IOT BASED DRIVER ASSISTANCE SYSTEM

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Abstract- *One of the major problems that the developing countries face is the problem of waste management. Not only does waste spread diseases but it also pollutes the water bodies and causes several such issues. Garbage bins at public places are matter of concern too. Clearance of bins at the appropriate time is essential. It otherwise creates unhygienic conditions for people as well as repulsiveness to that place and leaving behind bad smell.This paper proposes a smart waste collection system with the help of IoT. Information will be send to municipality center using which the waste can be collected in time. This method is supported by ultrasonic sensor, a weight sensor and MQ gas sensor which are attached to an Arduino Uno microcontroller. When the values read by the sensors reach a threshold, an alert is send to the Municipality server. An android app is developed to send the alerts from the microcontroller used in the system to the management. The whole procedure is reducing the human labor of monitoring. The real-time progress of the waste collection can be examined with the help of this system. This method will enable waste collection on time and thereby ensure a safer environment.*

Keywords- Ultrasonic sensor,MQ3 sensor, Raspberry pi, Open CV, Arduino.

I. INTRODUCTION

In today's world, road and transport have become an integral part of every human being. Everybody is a road user in one mode or the other. The present transport system has minimized the distances but it has, on the other hand, increased the life risk. Every year road crashes result in the loss of many lives and serious injuries too. Also, heavy rains and the movement of heavy vehicles are the main reasons for the formation of potholes. To avoid this, an effective and prompt conveyance of information well in advance to drivers can definitely decrease the number of traffic accidents. Most of the road accidents are caused because of drowsiness and drunk driving and also working environments, reduced sleep and time factor[1]. There are some techniques which are used to detect drowsiness like by sensing of driver operation or physiological characteristics of a driver like or vehicle movement etc[7].

Traffic survey shows that driver fatigue may be a contributory factor in up to 20% and due to alcohol drinking, it is about 31% of all road accidents. The primary purpose of the proposed system is to develop a system that can reduce the number of accidents from drowsiness and drunk driving of vehicle [2]. In the first part of the, this project is the detection of drowsiness, for that we use a camera for detecting image or face, Eye detection is an important part of this project will be done using Open CV [5]The Input 8 megapixel camera, which is capable of capturing real-time images and video. The captured frame is to be processed by Raspberry Pi. Raspberry pi algorithm is implemented using Python [8]. Eye closing rate is calculated after every 10 seconds, and if it crosses a predefined threshold value. On receiving the high pulse signal, the Arduino performs a set of tasks like Alarm by buzzer or send a message to its car owner. On the other hand alcohol sensor (MQ-3) is work as a breathalyzer and calculates blood alcohol content (BAC) from breath alcohol content[2]. The Arduino interfaces with MQ-3, Bluetooth, buzzer, and relay.

Arduino continuously checks alcohol content present in the air and also computes blood alcohol content in Percentage from it [11]. If the calculated %BAC crosses the threshold limit, at that time it will get alarmed through the buzzer and will turn off the relay. Driver fatigue (‗falling asleep at the wheel') is a major cause of road accidents, accounting for up to 20% of serious accidents on motorways and monotonous roads in Great Britain. The Government's Road Safety Strategy, ―Tomorrow's Roads: Safer for Every‖, identifies driver fatigue as one of the main areas of driver behaviour that needs to be addressed if the target for reducing the number of people killed and seriously injured in road accidents by 40% by 2010 is to be achieved.

Detecting the drowsiness of the driver is the surest ways of measuring the driver fatigue. The purpose of this project is to develop a drowsiness detection system. This system works by analyzing the eye movement of the driver and alerting the driver by activating the buzzer when he/she is drowsy. The system so implemented is a nonintrusive real-time monitoring system for eye detection. During monitoring, the system is able to decide whether the eyes were opened or

closed. When the eyes were detected closed for too long, a signal was issued to warn the driver.

II. LITERATURE SURVEY

Moazzam et al.[8] have developed a model in which a low-cost Kinect sensor is used. Kinect gives the direct depth measurements, thereby reducing computing costs. Meshes are generated for better visualization of potholes. Area of a pothole is analyzed with respect to depth. The approximate volume of a pothole is calculated using the trapezoidal rule on area-depth curves through pavement image analysis.

Rajeshwari Madli, et al.[3] have designed a system in which novel Wi-Fi based architecture for pothole detection and warning system which assists the driver in avoiding a pothole on the roads by the prior warning. The system consists of access points placed on the roadsides for broadcasting data, which can be received by Wi-Fi enable vehicles as they enter the area covered by the influence of the access points.

R. Sundar, et al.[4] have developed an intelligent traffic control system to pass emergency vehicles smoothly. Each individual vehicle is equipped with a special radio frequency identification tag which makes it impossible to remove or destroy. If RFID-tab read belongs to the stolen vehicle, then a message is sent using GSM SIM300 to the police control room. In addition, when an ambulance is approaching the junction, it will communicate to the traffic controller in the junction to turn on the green light.

Samyak Kathane, et al.[2] have proposed a model which is Real-time pothole detection and vehicle accident detection and reporting system and Antitheft. In this system the wireless access point collects the information about potholes, it distributes this information to BMC using wireless broadcast.

Taehyeong Ki, et al.[5] proposed a paper in which classification of potholes are given. Potholes are classified according to the location, shape, length, and depth. Many researchers have studied the methods to detect potholes and improve survey efficiency and pavement quality through prior investigation and immediate action. With these detecting methods, there is a need for developing a classification guideline for supporting decision-making system of pothole repair.

Ajit Danti, et al.[9] have developed a model based on Image Processing approach. In this paper, Hough Transformation is given for lane detection. Clustering based

algorithm is used for the detection of potholes. In this experimental results are tested with real-time image database.

J. Lin, et al.[11] have proposed a paper on drowsiness detection algorithm using a camera near the dashboard. The proposed algorithm detects the driver's face in the image and estimates the landmarks in the face region.

III. MOTIVATION

Fig 1: Road accidents due to potholes

Potholes are a menace as they not only cause traffic riot but also result in accidents. The patch work to cover them is mostly a manual job.The Hindu reported recently that, between 2013 and 2017, close to 15,000 Indians had died in accidents caused by potholes. Other reports suggest that the government has admitted to over 9,300 deaths and 25,000 people being injured because of potholes over the last three years. Our Supreme Court has described this situation as "unacceptable".The Supreme Court on Thursday described as "unacceptable" the death of nearly 15,000 people in road accidents caused by potholes in the last five years and said the number was probably more than those killed on the border or by terrorists.

IV. OBJECTIVE OF THE PROJECT

Our proposed method is to design and develop a low-cost system, which is based on the embedded platform for pothole and drowsiness detection. Most existing approaches for the drowsiness detection rely either on eye closure or head nodding angles to determine the driver drowsiness or distraction level. Detection of potholes using ultrasonic and capturing the image. This method combines both eye state and head position to detect the drowsiness of the driver.
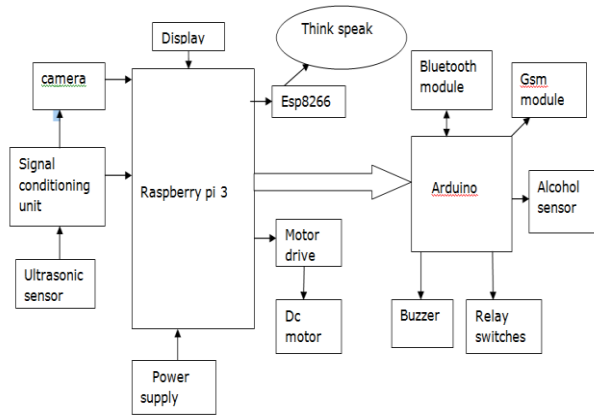
V. BLOCK DIAGRAM AND ITS DESCRIPTION

Fig 2 : Block Diagram

As shown in Fig1 the diagram consists of a Camera, Raspberry Pi, an ultrasonic sensor (HC-SR04) and ESP8266 WIFI module. The image of the road hump is stored in the computer in a file of a particular format. The camera captures the image of the road hump and sends this image to the Raspberry Pi. The ultrasonic sensor is used to measure the distance between the car body and the road surface and this data is received by the Raspberry Pi. The distance between the car body and the ground, on a smooth road surface, is the threshold distance. A threshold value depends on the ground clearance of the vehicle and can be configured accordingly. The measured distance is compared with the threshold value to detect the pothole. If the measured distance is greater when compared with the threshold value, then it is said to be a pothole. On the other hand of the system, Arduino is used for detection of the alcohol consumption by the person, alcohol gas sensor or breathalyzer MQ-3 is interfaced. Arduino will detect samples of the person who is driving drunk or not. Based on the output from Arduino, an alarm will be turned on and the car's ignition power source can be cut down through a relay to stop the car or preventing the driver to start the car.

VI. METHODOLOGY

Hardware requirements: Raspberry Pi -3, USB Camera -8MP, Ultrasonic Sensor- HC-SR04, Power Supply-1A, Motor Driver L293D, DC Motor-9v, 400Ma, ESP 8266, LCD display-16*2, Alcohol sensor-MQ3,Arduino Uno.

Fig 3 : Raspberry Pi

Software Requirements:Raspberry pi and raspbian os, Open CV-Library, putty and xming, wiring pi library, Arduino.
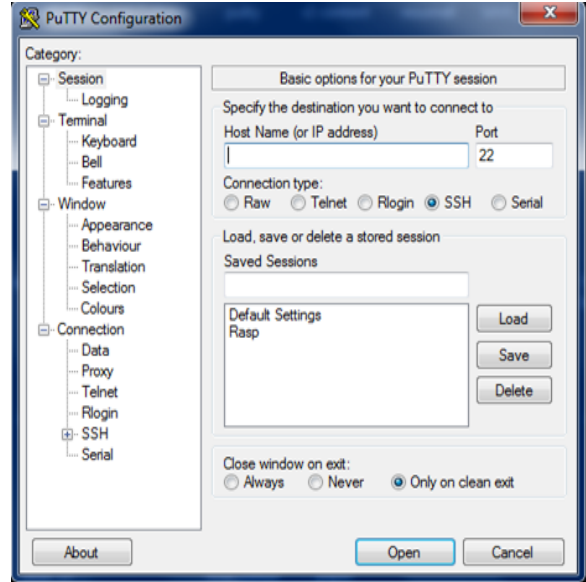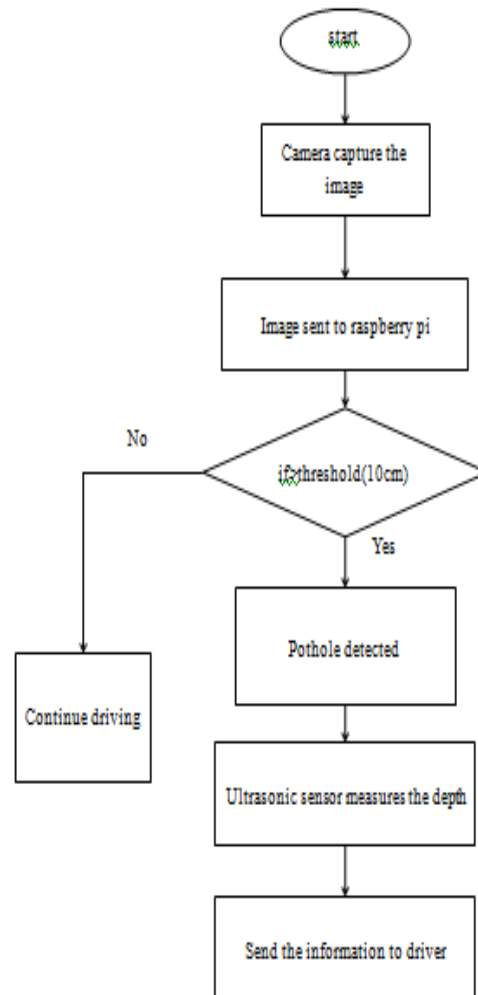

Fig 4 : Putty Software

VII. FLOW CHART FOR POTHOLE DETECTION
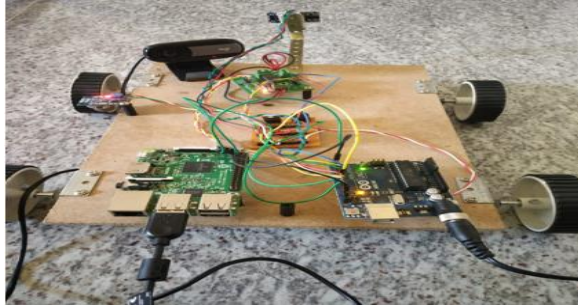
VIII. PROPOSED MODEL

Fig 5 : Proposed Model

In our model, Arduino is used to detect potholes and the consumption of the alcohol. Ultra sonic sensor is used to measure the depth of the pothole. Raspberry Pi and Open CV supports to detect the driver drowsiness.

APPLICATIONS AND ADVANTAGES

APPLICATIONS

Application of the project includes implementation of the driver assistance system in vehicles that ensure the safety of driver as well as passengers by alarming the driver in case he is drowsy. The system also aids if the driver has consumed alcohol above the threshold limit and automatically terminates the ignition of the vehicle.

ADVANTAGES

Intelligent transportation, Accidents due to drowsiness can be avoided, Drunken driving also prevented by using an alcohol detector, Intimation about potholes in roads,The spectacle is used to detect the eye movement and closure, it's free from reflection & easy to use.

CONCLUSION

The proposed system basically serves two purposes; it automatically detects the potholes and driver drowsiness and sends the information regarding this to the vehicle drivers, so that they can avoid accidents. This is a cost efficient solution for detection of potholes. This system is effective even in rainy season when roads are flooded with rain water as well as in winter during low visibility. This system helps us to avoid dreadful potholes and hence to avoid any tragic accidents due to bad road conditions. The information can also be used by the Government authorities for the maintenance of the roads. The proposed system can be further improved to display alerts such as 'Bad road ahead' in order to help the driver be more alert while driving/riding on such roads.The driver abnormality

monitoring system developed is capable of detecting drowsiness, drunken and reckless behaviours of driver in a short time.

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