

Momentary Collision Detection Based on Eye Gaze Tracking

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ABSTRACT

Our safety is the first significance while travelling or driving. One mistake of the driver can lead to severe physical damages, deaths and significant economic losses. Currently there are many systems available in market like navigation systems, various sensors etc. to make driver's work stress-free. There are several reasons especially human faults which gives rises to the road accidents. Reports say that there is a huge increase in the road accidents in our country since last few years. The main reason occurring from the highway accidents is the drowsiness and tiredness of driver while driving. It is a essential step to come with an effective technique to detect drowsiness as soon as driver feels sleepy. This could save huge number of accidents to occur. We conduct the review on various designs on drowsiness recognition methods to decrease the accidents.

Keywords: *Driver Drowsiness , Alcohol detection ,Eye Blink*

I. INTRODUCTION

The increasing number of traffic accidents due to a driver's reduced alertness level has become a serious problem for society. Some of these accidents are the result of the driver's medical state. However, a majority of these accidents are connected to driver fatigue, drowsiness of drivers. Car accidents related with driver fatigue are more likely to be serious, leading to serious damages and deaths. It is estimated that 30% of all traffic accidents have been caused by drowsiness. It was demonstrated that driving performance deteriorates with increased drowsiness with resulting crashes constituting more than 20% of all vehicle accidents. Usually transportation system is no longer sufficient. One can use a number of different techniques for examining driver's drowsiness. There are some methods which are used to identify drowsiness in drivers like by identifying of driver action or physiological characteristics of driver like or vehicle movement etc. Traffic survey shows that driver fatigue may be a responsible factor in up to 20% and due to alcohol drinking it is about 31% of all road accidents

.The main purpose of this drowsiness and alcohol finding system is to develop a system that can decrease the number of accidents from drowsiness and drunk driving of vehicle. In the first part of the this project is detection of drowsiness ,for that we using a camera for identifying image or face, Eye detection is the important part of this project. Then the detected information will be directly sent to authorized person .Driver fatigue is a significant factor in a large number of vehicle accidents. The development of technologies for detecting or preventing drowsiness at the wheel is a major challenge in the field of accident avoidance systems. Because of the hazard that Drowsiness presents on the road, methods need to be developed for counteracting its affects .The aim of this project is to develop a prototype drowsiness detection system. The focus will be placed on designing a system that will accurately monitor the open or closed state of the driver's eyes in real-time.

II. RELATED WORK

It is essential in our working to find the blinking of eye, since it is used to drive the device and to operate events. So blink detection has to be done, for which we can avail readily available blink detectors in market or we can incorporate it with a special instruction written in image processing that, if there is no pupil found for the certain period of pre-determined i.e. time greater than the human eye blinking time then consider an occurrence called “blink”, for which the set of operations will be followed. Here, in this case we need to set time as 1 second or above it, as “blink event” is different from “normal eye blinking”. We need to achieve testing for only blink event estimation, and not to find normal eye blinking.

Implementing an automatic security system to vehicles that provides high security to driver, designing an eye blink sensor which constantly monitors the number of times the eye blinks, if the eye blinks count decreases that means the driver is sleepy at that time buzzer will on and then turn the vehicle’s ignition off. This paper involves determining the eye blinks using IR sensor. There are two sections in 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. If the eye is closed then the output of IR receiver is high otherwise the IR receiver output is low. This to know the eye closing or opening position.

III. PROPOSED WORK

TEMPLATE MATCHING TECHNIQUE:

In this technique, one can use the states of eye i.e. if driver closes eyes for some specific time then system will produce the alarm. Because in this techniques system has both close and open eyes template of driver. Open Eye And Close Eye Template is the method which simple and easy to implement, because templates of both open and closed eye states are shown in figure 1&2 are available to system. In which we can recognize the drowsiness by the eye closing time. This technique based on eye closure is well suitable for real world driving circumstances, since it can be non-intrusive by using cameras to detect the open/closed state of the eyes.



Figure 1

In figure 1 the Eye is in normal condition the camera we are using in raspberry pi will always engage in tracking the drivers eye ,in this situation as the driver condition is normal the system works normally.



Figure 2

In figure 2 the eyes are closed ,in this situation the camera we are using in this system helps in detecting the drowsiness condition of the driver ,then the buzzer will on and also driver image will be captured and send to

the authorized person along with the location of the vehicle.



Fig.3:Eye Blink counting when driver is in normal condition



Fig.4:Eye Blink counting when driver is in sleeping condition

Implementing an automated security system to vehicles that provides high security to driver, designing 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 at that time buzzer will on .This paper involves measuring the eye blinks using Raspberry pi camera. If the eye is closed then the output of Raspberry pi receiver is high otherwise the Raspberry pi receiver output is low. This to know the eye closing or opening position. In the transmitter section, Raspberry pi camera 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 Arduino. The Arduino uses this information to compare with the normal eye blink programmed in the Arduino and if any unusual situation arises, the vehicle buzzer will on , In this proposed system the drowsiness condition of the driver will be detected by template matching of the drivers eye, if the driver is in sleeping condition then the buzzers will on and the image of the driver will be directly sent to the authorized person from both Email and the SMS , here we are also using GPS to get the exact location of the particular vehicle .

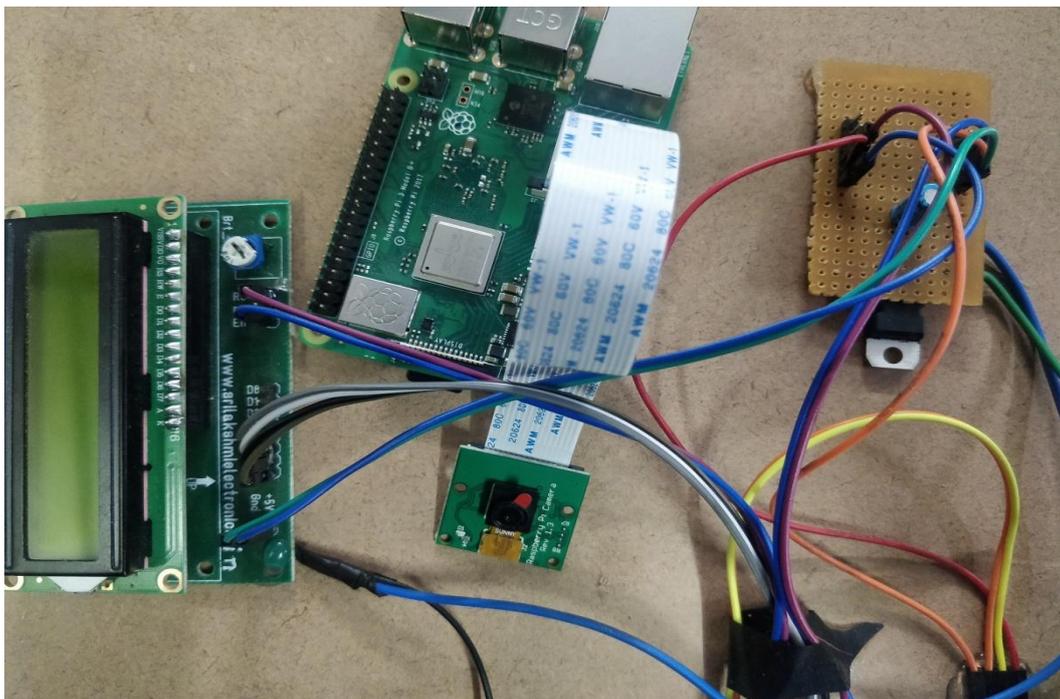


Figure.5

IV. METHODOLOGY

In the block diagram the Raspberry pi is used along with the camera for drowsiness detection, the arduino is used to control the over all operations, here we are using alcohol sensor in which if the driver is drunk then ignition system will be off, and he can't start the vehicle and also if the driver gets sleepy then the camera detects his drowsiness and it manages to alert the driver from the buzzer sound and the image of the driver is captured and send to authorized person ,here we are also using GPS and GSM for the exact location mapping.

Block diagram:-

Camera module

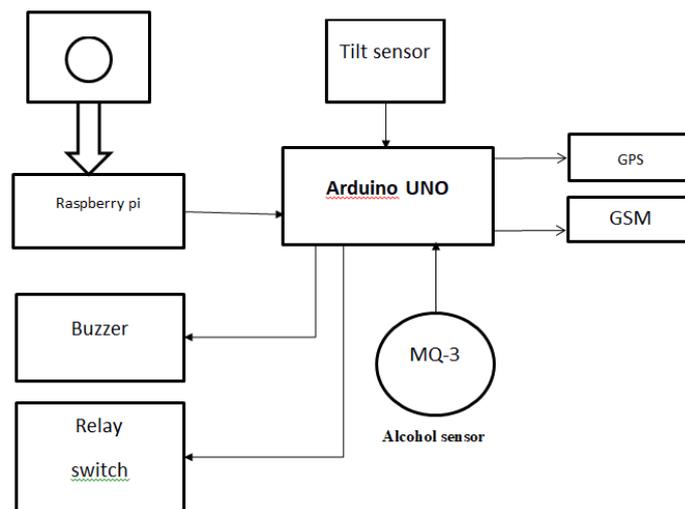


Fig.6:Block diagram

Flow Chart:-

Here the detected signal from the Raspberry pi camera reads the sensor and if the driver is drunk then the control of the vehicle is possible ,and the Raspberry pi helps the system to take the picture of the driver and sends to Mail through WIFI.

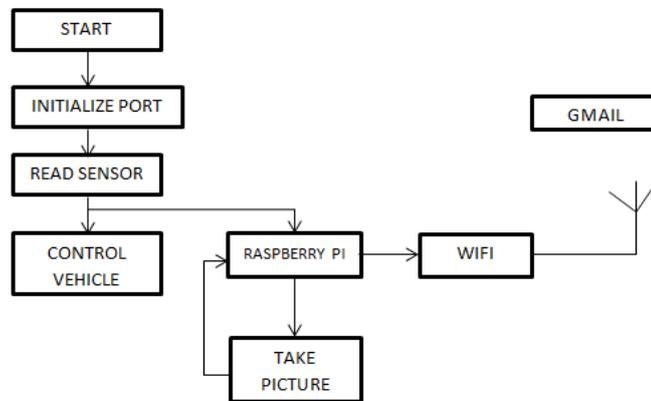


Fig.7:Flow Chart

V. CONCLUSION

The driver abnormality monitoring system advanced is capable of detecting drowsiness, drunken and reckless behaviors of driver in a short time. The analysis and design of driver drowsiness detection system is presented. The proposed system is used to avoid several road accidents caused by drowsy driving. When the eyes have been closed for too long, a caution signal is issued. Processing judges the driver's alertness level on the basis of continuous eye closures. This paper involves monitoring accident due to unconsciousness through Eye blink. Here one eye blink sensor is fixed in vehicle where if driver loses awareness, then it alerts the driver through buzzer to prevent vehicle from accident then the condition of the driver will be sent to the authorized person through GSM and Email along with the person condition along with the person image.

VI. REFERENCES

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