

Automatic Accident Detection Using IoT

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Abstract: The proposed work helps in finding the exact spot of the accident and informs the Ambulance and their relatives regarding the accident with an additional information like photo of the accident. The concerned authorities or the ambulance would arrive at the spot of the accident after a stipulated time which may result in the death of the person, so this motivated me to develop a system which would instantly convey the information to the family members without any delay & thereby reducing the death rate. I had couple of methods with which I could try to work on my idea but the best way to implement was using an internet platform. IoT was chosen which basically lets two devices to communicate together and to control working of one another. I have two main motto's one is to "Reduce Death Rate During Accidents", The life of an individual can be saved by providing first aid at appropriate time. As my proposed model will be able to alert victim's family members. The next idea was to "Enhance the current Ambulance service system" By providing exact location along with the picture of accident spot, so that they can reach the accident at the earliest.

Index Terms: *Internet of things, Accident detection & alert, accelerometer sensor, Global positioning system*

1. INTRODUCTION

Whenever accident occurs there would be a drastic delay in transferring the information about the accident to the family members, this motivated me to convey the information to the family members & ambulance without causing any delay. Well automated module is required to inform the concerned authorities when an accident occurs & thereby reducing death rate. The system can be implemented by embedding various sensors (accelerometer, GPS sensors) on to the

vehicle & making use of the IoT technology, with the help of an GPS would convey the information about the accident without causing any delay. This sensor will help us in achieving vehicle to vehicle communication, whenever accident occurs, an information will be conveyed to the people via SMS & email & thereby increasing the safety which also helps in avoiding & controlling accidents. So, the main aim of this project: (a) Firstly to develop a novel IoT system which can help the society in decreasing the death rate due to accidents (b) Secondly to ensure that passengers are attended immediately after the accident without causing any delay.

2. OBJECTIVE

- To learn new technologies & the working principle of accelerometer sensor
- Different types of sensors like (Intensity, fire, pressure) sensors which will be deployed in this module, hence understanding of each component is vital from the development point of view
- To implement a prototype which will maximize the safety of the driver & passengers

3. LITERATURE REVIEW

This chapter deals with the various surveys conducted, so as to find out the convenient components and software's that would aid in the realization of the project idea that I had. So, a number of papers and websites were studied carefully and are listed below.

“An IoT Approach to Vehicle Accident Detection, Reporting, and Navigation” by Elie Nasr, et al. This paper focuses on evolving IoT technology which helps the society in decreasing the death rate resulting from vehicle accidents. They have used sensors like accelerometer, vibration sensor, pressure sensors. The microcontroller which is been used in this project is Arduino. They also have Implementing a navigation system to find the closest rescue team to the crash.

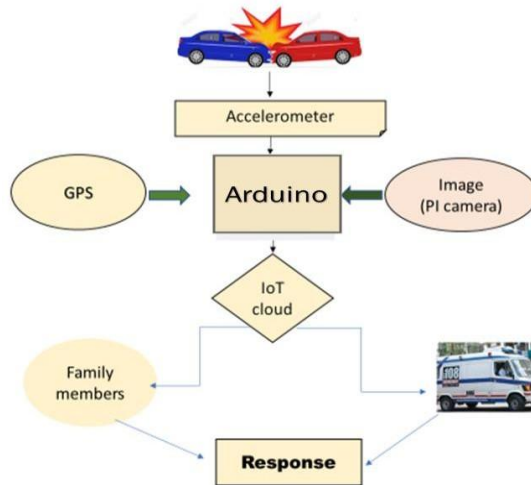
“Vehicle positioning system with accident detection using accelerometer sensor and Android technology” by Bannaravuri Amrutha Valli, et al. This paper focuses on developing a prototype to provide security to the vehicles that are parked on the road. It also focuses on implementing a system which senses it using Accelerometer and some few more components and to send the details to the respective owner of the vehicle or authorities. The drawbacks in the system is it sends the information about the longitude and latitude of the accident in which the data may not be understandable to the user.

“Airbag ECU coupled Vehicle Accident SMS Alert System” by Dheeraj Khandelwal, et al. This paper implements a prototype which detects the accident spot using Arduino and send the details to the owner of the vehicle (especially car). Implementing a system which reduces the death rate and saves the life of victim’s during accidents. The disadvantage with this system was it was not possible to access live recording and accuracy was very less.

“Accident detection from dashboard camera video” by Dr. Earnest Paul Ijjina, et al. This paper describes in identifying the harsh accidents due to turtling of the vehicle which results in major injuries. Implementing a system which reduces the death rate and saves the life of victim’s during accidents by capturing the accident spot image which can be sent. The result of the subject paper is to provide a new approach for detecting accidents of vehicles with dashboard camera is proposed where the video is used to recognize the most critical type of accident.

4. PROPOSED SYSTEM

The block diagram clearly tells about the flow of the project. When the



Fig;- Proposed method

accident is occurred, the sensor senses the happening of the accident and in this case, I am using accelerometer for this

as explained. Accelerometer sensor senses the accident, which is programmed using Arduino and in turn which is connected to camera module and GPS to locate the accident spot and to capture the image of the accident spot.

When the accelerometer readings cross some threshold value it triggers the camera module, GSM and GPS. So, the camera module captures an image and stores in the IoT cloud and collects the data of the exact location and sends the location and the vehicle details through SMS, using GSM module & apart from that it sends the picture and with the above-mentioned data through Gmail, to the family members, relatives and the Ambulance, with some message from the person who has undergone accident and if he is able to press a button given in the device which has pre-written message in the cod

5. HARDWARE DESCRIPTION

The main hardware specifications that are used in building this system is as follows,

i) Arduino UNO :

- Arduino Uno is developed by Arduino.cc & it is an open-source microcontroller board based on the Microchip ATmega328P microcontroller.
- It forms the **Heart** of this proposed model.
- With the help of sensors and it sends the location details.

ii) Camera Module:

- It is an image sensor combined with a lens, control electronics, and an interface like CSI, Ethernet or plain raw low-voltage differential signaling

iii) GSM & GPS Module:

- SIM808 module is a GSM and GPS two-in-one function module. It is based on the latest GSM/GPS module SIM80 from SIMCOM.
- A GPS / GSM tracker utilizes either the Global Positioning System satellites or the Global System for Mobile Communications to determine accurate location.

iv) Accelerometer:

- Whenever an accident occurs, some changes (I.e,vibration,axis movement etc) takes place. This sudden 'impulse' would be monitored by the sensor which would set off the camera module and activate the GPS&GSM module.
- After capturing picture of an accident spot and locating the geo-location Microcontroller takes all the accident details and sends it to the respective destination via email.

v) Bluetooth Module-HC05:

- This is the technology used in wireless communication. It is designed to restore cable connections & It uses serial communication to communicate with the devices.
- HC-05 is a Bluetooth element which is designed for wireless communication. This

module can be used in a master or slave configuration.

vi) DC Motor:

- It is an electric motor which works on direct current power. In any electric motor, potency is dependent upon simple electromagnetism. A current fetching conductor produces a magnetic field, when this is then mounted in an outer magnetic field, it will experience a power

6. WORKING PRINCIPLE

When the accident is happened, the sensors senses it and triggers the Camera, GPS module, GSM module and sends the information through SMS and E-mail. This information contains some of the basic information Vehicle No and Message saying that Accident has Occurred-Emergency. The received SMS, which will have some of the basic details and if you click on the link you will be taken to the google maps and the location of accident spot is shown in the map & this same message is sent to through E-mail as well with an Attachment of the photo captured from Camera module & the contact numbers in which it is sent is already collected before and their relative numbers as well who are really important to the person who has undergone accident.

Main advantage is, it does not require internet to receive the SMS and all the time receiver device might have not connected to the internet. If it is connected to the internet, you will receive it through E-mail and with an additional information of the attachment of captured images.

Like there will be two button (A) and (B) which has some hidden things behind that. After the accident has occurred the spot location will be sent, but if the person press (A) it tells that the accident was minor, if he presses (B) It tells that there is an emergency. If the person doesn't press anything then it is assumed that the person is not able to reply.

If the person who has undergone accident if he/she presses any button along with the

location and capture of accident spot will be sent again to family members or ambulance services.

If you just click on the link received, it will take you to the google maps and shows the location.

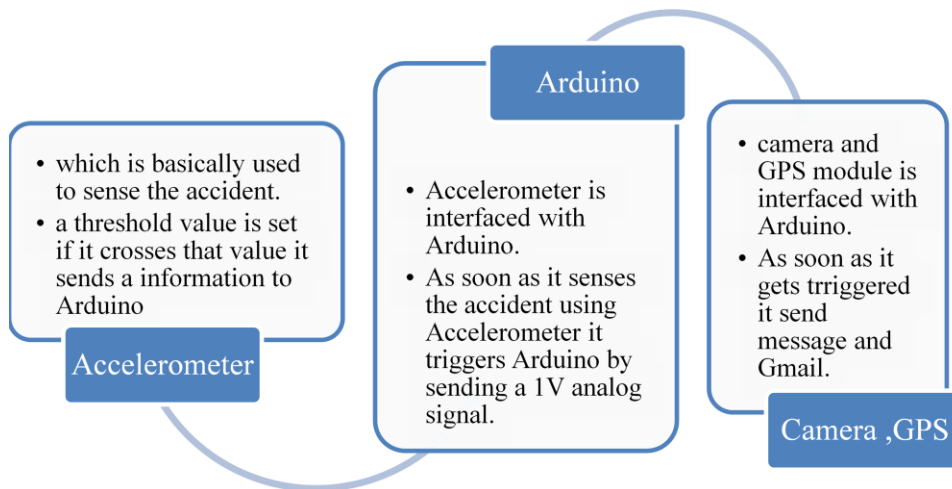
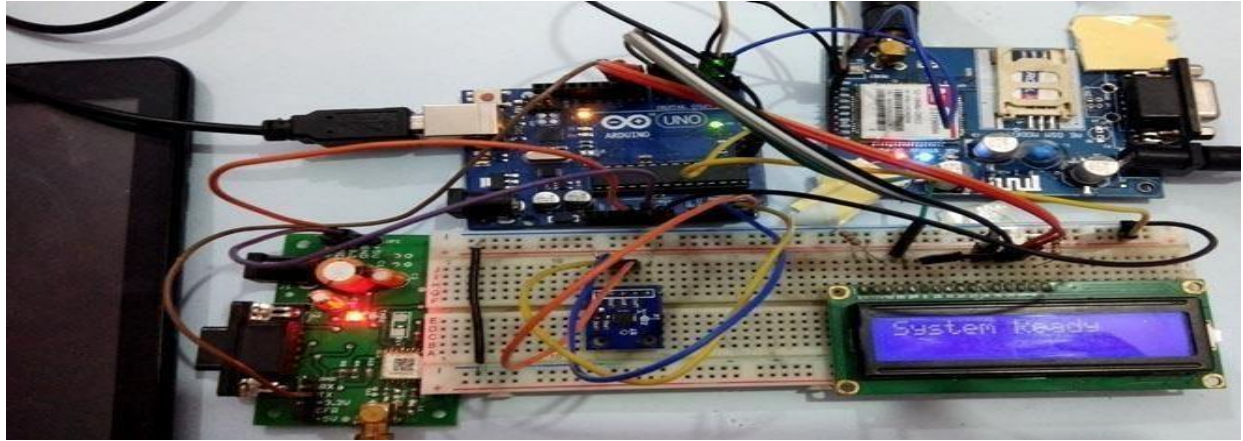


Fig 2: Working Principle

7. RESULTS

- The developed model will be deployed in cars, if any accident occurs this model comes into picture which will sense the accident and following up which will send the details to respective family members and ambulance services.
- The model has a great scope in the upcoming automated vehicles which can be deployed in almost all the vehicles.
- Considering this model accident prevention system can also be designed using the high-end sensors, and the model efficiency can be increased.



**Fig 3: Accident
Detection Using Iot**

8. CONCLUSION

Smart accident restraint and detection is suggested using technologies such as V2V communication, Arduino, different types of sensors, M2M architecture, etc. IoT is being developed at a faster rate which is leading to the growth and usage of technologies in human beings' life. This proposed system makes use of IoT technology along with the sensors that detects the accident and reports it to the rescue system & family members. The severity is measured & the rescue team will arrive to the accident spot with the medical aid at the earliest. This proposed system will help in reducing the rate of death to a greater extent. This strategy additionally tracks and ensures that our friends and family are safe. It is proficient in performance & parameters.

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