



## ACCIDENT DETECTION AND REAL TIME INFORMATION USING IOT TO AUTOMOBILES

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### ABSTRACT

*In automobiles, many advancements in technology could take place. Either interior or exterior, but cases of accident depend on the driver and the other automobiles surrounding the driver. So, it takes a keen importance in emergency service providence in automobiles in case of any accidents. In this project emergency service is activated as soon as there is any sight of accident. Accident stimulus is taken from the sensors like vibration, tilt and flame sensors. This sensor module is connected to the microcontroller which operates to perform the activity to send alert message in the system and also outside the system. If in case there is no accident witnessed but still the sensor module has detected the emergency, driver can always switch the alert of from the switch provided which is again connected to the microcontroller. Microcontroller sends signals to the Bluetooth module connected to it in case of accident. Bluetooth module which is to be connected to the phone of the user or the driver will get access to the android application.*

*In this android application the driver has to login and feed his personal details so that it helps in case of accident. He will also be asked to feed his close contact to whom he wishes to send alert message in case of accident. This application send message to the close contacts and also send message for the nearby hospital ambulance driver with location of accident. Since the ambulance driver may or may not be near the accident area, application also get access to the ola or uber application to find the nearby driver to pick up to the nearby hospital for emergency.*

*From this application time for surveillance to be provided is reduced so as to get immediate response to the emergency victims.*

**KEYWORDS-** Raspberry Pi, GPS, Vibration Sensor, L293D Motor Driver, Wi-Fi, Python.

### INTRODUCTION

The high demand of automobiles has also increased the traffic hazards and the road accidents. In present days the rate of accidents can be increased rapidly. Due to employment the usage of vehicles like cars, bikes can be increased, because of this reason the accidents occur. People are going under risk because of their over speed, due to unavailability of advanced techniques, the rate of accidents can't be decreased. To reduce the accident rate in the country this paper introduces an optimum solution. Automatic alert system for vehicle accidents is introduced; the main objective is to control the accidents by sending a message to the registered mobile and nearby hospital, using wireless communications techniques. When an accident occurs at a city, the message is sent to the registered mobile and nearby hospital through GSM module in less time. When individual met with an accident which might be a very critical situation as their lives are on stake where no one can rely on passerby or the strangers for the needful help and cooperation. So, it is very important to get to the optimal solution that might be a life line for the individual.

This is because of the lack of best emergency facilities available in our country. An automatic alarm device for vehicle accidents is introduced in this paper. This design is a system which can detect accidents in significantly less time and sends the basic information to first aid center within a few seconds covering geographical coordinates, the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team in a short time, which will help in saving the valuable lives. Thousands of people are dying because ambulances take too long to answer emergency calls. Human life is too precious to be lost in road accidents which are one of the major causes for fatalities in India. A switch is also provided in order to terminate the sending of a message in rare case where there

### LITERATURE SURVEY

In this framework, we work on accident detection technics by referring following papers, in [1] author proposed solution to detect accident sound sensor, flame sensor using raspberry pi. Which is also used to keep track of the accelerometer readings. In [2] GPS and GSM framework used for accident detection with help of vibration sensor and

send quick message to the relatives. Another work of dispatching emergency services to appropriate location is done by using Analytic Hierarchy Process (AHP) in [3]. In paper [4] the author proposed all this system fully automated using different sensor on every stage to send message for relative and hospital. In [5] author designed a system which used alcohol sensor, vibration sensor. And GPS and GSM module were used forming an IoT network and cloud server to store all information. In [6] framework includes a microcontroller-based low-cost Accident Detection Unit (ADU) that contains GPS and GSM modem used for sending SMS and Alarm. In paper [7] author has talked about how to control traffic which help in accident reduction using intelligent traffic lights ITL. In paper [8], author proposed a project by how network problem can be overcome with the help of smart cities. In paper [9] VANETs is used to connect between different automobiles while travelling and make all the vehicle connected. In paper [10] mobile is used which access the help of wretch server to send emergency alert without any external aid. In this paper we study all above paper and basic idea to detect accident by system which available to every two-wheeler easily and reduce delay in providing emergency services to victim. So here we came up with new idea which implement fully automated system for all process.

### Design and implementation

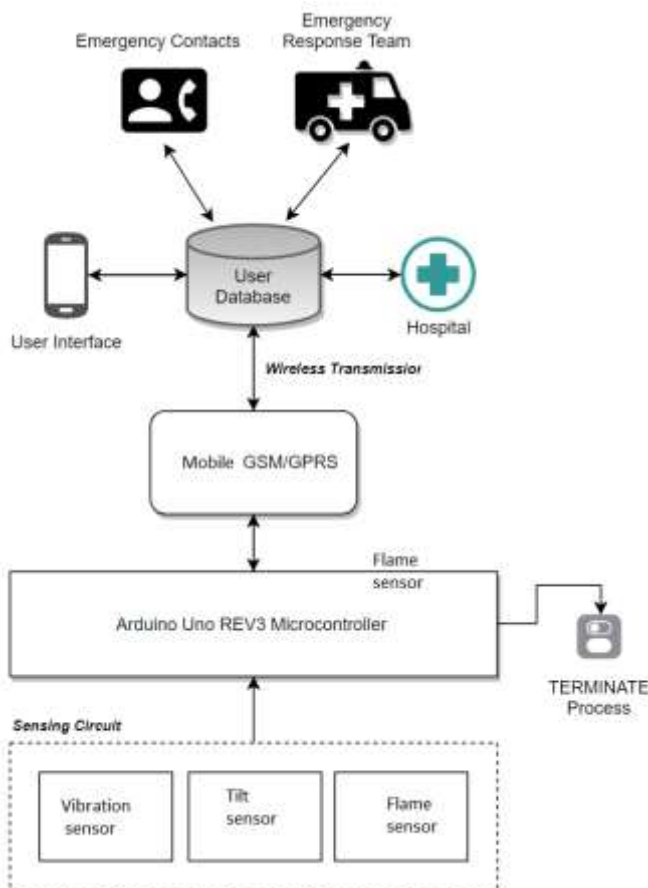


Fig 1: Block Diagram

### WORKING

In case of automobile accident, there must be immediate access to the emergency services. The taken by the emergency responders will play a major role in this kind of situation. So as to reduce this problem this project help in immediate service avail lance. The accident alert system and android app is interconnected with IOT. At first user have to install the app and have to register his details and have to enter his emergency contacts. If there is any occurrence of accident then the sensors in this device will detect the accident and then forward this information to the smart phone which is connected to it via Bluetooth. Now the remaining mechanism is done by app where app will automatically trigger an alarm upon receiving this information from the IOT. If the Driver fails to turn off this alarm within a specified time limit, the app sends a message to the contacts loaded by him which also contains the location of the accident to his emergency contacts and to the nearby hospital.

The android app developed will be having link to other application like Ola and Uber, since ambulance pick up time might be late to the location. This android app will send notification to the nearby Ola or Uber driver of emergency. It's up to the driver intention to help the accident-prone victims to help, company should give rewards for his act of humanity and gain respect and increase his commodity of service. Though ambulance driver intends to come as soon as possible to the accident area, driver from Ola/Uber whose work is to transport passenger can also help the emergency victims. To implement this service from the official app, if automobiles manufacturer looks forward to this surveillance which is a lifesaving project can change the death rates of accidents.

### Electronics parts

#### Vibration Sensor

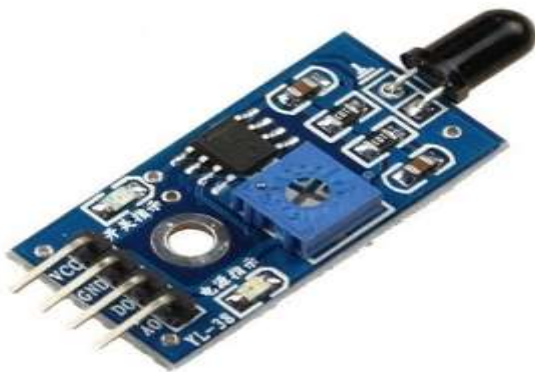
At present in the industry like research and development, the ability of monitoring, measuring as well as analyzing the vibration is very important. Unfortunately, the suitable techniques for making a measurement system for vibration with precise & repeatable are not always clear to researchers with the shades of test tools & analysis



Fig 2. vibration-sensor-module

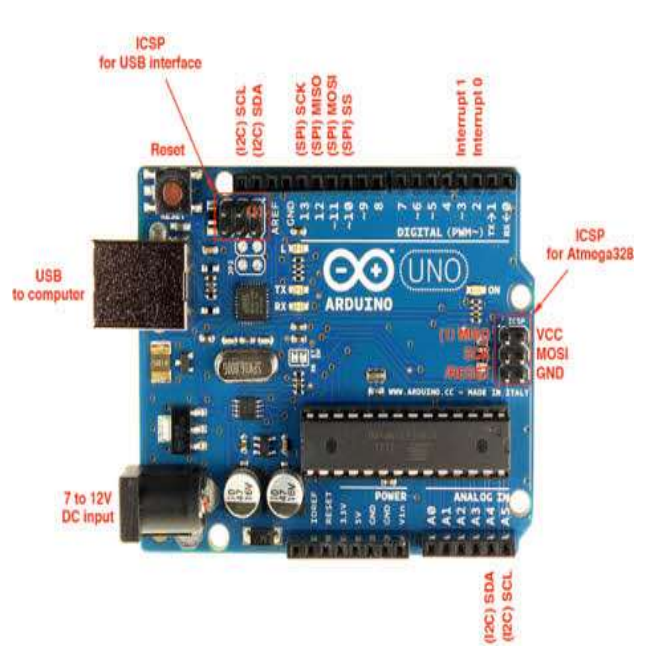
measuring the vibration which includes a selection of suitable component, the configuration of the system, signal conditioning, analysis of waveform and setup.

The vibration sensor is also called a piezoelectric sensor. These sensors are flexible devices which are used for measuring various processes. This sensor uses the piezoelectric effects while measuring the changes within acceleration, pressure, temperature, force otherwise strain by changing to an electrical charge. This sensor is also used for deciding fragrances within the air by immediately measuring capacitance as well as quality. The working principle of vibration sensor is a sensor which operates based on different optical otherwise mechanical principles for detecting observed system vibrations.



**Fig 3. Flame-sensor**

A sensor which is most sensitive to a normal light is known as a flame sensor. That's why this sensor module is used in flame alarms. This sensor detects flame otherwise wavelength within the range of 760 nm – 1100 nm from the light source. This sensor can be easily damaged to high temperature. So this sensor can be placed at a certain distance from the flame. The flame detection can be done from a 100cm distance and the detection angle will be 600. The output of this sensor is an analog signal or digital signal. These sensors are used in firefighting robots like as a flame alarm. A flame-sensor is one kind of detector which is mainly designed for detecting as well as responding to the occurrence of a fire or flame. The flame detection response can depend on its fitting. It includes an alarm system, a natural gas line, propane & a fire suppression system. This sensor is used in industrial boilers. The main function of this is to give authentication whether the boiler is properly working or not. The response of these sensors is faster as well as more accurate compare with a heat/smoke detector because of its mechanism while detecting the flame. This sensor/detector can be built with an electronic circuit using a receiver like electromagnetic radiation.



**Fig.4. Arduino Uno Board Pin Configuration**

The **Arduino Uno** is one kind of microcontroller board based on ATmega328, and Uno is an Italian term which means one. Arduino Uno is named for marking the upcoming release of microcontroller board namely **Arduino Uno Board 1.0**. This board includes digital I/O pins-14, a power jack, analog I/p-6, ceramic resonator-A16 MHz, a USB connection, an RST button, and an ICSP header. All these can support **the microcontroller** for further operation by connecting this board to the computer. The power supply of this board can be done with the help of an AC to DC adapter, a USB cable, otherwise a battery. The **ATmega328** is one kind of single-chip microcontroller formed with Atmel within the **meager family**.

The features of Arduino Uno ATmega328 includes the following.

- operating voltage is 5V
- The recommended input voltage will range from 7v to 12V
- The input voltage ranges from 6v to 20V
- Digital input/output pins are 14
- Analog I/p pins are 6
- DC Current for each input/output pin is 40 mA
- DC Current for 3.3V Pin is 50 mA
- Flash Memory is 32 KB
- SRAM is 2 KB



Fig.5.HC-05 Bluetooth Module

### Bluetooth Module

It is used for many applications like wireless headset, game controllers, wireless mouse, wireless keyboard and many more consumer applications. It has range up to <100m which depends upon transmitter and receiver, atmosphere, geographic & urban conditions. It is IEEE 802.15.1 standardized protocol, through which one can build wireless Personal Area Network (PAN). It uses frequency-hopping spread spectrum (FHSS) radio technology to send data over air. It uses serial communication to communicate with devices. It communicates with microcontroller using serial port (USART). HC-05 is a Bluetooth module which is designed for wireless communication. This module can be used in a master or slave configuration.

### Android Application

An Android app is a software application running on the Android platform. Because the Android platform is built for mobile devices, a typical Android app is designed for a smartphone or a tablet PC running on the Android OS. Although an Android app can be made available by developers through their websites, most Android apps are uploaded and published on the Android Market, an online store dedicated to these applications. Android apps are written in the Java programming language and use Java core libraries. They are first compiled to Dalvik executables to run on the Dalvik virtual machine, which is a virtual machine specially designed for mobile devices. Developers may download the Android software development kit (SDK) from the Android website. The SDK includes tools, sample code and relevant documents for creating Android apps.

Novice developers who simply want to play around with Android programming can make use of the App Inventor. Using this online application, a user can construct an Android app as if putting together pieces of a puzzle. The Android application made here in this project is used to get information of the person driving the automobile. His basic information such as his name, address, contact number, family members contact information, his blood group are fed during the login of the application.

In case of accident the application in the phone gets initiated with data acquired from the Bluetooth via accident detection module. Accident detection module involve sensors and microcontroller, which is connected to Bluetooth module to send data to phone.

Application in the phone detects the location of the phone and search for the nearest hospital and send the location of the accident area to the hospital's ambulance driver, since the driver and the hospital might be far away from the location of accident the application also sends notification of emergency to the nearest Ola/Uber driver. This way immediate surveillance to the emergency situation in case of an accident is achieved.

### ADVANTAGES

- Save time and increase notification efficiency
- Prepare notification templates in advance
- Multi-channel communication increases timeliness of notification receipt
- Send to contacts' preferred method of communication
- Target specific contacts in geographic regions
- Have contacts confirm receipt of the notification
- Share results with other organizations
- View detailed reports after the emergency
- Optimize notifications for future emergencies
- Day-to-day use increases familiarity with the process

### DISADVANTAGES

The main disadvantage of emergency surveillance is lack of network. Of course, network cannot be wide spread to all the regions

### FUTURE WORK

As a future work, a further analysis can be tried to improve the accuracy of detection phase and reduces the probability of false positive signs that are generated from being the user is inside or outside the car when the vehicle is travelling at a low speed. Therefore, it is suggested that the researchers investigate in the field of "Activity Recognition" based on smartphone sensors, which is used to detect the current activity of the user whether he is driving, walking, running. Also, a voice recognition module can be constructed and added to the proposed system to differentiate between airbag deployment and benign noise. Achieving this enhancement would increase the proposed system reliability and decrease false positive signs.

### CONCLUSION

It has been realized that the smartphone-based car accident detection system is not an easy task to handle. It is really surrounded with many obstacles that prevent the researchers from achieving 100% accurate detection system. The proposed system minimizes the impact of this obstacle which is proved in the practical results conducted in this work.



Every smartphone-based accident detection and notification system is exposed to false positives. In the proposed system, helpful supporting features were added to the system to increase the accuracy of detection process and reduce the probability of false positives, which are briefly listed below:

CADANS presents a confirmation screen which gives the user the opportunity to confirm the accident, thus in case of false positive occurs the user can cancel the alarm and notification is aborted.

badans allows for uninjured peoples or bystanders to take images/videos and send them to emergency responders, for reporting the accident.

CADANS utilizes smartphone camera to record a video, showing what is happening at the instance of an accident immediately after the detection process indicates that there is an accident. This video is sent to the emergency responders for further inspection and analysis.

To notify the family or friends quickly about the accident, the proposed system sends SMS message which contains accident location coordinates to predefined emergency contacts.

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#### REFERENCES

1. Aishwarya S.R, Ashish Rai, Charita, Prasanth M.A, and Savitha S.C "An IoT based vehicle accident prevention and tracking system for night drivers" *proc. IEEE*, vol.3, no.4, pp.2320-9798 2015
2. Sadhana B Sharing, Bhagya Shree Jagadish Niphargid, Maitra M Poojary and T Pooja, "Smart helmet-intelligent safety for motorcyclist using raspberry pi and open CV", *proc. IEEE*, vol.03, no.03 pp.2395-0056 2016
3. Jagdish A. Patel, Arin gale Shebang, Shweta Joshi, Aarti Pawar and Namrata Bari discussed on "Raspberrry Pi

- based smart home", Proc. IEEE*, vol.6, no.3, pp.2321-3361 2016
4. Dr. Pankaj Tomer and pretty Mehta focused on "An Efficient Management System based on Face Recognition using MATLAB and Raspberry Pi 2", *Proc-IEEE*, vol.3, no.5, pp.239 2016
5. T. Anita and T. Upplight focused on "Android based home automation using Raspberry pi", *Proc-IEEE*, vol.04, no.01, pp-2351-8665 2016
6. Shailesh Bhatnagar and Prof. H.G.Sayyed discussed on "Wireless System for Vehicle Accident Detection and Reporting using Accelerometer and GPS", *Proc .IEEE* vol.6, no.8, pp-2229-5518 2015
7. Md.Shaad Mahmud, Honggang Wang, A.M.Esfar-E-Alam and Hua Fang has focused on "A Wireless Health Monitoring System Using Mobile Phone Accessories", *Proc-IEEE*,vol.1, no.99, pp-2327-4662 2016
8. Sarika R. Gujar and Prof. A. R. Itkikar has focused on "Advanced Embedded System of Vehicle Accident Detection and Tracking System", *Proc-IEEE*, vol.5, no.2, pp- 2277 128X 2015
9. Zaobo He, Zhipeng Cai, Jiguo Yu, Xiaoming Wang, Yunchuan Sun, and Yingshu Li, has discussed on "Cost-Efficient Strategies for Restraining Rumor Spreading in Mobile Social Networks", *Proc-IEEE*,vol.66,no.3 2017
10. Hyung-Sin Kim, Hongchan Kim, jeongyeuo Paek and Saewoong Bahk has discussed on "Load Balancing Under Heavy Traffic in RPL Routing Protocol for Low Power and Lossy Networks", *Proc-IEEE*,vol.16, no.4, pp. 1536-1233 2017