

## ***A Survey on: Car Accident Detection and Car Health Monitoring Using IOT***

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### ***Abstract***

*Every day around the world, a large percentage of people die from traffic accident injuries. Increase in 'Road Accidents' have increased the death rates as well as is one of the biggest problems faced by human in daily transport. With increase in use of 'Internet of Things' smart cars and transportation is being developed, the aim of this project is to use IOT to detect the Car Accident and alert the required authority with intensity of accident for emergency cases and also measure the car health with specific parameters. IOT is a domain where every device is connected to each other and to humans. IOT can be used to solve the current problems by getting the sensor data and detection and intimation about the accidents. A large number of people deaths due to car accidents every day. The common reasons are driver's mistake and late response from emergency services. There is a need to have an effective road accident detection and information communication system in place to save injured persons. A system sends the information to nearby hospital and police station of exact location of accident spot. In research literature, a number of automatic accident detection systems are proposed by numerous researchers. These include accident detection using smartphones, GSM and GPS technologies, vehicular ad-hoc networks and mobile applications. The implementation of an automatic road accident detection and information communication system in every vehicle is very crucial. This paper presents automatic car accident detection techniques and car health monitoring used to save person's life.*

**Keywords:** - Internet of Things, Cloud, Automobile, Smart Cars

## INTRODUCTION

Car accidents are major issues in the world wide. In India every four minutes“ deaths occurred due to car accident. The serve report by world health organization shows that every year in Maharashtra „12264“ people died in „35853“ road accident in 2017. There are some of causes for which an accident can occur, lack of training institute, use of mobile phone while driving the car, unskilled drivers, bad road condition, and overloading and poor traffic management.

We observed Most of the time death occurred in the car accident due to late arrival of ambulance to the accident spot. In this paper we proposed a solution for above reasons. The Internet of Things is developing at global scale. IOT is built with the vision of uniting the physical world with the Internet; it has taken the world by a storm.

With ubiquitous computing prevalent in every aspect of our lives, the IoT will add another link in this chain of global interconnectivity. Accidental deaths are increasing a lot due to careless and high speed drives. Lot of lives is lost due to late access to hospitals or not able to send any

help message to respected authorities [1]. Using IOT with such problems can solve a lot of problems and also save lives. The paper proposes a system which will detect the accident and notify nearby authority with immediate location assistance and also monitor the car health. A study by Virtanen et al. shows that 4.6% of the fatalities in accidents could have been prevented only in Finland if the emergency services could be provided at the place of accident at the proper time [4]. Following is a survey from-

### **[3] National Hospital Ambulatory Medical Care Survey**

#### ***All unintentional injury deaths***

- Number of deaths: 146,571
- Deaths per 100,000 population: 45.6

#### ***Unintentional fall deaths***

- Number of deaths: 33,381
- Deaths per 100,000 population: 10.4

#### ***Motor vehicle traffic deaths***

- Number of deaths: 37,757
- Deaths per 100,000 population: 11.7

#### ***Unintentional poisoning deaths***

- Number of deaths: 47,478

- Deaths per 100,000 population: 14.8

### ***Deaths happen in Maharashtra in year***

**2017**

- Number of deaths:12264

### **EXISTING WORK**

In Existing work, we can find use of different module and android support for the car accident detection and different monitoring.

#### ***Previous systems use***

#### ***GSM – Global System for Mobile Communication***

GSM is a cellular network, which means that cell phones connect to it by searching for cells in the immediate vicinity. GSM can provide data services and roaming service. Roaming is using your GSM phone number in another GSM network.

#### ***GPS - Global Positioning System***

GPS system location and time information can be obtained by the GPS device in any weather conditions. Whether navigation system or tracking system, the architecture is more or less similar.

If there is an accident at any place then GPS system tracks the position of the vehicle and the information is sent to the

particular person through GSM. The person is alerted by either call or SMS.

Kinetic Energy  $\frac{1}{2}mv^2$

Where  $m$ =object mass and  $v$ =vehicle speed.

When car brake is applied due to break the two forces reduce the speed of car. One is the gravitational force ( $g$ ) and the other one is the friction force ( $f$ ).

Considering the friction coefficient 0.8 for a plain road surface and standard gravitational force (9.8 meters per square second), we can get the final speed of a vehicle after one second once the brake is applied. As such, if the speed is less than these maximum speed, than it would be assumed that some other deceleration force worked on the vehicle to reduce the speed and an accident has occurred [1].

Boards like arduino and xbee are also used in previous systems to make car accident detection with an approximate location.

### **LIMITATIONS OF EXISTING WORK**

Use of GSM and GPS module may get the location and intimation to the required authority but use of traditional methods makes it more non-reliable to work as the

data is not stored to cloud and the confirmation of data sent to right authority is also not obtained.

Use of development boards like arduino and xbee makes the project limited and slow as they are microcontroller and have less speed of calculation and less memory. The data is only send as a sms but not as actual data for analyzing or for monitoring the car health.

The existing systems are also not reliable for intimating to right authority and thus results in human loss.

### **PROPOSED SYSTEM**

The proposed system overcomes the problem of sending the alert to specified authority in a confirmation manner and also sending the data to the cloud for analyzing. Due to microprocessors used on board the data retrieval and sending of data is faster.

Proposed system supports internet connectivity as well as heavy databases for faster access and use of data for reaching the right authority as fast as possible. The use of different algorithms and python programming language helps in analyzing car health.

The Proposed system makes use of sensors like vibrational sensor, ultrasonic, Gas Sensor, GPS Sensor, Temperature and Humidity Sensor and raspberry pi computer for fulfilling the objective and working more efficiently. (See **Figure: 1**)

### **ADVANTAGES AND DIS-ADVANTAGES**

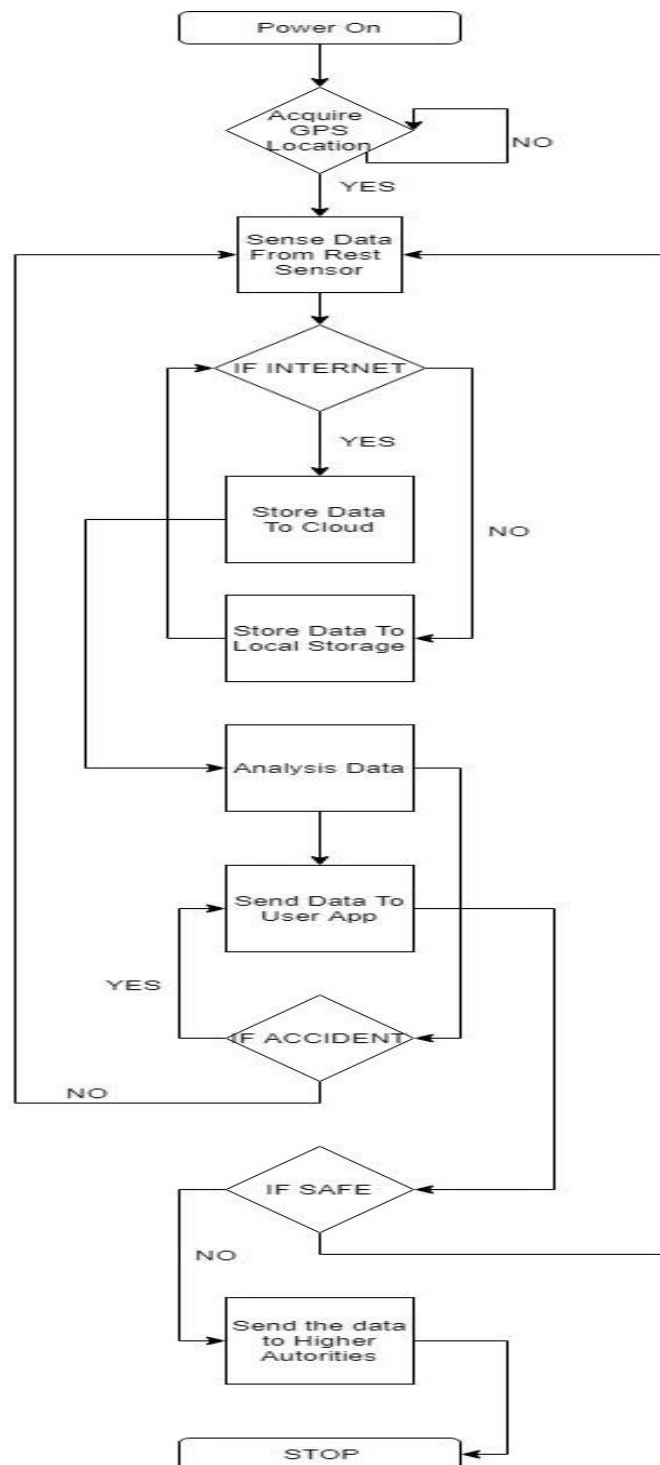
#### ***Advantages: -***

1. Faster Sensing of data
2. User friendly app for monitoring car health
3. Faster Intimation to the right authority
4. Easy detection of accident
5. Detection of Intensity of Impact+
6. Safety Intimation in app
7. Less Power Consumption
8. Distance detection in system

#### ***Disadvantages: -***

1. Needs Constant Internet Connect

## System Architecture



**Figure:1**

## METHODOLOGY

The accident detection sensors in the proposed system are vibrational sensors,

GPS sensor and Ultrasonic sensor. The system is continuously monitoring the car health with the help of different sensors

like Temperature Sensor, Gas Sensor, and Humidity Sensor.

When the user is driving the car the GPS sensor is tracking the location of the car and the vibrational sensors are sensing the vibrations coming from the car. The accelerometer is tracking the speed of car for driving speed limits or immediate brake detection of car. When the car is hit by any obstacle or car at any side the four side vibrational sensor will detect the amount of vibration and detection the side of accident. GPS sensor is used to detect the location of car in form of longitude and latitude. GPS technology has very much accurate result.

A very sensitive and accurate GPS signal acquiring device is required for the system. The Obtained data will be further sent to cloud.

The data obtained in cloud is analyzed by the different algorithms and user is provided with car health data and graphs. The data is also used for detecting the accident and the data is saved in database. When accident is detected the data is immediately sent to the nearest Hospitals and Police authority.

The authorities will have a portal with all the details of users sent by the cloud and they will get the location of the user and intensity of the accident, on the user side if the accident is not intense and user is safe than he/she can cancel the request for assistance from the hospital.

## **MECHANISM OF SYSTEM**

### ***Car Health Monitoring:***

The car health monitoring will be done by Temperature sensor, Gas Sensor, Accelerometer.

The car engine temperature plays a vital role in engine life. If the engine is over heated the piston can get damaged and engine can be seized. The temperature sensor senses the temperature and sends the data to cloud and keeps informing the user. The Gas Sensor keeps track of pollution done by the car which will reflect the car health and exhaust condition. The more is the carbon emission from the car the more the car needs attention.

The Accelerometer keeps the track of speed and breaking of car.

All the sensors are controlled by microprocessor based board which in-turns send the data to cloud using internet connection.

### **Middleware Cloud:**

The cloud contains all the frameworks and programs required for capture data and process data. Cloud is a remote computer where one can store data or retrieve anytime anywhere in world. The cloud will have Accident prediction algorithms and Data Analysis's tools. The data sent by sensors is captured by cloud and stored in database. Heavy data requires database created especially for IOT purpose. Lot of data is constantly received from sensors through the system installed in cars.

### **End Authorities:**

The Hospitals and Police are provided with a panel and app for obtaining the information and location of the user who had accident. The Intensity of accident is also sent from cloud for emergency situations and hospitals to take immediate action.

### **CONCLUSION**

Every day around the world, a large percentage of people die from traffic accident injuries. Increase in „Road Accidents“ have increased the death rates as well as is one of the biggest problems faced by human in daily transport, with increase in use of „Internet of Things“ smart cars and transportation is being developed. We developed this project

using IOT to detect the Car Accident and alert the required authority with intensity of accident for emergency cases and also measure the car health with specific parameters. In this project we aim to reduce the action time of intimating the hospital ambulance and approaching the accident location. Thus the duration of accessing the accidental location will decrease due to availability of location and impact of accident.

The health monitoring mechanism of our system helps the user to maintain his car in following parameter, pollution control, and engine temperature. The use of gas sensors also helps in analyzing the amount of carbon emitted by car, thus controlling and monitoring the pollution in air.

### **REFERENCES**

- I. Md. Syedul Amin, Mohammad Arif Sobhan Bhuiyan and Mamun Bin Ibne Reaz, Salwa Sheikh Nasir's "GPS and Map Matching Based Vehicle Accident Detection System"
- II. Amala James's "A seminar report on Accident Detection and Reporting System using GPS, GPRS and GSM Technology"

- III. “National Hospital Ambulatory Medical Care Survey”: 2015
- IV. Sneha R.S. and Gawande A. D., International Journal of Advanced Computer Technology (IJACT), June 2013.
- V. R.S. Gaonkar, Microprocessor architecture programming.
- VI. Wireless Vehicular Accident Detection and Reporting System, IEEE 2010