An IOT Based Accident Reporting and Tracking System

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***Abstract*- The rapid growth of technology and infrastructure has made our lives easier. The advent of technology has also increased the traffic hazards and the road accidents take place frequently, which causes huge loss of life and property because of the poor emergency facilities. Even with so many modern devices present in the field of vehicle design, road lane design and heavy traffic control accidents do occur at a large scale. Accident threatens human lives more and mainly road accident is common today. During accident many people lose their life because medical services and family member not getting accidental information on time. Any kind of accident detected is automatically sent as an alert to the required destination. Accident detection device installed in a vehicles when meets with an accident will send SMS/ messages to the pre-install numbers of the drivers family members, police station, ambulance and nearest hospital.**

This embedded system is useful for tracking and retrieving the exact position of any vehicle, which has met with an accident by using Global Positioning System (GPS) and sensors. Transportation has great importance in our daily life and its development has made many of our chores much easy. IOT based vehicle accident detection system using GPS has gained attention. When accident occurs, this system sends short message to mobile number via GSM. Message will give longitude and latitude values. From these values location of accident can be determined. Here comes car safe project which can detect location of a car, and if there is any accident occur it can communicate automatically to the nearest police station, hospital and owner to reduce instant loss or damage.

***Index terms*- Arduino, GPS Module, GSM Module, Accelerometer, LCD Display, Mobile**

I.INTRODUCTION

Today, the advanced universe of science and innovation, Transportation framework is an essential piece of living. Having this with us gives us the vibe of the generally mingled animals on the planet. Vehicles assume a crucial part in our day by day life yet like each other thing, with a few positives there are negatives as well. Street mischances are the real danger to human lives. Speed is the key factor in charge of a significant number of the incidents. PDA based mischance identification and warning framework will track the mishap with assistance of sent effect sensors, will process the information through microcontroller unit and with a Smartphone application GPS, GSM it will send a notice to the closest crisis benefits and to the casualty's family. The major death rates in the world are due to the road accidents. India faces the highest death rate in the world. Reasons for the accident are speed driving, lacking sufficient sleep, drink and drive. Automatic accident detection helps to recognize the location of the accident and to find the location of the accident. For an ambulance vehicle, every second is important. If there is a delay in the arrival of ambulance, there will be a loss of life. Radio Frequency module is used to control the traffic signals automatically. Therefore, the ambulance vehicle will reach the hospital in exact time to save the human.

In addition, the main goals for the automatic accident detection techniques are to detect the accident and to send the message automatically to the emergency contacts along with the location. Emergency contacts include family members, friends, hospitals, police station etc. The incidents of accidental deaths have shown increasing trend during the year 2000-2019 with an increase of 50 percent in the year 2010 as compared to the year 2000. According to Planning Commission of India, the total annual economic loss is 2.5% of India's GDP due to rising number of road fatalities. Most victims lose their lives due to such reasons. Therefore, this idea of saving lives by curing the problem comes into existence. Real-time positions of the vehicles are informed by the system using the pre-install smart sensing accelerometer equipment. This data is recorded and all the

information can be observed by remote location to provide the required services to the victims. Tracking of the vehicle can be done in all-weather condition. GPS and GSM technologies are used in this system to provide all the data to the remote servers which are then processed and the extracted information is used to provide the services to the individual at the time of emergency.

II. LITERATURE SURVEY

Manasi Patil et al., suggested a better traffic management system using Raspberry pi and RFID technology. The vehicle has a raspberry pi controller fixed in it which is interfaced with sensors like gas sensor, temperature sensor and shock sensor. These sensors are fixed at a predetermined value before accident. When an accident occurs, the value of one of the sensor changes and a message to a predefined number (of the ambulance) is sent through GSM. The GPS module which is also interfaced with the controller also sends the location of the vehicle. When the message is received by the ambulance, a clear route has to be provided to the ambulance. The ambulance has a controller ARM which is interfaced with the RFID tag sends electromagnetic waves. When an ambulance reaches the traffic signal the RFID reader which is placed on the joints detect the electromagnetic waves of the tag. If the traffic signal is red, then the readers goes through the database in fraction of seconds and turn the red light green. And automatically in such condition the RFID on opposite joints turn the opposite signal red. This provides a clear route to the ambulance. [1]. V. Sagar Reddy et al., developed an accelerometer based System for driver safety. The system has the advantage of tracking or identifying vehicles location just by sending a SMS or email to the authorized person. The system is designed by using Raspberry Pi (ARM11) for fast access to accelerometer for event detection. Is there any event is occurs the message sent to the authorized person so they can take immediate action to save the lives and reduce the damages. Images captured by the camera on the vehicle are emailed to the concerned person (for example the owner of the vehicle) along with the type of accident and the time of the accident. [2].Sri Krishna Chaitanya Varma et al., proposed an Automatic Vehicle Accident Detection and Messaging System Using GPS and GSM Modems. AT89C52 microcontroller is used in the system. When the system is switched on, LED is ON indicating that power is supplied to the circuit. When the IR sensors that are used sense any obstacle, they send interrupt to microcontroller. The GPS receives the location of the vehicle that met with an accident and gives the information back. This information is sent to a mobile number as a message. This message is received using GSM modem present in the circuit. The message gives the information of longitude and latitude values. Using these values the position of the vehicle can be estimated [3].Apurva Mane et al., described the methods for vehicle collision detection and remote alarm device using Arduino. Key features of this design include real-time vehicle monitoring by sending its information regarding position (longitude, latitude), time, and angle to the monitoring station and to the user/owners mobile that should help them to get medical help if accident or the theft occurs. Also user/owner has an access to get real-time position of a vehicle in real time.

III. BLOCK DIAGRAM

In this project, Arduino is used for controlling whole the process with a GPS Receiver and GSM module. GPS Receiver is used for detecting coordinates of the vehicle, GSM module is used for sending the alert SMS with the coordinates and the link to Google Map. Accelerometer namely ADXL335 is used for detecting accident or sudden change in any axis. And an optional 16x2 LCD is also used for displaying status messages or coordinates. We have used GPS Module SIM28ML and GSM Module SIM900A.

1 GPS 4 GSM
2 LCD 5 Accelerometer
3 Arduino 6 Mobile

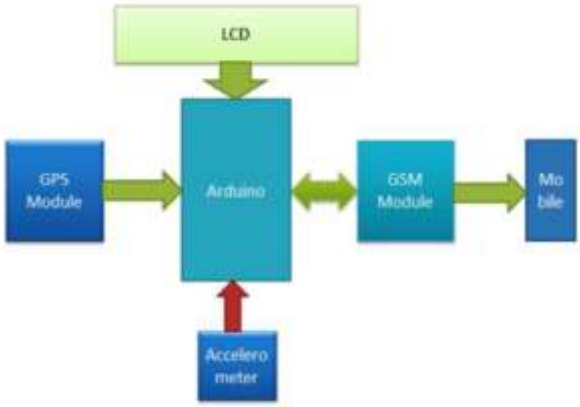

Fig 1 Block Diagram of Implemented System

IV. HARDWARE IMPLEMENTATION

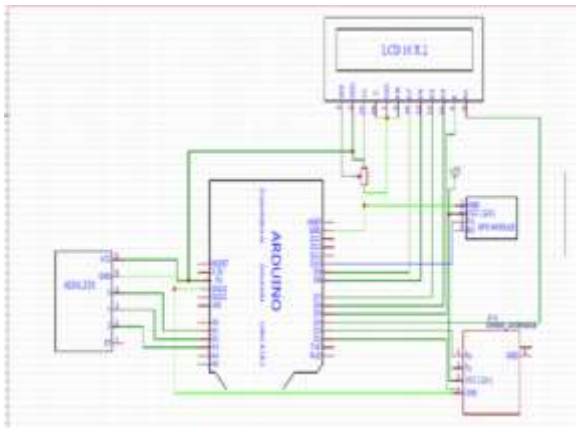

Fig 2 Circuit Diagram

A. Circuit Description

Circuit Connections of this Vehicle Accident Alert System Project is simple. Here Tx pin of GPS module is directly connected to digital pin number 10 of Arduino. By using Software Serial Library here, we have allowed serial communication on pin 10 and 11, and made them Rx and Tx respectively and left the Rx pin of GPS Module open. By default Pin 0 and 1 of Arduino are used for serial communication but by using the Software Serial library, we can allow serial communication on other digital pins of the Arduino. 12 Volt supply is used to power the GPS Module.

GSM module's TX and RX pins of are directly connected to pin D2 and D3 of Arduino. For GSM interfacing, here we have also used software serial library. GSM module is also powered by 12v supply. An optional LCD's data pins D4, D5, D6, and D7 are connected to pin number 6, 7, 8, and 9 of Arduino. Command pin RS and EN of LCD are connected with pin number 4 and 5 of Arduino and RW pin is directly connected with ground. A Potentiometer is also used for setting contrast or brightness of LCD. An Accelerometer is added in this system for detecting an accident and its x, y, and z-axis ADC output pins are directly connected to Arduino ADC pin A1, A2, and A3.

B. Data Flow Diagram

Step 1 Start

Step 2 Automatic modem initialization Step 3 Send text message to modem to store mobile number

Step 4 Text message will be received and the system is ready to use

Step 5 After the system is ready to use a text message will be received

Step 6 When the accident will be occurred the location will be automatically sent to registered mobile no Step

7 Location will be updated to the server and it will contain the voice data or text message Step

8 End

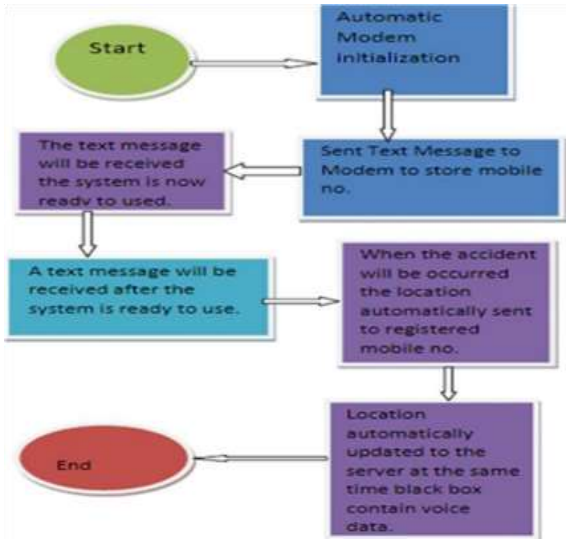

Fig 3 Data Flow Diagram

V. RESULT

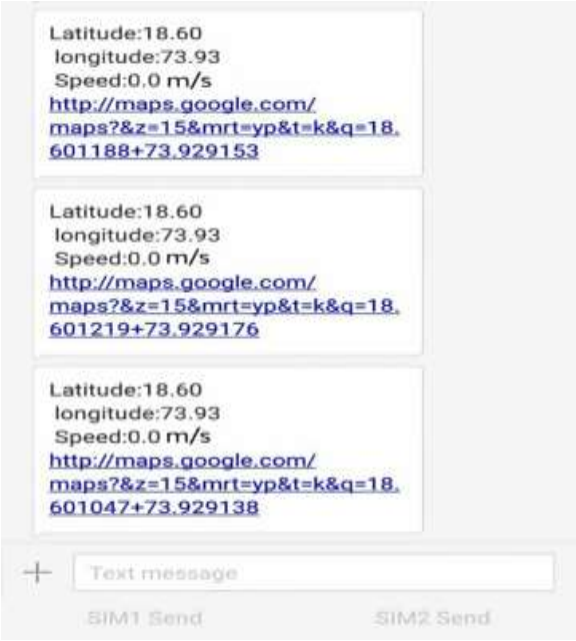

Fig 4 GSM Output

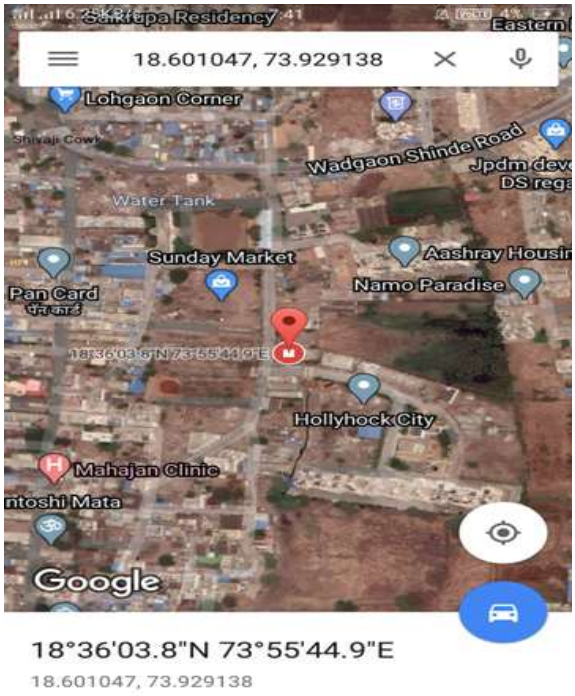

Fig 5 GPS Output

Accelerometer Output

x= 323	y= 305	z= 275	Roll= 19.29	Pitch= 80.90
x= 329	y= 305	z= 275	Roll= 19.10	Pitch= 84.51
x= 322	y= 308	z= 275	Roll= 17.64	Pitch= 80.30
x= 325	y= 305	z= 275	Roll= 19.29	Pitch= 82.09
x= 323	y= 306	z= 277	Roll= 19.12	Pitch= 80.09

VI. CONCLUSION

A. Conclusion

Proposing an IOT system which may help the community decreasing the death rates resulting from vehicles accidents. It also provides many advantages compared to traditional systems, namely, minimizing injured passengers interaction, providing basic medical information to rescue teams, recognizing exact and accurate accidents locations, and facilitating the routing process. The IOT device keeps sending continuous notification of crash occurrence until it makes sure its reception by the headquarter. Accident detection device installed in a vehicles when meets with an accident will send SMS/ messages to the preinstall numbers of the drivers family members, police station, ambulance and nearest hospital. This embedded system is useful for tracking and retrieving the exact position of any vehicle which has met with an accident by using Global Positioning System (GPS) and sensors. This project provides very good idea of how we can extract a location of accident and send the SMS notifications and help can be provided to the victims.

B. 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 windows. This can also be developed by interconnecting camera to the controller.

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