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Accident Avoidance and Alerting System with Alcohol Detection

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ABSTRACT: Our research paper is here to showcase our project that we have developed. It is aimed to avoid the deaths due to road accidents caused by negligent drivers and also the lack of support. We often see/listen to a lot of road accidents. While over speeding has a bigger pie among various other causes for deaths due to road accidents, there are some other cases, where victims would have still been alive, even after a major accident, if there were support. With the device we were able to build, embedded into the vehicles, the majority of these cases can be avoided.

KEYWORDS: Alcohol sensor, Ultrasonic sensor, Vibration sensor, SMS, GSM, GPS.

I. INTRODUCTION

This project has three different functions, Testing the driver for their alcohol toxicity, Monitoring the vehicles in the way and warning the driver of potential to impact, If the accident occurs, alerting the emergency contacts about the incident. At the time of ignition, an alcohol sensor will detect the alcohol toxicity of the driver. If in case of high toxicity, the access to the vehicle is restricted [1]. And if alcohol toxicity is in limit, the vehicle will be running. The threshold limit for alcohol toxicity is set for 400PPM. With the help of ultrasonic sensors, we can keep on monitoring the obstacles in the way and alert the driver, through a buzzer in the vehicle, about the potential of impact. If any accident occurs, which is detected using a vibration sensor,[2] an SMS is sent to the specified number of emergency contacts using the GSM module. This message will include the location details of the vehicle, that are calculated using the GPS Module.[3]

II. LITERATURE SURVEY

In the view of **Vikram Singh Kushwaha** in 2015 [4] in which they proposed to develop a system which is fully automated so it can help in reducing the time between the time when an accident occurred and arrival of the medical team. This can be created with a combination of accident detection and Emergency Medical Service System. This proposed system can consist of accelerometer and Piezo sensor which gives input to the device and with help of GPS the users location is detected and GSM/GPRS is used for communication. An Android app is built to get information from users at the time of hospital registration.

According to author **Apurva Rajendra Patkar** who published the paper in 2014 [5], In this she explains that less visibility on fast roads and highways is one for accidents caused among motor vehicles. To avoid this some traffic sensors are installed and fixed on the road which gets connected to drivers via mobile app using 3G/4G mobile network which helps in reducing the accidents by giving prior information about the traffic. This can be developed into a traffic monitoring system using the IOT Cloud system and for notifications using OPENGTS and MongoDB. This cloud system can be very useful for rescue drivers like ambulances.

In this published paper **K Srijayathi** and **M. Veda** [6] chary have proposed for designing an automatic drowsiness detection in which IR sensor and IoT are used. An ARM7LPC2148 chipset is used as a controller. The Eye blink sensor is for detecting if the driver is in drowsy state and if drowsiness is detected the buzzer gives an alarm. The author used an LCD display and DC motor to show that ignition off. The eye blink sensor is programmed in such a way that if any situation comes up, the vehicle gets stopped and ignition is turned off. This process takes place with a driver circuit

connected to the motor and sending a signal using RF transmission.

As per **Cahalan D.** designed a project that can make people drive safely and to avoid accidents [7]. The project was developed by using an alcohol sensor and interfacing it with Arduino. The ATmega328 controller is used as it can perform many functions than other controllers. MQ3 alcohol sensor is used in this system which helps in detecting the value of alcohol in human breath and this sensor has a range of 2meters and can be easily placed inside a vehicle. The author proposed this for the safety of the people.

According to **Kenichi Takahashi** [8] paper which was published by authors in 2015 they represented a project which is based on detection of drinking state which is done from face images and neural network systems. This can be detected from a camera placed in front of the driver and it detects whether the driver has drunk alcohol or not by those images. This system also checks the neck, cheek and hand which helps to detect drinking.
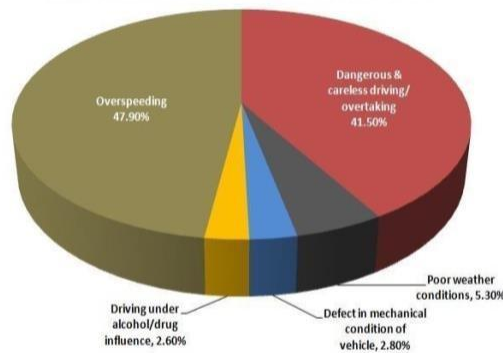
III. PROBLEM STATEMENT

Fig. 1 Major causes for road accidents as per 2014

From the above pie chart, which explains the causes of road accidents, we see that over speeding takes more than half of the total number of accidents. The high demand of automobiles paved the way for the traffic hazards and the road accidents. There is a lack of best emergency facilities available in our country, besides the poor implementation of rules and weak safety standards of vehicles sold in India. Life of the people is at a high level of risk.

IV. PROPOSED SYSTEM

Our device deals with the situation in a more accurate and efficient way. The device consists of 16x2 LCD, GSM Module, Arduino UNO, Limit Switch, GPS Modem, Vibration Sensor, Alcohol sensor, Ultrasonic Sensor, DC Motor. These components are embedded onto a single device and made to work as programmed. The system, using an alcohol sensor, detects the toxic level of the driver and decides whether to turn ON the ignition of the vehicle, using a limit switch. This device also gives an audible range buzzer sound inside the vehicle's cabin to alert the driver when the vehicle is too close to another
vehicle which is to avoid the accident or damage to vehicle. If a vibration sensor detects any accident, the location in terms of latitude and longitude, where the accident took place, is sent in the form of SMS, to specified number of emergency contacts using the GSM module and GPS modem.
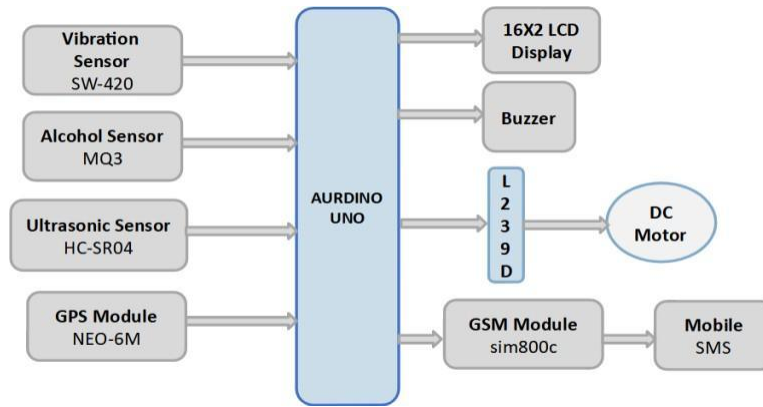
Block Diagram

V. FLOW CHART
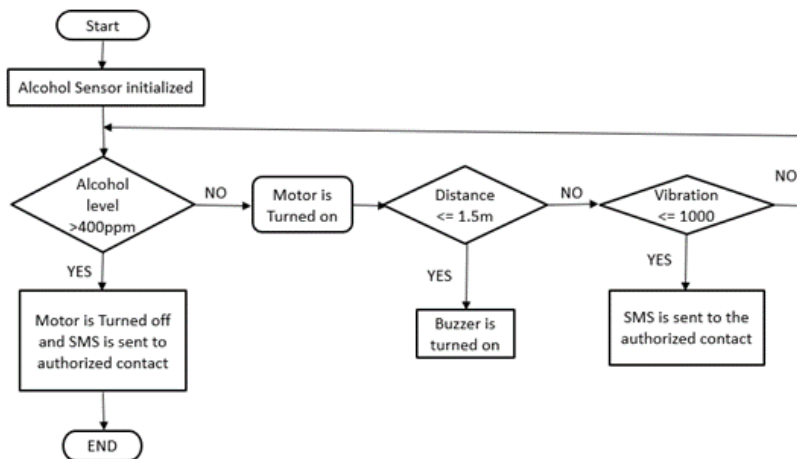
VI. METHODOLOGY

The function of this device is divided into three stages. The first stage of this function is that the driver is required to prove their toxication level before they can proceed with driving the vehicle. If they are under the permissible level, they will be allowed to turn on the ignition. If not, the ignition of the vehicle is locked. Though the microcontroller is the brain behind all the 3 parts of the function, alcohol detector and Motor driver are the ones that are responsible for this stage of the function. The second stage of the function is to monitor the vehicle continuously for any chances of contact/impact with nearby obstacles or vehicles, using the ultrasonic sensor, and warn the driver through a buzzer, about the chances of impact/contact, if any. And if the vehicle has faced any accident and people in the vehicle are in a state of helplessness, the device will come in hand. It will alert the provided number of emergency contacts, all at once, by sending an SMS that contains information about the incident and the location of the vehicle in terms of latitude and longitude. This is the third stage of function. The vibration sensor, GSM Module, GPS modem are the ones that play a key role in the third stage of the function.

VII. RESULTS

(a)   (b)

a). Alcohol is detected and Motor is OFF

b). Using GPS & GSM information where an accident occurred has been sent.

VIII. CONCLUSION

The ultimate aim of this project is to reduce the number of deaths from road accidents that happen due to the negligent driver and lack of support. This device is developed to deliver accurate results and help the users in the most effective way. With the increase in the number of vehicles and road accidents. This device has a capacity to fill the gap between the need of safety and affordability.

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