A METHODOLOGY: IOT BASED DROWSY DRIVING WARNING AND TRAFFIC COLLISION INFORMATION SYSTEM

Sagar D. Charde¹, Prof. N. P. Bobade ², Dr. D. R. Dandekar ³

¹PG Scholar, Department of Electronics Engineering, BDCE, Sevagram, Wardha –442102, INDIA
²Assistant Professor, Department of Electronics Engineering, BDCE, Sevagram, Wardha –442102, INDIA
³Professor, Department of Electronics Engineering, BDCE, Sevagram, Wardha –442102, INDIA

---***---

Abstract - *The Digital Image Processing (DIP) is vast and important research challenge, there are many fields where digital image processing is use for number applications. One of them is to detect the drowsy state of human. The recent boom in smartphone industry has plenty of potential and can use for various applications. So if the digital image processing technique embedded with smartphone then we can have new portable product which will be efficient for detection of driver's fatigue.*

In this paper, we will represent the design approach to develop the android platform based application and IoT based hardware, which is advanced product related to driver safety on the roads using combination of mobile computing and digital image processing and controller. Our proposed system will detect driver drowsiness and gives warning in form of alarm. And traffic collision information system will continuously monitor the distance from vehicle which is done by the ultrasonic sensor. If the ultrasonic sensor detects the obstacle then it will accordingly warns the driver.If somehow collision occurs it will detect collision using impact sensor and provide emergency help service for driver.

Key Words: **Android, DIP, Drowsy Driving, IoT, Smartphone, Traffic Collision.**

1. INTRODUCTION

Nowadays due to easier EMI options people are able to afford cars, bikes thus adding to the traffic day by day. Even some manufactures have adopted various marketing schemes. This not only adds to the traffic but also increases the risk of deaths due to accidents and vehicle collision. Due to heavy traffic on some roads so that emergency vehicles can't arrive on time so that leading to more deaths due to road accidents.

According to Forbes report, an estimated 5000 lives lost in just USA by drowsy driving, at an annual cost of something like $109 billion.

The AAA says that 20% of all fatal accident in the USA are due to drowsiness, we can only imagine what stats are like for India which has highest road accident in world at 18%. This project uses Internet of Things (IOT) as a solution to the problem of accident detection and collision avoidance using present day technologies and also upcoming technologies like Global Positioning System (GPS), Global System for Mobile (GSM), Smartphones**.**

The main objective behind this project is to develop a nonintrusive system which can detect drowsy state of the driver and issue a warning. Driver drowsiness detection technologies can reduce the risk of a catastrophic accident by warning the driver of his/her fatigue. The development of technologies for preventing fatigue is a major challenge. To prevent drowsiness of driver during driving requires a method for accurately detecting a fall in driver alertness. Micro sleeps which are short period of sleeps lasting 2 to 4 seconds are good indicator of fatigue state. Thus by constantly observing the eyes and mouth movement of the driver it can detect the drowsy state of driver early enough to avoid accident.

2. LITERATURE REVIEW

2.1 Research on Internet of Things for Smart Cities

The Internet of Things (IoT) shall be able to implement perfectly and consistent with large number of different and heterogeneous systems. Building a generalize architecture for the IoT is the complex task, because IoT has extremely large variety of devices, link layer technologies, and services that may be involved in such a system.[1]

The Internet of Things (IoT) is newly adapted technology which has plenty of room to grow, because internet of things have huge amount of application. This generation is rapidly moving toward cities so that cities must have to grow them self for this exodus. So more people in city needs better life style, good housing and quality infrastructure. Hence the IoT which is widely used in monitoring and controlling of different parameter. As we know, The Internet of Things have many applications, so that produce tons of data, hence the data management is challenge in IoT based system as data comes from different location in the network.

SMART CITY CONCEPT AND SERVICES

According to Pike Research on Smart Cities, the Smart City Market is estimated at 1000 of billion dollars by 2020, with an annual spending of nearly 16 billion. This market consist of different service sectors, Smart E-Governance, Mobility, Smart Utilities, Smart Buildings, and Smart Environment.

Fig-1: Applications of smart city.

2.2 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. [2]
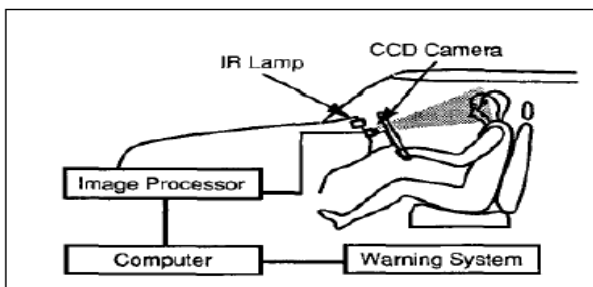

Fig-2: System Configuration

2.3 Drowsy Driver Warning System Using Image Processing

Driver in-alertness is one of the important cause for most accident related to the vehicles crashes. Driver drowsiness resulting from sleep disorders is an important factor in the increasing number of the accidents on today's roads. Fatigue is human parameter that shows he/she is tired. The best remedy for fatigue is proper sleep.

Drowsy driver warning system can form to possibly reduce the accidents related to driver's drowsiness. By placing the camera inside the car, we can monitor the face of the driver and look for the eye-movements. The eye is main facial parameter to monitor because if driver is getting micro sleep then it will closed eyes for few seconds or longer which is the sign of driver drowsiness. So in such case system will alert the driver hence accident can tackle.

This paper describes how to find and track the eyes. Also it explain a method to determine if the eyes are open or closed. The main criterion of this system is that this system must be non-intrusive and system should start when the vehicle is turned on without driver initiation the system. Driver shouldn't provide any feedback to system. The system must operate regardless of the colour, size texture of face and different illumination. [3]

3. PROBLEM FORMULATION

Road accidents have been a major issue for most of the countries. Studies shows that the number of deaths due to road accidents is increasing year by year making safety a major concern. Driver drowsiness is one of the major cause of road accident in which driver's lack of concentration on driving and traffic due to fatigue. Internet of Things (IoT) coupled with Smartphone technology, Image processing algorithm, aims to minimize the deaths that occurs worldwide due to road accidents and to increase the life span and mortality rate of person, proposed System is design to reduce road accident due to the drowsy driving .It will deal with the major issues about driver fatigue and Collision detection and suggest remedies.

4. PROPOSED METHODOLOGY

IoT based Drowsy Driving Warning and Traffic collision Information System will consists of following methodology-

Drowsy driving warning system will be implement on smartphone with the help of one of image processing algorithm. Driver`s face expression such as eye blinking , mouth position will continuously monitor by smartphone camera .If the driver face expressions match with drowsy parameter then smartphone will alert the driver. For emergency situation, driver can call for medical assistance by speaking "help" so smartphone will detect this command and will sent help message to nearest hospital with its current location.
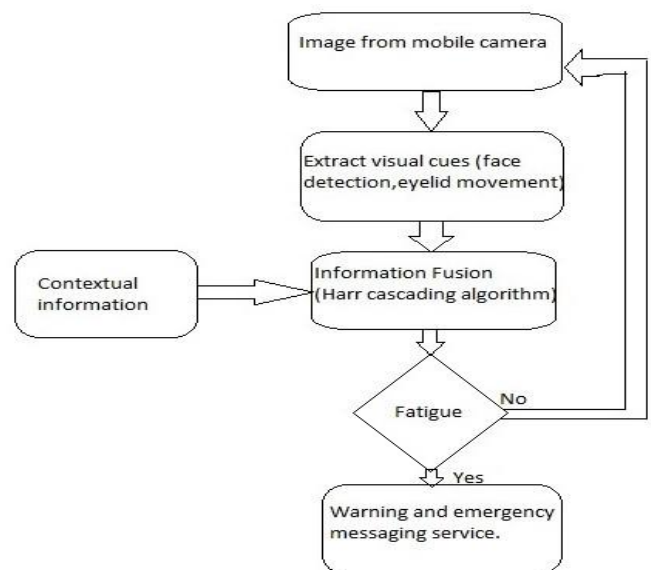

Fig-3: Block diagram of Driver fatigue monitoring system.

Traffic collision will detects by impact measuring sensor. When certain degree of impact occurs on sensor so system will consider as Traffic collision. Hence system will send emergency message with co-ordinates of collision area to nearest hospital, police, as per database, by using it's the GSM-GPS system. Android application and web based data portal will create to trace collision area
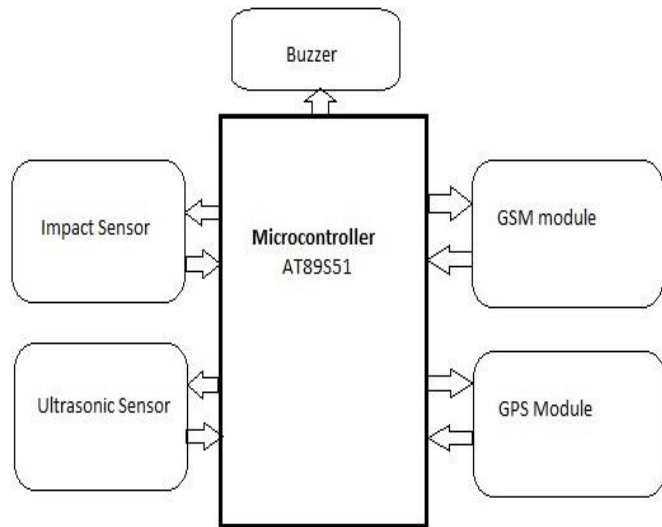

Fig-4: Block diagram of Traffic collision detection system.

5. CONCLUSION

In this work, proposed system will help to reduce Traffic accident. system will monitor driver`s facial cues and it will alert driver on fatigue condition. Also this system will give driver voice to text facilities for medical emergencies.

Traffic collision information system will detect the collision and instantly call to help nearest hospital, police station, relatives as per data base.

ACKNOWLEDGEMENT

REFERENCES

[1] Andrea Zanella, Nicola Bui, Angelo Castellani, Lorenzo Vangelista, and Michele Zorzi, "Internet of Things for Smart Cities" IEEE INTERNET OF THINGS JOURNAL, VOL. 1, NO. 1, FEBRUARY 2014.

[2]Qiang Ji, Zhiwei Zhu, and Peilin Lan "Real-Time Nonintrusive Monitoring and Prediction of Driver Fatigue" IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY, VOL. 53, NO. 4, JULY 2004

[3]Singh Himani Parmar, Mehul Jajal, Yadav Priyanka "Drowsy Driver Warning System Using Image Processing" Brijbhan Electronics & Communication, GEC, Bharuch, Gujarat ISSN: 2321-9939

[4] Ling Hu and Qiang Ni, "IoT-Driven Automated Object Detection Algorithm for Urban Surveillance Systems in Smart Cities" JIOT.2017.2705560, IEEE Internet of Things Journal.

[5] Bo Li, Bin Tian, Ye Li, and Ding Wen, "Component-Based License Plate Detection Using Conditional Random Field Model" IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, VOL. 14, NO. 4, DECEMBER 2013

[6] Álvaro González, Luis M. Bergasa, and J. Javier Yebes "Text Detection and Recognition on Traffic Panels From Street-Level Imagery Using Visual Appearance" IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, VOL. 15, NO. 1, FEBRUARY 2014