Accident Prevention and Blindspot Detection

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Abstract: The Internet of things (IoT) is an emerging topic in a variety of industry fields such as manufacturing, engineering, automobile, etc. Especially, many automobile companies are competitively introducing a smart-connected car in conjunction with the IoT technology.

In todays, world increasing number of vehicles has led to increase in pollution and number of accidents. Driving while drinking alcohol, not wearing seatbelts has led increase in number of accidents. The awareness while driving any vehicle should be improved , also there should be techniques to prevent such kind of accidents . In this paper, our main purpose was to prevent car accidents using IOT technology , we developed a system for prevention with various sensors and hardware with GPS module and we confirmed that the developed system successfully met the evaluation criteria through testing. Furthermore, we are proposing improvement plans.

Keywords: accident , prevention , detection

I. INTRODUCTION

In a modern society, machines innovatively get smarter and connected each other through Wi-Fi, 3G/4G, and Long-Term Evolution (LTE). These functions are called "Smart Connected", and their purpose is to improve people's life and productivity. Furthermore, one of the connectivity mechanisms is the Internet of Things (IoT), which interconnects every physical product with virtual machines.

IoT gives opportunities to generate new values by transforming traditional industries into revolutionary and ubiquitous industries. The concept of smart-connected leads to share-and-store users' information and predicts users' activities. This concept expands to smart connected mobile phones, houses and smart connected cars. There are three main functionalities of smart-connected cars: avoid getting stuck in traffic, find a destination with accurate information, and reduce traffic accidents. Among them, this research focuses on the third functionality , with advancement in the transportation technology and rise in the total number of vehicles, road accidents increases rapidly. This advancement in technology also increased the traffic hazards. There is no effective mechanism to prevent these root causes.

Therefore this paper mainly focuses on the prevention of car accidents, with some prevention mechanism and blind spot detection. The paper is organized as follows , Section II focuses on related research paper work to study the prevention systems in car accident , Section III describes the methodology and idea behind this system ,Section IV comprises of design and implementation of system Section V introduces new ideas to improve the system and safety of the human blah ..Section VI Summarizes the research work and describes research limitations with future scope.

II. RELATED WORK

[1] Author proposed a vehicle accident prevention and detection system. The system consisted of Arduino microcontroller for all controls of ultrasonic sensor , infrared sensor , MQ3 sensor and accelerometer. With the help of above sensor's the system detects the drowsiness of driver by its motion of head, alcohol sensor used for mouth detection using webcam and ultrasonic sensor to detect the speed breaker or bumpers on road and control the speed with accelerometer. The proposed system is efficient and cost- effective.

[2] Here, B N Manjunath Reddy , et al. proposed a car safety system which includes various sensor's with GSM SIM-800 module and GPS module. The proposed system is efficient but not cost effective. System can provide fire detection & suppression system with use of fire sensor, where if fire detected by fire sensor the buzzer will alarm and water spray will be on

automatically. System also consisted temperature sensor to control overheating of car.

It also provides accident detection and alert system when accident happens it will detect it & alert the nearby hospitals by sharing location through GPS module. Send message to the number which is stored in system with GSM module.

[3] S. Johnpaul et.al. proposed accident prevention system for two wheeler vehicle. The proposed system consist of IOT based smart helmet system. It provides safety with two sections namely 1.helmet section and 2. Vehicle section.

Helmet section provides gyroscope, touch sensor, gas sensor, crash sensor and Zigbee protocol. The system is used to detect if driver is wearing helmet with touch sensor. Alcohol detection with gas sensor and gyroscope to prevent bike accidents. In vehicle section it consists of Zigbee protocol which is wireless PAN with crash sensor. After the accident the crash sensor will detect & send message through zigbee module. The proposed system is cost-effective and efficient.

[4] Adnan Z. et.al, proposed vehicle blind spot monitoring system using ultrasonic sensor. Many of accidents occur during vehicle overtaking , an area from where the vehicle passing by cant be seen by the driver the area is known as blind spot. This can be prevented using ultrasonic sensor for this blind spot.

System consisted Arduino controller with ultrasonic sensor. The blind spot zone of vehicle is specified at the beginning of experiment & setting the both sensors exactly at the blind spot zone which will detect vehicle passing by and with three LED's indicating the distance between our vehicle and passing by vehicle so, that driver will be alerted.

III. METHODOLOGY

This system aims to significantly reduce the frequency and severity of road traffic accidents and their associated consequences. To assure driver's safety & increase the prevention measure this project combines all the prevention techniques to make a cost-effective and efficient system.

This project consist of four phases. The alcohol detection is first phase. The seatbelt detection system is second phase. The third phase consists of blind spot monitoring system preventing adjacent crashes. The accident detection and reporting to emergency centers is fourth phase.

Accident may happen due to alcohol consumption & not wearing seatbelt. Thus in first two phases both parameters are checked with MQ-3 sensor and IR sensor. If any of these detected buzzer will alarm and main engine i.e motor of the engine will not start.

The jerks and odd vibrations that cause the accidents could result in severe injuries, therefore it's important to make sure that the necessary medical assistance is given. The fourth phase includes anvibration sensor that continually monitors vibration values and sends a message to an emergency center if the value is greater than a threshold value.

Automation of alcohol detection, seatbelt detection, blind spot monitoring, accident detection & alerting and preventing neighboring collisions. As seen in block diagram which is illustrated in fig.1

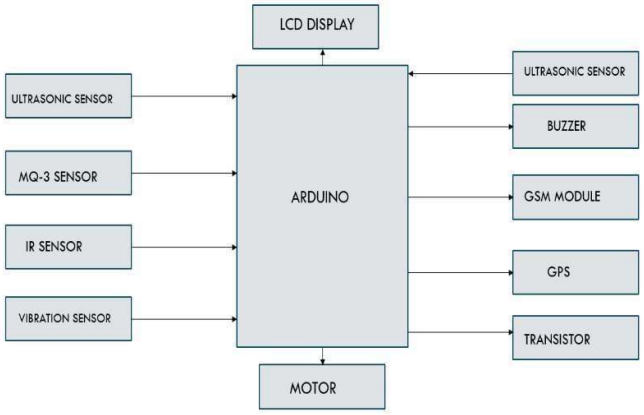

Fig.1: Block Diagram

A. Seatbelt Detection

Fig.2 illustrates the flowchart of system. The system is comprised of IR sensor. Infrared sensor contains IR LED and IR photodiode our system will use photodiode by producing radiation, which will hit the object and bounce back to receiver.

By detecting the motion of seatbelt it will display the message 'seatbelt detected' on LCD display.If seatbelt is not detected the buzzer will sound to alert the driver and engine will not start till the seatbelt is detected.

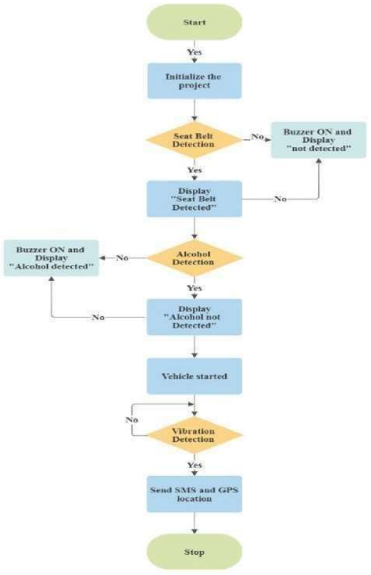

Fig.2: Flowchart of accident prevention

B. Alcohol Detection

For alcohol detection our system uses MQ-3 sensor. The gas sensor will detect the alcohol molecules and send analog voltage output to Arduino which will send signal to display ‘alcohol detected’ and the engine will not start till the sensor will confirm that alcohol is not detected.

C. Blind Spot Monitoring system:

This system comprises of ultrasonic sensor on left and right side of the vehicle which will detect the other vehicle in blind spot area. If the vehicle is detected by the sensor it will send the output to Arduino controller. Controller will send signal to buzzer and it will start to alarm.

The distance of the vehicle passing by will be displayed on LCD as shown in fig.3

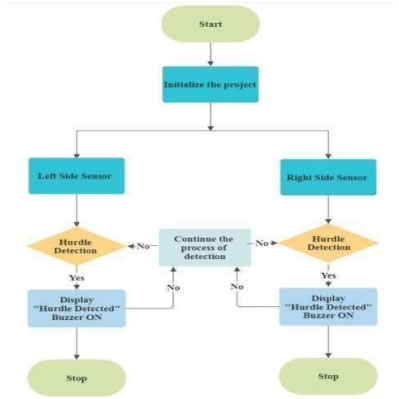

Fig.3: flowchart for blind spot detection

D. Accident detection System

Our project consists of Vibration sensor which is used to detect vibration of vehicle. The vibration sensor is set with a threshold value if the vibration goes above the threshold value the controller will detect the accident and display a message on LCD.

With the help of GPS module it will send the location of accident to nearby hospital to give early medical attention and with GSM module it will send message to the stored phone number on system with live location.

IV. RESULT ANALYSIS & DISCUSSION

IR sensor detects the seatbelt motion and displays on LCD ‘ seat not belt detected’ as shown in fig.4.

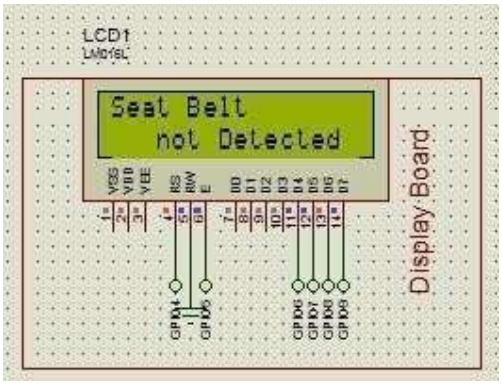

Fig.4: Seat belt not detected

MQ-3 sensor detects alcohol and displays ‘alcohol detected’ as shown in fig.5.

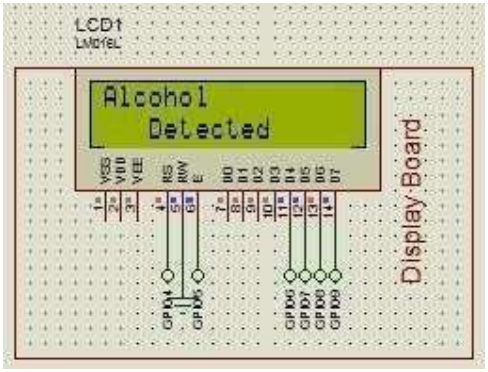

Fig.5: Alcohol detected

Vibration sensor detects the accident and sends location and message to the stored phone number

The location of accident area along SMS has done by the GSM module and GPS module we have as shown in fig.6

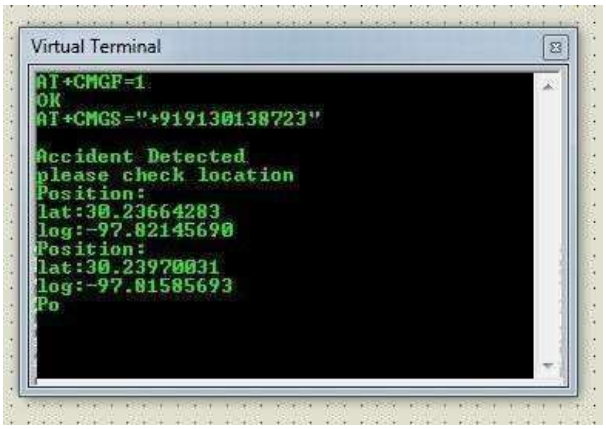

Fig.6: GSM & GPS location

Ultrasonic sensor detects the vehicle at blind spot area and giving its measures on LCD display as shown in fig.7

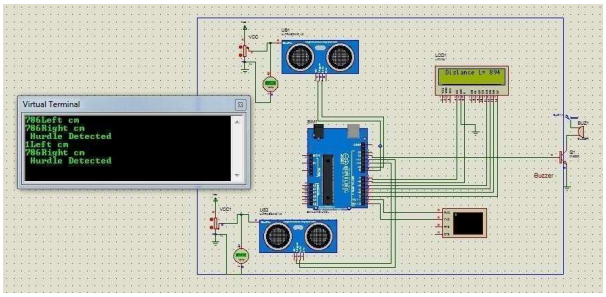

Fig.7 Blindspot detection

V. CONCLUSION

Many accidents have been discovered in our research, with high precision and accuracy, demonstrating that our suggested method is accurate in recognizing accidents using vibration, touch sensing, and heavy alcohol consumption. The technology is capable of preventing alcohol consumption while riding. Actions that must be taken at the moment of the accident, as well as the location that must be communicated to others.

In the case of a car collision, an IoT-based accident prevention system has the ability to save lives and prevent injuries. As technology advances, we can expect additional innovations and improvements in automobile safety systems, resulting in safer and more secure driving experiences for everyone

VI. REFERENCES

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