents. However, the first signs of fatigue can be detected before a critical situation occurs. Detecting drowsiness in the Bosch driver can do this by monitoring steering movements and advising drivers to take a break in time.

- Warns driver of drowsiness and risk of micro sleep
- Observing the driver's warnings helps prevent accidents due to fatigue.

Applications:

Uses of the PERCLOS monitor include: providing real-time sleepiness feedback to the driver, providing performance feedback to a fatigue management program, and / or. provide regulatory compliance information to law enforcement officials.

- Drowsy driver detection
- Communication for disable people .
- Alert if person came out from comma in absence

CHAPTER 7

Future scope:

Future work could focus on the use of external factors such as vehicle condition, hours of sleep, map conditions, mechanical data, etc., for fatigue measure it. ⁶ Driver drowsiness is a major threat to road safety and the problem is particularly serious for drivers of commercial vehicles. Twenty-four hour operation, high annual mileage, exposure to harsh environmental conditions and demanding work timetables have all been published to this serious safety issue. Driver drowsiness monitoring and vigilance and provide feedback on their condition so that they can take appropriate action is a crucial sword in a series of preventive measures necessary to solve this problem. Currently there is no camera zoom or direction adjustment during operation.

Conclusion :

The developed ¹⁴ drowsiness detection and correction system is capable of quickly detecting drowsiness. The system that can differentiate between normal blinking and ¹⁴ drowsiness which can prevent the driver from entering the drowsy state while driving. It joins a new adaptive method of extracting symptoms and estimating driving status to the proposal to detect driving alertness. ⁴ Two types of symptoms

have been defended: symptoms related to the eye region (including PERCLOS, ELSDC and CLOSNO) and symptoms related to the facial region (ROT). The method proposes to extract the symptoms related to the ocular region using the horizontal projection of the segment of the upper half without explicit detection of the eyes; The symptom related to the face region is extracted based on the match of the face model. Then the normal value of the symptoms extracted is during a short training phase. In developing the standard for foreign characteristics, an adaptive fuzzy expert system estimates the level of fatigue and distraction.

Appendix:

The code used is in this project :

```
#define SENSE A0
```

```
void setup()
{
  pinMode(SENSE, INPUT);
  pinMode(2, OUTPUT);
}
```


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```
pinMode(LED_BUILTIN, OUTPUT);  
} void  
loop()  
{  
  if(digitalRead(SENSE))  
  {  
    digitalWrite(LED_BUILTIN, LOW);  
    pinMode(2, LOW);  
  }  
  else  
  {  
    delay (2000);  
    if(digitalRead(SENSE))  
    {  
      digitalWrite(LED_BUILTIN, LOW);  
      pinMode(2, LOW);  
    }  
    else  
      digitalWrite(LED_BUILTIN, HIGH);  
    pinMode(2, HIGH);  
  }  
}
```

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