Review Paper on 'Drivers Sleep detection and alarming system'

[1]Prof. Bhalerao B.L,[2]Vaibhav Suresh Borate,[3]Ravi Devidas Borate,
[4]Saurabh Natha Metkari,[5]Abhishek Milind Ghadge

1-Asst.Professor, 2,3,4,5- Students
Dept. of Mechanical Engineering, S.B.PATIL College of engineering, Vangali, Maharashtra,India.

Abstract : Nowadays There has been a very large increase in road accident due to drowsiness of driver while driving which leads to enormous fatal accidents .The driver lose his control when he falls sleep which leads to accident .This is because when the driver is not able to control his vehicle at very high speed on the road. Driver in-alertness is an important cause for most accident related to the vehicles crashes.

Driver fatigue resulting from sleep deprivation or sleep disorders is an important factor in the increasing number of the accidents on today's roads. Drowsy driver warning system can form the basis of the system to possibly reduce the accidents related to driver's drowsiness. This project can generate a model which can prevent such accidents. To prevent this, we outlined a very simple and economical system which deals with this issue. In this project, when a driver falling asleep, an alarm is raised to warn the driver attached to the rear of the vehicle. The alarm continues for a minimum of 10 seconds so that the driver wakes and get ready to steady the vehicle he drives. Thus we can control the major accidents.

Keywords : construction, working, details, view, analysis.

Introduction

The primary purpose of the Driver Sleep Detector is to develop a system that can reduce the number of accidents from sleep driving of vehicle. With our two monitoring steps, we can provide a more accurate detection. For the detecting stage, the eye blink sensor always monitor the eye blink moment. It continuously monitor eye blink. If the monitoring is over, the collected data will be transmitted to a microcontroller, and the Arduino nano microcontroller digitizes the analog data. If the warning feedback system is triggered, the microcontroller makes a decision which alert needs to be activated.

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The second application of this paper is to control the vehicle, once it deduct such sensation the buzzer blows indicating emergency and this project also deals with controlling the vehicle, in case of drivers does not awakes on time then system stops the engine. For the alert systems, we have a buzzer device. The project code is developed in C language and then converted to hex code which is readable to the microcontroller.

What we studied :

Due to the continues day-night work pressure drivers lacked in their sleep. Thus it has been observed that most of the road accidents happened due to the drivers sleeps while driving. That's why we need to develop a system to avoid such accidents which can detect if drivers is awake or slept. If the driver is slept during the driving the system must be able to control the vehicle i.e. stop the vehicle. Thus, we can avoid an accident.

Material

1. Arduino nano :

Arduino is an open-source hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices. Its hardware products are licensed under a CC BY-SA license, while software is licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL).

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards ('shields') or breadboards (for prototyping) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs. The microcontrollers can be programmed using the C and C++ programming languages, using a standard API which is also known as the Arduino Programming Language, inspired by the Processing language and used with a modified version of the Processing IDE. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) and a command line tool developed in Go.

2. Eye Blinking 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 waves which 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 mechatronics projects as it provides excellent results and is very economical.

3. Single Channel Relay :

Single-Channel Relay Module Pinout Relay is an electromechanical device that uses an electric current to open or close the contacts of a switch.

4. SPDT Relay :

The Single Pole Double Throw SPDT relay is quite useful in certain applications because of its internal configuration. It has one common terminal and 2 contacts in 2 different configurations: one can be Normally Closed and the other one is opened or it can be Normally Open and the other one closed. So basically you can see the SPDT relay as a way of switching between 2 circuits: when there is no voltage applied to the coil one circuit "receives" current, the other one doesn't and when the coil gets energised the opposite is happening.

5. Buzzer :

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric.

6. DC Motor :

A DC motor is defined as a class of electrical motors that convert direct current electrical energy into mechanical energy.

7. Wireless Sensor :

Wireless sensors are standard measurement tools equipped with transmitters to convert signals from process control instruments into a radio transmission.

Working

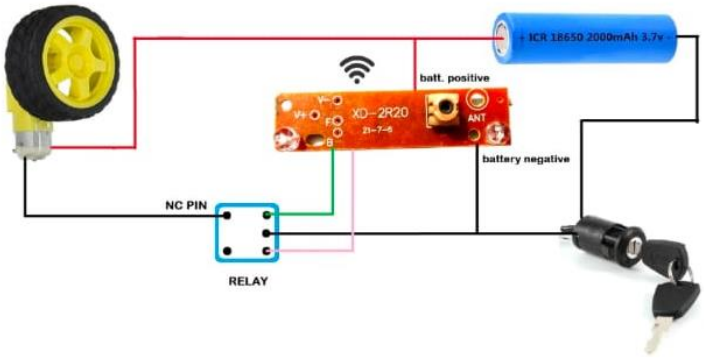
The sensor was processed by a microcontroller and transfer to sensor based system. The IR-Led sensor module is focused on the eye with the help of an eyeglass fixed with respect to the eye. It provides the two different level of signal from the sensor which we use to differentiate between a closed eye and open eye. The micro controller considers that the last 60 readings and if 10 of those readings indicate a closed eye then the micro controller decides that the drivers is getting drowsy an alarm is raised to warn the driver attached to the rear of the vehicle. The alarm continues for a minimum of 10 seconds and longer even until the microcontroller.

Fixing the sensor in front of driver seat so that the sensors monitor the eye movement of the driver periodically. If the eye lid of driver is not showing any change for a period of time, the caution will be given to the driver. This sensor should be fixed in such a way that it shall sense the eye movement when the driver bends or sets erect.

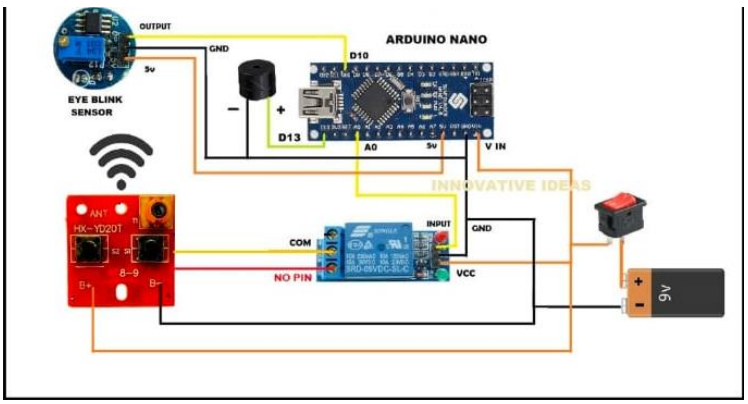
The proposed method is built in four stages and it is applied to the Microcontroller :

1. IR LED focused to the eye.
2. Photodiode senses the reflected ray and sends a corresponding output to the arduino.
3. The arduino compares the output with a set threshold and determines eye status.
4. If „closed eye" status comes in 10 out of last 60 reading to warn the driver or to wake him.

Circuit Diagrams



1.1 Vehicle Controll System



1.2 Eye Blinking detector system

Conclusion

As for the software part, we fulfilled our goal successfully. The detection algorithm could not only work effectively and accurately at daytime, but also at night. The Eye portion extraction is smooth and in real time with no delays on the microcontroller. In addition, there is a bonus function in the software part – detection with glasses.

For the Arduino board, we achieved two major difficulties. First, we were not able to power up the board with any commercial chargers initially, including the ones for Iphone, for Samsume, or the USB charger on car. But later we added DC POWER battery to power our board and used the power supply we designed to charge the battery to solve the problem. The power supply unit basically completes all its design requirements. By adding the extra USB battery stage, the problem of powering the entire microcontroller and alarming system has been solved.

Moreover, the alarming system works as we supposed. The voltage ripple of the power supply unit can be mitigated by applying more resilient capacitor components. It is apparent that the overall project success is not derived from one team member's mind but the keen coloration within our group. Each part is indispensable and every team member made the great dedication on the completion of this design project.

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