IoT BASED ACCIDENT DETECTION AND ALERT SYSTEM

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Abstract— The combination of computer technology and cars has resulted in the creation of a new level of knowledge services in vehicles. The capabilities that the car recorder has are quite similar to those of a heavier-than-aircraft recorder. It is used to study the causes of automobile accidents and to avoid the loss of life and property that occurs from the collisions. In this study, a paradigm for an associate Automobile Recording System that will be installed inside automobiles is proposed. The purpose of the system is to conduct an investigation into the occurrence of accidents by searching for the reason in an objective manner and monitoring what takes place within the cars. The method also includes enhancing safety by prohibiting tampering with the recorder's information in order to make it more foolproof. The Arduino controllers are used in order to control the various sensors. The primary objective of this study is to design a model for the recorder system that can be installed into any vehicle, located anywhere in the world. This paradigm is often conceived using the smallest possible range of circuits. This leads to the development of safer cars, improved care for accident survivors, assistance to insurance companies for auto crash reports, and improved traffic safety on roads, all of which contribute to a lower death rate. Additionally, this helps improve traffic safety on roads, which also contributes to improved road safety.

I. INTRODUCTION

In today's world there is a severe increase in the use of vehicles, such heavy automobile usage has increased traffic and thus resulting in a rise in road accidents. This takes a toll on the property as well as causes human life loss because of unavailability of immediate safety facilities. Complete accident prevention is unavoidable but at least repercussions can be reduced. Proposed system makes an effort to provide the emergency facilities to the victims in the shortest time possible. In big organizations the drivers make illegal use of the vehicles thus resulting in financial, time loss of the organization. Apart from these purposes the system can be used for tracking of stolen vehicles or travelling luggage, fleet management and vehicular sales etc. The system incorporates a single-board embedded system that contains GPS and IoT modems connected with a microcontroller. The entire set-up is installed in the vehicle.

It measures the vibration at the location it is placed. The signal is then compared with the standard value which further confers the accident of the car, unnecessary shock or vibration produced by machines, tilt of the car with respect to the earth's axis can be identified with the level of acceleration. Global Positioning System (GPS) is used to identify the location of the vehicle. IOT is used to inform the exact vehicular location to the preceded numbers. Message will give longitude and latitude values. From these values location of accident can be determination modem provides a two-way communication by using a sim card. Such a module works the same as a regular phone. The project aims at intelligent security system providing situational awareness and agile safety.

II. RELATED WORK

The report by the Government of India[1] (Ministry of road transport and highways) in the year of 2017 states that, the total number of accidents occurring on the Indian roads were 4,64,910. Out of these, 14,071 accidents occurred due to drunk driving, which is becoming a major cause of accidents on Indian roads. India has thus earned the dubious distinction of having a huge number of accidents due to drunk driving. Many mishaps are occurring because of the alcohol consumption of the driver. Due to drunk driving many lives and properties have been endangered. This is because the person driving the car is not in a stable position to take control of the car. In such a situation, the driver must not be permitted to operate his vehicle. Figure. depicts the alarming number of accidents and deaths occurring between the years 2008-2017.

Rapid development of economic construction and people's living standard continues to improve well as road traffic accidents take place frequently, which causes huge losses of life and property to the country and people.
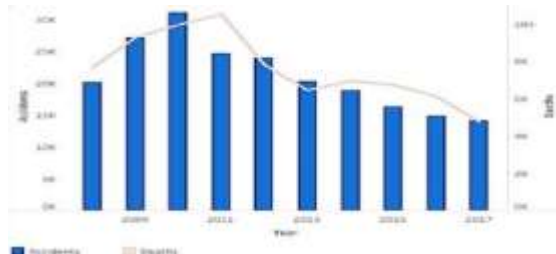

Figure: Road accidents and deaths due to driving under influence of alcohol

III. EXISTING MEHTOD

The block diagram of the existing system is shown in Figure. It consists of a switch which is used to start the system. It is analogous to starting the car engine. The MQ-3 alcohol sensor is used to detect the presence of alcohol that crosses the specified threshold value. The value is then sent to the Arduino and if the specified value is surpassed, then it forwards an input to GSM module to send a SMS to the concerned authority. The DC motor is used in order to signify the car ignition system which is cut off in case of alcohol consumption.

Figure: Existing System

IV. PROPOSED METHOD

In urban areas accidents are most common phenomena where many of such accidents can be taken care easily but some accidents occur during night time when the visibility is quite low, during such cases it will be difficult for an ambulance driver to identify the accident spot with the help of phone calls made by the citizens. If the driving force knows the precise spot of the accident the time period between the spot and the hospital is

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going to be significantly reduced. The main objective of this paper is to help reduce the time factor in case of accidents. There are many cases where an accident occurs during the night and the person met with the accident is unconscious then it would take hours for someone to find out and inform the authorities about it. So saving such precious time will indeed save lives. In connection with this concept, an experimental setup is constructed that can detect accidents automatically without any human help. After the accident detection, the same setup will send accident coordinates to the ambulance to help to find the location easily. Once the victim is transferred into the ambulance a second setup is connected to the patient which will continuously monitor the vital information of the patient to keep him stable.

The block diagram of the proposed system consists of the following components: ATmega 328P Controller, IOT Module (ESP8266), GPS Modem, L293D motor drive, MEMS sensor, Limiting Switch, GAS sensor, buzzer, power supply (12v DC).
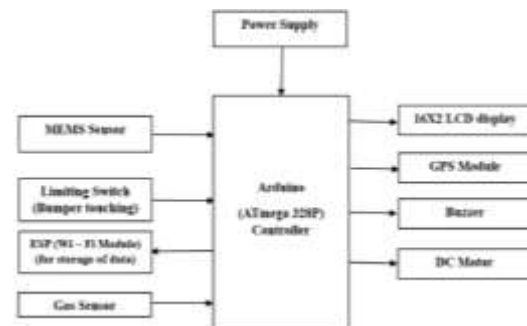

Figure: Proposed System

If any of these sensors detects the problem then the values detected by the sensors at that particular point of time will be sent to the IOT cloud. The information about the vehicle's latitude and longitude will be sent to the mobile number that has been registered, and the data will also be updated in the IOT cloud. This will allow for the information to be accessed from the cloud at any time.

V. RESULTS

Figure: Hardware Kit

Figure: Hardware Kit working time

01T06:39:17Z","entry_id":1341,"field1":""},{"created_at":"2024-05-
01T12:00:38Z","entry_id":1342,"field1":"ACCIDENT_ALERT_Vehicle_
at_latitude_14.46_logitude_78.82"},{"created_at":"2024-05-
01T12:00:54Z","entry_id":1343,"field1":"ACCIDENT_ALERT_Vehicle_
at_latitude_14.46_logitude_78.82"},{"created_at":"2024-05-
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at_latitude_14.46_logitude_78.82"},{"created_at":"2024-05-
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01T12:02:25Z","entry_id":1346,"field1":"ACCIDENT_ALERT_Vehicle_
at_latitude_14.46_logitude_78.82"},{"created_at":"2024-05-
01T12:02:45Z","entry_id":1347,"field1":"GAS_ALERT_Vehicle_at_lati
tude_14.46_logitude_78.82"}])
                                              5:34 pm

Figure: Data Uploaded into Sever

CONCLUSION

The proposed system uses the IoT for vehicle accident detection and alarming the authorities regarding accidents, vehicle tracking using GPS Modem. In this project we have designed IoT based vehicle accident detection and tracking system using GPS Modem. Hence IoT can revolutionize the way the system interacts and respond for the variety of applications especially in case of traffic control.

FUTURE SCOPE

This system can be interfaced with vehicle airbag system that prevents vehicle occupants from striking interior objects such as the steering wheel or window. This can also be developed by interconnecting a camera to the controller module that takes the photograph of the accident spot that makes the tracking easier.

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