iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** IV **Month of publication:** April 2018

DOI: http://doi.org/10.22214/ijraset.2018.4222

www.ijraset.com

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue IV, April 2018- Available at www.ijraset.com

Accident Alert using IOT and Android Application

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Abstract: ***The accident alert system is designed using IOT and an android app. It is primarily developed to save lives of people in critical situations (or) in case of road accidents. The app is interconnected with sensors, which are connected in user's vehicle and responsible for detection of an fall down or accident event, and after they sends this information to the application which is pre installed in the user's mobile. The application will send alert SMS or voice message regarding accident and its location to emergency contacts and Emergency Medical Services automatically. The user needs to register his details while installing it and can add his desired contacts, to which the information needs to be passed. It may take 2-3 min of time to send this message, as an alarm would be sounded on the occurrence of an event, and failing to switch it off would trigger the message. The message would also contain the location along with time. This would help save precious time in situations where an immediate action for the event has to take place in saving the life of dear ones.***

Keywords: ***Sensors, Desired contacts, alarm, Emergency Medical Services***

I. INTRODUCTION

Road accidents are undoubtedly the most frequent and, overall, the cause of the most damage. The reasons for this vary from a lot of factors involving in it. A Road Accident is a very unpleasant event and no one ever wants it to occur in their life. Transportation is a basic need of society. It's make human life more easy and comfortable. As far as increasing transportation, accident is also increasing. It cause death of human and damages any part of body. The advent of technology has increased traffic hazards and also the frequency of road accidents has also increased.

Automobile has a great importance in our daily life. We utilize it to go to our work place, keep in touch with our friends and family, and deliver our goods. But it can also bring disaster to us and even can kill us through accidents. Road accidents are an outcome of the interplay of various factors, some of which are the length of road network, vehicle population, human population and adherence/enforcement of road safety regulations etc. Road accident causes injuries, fatalities, disabilities and hospitalization with severe socio economic costs across the country.

Consequently, road safety has become an issue of concern both at national and international level. The United Nations has rightly proclaimed 2011-20 as the Decade of Action on Road Safety. An immediate rescue process after an accident can be considered as a tightrope walk between life and death. Any fractional time delay of arriving medical help can cost the life of the victims. As such, an efficient automatic accident detection with an automatic notification to the emergency service with the accident location is a prime need to save the precious human life.

Road accidents have become the major issue during these days. Accidents not only bring loss to life and property but also for our economy. Transportation has evolved greatly over time. With modern technology, the automobile industry has obtained new heights with respect to speed, security, efficiency and comfort. But with this improvement in technology, there has also been an increase in the rate of accidents and sometimes these accidents even lead to death. Especially in a country like India, where accidents occur mainly due to incompetence of the drivers, their negligence towards traffic rules and bad road conditions, accidental death rates are increasing at a startling rate.

A. Working

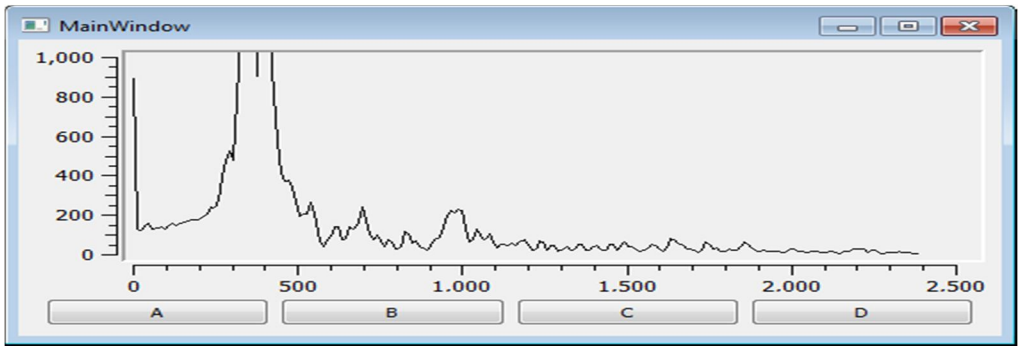
This accident alert system is an android app which is interconnected with IOT. At first user have to install the app and have to register his details and have to enter his emergency contacts. The IOT device must be placed outside the vehicle. If there is any occurrence of accident then the sensors in 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 triggers 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 an SOS message to the contacts loaded by him which also contains the location of the accident.

User registering with App SMS Page IOT

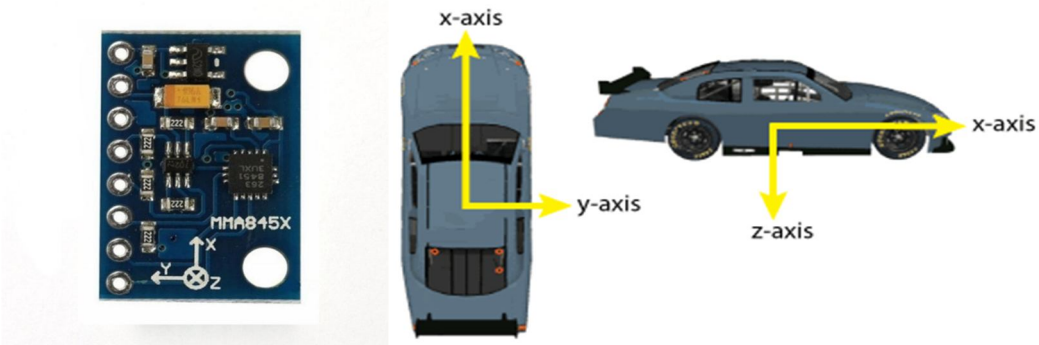
The IOT module consists of Raspiberry Pi 3, which is connected with Sensors such as Sound Sensor and Flame Detection Sensor. These Sensors detect their corresponding event and then send this information to the SOC.

B. Sensors

1) Sound Detection Sensor: These sensors detects whether sound has exceeded a threshold value. Sound is detected via microphone. It uses a microphone which supplies the input to an amplifier, peak detector and buffer. When the sensor detects a sound, it processes an output signal voltage which is sent to a microcontroller then performs necessary processing.



2) Accelerometer: An accelerometer is an electromechanical device that will measure acceleration forces. These forces may be static, like the constant force of gravity pulling at your feet, or they could be dynamic - caused by moving or vibrating the accelerometer. They are useful to detect the dangerous driving. If there is sudden decrease in Accelerometer then there is some chance of accidents.



Accelerometer tilt sensor

When vehicle position is in x-axis when vehicle position is in y-axis

3) Flame Sensors: Flame Detection Sensor Module is sensitive to the flame, but also can detect ordinary light. Usually used as a flame alarm. Detects a flame or a light source of a wavelength in the range of 760nm-1100 nm. Detection point of about 60 degrees, particularly sensitive to the flame spectrum. Sensitivity is adjustable, stable performance.

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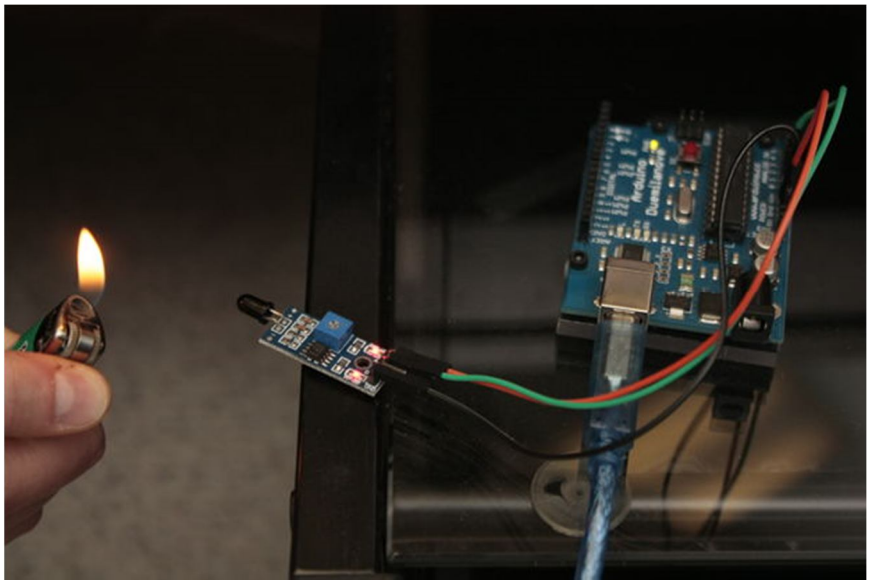

II. PROBLEM STATEMENT

Accidents not only bring loss to life and property but also for our economy. Transportation has evolved greatly over time. With modern technology, the automobile industry has obtained new heights with respect to speed, security, efficiency and comfort. But with this improvement in technology, there has also been an increase in the rate of accidents and sometimes these accidents even lead to death. Majorly these deaths are causing due to the delay of the proper medical aid provide to the road accident victims.

III. RELATED WORK

Mobile devices, especially Smartphone's have been deployed as floating traffic probes and sensors in many applications, both academically and commercially. These applications include road conditions survey, traffic conditions monitoring and accident detections. All of these abilities are essential to an Intelligent Transport System (ITS), which aims to reduce traffic congestion and enhance traffic safety. Real-time traffic accident prediction focuses on the change of traffic conditions before an accident occurrence, while traffic incident detection studies are concerned with the change of traffic conditions after an incident occurrence. However, the performance of these detection and prediction system is greatly restricted by the number of monitoring sensor, available fund, the algorithms used to confirm an accident, weather, traffic flow etc. An acoustic accident detection method is proposed by D. A. Whitney and J. J. Pisano . There are possibilities of false alarm in the system and also does not guarantee the occurrence of an accident. S. Amin et al. proposed a method of accident detection and reporting system using GPS, GPRS and GSM Technology.C. Saiprasert et al. propounded a reporting system in case of dangerous driving using android. Jung Lee described an accident detection system on a highway by tracking the vehicle . We have used pressure sensor, GPS and accelerometer to detect a real alarm and dispatch alert message to nearby police station and health care centre.

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IV. EXISTING SYSTEM

The Present existing system is very poorly structured and has little impact .Every time an accident occurs , there is a delay in action initiated and this leads to loss of valuable life. The golden hour which is crucial in saving a person's life is entirely dependent on the speed of information transfer. The accident is identified by the nearby people or the victim itself.

V. PROPOSED WORK

The accident alert system is designed using IOT and an android app. It is primarily developed to save lives of people in road accidents. The app is interconnected with sensors, which are attached in user's vehicle and responsible for detection of an fall down or accident ,and after they sends this information to the application which is pre installed in the user's mobile. The application will send alert SMS or voice message regarding accident and its location to emergency contacts automatically. The user needs to register his details while installing it and can add his desired contacts, to whom the information needs to be passed. It may take 2-3 min of time to send this message, as an alarm would be sounded on the occurrence of an event, and failing to switch it off would trigger the message. The message would also contain the location along with time.

VI. IMPLEMENTATION

A. Android Things Overview

Android Things lets you build professional, mass-market products on a trusted platform, without previous knowledge of embedded system design. It reduces the large, upfront development costs and the risks inherent in getting your idea off the ground. When you're ready to ship large quantities of devices, your costs also scale linearly and ongoing engineering and testing costs are minimized with Google-provided updates. The IOT module is connected to the android app via a Bluetooth module. Bluetooth module establishes the connection between the android app and the IOT Device. The Smart phone's Bluetooth is connected to this module and the information transfer happens through this process. Now, the mechanism of the android app begins to function, it first raises an alarm for a specified period of time and the failure to switch off this alarm would trigger an SMS to the contacts set by the user.

B. Sound Sensor Module

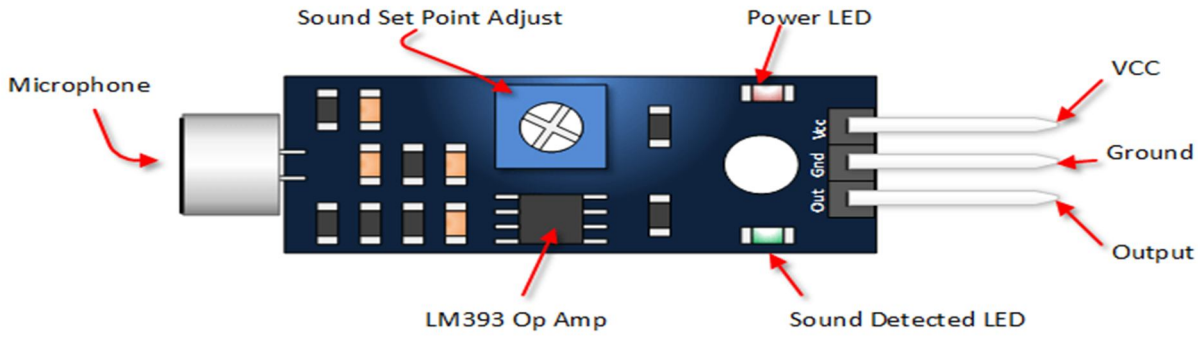

Fig 6.1: Sound Sensor Module

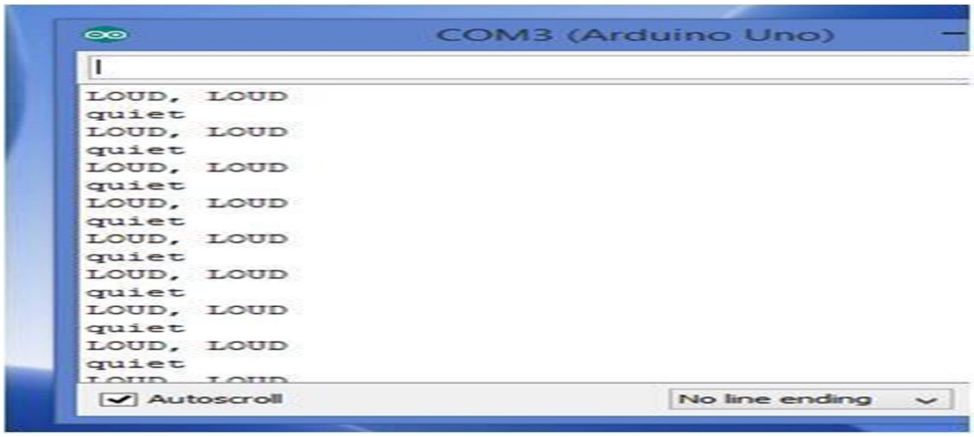

Fig 6.2: Sound detection through the sensor

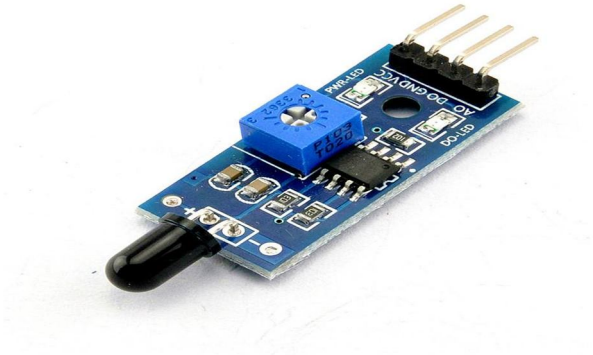

Fig 3.1: Flame Sensor

VII. CONCLUSION

The rate of accident deaths could be reduced by improving the emergency medical services. These services are entirely dependent on the speed of information transfer about an accident. The technological advent can solve this issue and stop the deaths of people. The accident alert system is one such system which can alert the relatives and the emergency services about the accident and thus save valuable life. Main motto of the accident alert system project is to decrease the chances of casualties in such accident. Whenever accident occurs, paramedics are alerted and they reach the particular location to increase the chances of saving life. This device invention is much more useful for the accidents occurred in deserted places and those occurring at night time which usually goes unattended. This system will have broad application prospects and it will play an important role in day to day life in future.

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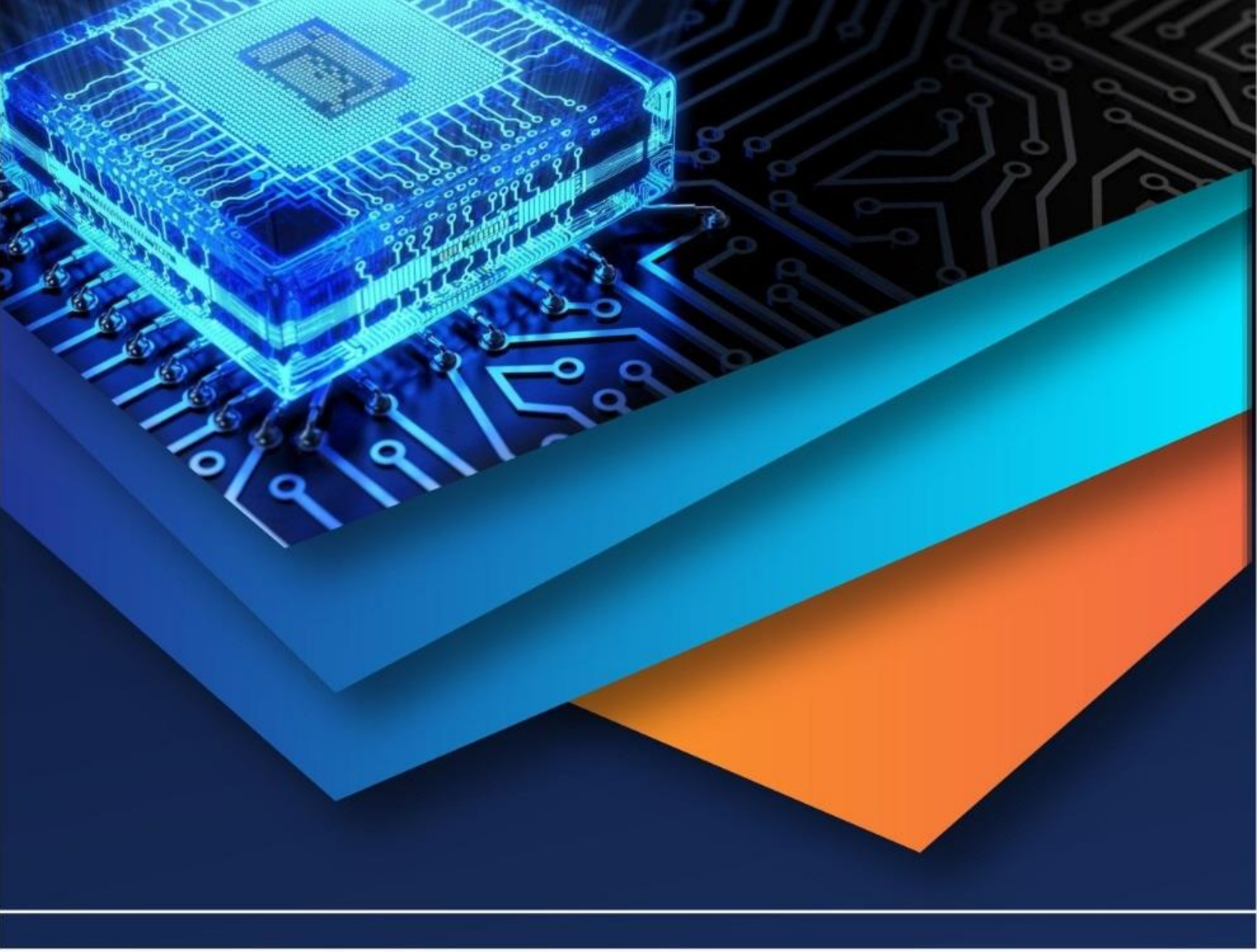

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