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SLEEP SENSING AND ALERTING SYSTEM FOR DRIVERS

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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.

Key Words: Sensor, IR LED Sensor, Microcontroller, alarm

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

2.1Methods 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 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.

2.4 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 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.

2.5 Alcohol Sensor

This sensor 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.

2.6 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.

2.7 Other Methods

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.

3. Aims and Objectives of the study

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.

4. Proposed Methodology

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.

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