ANTI-ACCIDENT ALERT SYSTEM

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Abstract :Day by day the number of vehicles on road is increasing rapidly which leads to the cause of more accidents. A huge number of people are killed or injured in road accidents due to various factors like bad road conditions, fault of motor, due to consumption of alcohol by the driver or sleepy driving. Most of the accidents occur due to sleepiness of driver during late night travelling. In this paper an IOT based solution is proposed to awake the driver, change the direction of the vehicle movement towards left and automated application of the brakes to avoid accidents. If the distance is too less, then an email is sent to the peer contacts. With this application many accidents can be avoided with more accuracy.

IndexTerms **- Accident alert system, sensor networks, Ultra sonic Sensor**

I. INTRODUCTION

The increase in traffic leading to traffic accidents which is the major cause of death of people. Approximately 1.25 million people die each year and 20 to 50 million people suffer with injuries. If the preventive actions are not taken it is predicted that road traffic crashes may rise to become 7th leading cause of death in the world [1].

According to the statistics reports in India at least 4,80,652 accidents in 2016, are recorded which lead to 1,50,785 deaths. It shows that 413 people died everyday in 1,317 road accidents. The accident severity has been increased from 29.1% in 2015 to 31.4% in 2016 [2].

There are many reasons to increase the road accidents like due to fault of driver, due to two wheeler, due to weather condition, consumption of drugs by the drivers, drunken driving ,speeding, driving the vehicles with less safety measures and sleepy drivers. In this fast-moving generation, to save time, it is preferred to travel at night that is more prone to accidents. In order to improve traffic safety, traffic analysis is required to plan about the improvement of road conditions and taking necessary remedial actions to prevent road accidents[3].

This paper is organized into 6 sections. The section I contains the introduction, section II contains the related work, section III contains architecture of the system, section IV contains methodology , section V describes the results and discussion and section VI contain conclusion and future scope.

II. RELATED WORK

Shirish Srivastava et al.,developed a prototypeUltrasonic sensorbased collision avoidance system. This system estimates the distance between the before vehicle and displays various warning messages on the LCD screenbased the distance. This system assists the drivers while driving on road and can warn about decreasing margin distance between two vehicles to avoid the collision and helps in saving human lives. [4].

S.P. Bhumkar et al., developed asystem ”Accident avoidance and detection on highways”whichcontinuously monitors the driver’s behavior, using Eye Blink Sensor & alcohol detection system. The Eye Blink Sensor continuously monitors the number of times the eye blinks. If the eye blinks count decreases that means the driver issleepy; in that case, a buzzer is operated. The system also detects the alcohol consumption by the driver and it switches of the ignition to avoid the accidents that are mainly caused at nighttime due to the drunken drivers and sleepy drivers [5].

P. Dhivya et al., proposed system of braking uses Fuzzy Logic with two controllers. In this, one controller decides upon whether to stop the car or to steer the car to an angle to avoid collision with the obstacle in its path. It has two outputs: force of brake and steering angle. The force of the brake is taken as the activation input for the second fuzzy logic controller. Thus, the system is made intelligent by employingfuzzy logic to take decisions without human intervention [6].

AkritiSinghal et al., proposed a system with integration of IOT and cloud-computing. In this system, the data from the IOT devices is collected and sent to cloud so, there is no problem with the storage of the data and in this model the intensity of accident is measured.Depending upon the value of intensity respective safety measures are taken [7].

TasneemSanjana et al., proposed a system in which a distance sensor detects the very shorter distance between the obstacles and gives the information to the microcontroller. Microcontroller sends the signal to the LCD and alarming device. LCD displays the distance on the screen and alarming device gives a buzzer sound when the vehicle exceedsa threshold distance.Then the actuator gets signal from microcontroller through the motor driver and it stops the car automatically without applying the brakes [8].The main objective of the related work is to detect the collisions before occurring an accident and automatically stops when the vehicle exceeds the safety distance.All the proposed models have same limitations that there is no chance of prior intimation tofamily members or peer contacts about of the victims. By summarization of all the above systems, the main aim is to detect the collisions before occurring an accident and automatically stops when the vehicle exceeds the safety distance.

Considering the present existing system with the cars there are a few solutions for the safety of the drivers like air bags. These are used to protect the driver from injury but not to avoid the accidents. In addition to that, there isone more solution with eye blink sensorwhich counts the number of seconds the driver has closed his/her eyes and if it crosses the limit then it gives an alert sound to avoid theaccidents. However, there may be other reasons for the cause of accidents like the unconscious state of the driver to hear the alert sound. So in this paper a prototype is proposed to alert the driver if he is sleepy and don’t observe the obstacles and turns towards left. If the safety distance is very less then an alert email send to the family members or peer contacts.

III. SYSTEM ARCHITECTURE

This system contains three modules. First module related to alert buzzer sound, second module for the Automatic braking system and the third module is for sending Email using Wi-Fi module. Using different IOT components like Arduino board, Buzzer, Motor driver (L293D) and Wi-Fi module (ESP8266). Initially an ultrasonic sensor continuously monitors for obstacles before the vehicle. If the distance between the obstacle and vehicle is less than the safety distance then buzzer starts ringing and the vehicle turns towards left side.

With this if the vehicle driver is in drowsy condition he gets alert to the buzzer sound and drivers the vehicle carefully. If the driver neglects the buzzer sound due to some reasons like drunk driving, unconscious state etc., the vehicle goes nearer to the obstacle and automaticbraking system stops the vehicle. Pulse Width Modulation (**PWM** concept) with L293D motor driver is used to control the electrical power supply to the motors. By doing this, the speed of the vehicle controls and stops before hitting to the obstacle.

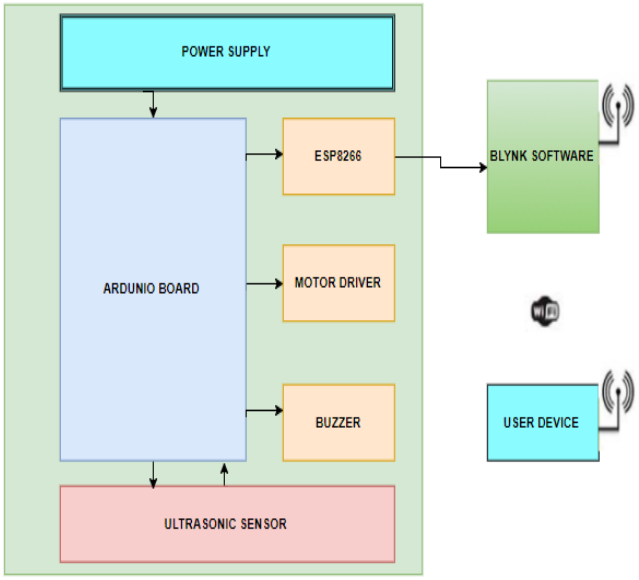

Fig. 1 Block diagram of Anti Accident Alert System

With respective to the distance, the speed of the vehicle is controlled. If suppose in some cases the brakes are failed , the vehicle is unable to stop or if the vehicle stops very nearer to the obstacle then an email is sends to the driver peer contacts by using ESP8266 Wi-Fi module which is coded with blynk. ***Blynk*** is an Internet of Things platform with a drag-n-drop mobile application builder that allows visualizing sensor data and controlling electronics remotely.By using this, automatically an email is transferred form the driver's email to his peer contacts in the (contacts need to mention before) mobile phones.

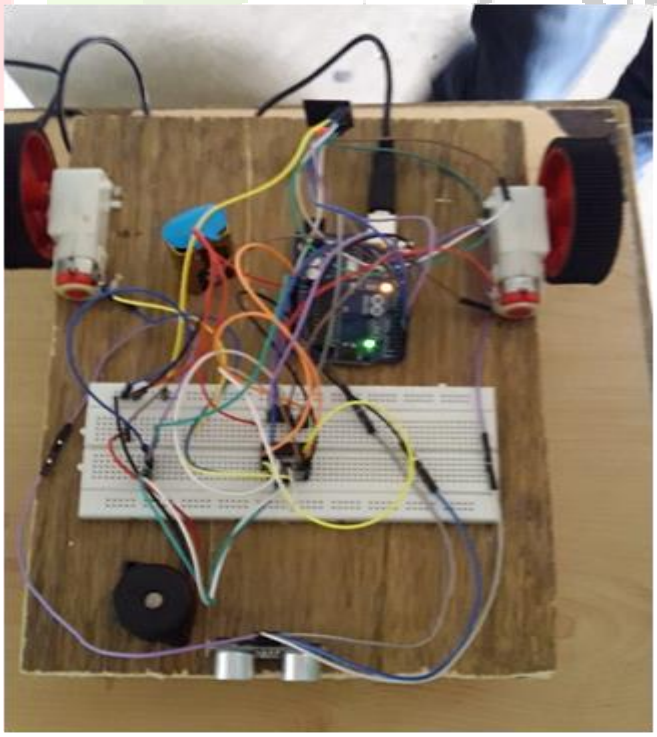

Fig. 2 Prototype

IV. METHODOLOGY

The working procedure of the proposed prototype is explained using the following algorithm and flow chart.

Algorithm:

Step 1: An ultrasonic sensor senses the objects in opposite direction and gives the sensor values to the Arduino board.

Step 2: In this step, we are continuously checking the sensor values with the safety distance (minimum distance between vehicle-to-vehicle)

Step 3: If the sensor value is less than the safety distance then an alarm rings and gives warning to thedriver and the vehicle automatically slows down by turning left side.

Step 4: If the sensor value is less than the previous value then using the PWM concept (time and distance measurement) the vehicle brakes are applied automatically this results stopping of vehicle without the interference of the driver.

Step 5: If the sensor value is, too less than safety distance an email will send to the driver peer contacts.

Step 6: If the sensor values are more than the safety distance then the ultrasonic sensor continuous checks the opposite obstacles distances.

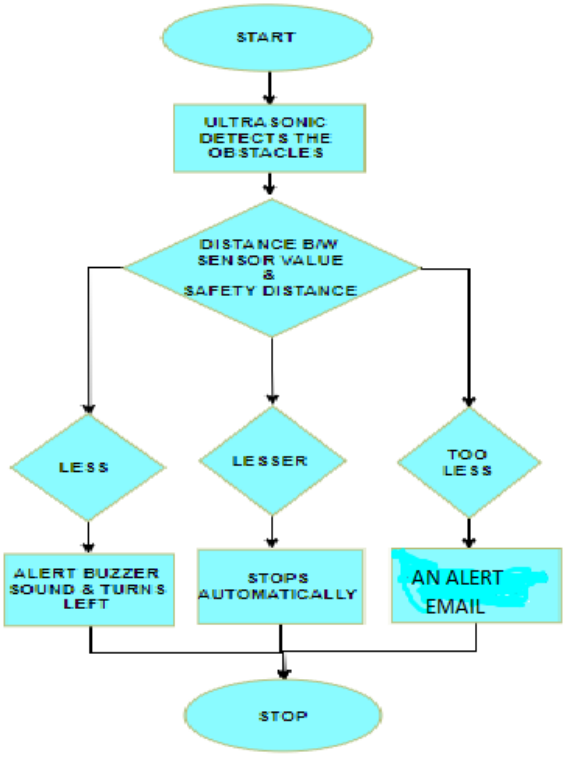

Fig. 3 Flow chart of methodology

It contains three modules the Alert buzzer sound, the Automatic braking system and the Wi-Fi email. If the driver is sleepy the Buzzer gives an alert sound to make the drivers awake, if the driver is unconscious or drunkand avoids the buzzer sound then the automatic breaking system works after a certain distance is sensed by the ultrasonic sensor then the brakes are automatically applied slowly not abruptly to avoid the accidents, in case if the brakes got jammed or failed then Wi-Fi module helps to send an alert email to their family members.

V. RESULTS AND DISCUSSION

The prototype was built to test the functionality of the proposed system. The ultrasonic sensor measures the distance between the vehicle and obstacle and actives the LED and buzzer.The L293D motor driver controls the two dc motors fitted to the wheels of the vehicle for controlling the movement of the vehicle. The ESP266 Wi-Fi module is used to send an email to the peers.

Table 1 :Results and Test cases:

SAFETY DISTANCE	RESULT	STATUS
15 cm	Buzzer sound & vehicle turns left-side	Successful
10 cm	Stops Automatically	Successful
22 cm	Nothing	Successful
13 cm	Buzzer sound & vehicle turns left-side	Successful
21 cm	Nothing	Successful

4 cm	Sent an alert email	Successful
9 cm	Stops Automatically	Successful
5 cm	Sent an alert email	Successful
3 cm	Stops Automatically	Failure
2 cm	Stops Automatically	Failure

The prototype is tested for 100 times at different conditions and averages of 10 test cases are tabulated. From the results and test cases it was observed that among the 10 times of test run, the prototype is worked well for 8 times. When the obstacle distance isbelow 15cm then the vehicle turn to left side with buzzer sound, if the obstacle distance is below 10cm then the vehicle automatically stops with the help of motor driver and if the obstacle distance is less than 2-4 cm alert will send to peers. So, after experimenting 10 test runs there is a success rate of 80%.

VI.CONCLUSIONS AND FUTURE SCOPE

Day by day, the use of vehicles has been increasing rapidly in Indi. Many accidents are reported because of various reasons like fault of motor, sleepiness and drunk driving. After analyzing the causes of accidents if proper preventive measures are not taken it was predicted that road traffic crashes may rise to become seventh leading cause of death in the world. This paper proposed a prototype for avoiding accidents by alerting the driver based on the distance from the obstacles and turn towards left direction. It also sends alerts to peer contacts if the accident is unavoidable. This prototype can be further extended by sharing the location of the accident..This prototype helps in saving human lives..

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