

Road Accidents Prevention System Using Driver's Drowsiness Detection

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Abstract-Driver drowsiness is the major reason behind most of the road/vehicle accidents. It is very important to build a system to prevent collisions due to drowsiness problem of drivers. The basic goal to develop the Drowsy Driver Detection System is to avoid the road accidents which occur in a large scale on roads. The purpose of developing such a system is to keep the driver alert while driving to avoid accidents on roads and to save life. So we need a system that must come with every car and if it detects the sleepy driver it must stop the vehicle immediately. In addition to this if the driver is slept the vehicle will be stopped, and it monitors the heartbeat, pulse rate, temperature and alcohol detection of the driver and displays it in the LCD and giving the alarm. These parameters are very important because it shows the body status of the driver.

Keywords-Raspberry Pi , LCD , Pi Camera ,LM3 Sensor ,MQ3 Sensor ,Pulse Sensor ,Twilio Server

I. INTRODUCTION

In recent years, driver drowsiness has been one of the major causes of road accidents and can lead to severe physical injuries, deaths and significant economic losses. Various studies have suggested that around 20% of all road accidents are fatigue related, up to 50% on certain roads. Drowsiness is a process in which one level of awareness is reduced due to lacking of sleep quietly. When the driver is suffering from drowsiness driver loses the control of the car, so driver might be suddenly deviated from the road and hit an obstacle or a car to overturn. It has proved from different studies that the main two risky behaviors are sleepy driving and drunk driving, which are interrelated to a reasonable rise in accidents these days. But most of the drivers do not identify the dangers of fatigued driving. It is seen that a person's cerebral and bodily function have been deliberately impaired because of sleepiness, which influence safety-critical tasks such as attention, operating, effective memory and coordination.

The focus will be placed on designing a system that will accurately monitor the movement of eye by the pi camera, heart-beat respiration rate by the pulse sensor, temperature by the LM3 sensor and alcohol by the MQ3 sensor detection of the driver .In this p we use sensors to measure all these factors. The values measured will be sent to the raspberry pi

here the measured values will be compared with the reference values. If the values measured does not match with the reference values then the raspberry pi will send a warning message in the LCD display and buzzer give the warning to prevent the accident.

II. PROPOSED SYSTEM

This is small system so we can easily embed it on any vehicle. The above system mainly consist of Raspberry Pi as controlling module, Camera module, LM35 Temperature Sensor as Body temperature sensor, MQ3 Sensor as Alcohol detector, Pulse Sensor as Heart rate sensor, Ignition Relay, LCD Display and a buzzer.

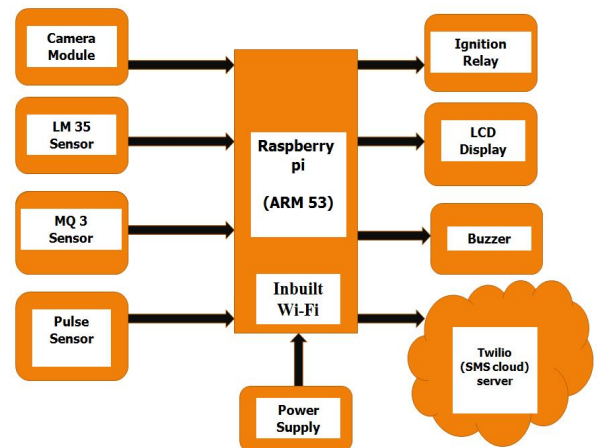


Fig.1. Block diagram of proposed Drowsiness Alert System

III. BLOCK DIAGRAM DESCRIPTION

Raspberry Pi

This powerful credit-card sized single board computer can be used for many applications and supersedes the original Raspberry Pi Model B+ and Raspberry Pi 2 Model B. Whilst maintaining the popular board format the Raspberry Pi 3 Model B brings you a more powerful processor, 10x faster than the first generation Raspberry Pi. Additionally it adds wireless LAN & Bluetooth connectivity making it the ideal solution for powerful connected designs. Raspberry Pi hardware supports embedded Linux which already have

library. Fig.2. shows the features of Raspberry Pi board. The input from Temperature sensor (LM35), Alcohol sensor (MQ3), Pulse (heart beat) sensor and the behavior of eye is given to the Raspberry Pi.

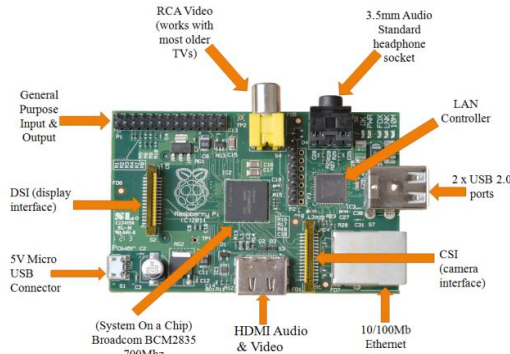


Fig. 2. Raspberry pi board

Pi Camera

Pi camera come with Raspberry Pi. Pi camera module is also available to which can used to take high definition videos and photographs. It is easy to use for beginners. The Raspberry Pi Camera Module is a 5MP CMOS camera with fixed focus lense that is capable of capturing still images as well as high definition video. Stills are captured at a resolution of 2592 × 1944. The work of Pi camera is observe the moment of eye .This concept we are using in this driver's drowsiness.



Fig.3. Pi Camera

LM35 Sensor

LM3 Sensor is also known as Temperature Sensor. The LM35 is one kind of commonly used temperature sensor that can be used to measure temperature with an electrical o/p comparative to the temperature (in °C). It can measure temperature more correctly compare with a thermistor. This sensor generates a high output voltage than thermocouples and may not need that the output voltage is amplified. The LM35 has an output voltage that is proportional to the Celsius temperature. The scale factor is .01V/°C.

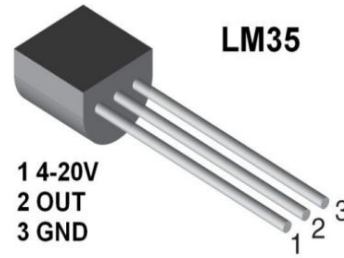


Fig.4. LM35 Sensor

MQ3 Sensor

MQ3 Sensor is nothing but the alcohol sensor. This alcohol sensor is suitable for detecting alcohol concentration on your breath. It has a high sensitivity and fast response time. Sensor provides an analog resistive output based on alcohol concentration. The drive circuit is very simple, all it needs is one resistor. A simple interface could be a 0-3.3V ADC. This alcohol sensor sense the driver is drunk or not.



Fig.5. MQ3 Sensor

Pulse Sensor

Pulse Sensor is nothing but the heart beat sensor. The sensor which measures heart beat is called heart beat sensor .Heart Beat can be measured based on optical power variation as light is scattered or absorbed during its path through the blood as the heart beat changes.

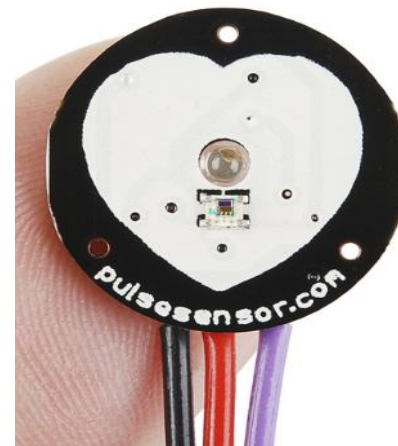


Fig.6. MQ3 Sensor

LCD Display

LCD is the Liquid Crystal Display is an electronic display module. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. The working of LCD is to display the information or message.



Fig.7. LCD Display

Twilio Server

Twilio is a cloud communications platform. Twilio allows programmatically make and receive phone calls and send and receive text messages.

IV. CONCLUSION

In this paper, we have reviewed the methods to determine the drowsiness state of a driver. This paper also discusses the various ways in which drowsiness can be manipulated in a simulated environment. 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. This paper involves avoiding accident through moment of eye by camera. Here one camera is fixed in vehicle where if driver lose his consciousness, then it alerts the driver through buzzer to prevent vehicle from accident and display the warning message. The alcohol and temperature sensor are used for further safety system in the vehicle. In vehicle which also consists of an alcohol sensor which will sense if the driver is drunk and would not start the vehicle. The main objective of the paper is to detect the drowsy in drivers to prevent accidents and to improve safety on the roads.

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