



CIRCUMVENTING TRAFFIC COLLISION INFLUENCED BY DROWSY DRIVING THROUGH IOT TECHNOLOGY

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Abstract—It is a universally approved fact that when the driver is drowsy fatal road accident can occur. Therefore the invention of counter measure device is very crucial in order to avoid accidents which occur due to sleep deprivation of driver. Aim of this paper is to explore permanent solution to collisions caused by drowsy driving. Digital image processing (DIP) is an effective application which plays a decisive role in road accident caused by drowsy driving. DIP is an efficient research exploration which can be used in many fields. No sooner driver begins to drowsy than this application detects his state of sleepiness and attempts to warn driver. Main objective of this paper is an attempt to exhibit the right design to develop IoT based hardware which is highly advanced device. The proposed device will track down inert state of driver and sends warning signal in order to bring back to alert state. System uses Eye Aspect Ratio (EAR) as input to detect the drowsy state of driver. Whereas the entire system is executed in Raspberry Pi3 it uses web camera to detect eye blink and drowsiness. The next phase is the traffic collision detection system. Here the devices which we use are of two types that is, ultrasonic sensors and touch sensors. The obstacles which may lead to an accident are of many such as, another vehicle with uncontrolled speed or maybe a human obstacle or even it could be a natural obstacle. Here in this system the ultrasonic sensors will continuously observe the distance between vehicles and if any obstacles are found as to cause an accident then the ultrasonic sensor will sense and alarm message will be sent by using Raspberry Pi. And hence the upcoming accident could be avoided. But in case, in spite of all these efforts if an accident occurs then the touch sensors will detect the crash and will immediately send message to the emergency number by using GSM and also by using GPS the location of the crash site along with accident message will be sent to the nearby medical facility. So that the driver will get all necessary treatment.

Keywords—DIP, IoT, alarm, traffic collision

I. INTRODUCTION

In modern times the purchasing of automobiles has become much easier. The alarmingly increasing number of deaths due to road accident and densely claustrophobic traffic issues are the serious negative impacts of having great many vehicles on roads. According to the survey done on drowsy driver detection system nearly 16 Indian die in road accident every hour. As national highway traffic safety administration (NHTSA) around 100000 collisions take place every year in us alone due to driver's fatigue. This paper proposes IOT as an efficient means to fix the issue of traffic collision. The chief function of IOT is to control digital devices as well as things through user friendly GUI over the internet. Survey done on IOT reflects the fact that it is one of the most desired as well as utilized product in coming age. Intension of this paper is to design a nonintrusive device which detects the driver's drowsy state and sends a warning signal. State of drowsiness in driver has probability to avoid casualties during the traffic collision. As it produces warning signal to driver immediately when he or she is going through face of fatigue, one can hope that IOT reduces number of deaths in road accidents. In order to prevent accidents caused by drowsy driving, device has to

monitor movements of eyes and mouth of driver each and every second, by analyzing this movement device can trace out of driver in order to stop accident from happening.

II. LITERATURE REVIEW

The National Highway Traffic Safety Administration estimates that drowsy driving was responsible for 72,000 crashes, 44,000 injuries and 800 deaths in a year. However these numbers are under estimated and up to 6000 fatal crashes each year may be caused by drowsy drivers. The AAA says that 20% of all fatal accident in the USA are due to drowsiness, we can only imagine what states are like for India which has highest road accident in the world at 18%. This project uses Internet of things(IoT) and Image processing technologies to solve this problem of accident by detecting drowsiness and collision using current technologies and also with upcoming technologies like Global Positioning System(GPS), Global System for Mobile(GSM), SmartPhone, etc. Some researchers have attempted to solve the problem of drowsy driving and so reduce the accidents and the number of life's spoiled in roads. There are references of many papers in recent years which have addressed the fundamental problems of drowsy driving using various techniques.

2.1 Real-Time Monitoring and Prediction of Driver Fatigue

This real-time nonintrusive monitoring and prediction driver fatigue system uses two charge coupled camera with infrared illuminator to monitor the driver face without interfering the driving. This system validates under real-life, real-time drowsy conditions with human having different ethnic backgrounds, genders and ages; and under different lighting conditions. This system founds reliable, robust and efficient for different ethnic people and provide timely warning on driver's fatigue.

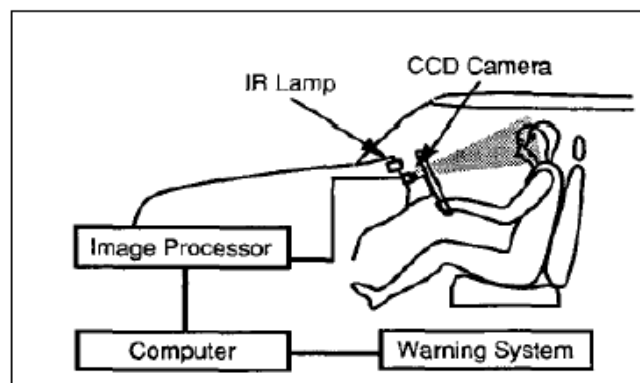


Fig - 1: System Configuration

2.2 An Android-Based Driver Drowsiness Monitoring System

The traffic accident has become one of important factors of abnormal deaths, and the status of the driver is especially important for traffic accident. This paper describes an Android-based driver drowsiness monitoring system. The system collect EEG signal of driver, analysis EEG data and extract feature, determine the condition of drowsiness, if yes, then give alert.

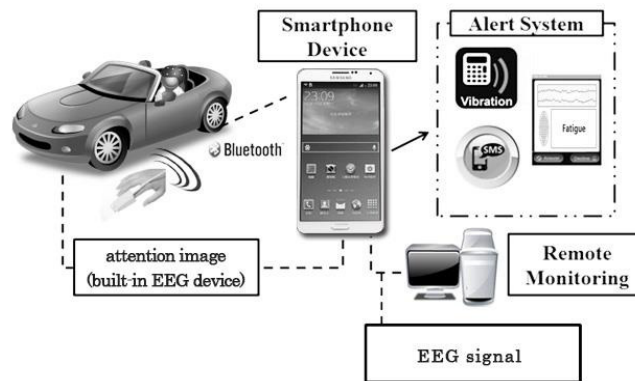


Fig - 2: System Configuration

2.3 Drowsy driving detection and alert system

The system works on the concepts of ‘Image processing. The main concept includes the recognition of face (facial features) and these features are taken as the basis for the processing. The threshold features are set and after that the deviation from these thresholds would result into the alert system activation. Additionally, the pressure along steering wheel using sensors is continuously monitored at the same time. The various features incorporated are eye contours, jaw movements, shoulder-to head tilt angle and pressure on the steering wheel. Following the of features extractions, the system uses ‘Viola-Jones face detection algorithm. The system is real time and at the same time it is non-intrusive.

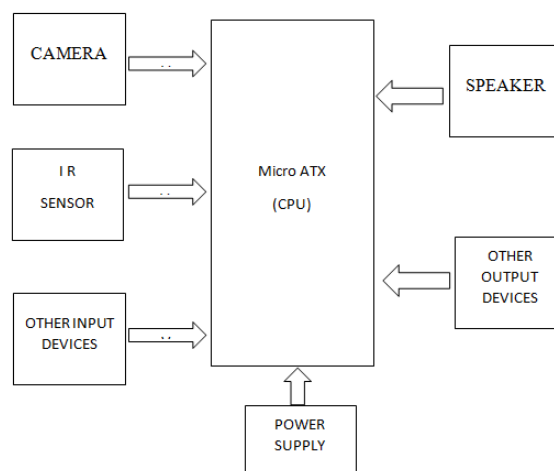


Fig – 3 Block diagram for Drowsy Driving Detection and Alert System

2.4 Intelligent Traffic Accident Detection System Based On Mobile Edge Computing

The lack of awareness of the traffic accident ahead would probably cause serious congestion or more serious secondary traffic accidents. Usually, accident detection is to use equipment in vehicles to detect accidents and send accident information to related people via SMS. This paper proposes an intelligent traffic accident detection system based on Mobile Edge Computing with proximity, low latency and computing and vehicle identification. Our system utilizes common smartphones to obtain acceleration and speed, and identifies images showing accident scenes mainly at servers in case of false positives, realizing automation of accident detection and notifying surroundings and departments like hospital, etc.

III. PROBLEM FORMULATION

The major problem that we face in many of the country is the death's caused due to road accidents. Even though there are many reasons that causes the road accidents the major cause is

drowsiness. Drowsiness is caused due to the lack of proper sleep, it will make your driving inputs poorer by destroying your reaction time. According to the survey conducted in 2018, it was clear that about 75% of the road accidents are caused due to drowsiness. So, here we are introducing the concept of IoT in a different way that is, the system will help in giving proper alertness to the driver if he or she is falling to drowsiness. The system will not only give alert to the driver but also contains many other advantages which will help in the minimization of road accidents.

IV. PROPOSED METHODOLOGY

The methodology which we have used in the IoT based drowsy driving warning and traffic collision system consists of the following parameters:

The drowsy driving system is processed by Raspberry Pi3.



Fig – 4 System Configuration

Here, the driver will be continuously analyzed by the web camera and if his/ her eyelid are found to be closed for about two seconds or more, then by using the eye aspect ratio (EAR) it will detect whether the driver is sleepy or not and if found sleepy then the driver will be warned by an alarm. . The EAR is mostly constant when an eye is open and is getting close to zero while closing an eye. It is partially person and head pose intensive.

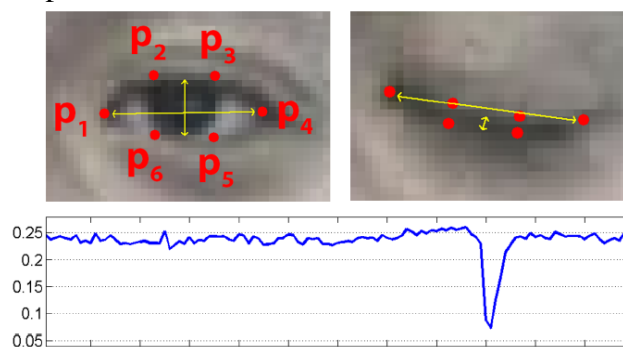


Fig – 5 Representation of Eye Aspect Ratio (EAR)

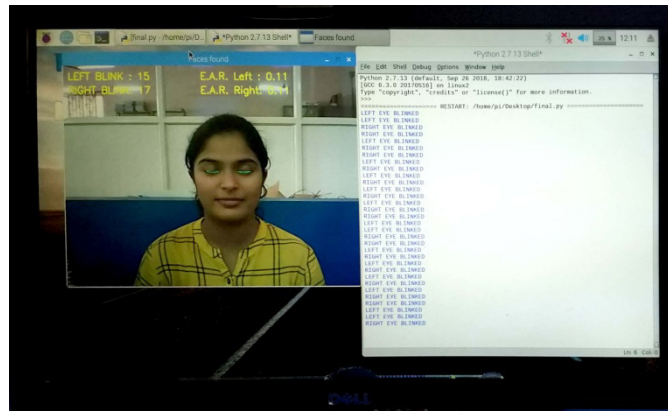


Fig – 6 Driver Fatigue Monitoring System

Traffic collision detection is the next parameter under methodology. If, the obstacles found in front of the vehicle which may leads to accident are detected using ultrasonic sensor and proper warning is given to the driver. Incase if the driver is not responding to the given warning and if any accident occur, then touch sensor will detect the crash and for the safety of the driver the location of the crash site and emergency message will be sent to the registered number along with nearby medical facility using GSM & GPS.

CONCLUSION

The real time drowsiness detection system here to locate driver's eyes to monitor them for fatigue is capable of detecting the drowsiness in a rapid manner. This paper discusses about the internet of things (IOT) and the importance of IOT in our life. We developed a system that localizes and track the eyes of the driver in order to detect the drowsiness. The system uses the combination of template with the based matching and feature based matching in order to localize the eyes. The system is capable of differentiating a normal blink verses the drowsiness. This paper also discusses about unique and attractive features of the above proposed system based on IOT and interconnectivity of sensors and sound system of the cars that will lead to a safer life for drivers. Our system consists of a Raspberry pi3 and a web camera module that continuously keeps scanning for facial landmarks. Also, now a day's as the number of vehicles increases chances of crashes are also high. Hence for the safety of the driver and for reducing the number of crashes we have introduced traffic collision detection system using sensors. The sensors will help in detection of obstacles and will send alarm messages to the driver. Also, incase if an accident occur then the other sensors will sense the crash and message will be send to the emergency numbers for the safety of the driver and on time medical treatment. Majority of portable devices are aimed at providing unlimited access to internet services for data storage and synchronization with other remote devices. Hence, there is a need of faster data acquisition and quick decision making of embedded computing system for real time applications for making vehicles safe, automatic, responsive and intelligent.

Further, the development of smart grids fascinates the overall process of communication between human and machine rather than machine to machine communication. As humanity and human life is the most important thing in this world we would like to propose this safety system that should come in all the cars and enhance the safety for the car drivers.

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