

Drowsy Driving Detection and Accident Tracking System

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Abstract: The ultimate aim of this project is to prevent an accident occurs during Drowsy Driving. Nowadays, almost many accidents are happened because of driver's carelessness. For instance, swift driving, disobeying of driving rules, drowsiness (sleepiness) of driver while driving, etc. these are the main reasons which makes the risk for driver's, passengers in vehicles and other people near the vehicle. From the above conditions mostly the drowsiness relates to cause more accidents particularly during the night time than other conditions. Hence the main objective is to design some system to decrease the accidents related to this. Here in this project the drowsiness is determined or identified using Eye Blink Sensor (infrared sensor), when the eyes are open the rays emitted from sensor are reflected from eyes and received by the receiver of sensor, there the output is low. When the driver is in drowsy state then their eyes tends to be closed, in that condition rays emitted from the sensor are not reflected from eyes and output is increases then it sends an input signal to Arduino Nano Board. As a result buzzer will alert the driver to stay active. All these components are connected with the head band.

Keywords: Drowsy Driving Detection, Eye Blink Detection, Eye Blink Sensor, Head Band.

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I. Introduction

These days, almost many major accidents are happening in our area because of the carelessness of the driver. For example, fast driving, not obeying of driving rules, drowsiness of driver while driving. These are the main reasons which creates the risk for drivers, passengers in vehicles and also around the vehicle. From these wconditions mostly the drowsiness relates to create many accidents particularly at the night time than any other conditions or time. Hence the main objective is to design some system or prototype model to decrease the amount of the accidents because of the Drowsiness. An eyeblink sensor is used to measure and monitoring the eye blink using Infrared sensor. The IR transmitter work is to transmit the infrared rays in human eyes. The IR receiver work is to receive the reflected infrared rays from the human eyes. If the eyes are closed means the output is in high state for the Infrared receiver otherwise the output for the Infrared receiver is in low state. This is to know whether the human eye is in closing or opening position. This output is given to the Arduino Nano microcontroller which indicates the final output that is alarm or beep sound. Eye Blink Sensor is the sensor which will be useful for detecting or monitoring the eye blink and also drowsiness of the driver. Buzzer is used to alert the driving person to avoid or to prevent the accidents. The Eye blink sensor and the buzzer are connected to the Arduino Nano board. For power supply purposes battery will be used. All these components are connected to the Head band which will be a feasible method for detecting the drowsiness. By using the head band, the driving view for the driver will not get affected.

II. Methodology

The working prototype of this model will be done by the following steps:

1. An eyeblink sensor is used for the eye blink detection purpose by controlling the eye blink of the driver. If the human eye is closed means; the Infrared receiver output is high otherwise the output for the Infrared receiver is in the low state.
2. The buzzer is used here for the alerting or alarming purposes. If the IR output for the receiver is high then the buzzer gets On otherwise the buzzer will get turned Off.

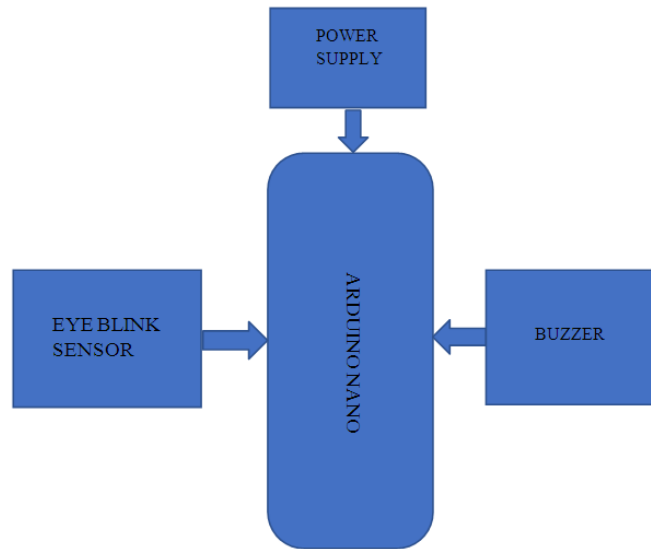


Figure 1: Block Diagram of our Work

III. Hardware Components

The hardware components utilized in this project are as follows:

1. Arduino Nano
2. Eye Blink Sensor
3. Buzzer
4. Battery
5. Head band

3.1 Arduino Nano

The Arduino Nano might be a compact, whole, and works friendly for bread board controlling by the processor ATmega328. It's chance is high or low in constant practicality of the Arduino microcontroller, moreover it is entirely a new package. DC power jack is absent in Arduino Nano, it works with a small-B type USB cable not a normal one.

3.1.1 Specifications

Processor of microcontroller	:ATmega328
Architecture of the board	:AVR
Using Voltage	:5 V
Memory for Flash	:32 KB
Static RAM	:2 KB
Speed of clock	:16 MHz
INPUT Pins of Analog	:8
EEPROM	:1 KB
Direct Current for one I/O Pins	:40 mA (In/Out Pins)
Applying Voltage	:7 to12 V
Input/Output Pins for Digital	:22 (6-PWM)
Output of PWM	:6
Consumption of Power	:19 mA
Size of PCB	:18 x 45 mm
Weight of the board	:7 g

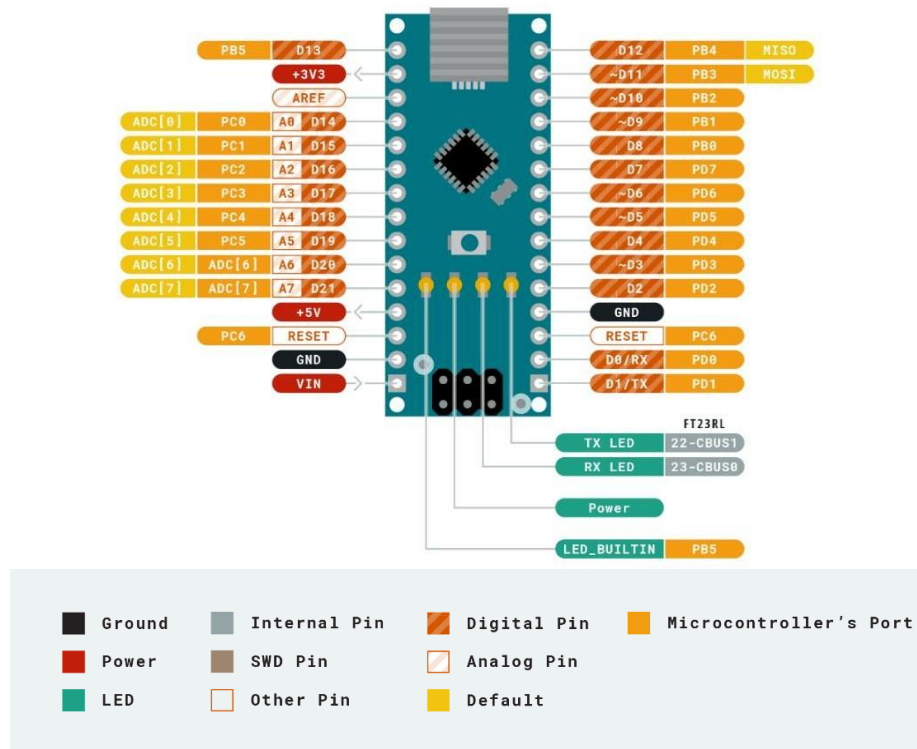


Figure 2: Pin Diagram of Arduino Nano

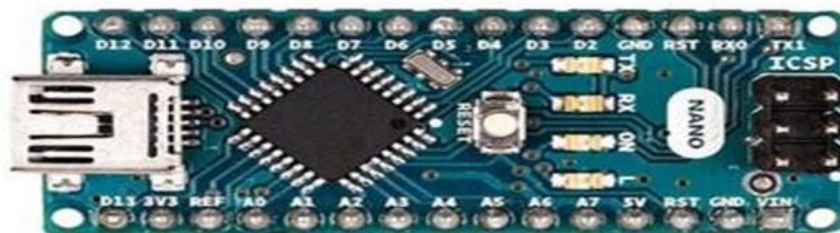


Figure 3: Arduino Nano Board

3.2 Eye Blink Sensor

The eye blink sensor is the sensor which works by illuminating the light which is the infrared rays in the eyelid region and also eye region; phototransistor and differentiator are the two main circuits in this sensor which is used to viewing any changes occurring in returning reflected infrared light. The correct and the overall function highly depends on the aiming and positioning of the detector part and also emitter part with respect towards the human eye.

The eye blink sensor is used to monitor or detect the eye blink of the driver to detect whether they are in a drowsy state or not. If the human eyes are closed, the output of Infrared receiver is in high state otherwise the Infrared receiver output is in low state.

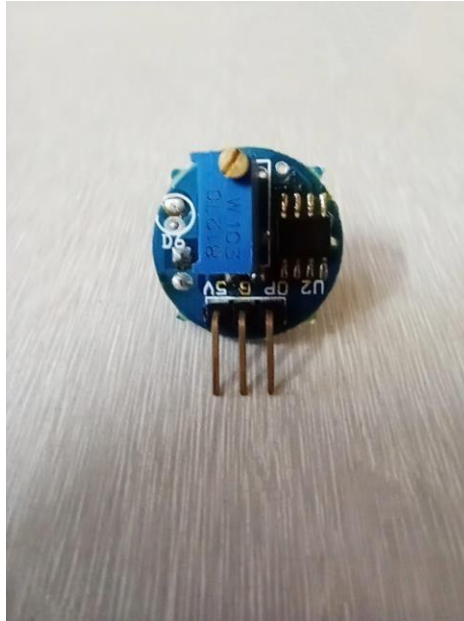


Figure 4: Eye Blink Sensor

3.2.1 Working

Eye Blink Sensor has two main parts. One is Infrared Transmitter and other is Infrared Receiver. IR transmitter role is to transmits the Infrared rays to the driver’s eyes and an IR receiver role is to receive the reflected rays which was initially transmitted; when the eyes are in the closed manner. If the eyes are closed, it is nothing but the output of IR receiver is high and if the eyes are open, it means the output is low for the IR receiver. The Buzzer automatically turns On when there is a high output and if there is a low output then the buzzer turns Off automatically.

(5V) High → LED On; Eye closed condition. (0V) Low → LED Off; Eye opened condition.

Table 1: Pin Configuration of Eye blink sensor

Pin Name	Description
VCC	Input Power Supply
GND	Ground
OUT	Output

3.2.2 Features

- LED indicating for the eye blink.
- Quick output in digital signal when it is directly connected with the Arduino board.
- Size is compact.
- Operating Voltage is +5V DC.

3.2.3 Specifications

- Working Voltage :+5V Direct Current regulated
- Working Current :100 mA
- Data Level Output : Transistor Transistor Logic Level.

3.2.4 Applications

- Preventing vehicle accidents by monitoring the digital eye blink.
- Utilized for real time driving purposes.

3.3 Buzzer

Buzzer is a device which is used for the purpose of giving signals in an audio manner. It might be mechanical, electromechanical or piezoelectric in nature. The buzzer used here is the piezo buzzer. Piezo buzzer is a compact speaker which can be directly connected to an Arduino Nano board. Piezo buzzers are the devices that can generate the beeps and tones which is required for the signalling device. Its working technique is by a piezo crystal, a special material that changes its shape when the voltage is applied to it. If the crystal pushes against a diaphragm, like a small speaker cone, it can generate a pressure wave, and that pressure wave is heard by the human ear as a sound.

3.3.1 Features and Specifications

- Voltage Rated: 6V DC
- Working Voltage: 4-8V DC
- Current Rated: <30mA
- Type of Sound: Continuous Beep
- Frequency Resonance: ~2300 Hz
- Tiny and perfectly sealed packing
- Bread board friendly

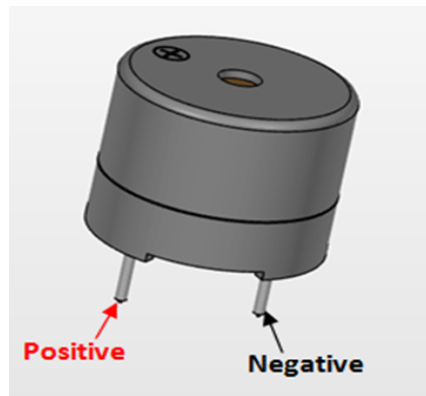


Figure 5: Buzzer Pin Diagram

3.3.2 Applications

- Circuits for alarming, in which the operator has to be alerted for anything to get consciousness
- Equipments for communication
- Electronics in automobile
- Equipments in portable size, because of its compact nature.

3.4 Battery

Battery is used in this project for the power supply purposes.



Figure 6: Battery

IV. Software used

The software which utilized in our project is nothing but the Arduino Integrated Development Environment (IDE). For the programming purpose of the Arduino Nano board, the Arduino Integrated Development Environment (IDE) software is used, which is a unique platform application where the programs are coded in Java language which is self-installable. Here in this software, coding languages such as C and C++

are used. This IDE software makes the way for a strengthen environment and it is easy for the user to work. Here we are going to compile and upload the programs to the Arduino Nano board via connection with USB.

V. Conclusion

Drowsiness is one of the major prominent causes for the accidents. In this project it is designed as an easily handable, prototype model for drowsiness detection with the help of the eye blink sensor. The proposed system helpful to avoid vehicle accidents because of driver sleepiness using eye blink sensor, in this paper we design and study the system for detecting the driver fatigue. If the driver becomes drowsy the eye blink sensor attached to the Head band will detect that and for that the buzzer will alert the driver through the sound of beep to avoid the accidents occurring in the roads.

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