

Automatic Alert to Safety Officers

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Abstract

The expeditious growth of technology and infrastructure has made our life easier. The development of technology has also increased the road accidents which cause huge loss of life and this is all due to poor facilities and sometimes even because of the unawareness of the accident spot at which the accident has took place and that's why ambulance service cannot be reached. Our paper will provide a superlative solution to this drawback. Impact sensors can be used in vehicles to detect any collision. An automatic alert to Safety Officers or Ambulances for accident victims in vehicles could be given by developing software and a prototype hardware sensor. The sensor device may be integrated or embedded to the vehicle's collision detection system (for example: like deployment of Airbag, collapsing the steering) so that when accident occurs, sensor and associate software will send a panic signal using the GPS technology to all the GPS enabled ambulances nearby with exact location of accident. The alert may also be sent to police control room. The combination of hardware and software may be suitable for deployment in all type of vehicles. This will help to provide immediate medical assistance to the victim and can save the life. A prototype hardware sensor may be developed which has to be embedded in the vehicle to sense accident / collision. Software may be developed to integrate with the vehicle's GPS software system, which will automatically have activated by sensing the collision and will send alert messages either to police control room or to all GPS enabled Ambulances nearby to attend the accident site with exact location of the accident. This will save valuable time to save the life of victim. According to this paper when a vehicle meet with an accident then the pressure on the impact sensor is detected and the

signals then will be passed to the microcontroller Arduino. Microcontroller sends the HTTP Post Request to server through GSM module. The GPS module is used to identify the car's location. Once the request is send to server it informs to nearby police station as well as to nearby hospitals. The hospital informs to the ambulance and the ambulance reaches there and acknowledges the server. Similarly police also acknowledge the server. This research is able to detect accidents and provide quick help to the victim. This idea can be upgraded by inserting webcam for capturing the image which will help in providing drivers assistance.

Keywords: *Microcontroller Arduino, Embedded System, Django Server, Impact sensor, Google API, Python, GSM, GPS, Agis Database.*

INTRODUCTION

Field of the Innovation

In particular, the invention relates to a Microcontroller with program storing capability, a Global Positioning Module, and means for GSM communication connectively disposed within a vehicle. More particularly the invention relates to a plurality of data structures stored in the memory wherein the data structures are formulated into instruction modules to direct the functioning of the controller.[1]

The high demand of automobile has also increased the road accident. Usually mostly road accidents lead to death. This is because of the lack of acknowledgement of accidents that happen.

41% Indian road users won't help accident victims, 51% ignorant of seatbelts! Ford Cartesy Survey.[2] .

Death of victims with head injury is high in accidents. Key factors which is responsible for it is delay in transportation of the patient to hospital due to nonexistent ambulance services and apathy of passersby. The golden period for survival after sustaining injury is the first 1 hour. Only 10% of injured make it up to hospital in the first golden hour, about 42% patients arrive in hospital between 1 and 6 hours, and 48% traumatized reach hospital after 6 hours[4].

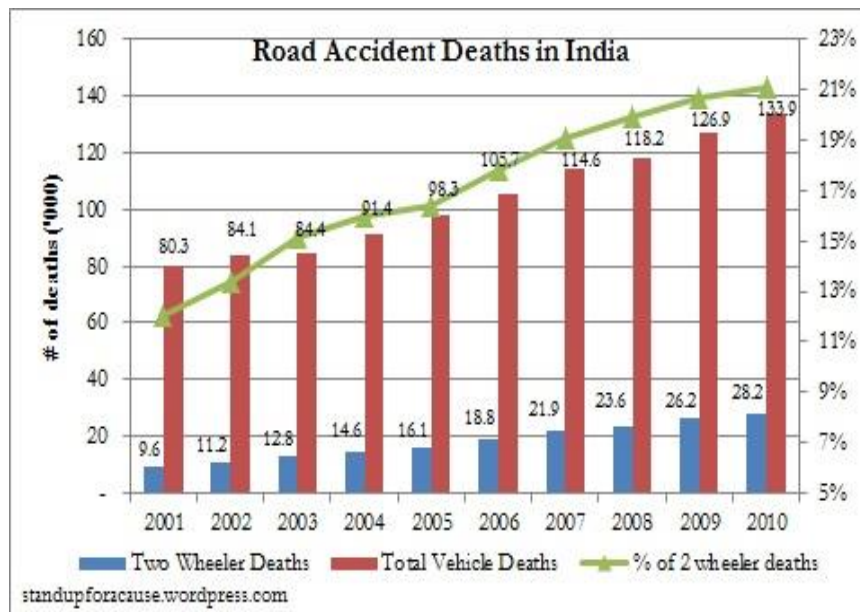


Figure:-1



Figure:-2

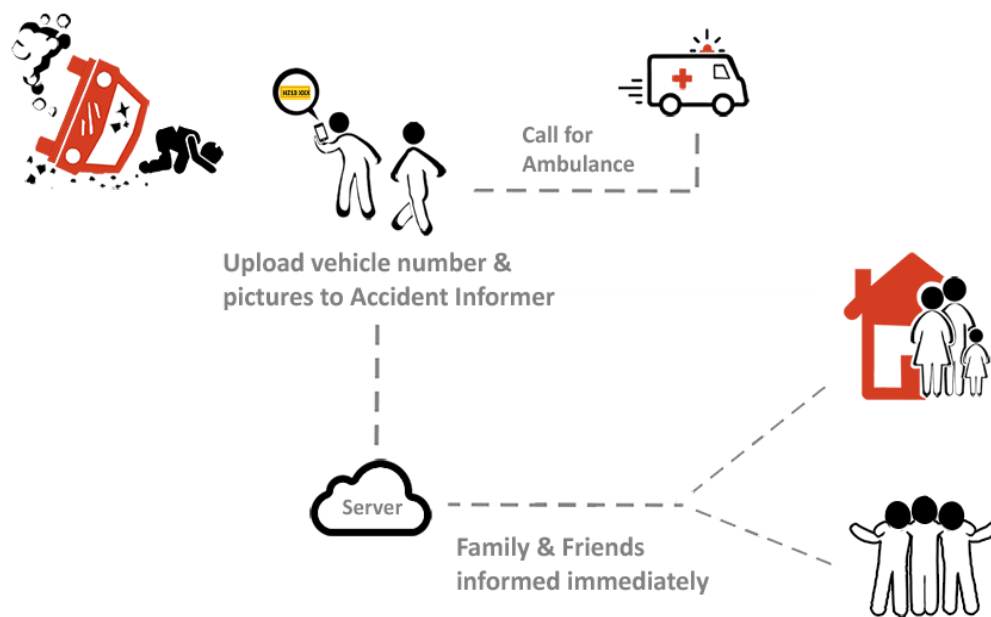


Figure:-3 Prototype for existing system of solution of accident detection [3]

So to provide quick assistance to victim of road accident, we are thinking to develop a web based system including embedded system. It involves the system which can detect the severity of accident and provide quick help to the victim. The severity of accident can be detected precisely by the impact sensors fitted in the vehicle. When the accident occurs, then a HTTP Post Request passed to server by microcontroller through GSM. The accident's location is identified through GPS Module. After receiving the request, the help can be provided.

EXISTING SYSTEM IN INDIA

In our country if road accidents occur, then someone informed to the hospitals or

police stations. Despite the critical situation of the victim only a few people come forward to avail. It conventionally gets too tardy by the time ascendant entities arrive. The witness is taken into an ambit of protracted dealings with the court and police. It acts as a vigorous deterrent against people who are authentically disposed to avail the road contingency victim.

In 2015, the Supreme Court of India relinquished a few guidelines to bulwark the witness and embolden a sympathetic replication towards road contingency victims. The guidelines still fail to affect the number of casualties due to the lack of cognizance regarding the incipient laws.

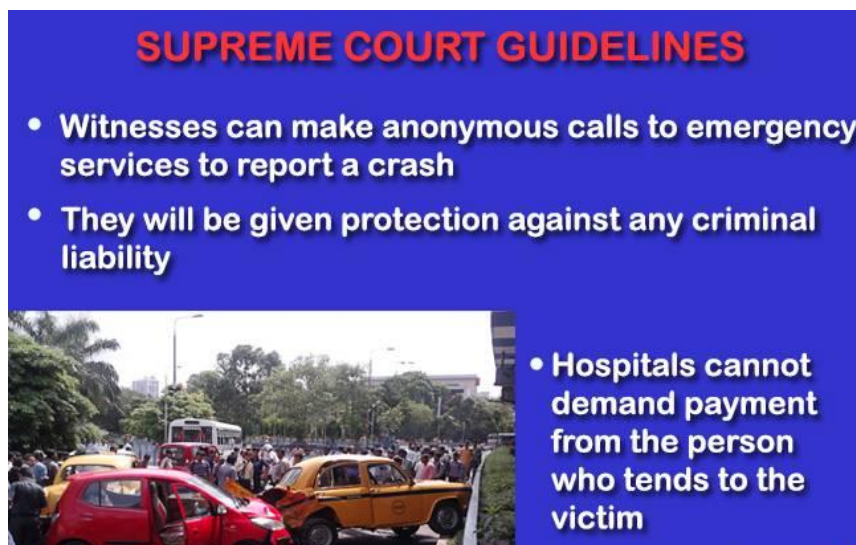


Figure:-4 Supreme Court Guidelines for Road Accidents [5]

After that, technology assisted in solving this problem statement like KruZR, Safely Home Application etc.[6]. For example: In an emergency situation, Safely Home automatically alerts the police, ambulance and the user's emergency contacts. By leveraging location tracking, the app can monitor speed and kineticism to detect road crashes. It withal provides roadside assistance for a variety of issues including breakdowns and running out of fuel, displaying the most proximate mechanics, petrol pumps and so on.

Developed by a bureaucrat in Rajasthan, the HumSafar Road Safety app aggregates the details of hospitals, police stations, ambulance accommodations and other emergency accommodations and sends out precise map locations. The conception is that, with a single click, a utilizer will be

able to expeditiously avail emergency accommodations for themselves or others. The app is currently only functional in Rajasthan but the regime has plans to eventually roll out the accommodation across the country.

But there are some issues in these solution approaches like every conveyance driver have to install this application. So it depends consummately on the driver. In some application user have to click but if victim is not in such state than this application will not work in emergency.

PROPOSED SYSTEM

We proposed a system that is mixture of Embedded System & Web based application. The technology which we are using is as follows:

Technology Used

Arduino + Sensor with RF communication (GSM and GPS Module) –Embedded System

Python language with Django server and Agis database as Backend of the Web based Application
HTML & CSS as front End.



Figure:-5



Figure:-6

Prototype Model

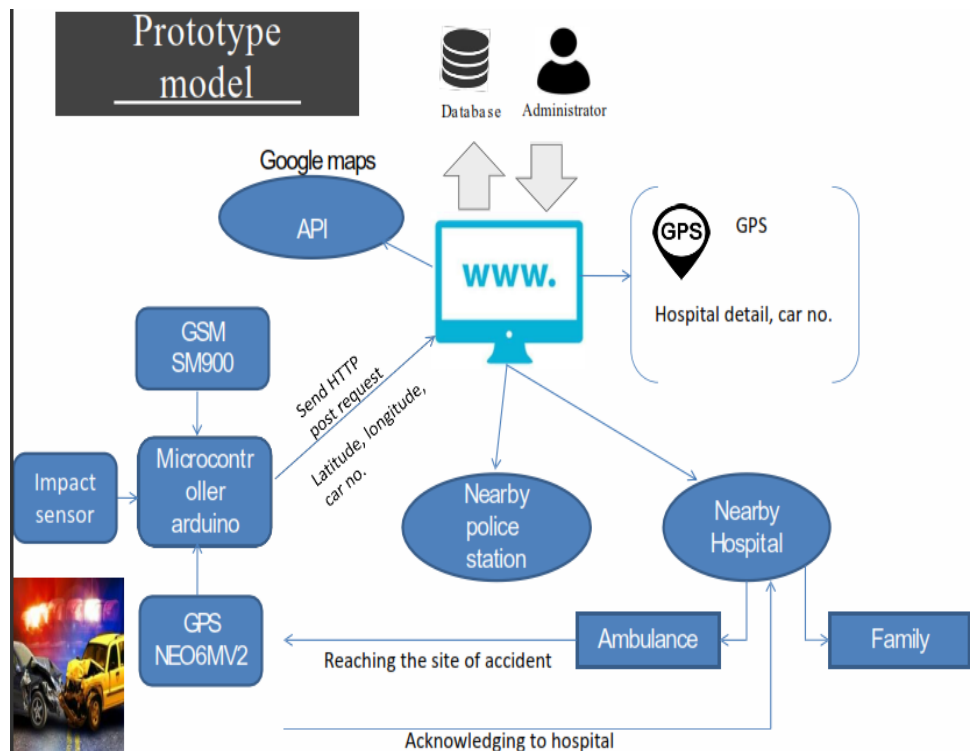


Figure:-7

PROPOSED SYSTEM

The system consists of different modules which are interfaced to microcontroller and a server. The server contains all the information of the utilizer on substratum of their vehicle number. Server will be designed in Police Control Room. After developing the Server, first all the hospitals registered on it & update the location & address & contact numbers. Then all conveyance owners will update information on it like Vehicle Number, Family Contact Number etc. Sometimes it happens that there is just a simple collision between two vehicles that does not need

any rescue, at that time informing the police and hospital will be a waste. To avoid this condition, we use following method. About 4 impact sensors are fitted in two wheelers, 5 in four wheelers that are light motor weighted, 8 in passenger carrying vehicle and 3 in goods carrying vehicle. The impact set for impact sensor of following are:

Two wheelers – x

Light motor vehicle – y

Passenger carrying vehicle – z

Goods carrying vehicle – w

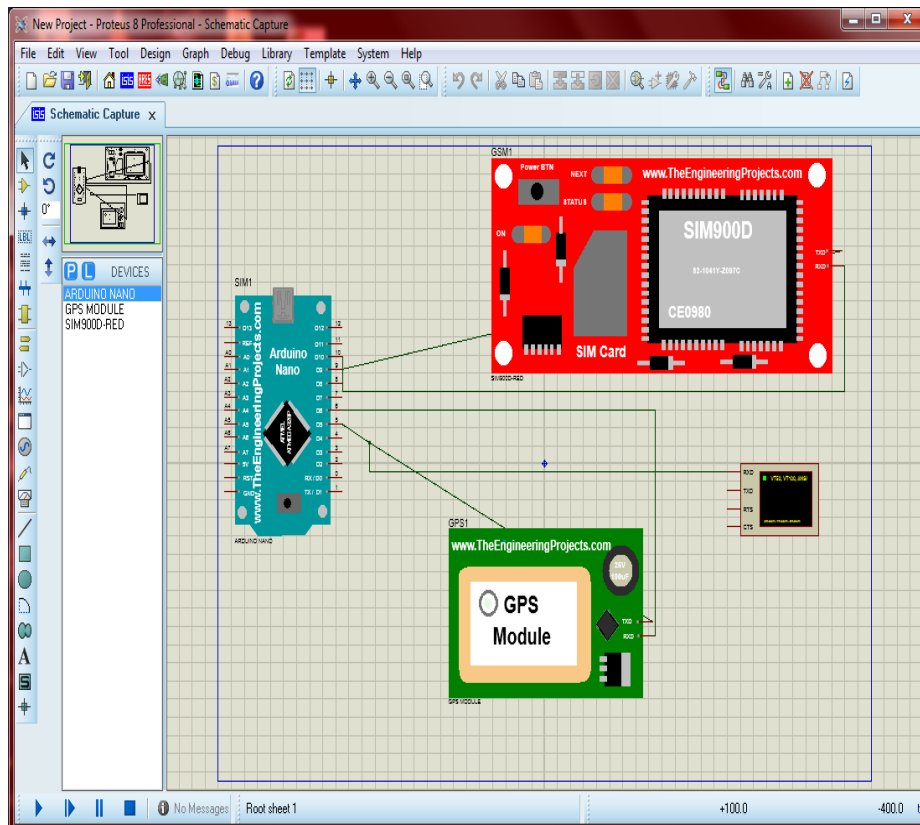


Figure: 8

When an accident occur then it is detected by the Impact Sensor like Acceleration Sensor, Air Bag sensor etc .The signals from the impact sensors are sent to microcontroller Arduino which take the Location parameters from GPS Module and encode it using Tiny GPS Library. Then this location will send to Web Server designed by using Python only on two cases:-

1. If any one of impact sensors sense more impact than specified.
2. If two or more sensors sense an impact or more.

The Sensors and SIM 900 Module along with GPS NEO- 6M Module is fitted in Vehicle.

The server instantly gets the Location & Map it using Google Map API automatically. Similarly this information also observes by hospitals. Server find out the nearest hospital & authority informs it to that hospital about the accident. The hospital informs to the ambulance. If ambulance is GPS enabled and equipped with this system then it automatically detect the accident spot location and take necessary action.

The ambulance and the police reach the accident spot. The first aid is provided to victim. The police search the victim details from the server by Vehicle Number. In this way the family member gets informed. After the whole procedure the hospital and ambulance acknowledge the server.

Use Case

Administrator - Manage the portal, database, contents authenticate Users, analyze the location of accident, inform to nearby police station and hospitals.

Hospitals -Provide content in the form of documents, provide location, hospital details like address, contact no. etc and provide the location of the accident and inform ambulance and family.

Police station –Update its information & details & observe the accident spot on API & take necessary action for rescue.

USE CASE

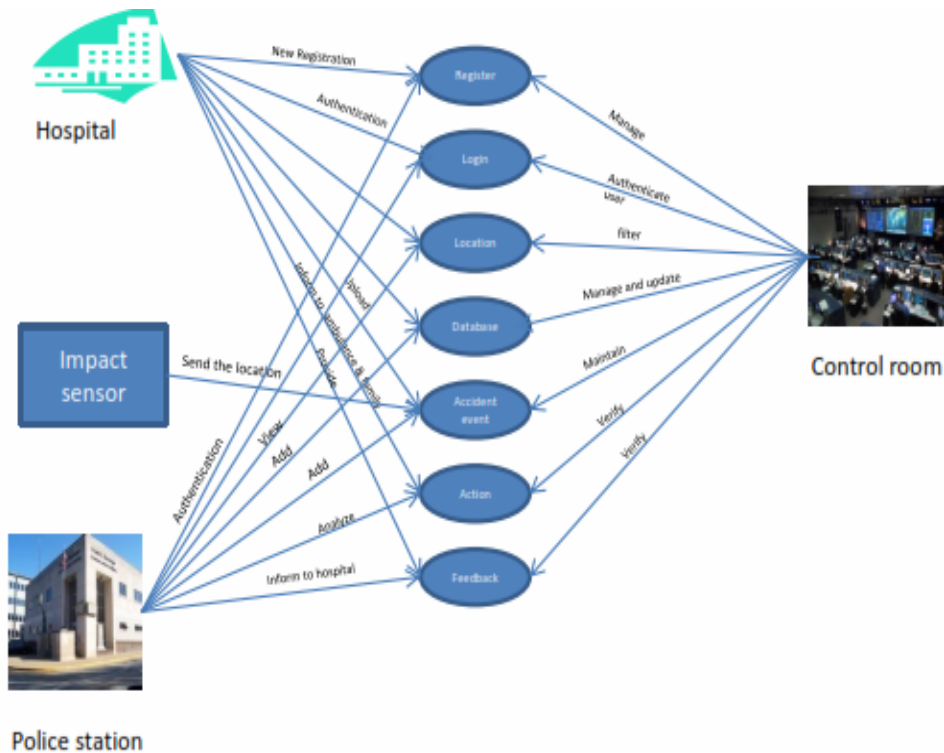


Figure:-9

Administrator - Manage the portal, database, contents authenticate Users, analyze the location of accident, inform to nearby police station and hospitals.

Hospitals -Provide content in the form of documents, provide location, hospital details like address, contact no. etc and provide the location of the accident and inform ambulance and family.

Police station -Update its information & details & observe the accident spot on API & take necessary action for rescue.

Dependencies & Stopper

- All Hospitals & Police Station of a city should be registered..
- Necessary details of all Hospitals, Police Stations & Vehicle Driver required.
- If sensors fail, then this system will not work.
- Hospital and Police Station should respond properly according to the information provided to them by the server.

CONCLUSION

This paper gives a different way of approaching the problem. Even those accidents which were not reported due to lack of awareness will now be provided help. To get to know about severity of accident is the major advantage of this paper. This paper has overcome the problem of previous ambulance services.

The use of GPS module helps in detecting the actual location of accident. The way of using the logic of sending signal to microcontroller only in two cases help to save time of medical as well as police services. The main priority is given to the life of people. Hence this paper provides a superlative solution to unknown road accidents.

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