

Drowsy Driver Sleeping Device and Driver Alert System

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Abstract: *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. This project can generate a model which can prevent such accidents. Temperature sensor and smoke sensor are used for further safety system in the vehicle.*

Keywords: Eye blink sensor, Temperature sensor, Smoke sensor, relays, microcontrollers

1. Introduction

The primary purpose of the Drowsy Driver 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 microcontroller digitizes the analog data. If the warning feedback system is triggered, the microcontroller makes a decision which alert needs to be activated. The second application of this paper is to detect the alcohol content or any leakage of gas from the vehicle, once it deduct such sensation the LED light glows indicating emergency and this project also deals with temperature sensors, in case of any fire inside the vehicle the sensor senses and stops the engine. For the alert systems, we have a beeper device. The project code is developed in C language and then converted to hex code which is readable to the microcontroller.

2. Literature Survey

2.1 Methods for Detecting Drowsy Drivers

There are various techniques that can be used to detect the drowsiness of drivers. These techniques can be generally divided into the following categories: sensing of physiological characteristics, sensing of driver operation, sensing of vehicle response, monitoring the response of driver.

2.2 Monitoring Physiological Characteristics

Among these methods, the techniques that are best, based on accuracy are the ones based on Human physiological phenomena [5]. This technique is implemented in two ways: Measuring changes in physiological signals, such as brain waves and eye blinking; and measuring physical changes such as sagging posture, leaning of the driver's head and the open/closed states of the eyes [5]. The first method, the most accurate, is not realistic, since sensing electrodes would have

to be attached directly onto the driver's body, and hence be annoying and distracting the driver. In addition, long time driving would result in perspiration on the sensors, diminishing their ability to monitor accurately. The second technique is well suited for real world driving conditions since it can be non-intrusive by using optical sensors of video cameras to detect changes.

2.3 Other Methods

Fixing the sensor in front of driver seat so that the sensor 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.

2.3.1 Temperature Sensor

Thermistors are thermal sensitive resistors whose prime function is to exhibit a large, predictable and precise change in electrical resistance when subjected to a corresponding change in body temperature. Negative Temperature Coefficient (NTC) thermistors exhibit a decrease in electrical resistance when subjected to an increase in body temperature and Positive Temperature Coefficient (PTC) thermistors exhibit an increase in electrical resistance when subjected to an increase in body temperature. In case of any fire inside the vehicle the sensor will deduct it initially and safeguard the passengers from worst case.

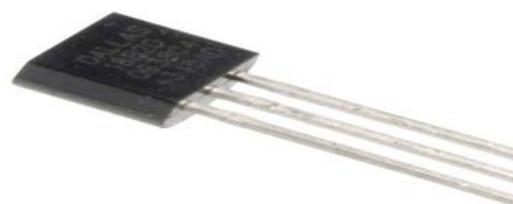


Figure 1

Once when the temperature increases inside the vehicle the sensor sense it and stops the engine from further running.

2.3.2 Eye Blink Sensor

The blinking of eye is necessary in this project, since it is used to drive the device and to operate events. Eye blink detection has to be done, for which we can avail readily available blink detectors (FIG 2 & FIG 3) (Catalog No. 9008 of Enable devices) or we can incorporate it with a special instruction written in image processing that, if there is no eye lid movement found for the certain period of pre-determined i.e. time greater than the human eye blinking time then consider an event called “blink”, for which the set of operations will be followed. Here, in this project we need to set time as 5 second or above it, as “blink event” is different from “common eye blinking”.(4) We need to conduct testing for only blink event, and not to find common blinking of human eye.



Figure 2



Figure 3

2.3.3 IR Sensor

Infrared transmitter - a device that emits infrared rays. Similarly IR Receiver is used to receive the IR rays transmitted by the IR transmitter. One important point is both IR transmitter and receiver should be placed parallel to each other. The signal is given to IR transmitter whenever the signal is high, the IR sensor is conducting it passes the IR rays to the receiver. The IR receiver is connected with comparator. The comparator is connected with operational amplifier. In the comparator circuit the reference voltage is given to inverting input terminal of the circuit. The Non-inverting input terminal is connected to IR receiver. When there is an interruption in the IR rays between the IR transmitter and receiver, the IR receiver becomes not conducting. So the comparator non inverting input terminal voltage is higher than inverting input. The comparator output is at the range of +5V. This voltage is given to microcontroller. When IR transmitter passes the rays to receiver, the IR receiver becomes conducting due to non-inverting input voltage is lower than inverting input. Now

the comparator output is GND. So the output is given to microcontroller. This circuit is mainly used for counting eye lid movement

2.3.4 Alcohol Sensor

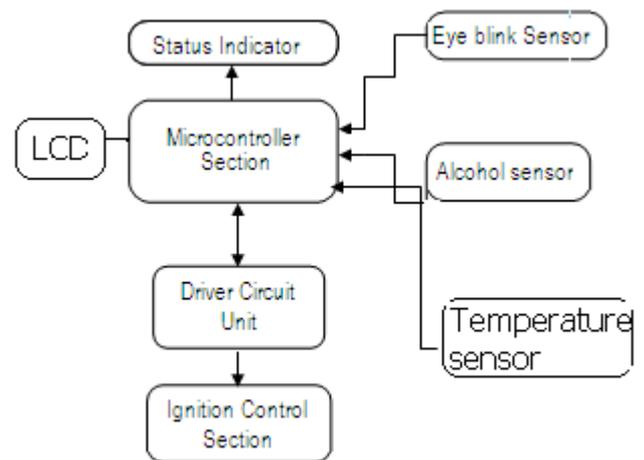
This sensor (FIG 4) is used to detect the presence of dangerous LPG leak in the car or in a service station, storage tank environment. The sensor has an excellent sensitivity combined with a quick response time. (3)The sensor can also sense iso-butane, propane, LNG, alcohol and cigarette smoke. This unit can be very easily incorporated into an emergency light, to give a visual indication to the driver.



Figure 4

In such case the sensor gives caution to the driver indicating that there is a leakage of gas in the vehicle glowing emergency light.

3. Block Diagram



4. Methodology and Implement

Implementing an automated system to vehicles that provides high security to driver and the passengers, by designing an eye blink sensor which continuously monitor number of times the eye blinks, once when the eye blinks count decreases (that means the driver is sleepy), buzzer indication will be given and that wakes driver from sleep. This paper involves measuring the eye blinks using IR sensor. There are two sections in IR sensor .The IR transmitter is used to transmit the infrared rays to our eye. The IR receiver is used to receive the reflected infrared rays of eye. If the eye is closed then the output of IR receiver is high otherwise the IR

receiver output is low. This is to know whether the eye is at close or open position at that condition.

In the transmitter section, eye blink sensor is placed near the eye to sense the blink count and this information is transmitted in the form of pulses and is given to the ARM7 Microcontroller. The ARM7 processor use this information to compare with the normal eye blink programmed in and if any abnormal situation arises, the buzzer indication is given to the driver to alert him, this operation is enabled by means of the circuit connected to the buzzer and the signal is transmitted via RF-transmitter at the frequency of 433.92 MHz's. The transmitted signal is received and the signal is decoded and given to the Microcontroller, which use this information for displaying the alert message in the LCD as programmed along with buzzer alert. When there is any leakage of gas in the vehicle the sensor sense such condition and give the signal by glowing the Emergency light. And in case of any fire inside the vehicle the temperature sensor sense the condition and stops the engine. And in case of any gas leakage the smoke sensor deducts the condition and gives the emergency light.

Algorithm

The algorithm is as follows

- Step1: Start process
- Step2: Data Sense from eye blink sensor
- Step3: If the data send by sensor
- Step4: Process the sensed data
- Step5: Check the mode
- Step6: Normal mode else sleeping mode
- Step7: Normal mode
- step8: No buzzer
- Step9: Else if sleeping mode
- Step10: Buzzer on
- Step11: stop the process
- Step12: if smoke sensed
- Step 13:Led light glow
- Step 14:If heat is sensed
- Step 15:Engine off

The result shown in the figures was received from the eye blink sensor. Here we have designed an eye blink sensor which continuously monitors the number of times the eye blinks, if the eye blinks count decreases that means the driver is sleepy, in that case a buzzer is operated. If smoke& temperature is sensed by the sensor the LED light glows indicating some caution and stops the engine and alert the driver in vehicle and saves from worst case.

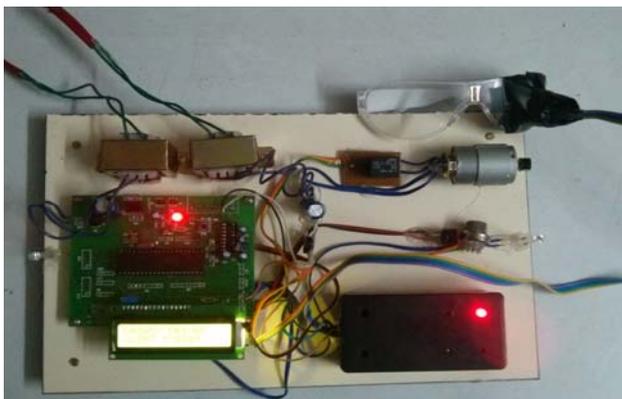


Figure 5

5. Result and Conclusion

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 microcontroller 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

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