

# Accident Detection and Ambulance Rescue System

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**Abstract**— Large number of roadways transportation has increased in the recent years and almost every capable individual has his personal car or bike. We cannot overlook the number of government transports as well the rickshaws and taxis. Due to this the intensity or we can say the number of vehicles has increased to a large extent which has directly or indirectly lead to a lot of accidents. Now the main problem what we face is the immediate medical assistance after the accident which leads to more number of deaths. Most of the time it happens that an accident has occurred and the accident victim is injured badly and is not in a state to help himself and which thereby reduces his chances of surviving. Here our project will provide a solution to this problem. When a vehicle will meet an accident the sensors and other equipment fitted in the system will sense or detect the accident and send a message to all the nearby hospitals through the server on the application and ambulance is sent to the exact location received by the GPS module. The hospitals will act accordingly and there will be much faster assistance to the victim as it was used to be before. So basically our project will provide a faster assistance and rescue to the accident victims and help save many lives.

**Key words:** Accident Detection, Ambulance Rescue

## I. INTRODUCTION

From the recent years we have seen that there is a lot of advancement in science & technology in our country as well as in the world. A lot of vehicles have been increased on the roads in the past years and due to which a lot of accidents take place which leads to a large number of loss of human life and property. Sometime the accidents take place in places where there is no proper facilities nearby and not a lot of settlements which causes a lot of problems. The main problem that we face during accidents is that there is no immediate medical assistance to the victims and due to which a lot of life's that can be saved is lost because the victim isn't taken to the hospital on time or due to the ambulance arriving late or stuck in traffic. The solution to this problem is to implement a system that will detect the accident and inform the nearby hospitals and ambulance about the accident and provide immediate medical assistance to the victims. Here our project will provide a similar solution to the problem. The system will be based on Arduino and firebase. The system will consist of a lot of sensors and other equipment which will be used to detect the accident. Once the accident is detected a message will be send to all the nearby hospitals which will be having a receiver device. On the receiver device the timing of the accident and the coordinates of the location of accident will be sent using a GPS module. After receiving the message the most nearby hospital will send its ambulance to the location. The ambulance will reach the location on time which will be very helpful in providing a proper medical assistance to the victims of the accident.

The system will be divided in 3 main sections

- 1) Detection of accident
- 2) Message to the Hospital
- 3) Immediate action by the hospital

## II. METHODOLOGY

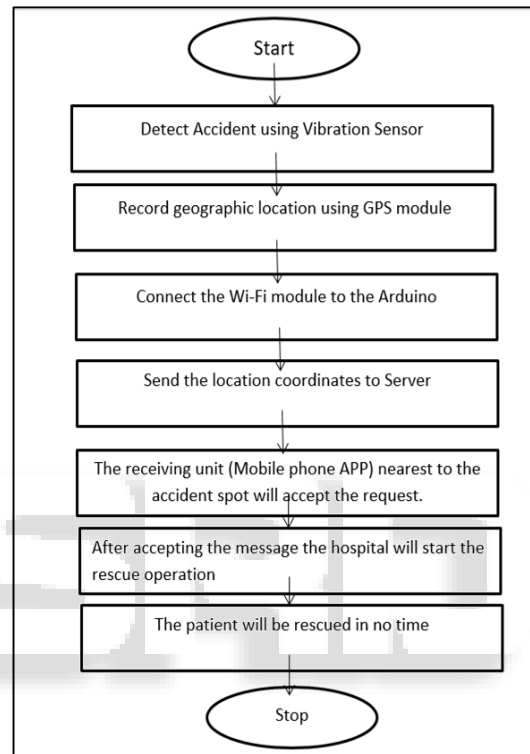


Fig. 1:

## III. PROPOSED WORK

The proposed system consists of two main units, which coordinates with each other and makes sure that ambulance reaches the hospital without any time lag. Thus our system is divided into following two units:

- 1) The Vehicle Unit
- 2) The Ambulance Unit

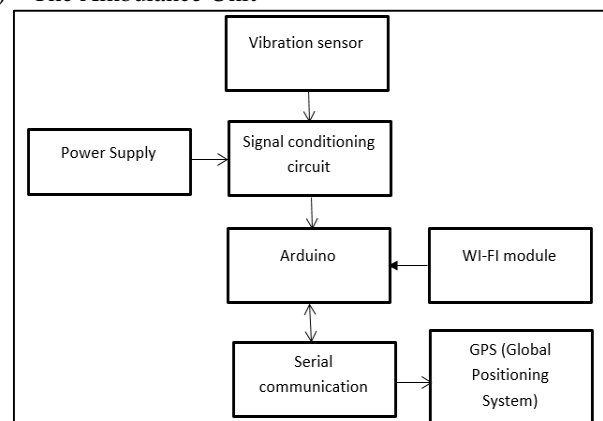


Fig. 2: Vehicle Unit

According to the system, every vehicle should have a vehicle unit. The vehicle unit consists of a vibration sensor, Arduino, a user interface, GPS system. The low level voltage signal needs to be processed properly given by vibration sensor. We can use multiple sensors for detection of accident for the proto type to avoid any error in detection. These sensors can be installed in vehicle body at most vibration sensitive locations. A central system can be implemented inside vehicle to process the signal coming from sensors and to detect the accident from the signals coming from multiple sensors.

The predefined data i.e. Peak voltage level or crash waveform data are used to decide whether an accident is occurred or not. The vibration sensor used in the vehicle will continuously sense for any large scale vibration in the vehicle. The sensed data is given to the controller GPS SYSTEM inside the vehicle. The GPS SYSTEM finds out the current position of the vehicle (latitude and the longitude) which is the location of the accident spot and information is sent. We can also use this vehicle unit for health monitoring of the patient using different sensors.

#### A. Ambulance Unit:

The message sent by vehicle unit to the server is received by ambulance unit. The ambulance unit will have the mobile phone (i.e the app) where the message of accident will be sent and the nearest hospital will book the slot and ambulance will be sent for the rescue purposes. The rescue team in the ambulance immediately traces the location by putting geographical location coordinates in GPS viewer application.

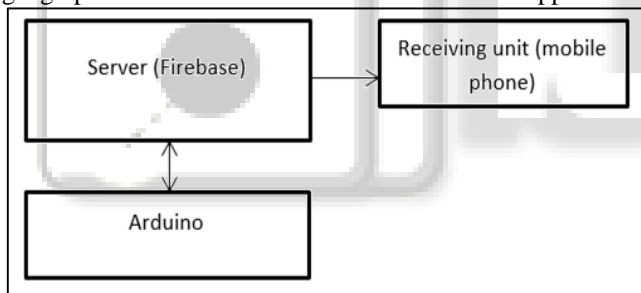


Fig. 3:

#### IV. RESULTS

- 1) The connection image of Arduino Mega 2560 with the GPS module
- 2) The Arduino code was written in Arduino IDE software and the corresponding location co-ordinates were generated.
- 3) Image of the location coordinates generated in the serial monitor of the Arduino IDE software.
- 4) The final connection image of the vehicle unit, GSM, vibration sensor, and the WI-FI module combined
- 5) The image of the firebase database where the data from the GPS module will be uploaded.
- 6) The image of Android application which is the main ambulance unit where the location of the accident will be sent.
- 7) The exact location of the accident spot on google map for better access of location, so that the ambulance follows the correct path to the location and reaches on time.

#### V. CONCLUSION

In this project a novel idea is proposed for accident detection and alert system with information to the hospitals via the server on the mobile application and the nearest hospital booking the slot and sending the ambulance to the location. The GPS tracking based algorithm is designed and implemented in embedded system domain. This system can be proved to be effectual to control not only ambulance but also authoritative vehicles. Thus, if this system is implemented in countries with large population like INDIA it can produce better results. This system is more accurate with less loss of time.

With this system we have successfully achieved our task and designed a system which will be used to detect the accident and alert the hospital about the accident in order to provide a faster and better medical assistance in order to save more number of life during such accidents and also provide the ambulance facility and give a clear way to the ambulance so that it can reach it's destination in least time without stopping at traffic intersection. This system can be effectively implemented for an entire city or countries with large population like India for better results.

#### VI. FUTURE SCOPE

The proposed system would help users to monitor their car when they are using it and otherwise. This technology can be implemented in larger scale where all the cab drivers can be suggested to use this device and user can see the driving pattern and quality of driver basis of performance. Also, it can be used by the government to grade drivers based on driving skills and check whether they are following all the traffic rules. This can be used to cancel driving licenses based on rash driving behavior. This would prevent accidents and reckless driving.

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