Overcoming Drowsiness Alerting System Using LPC2148

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Abstract: *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. The purpose of such a system is to perform detection of driver fatigue. The proposed system is also verified the alcohol consumption during the starting Process of the vehicle using alcohol detector. If the driver is drunk then the buzzer indicates and the vehicle doesn't allow the driver to start the vehicle. If the driver is drowsy, then the system will give buzzer signal and the vehicle is stopped.*

Keywords: Lpc2148, LCD, L293d, IR Sensors, Motor, O2/Co2 Sensors, Alcohol sensor, Keil IDE Embedded C

1. Introduction

The innovations in the automobile industry over the last hundred years have made our vehicles more powerful, easier to drive and control safer more energy efficient, and more environmentally friendly. Majority of the accidents caused today by cars are mainly due to the driver fatigue. Driving for a long period of time causes excessive fatigue and tiredness which in turn makes the driver sleepy or loose awareness. With the rapid increase in the number of accidents seems to be increasing day to day. Therefore a need arises to design a system that keeps the driver focused on the road. Data on road accidents in India are collected by Transport Research Wing of Ministry of Road Transport & Highways. The aim of this paper is to develop a prototype of drowsy driver warning system. Our whole focus and concentration will be placed on designing the system that will accurately monitor the open and closed state of the driver's eye in real time and by tilting of head. This detection can be done using a sensor. Devices to detect when drivers are falling asleep and to provide warnings to alert them of the risk, or even control the vehicle's movement, have been the subject to much research and development. Driver fatigue is a serious problem resulting in many thousands of road accidents each year. It is not currently possible to calculate the exact number of sleep related accidents because of the difficulties in detecting whether fatigue was a factor and in assessing the level of fatigue. However research suggests that up to 25% of accidents on monotonous roads in India are fatigue related. Research in other countries also indicates that driver fatigue is a serious problem. Young male drivers, truck drivers, company car drivers and shift workers are the most at risk of falling asleep while driving. However any driver travelling long distances or when they are tired, it is at the risk of a sleep related accidents. The early hours of the morning and the middle of the afternoon are the peak times for fatigue accidents and long journeys on monotonous roads, particularly motor-ways, are the most likely to result in a driver falling asleep. In this paper the algorithms for face detection and eye tracking have been developed on frontal faces with no restrictions on the background .The proposed method for eye tracking is built into five stages. These include coarse and fine face detection, finding the eye region of maximum probability.

2. Proposed System

The proposed system is also verified the alcohol consumption during the starting Process of the vehicle using alcohol detector. If the driver is drunk then the buzzer indicates and the vehicle doesn't allow the driver to start the vehicle. If the driver is drowsy, then the system will give buzzer signal and the vehicle is stopped.
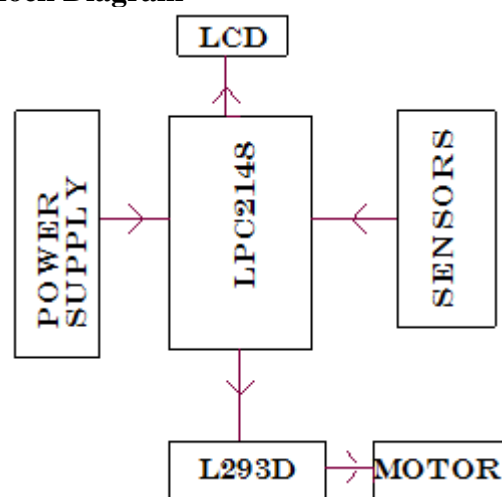
3. Block Diagram

Figure 1

4. Function

This project involves measure and controls the eye blink using IR sensor. The IR transmitter is used to transmit the infrared rays in our eye. The IR receiver is used to receive the reflected infrared rays of eye (in fig 1). If the eye is closed means the output of IR receiver is high otherwise the IR receiver output is low. This to know the eye is closing or opening position. This output is give to logic circuit to indicate the alarm. This project involves controlling accident due to unconscious through Eye blink. Here one

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eye blink sensor is fixed in vehicle where if anybody looses conscious and indicate through alarm. We are also using alcohol detector, if any driver is consuming alcohol while driving automatically the system will give the indication it will stops the motor. And also we are opening the door automatically.
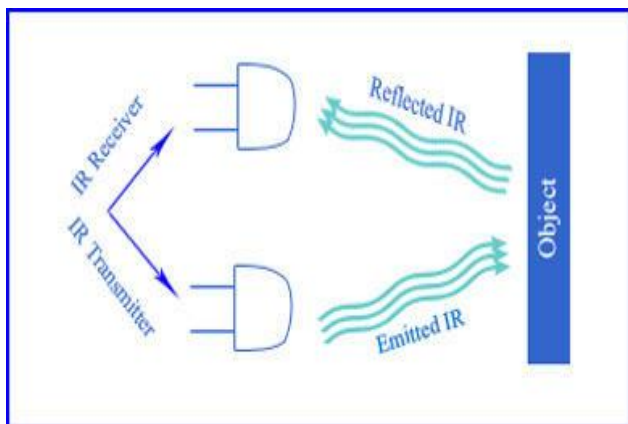

Figure 2

In our project we are using ir sensor to detect the drowsiness, the output of the sensor is connected to the adc Here we are using 10 bit adc with reference voltage 3.3v.

Output voltage =(3.3v/1024)*Adc digital.(in mv)
1) If output voltage is >1000mv && <2000mv it is called the person is in normal state
2) If out voltage is >3000mv means it is the drowsiness stage to the driver.
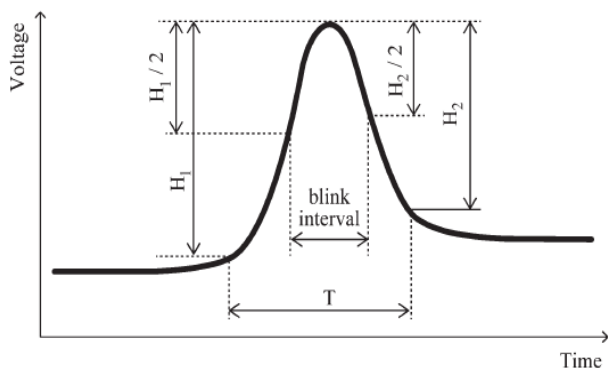

Figure.3:Graph between sensor output voltage and time.

5. Futures of LPC2148

- ARM7TDMI-S based high-performance 32-bit RISC Microcontroller with Thumb extensions
- 512KB on-chip Flash ROM with In-System Programming (ISP) and In-Application Programming (IAP), 32KB RAM,
- Vectored Interrupt Controller,
- Two 10bit ADCs with 14 channels,
- USB 2.0 Full Speed Device Controller,
- Two UARTs, one with full modem interface.
- Two I2C serial interfaces, Two SPI serial interfaces
- PWM unit,
- Real Time Clock with optional battery backup,
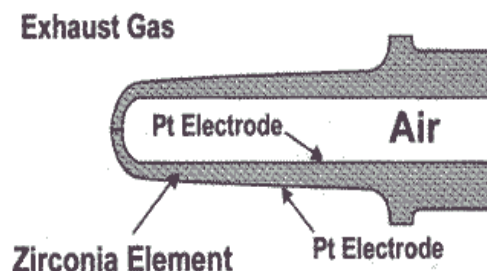
6. How does the Oxygen Sensor Work

Figure 4: Oxygen Sensor

7. Zirconia Sensors

An important property of the Zirconia element is that it can conduct oxygen ions above a temperature of about 350°C. When the sensor is fitted, the outside of the Zirconia element is exposed to the exhaust gas and the inside is in contact with reference air. Both sides of the element are coated with a thin layer of platinum that act as electrodes and carry the sensors voltage signal from the Zirconia element to the lead wire. At operating temperature, oxygen ions are able to pass through the element and deposit a charge on the platinum electrode thus generating a voltage signal. If the AFR is rich, a high signal voltage is generated across the electrodes due to the difference in oxygen concentration present across the two sides of the element. Conversely, if the AFR is lean, a low voltage is generated across the electrodes due to the small difference in oxygen content between exhaust gases and the reference air inside the sensor

8. Alcohol sensor

It has good sensitivity and fast response to alcohol. It is suitable for making Breathalyzer. This Grove implements all the necessary circuitry for MQ303A like power conditioning and heater power supply. This sensor outputs a voltage inversely proportional to the alcohol concentration in air.

Figure 5: Alcohol sensor

9. L293D

It is High power transistor used to drive the motor. The L293 and L293D are quadruple high-current half-H drivers. The L293 is designed to provide bidirectional drive currents of up to 1 A at voltages from 4.5 V to 36 V. The L293D is designed to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V. Both devices are designed to drive inductive loads such as relays, solenoids, dc and bipolar stepping motors, as well as other high-current/high-voltage loads in positive-supply applications. All inputs are TTL compatible. Each output is a complete

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totem-pole drive circuit, with a Darlington transistor sink and a pseudo-Darlington source. Drivers are enabled in pairs, with drivers 1 and 2 enabled by 1,2EN and drivers 3 and 4 enabled by 3,4EN. When an enable input is high, the associated drivers are enabled and their outputs are active and in phase with their inputs. When the enable input is low, those drivers are disabled and their outputs are off and in the high-impedance state. With the proper data inputs, each pair of drivers forms a full-H (or bridge) reversible drive suitable for solenoid or motor applications. On the L293, external high-speed output clamp diodes should be used for inductive transient suppression. A VCC1 terminal, separate from VCC2, is provided for the logic inputs to minimize device power dissipation. The L293and L293D are characterized for operation from 0°C to 70°C.
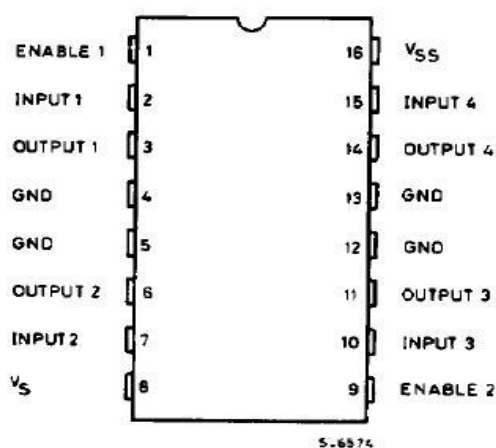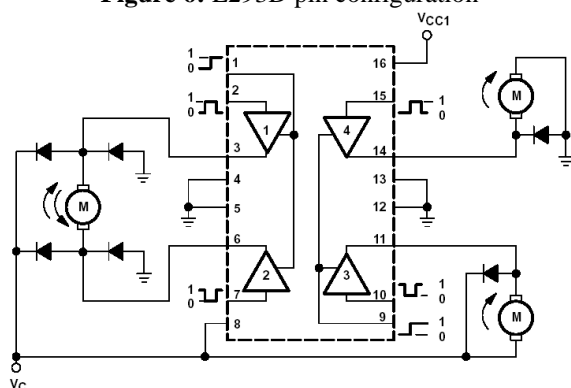

Figure 6: L293D pin configuration

Figure 7: L293D motor interface

10. Advantages

1) Intelligent Transportation
2) Accidents due to drowsiness can be avoided.
3) Drunken driving also prevented by using alcohol detector.
4) Safe parking with no damage or distraction to nearer vehicles.
5) Spectacle are used to detect the eye movement and closure, it's free from reflection & easy to use.

11. Result

This project is verified at the different aged persons in the different times, either it is long driving time or short driving time we got exact result at all conditions. if the driver is facing drowsiness the system is giving buzzer and also we

verified the driver's drunk and drive condition, in this condition also we got perfect result at all time in both conditions we are giving buzzer and also we are opening the vehicle door when the door is open automatically the percentage of oxygen increases which decreases driver's drowsiness.

12. Conclusion

We developed a system that localizes and track the eyes and head movements of the driver in order to detect drowsiness, and also drunk and driving, the system uses a combination of microcontroller arduino Uno in order to localize the eyes and accelerometer module for localizing head movement.

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