

## GPS AND GSM BASED ACCIDENT DETECTION SYSTEM

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**Abstract**-Human life is extremely important than anything else, timely help is more important than lending a helping hand. So, I have proposed and designed the project in such a way that it saves human life during emergency state of accidents. Today road accidents are increasing abruptly and it is one of the major causes for the death of human. The time between the accident and when the ambulance reaches the location of accident plays an important role in saving the human lives. If we decrease the time between when an accident occurs and when the medical emergency are dispatched to the location decreases mortality rates, we can save human lives. The main motto of the project is accident location intimation through SMS by using GSM module.

**Keywords** – Sensors, Traffic Accidents, GPS, GSM, Zigbee.

### 1. INTRODUCTION

Now a days, road accidents have been increased by high demand of automobiles. With one of the highest motorization growth rate in the world accompanied by rapid expansion in road network and urbanization over the years, our country is faced with serious impacts on road safety levels. Life of people is under greater risk. Now-a-days, more number of accidents caused due to increase in traffic on highways. And in most of the situations the family members or the ambulance and police authority is not informed in time. This result in delaying the help reached to the person suffered due to accident. The total number of road accidents in 2014 was 4,89,400, whereas the number of road accidents is increased to 5,01,423 in 2015. The road accidents has taken the lives of 1,39,671 people in 2014, whereas accidents have taken lives of to 1,46,133 in 2015. Fig-1 shows the number of deaths due to road accdients over the years. Lots of people are injured due to road accidents every year, the number of people who have got injuries due to road accidents was 4,93,474 in 2014 and the number of people who have got injuries due to road accidents was 5,00,279 in 2015. The survey on the road accidents of 2015 says that 1,374 road accidents occurs everyday and 400 deaths take place every day on Indian roads. Most of the people are dying due to road accidents because accident intimation is not sent to the nearest hospital so that they can send emergency to the accident location immediately after the intimation. Our project “Smart SOS” is designed to avoid such situations.

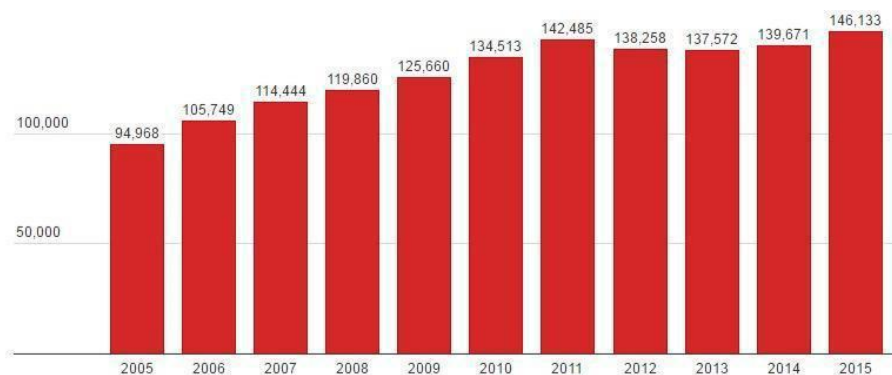


Fig. 1 Road fatalities over the years

### 2. LITERATURE SURVEY AND METHODOLOGY

#### 2.1 Literature Survey

As soon as accidents occurs the crash sensor senses the amount of damage and based on damage prediction algorithm, it predicts the condition of the passenger inside vehicle. In currently popular solutions which are available in market, it only senses the crash but does not predict the amount of damage. Based on damage predicting system, one could predict if it is very emergency or not. Fig-2 shows the complete working of Smart Save Our Souls.

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Fig. 2 Working of Smart Save Our Souls

Reference [1] solution does not give information about pictures of the driver. Since we are using Raspberry Pi camera at the steering wheel, we could be able to send the pictures of the patients to the hospital. Reference [2] solution just notifies about the location of the accident but in our project, the solution not only give information about the location of the accident but also predict the condition of the driver using sensors and advanced algorithms. Reference [10], solution just give information about the location of the accident using geographical coordinates, but in our project since we use ZigBee sensor, it clears the traffic till the ambulance reaches the location where accident had occurred along with the intimation about the location of the accident. I personally feel these are the areas need to be worked. So I am doing the project keeping these things in mind and try to improve the existing solution where it lacks. Therefore my project “Smart SOS” sends the information about the accident, condition of the driver, pictures of the driver and clears traffic till the ambulance reaches the location.

The project “Smart SOS(Save Our Souls)” is designed in such a way that it detects the exact accident location in a lesser time using GPS module and intimate about the accident to the nearest hospital and to the family members soon after the accident. This alert message is sent to the nearest hospital in a shorter time, which will help in saving the lives of victim. When the accident occurs the alert message is sent automatically to the nearest hospital and to the family members using the database. The intimation about the accident is done through GSM module and the detection of the exact location of the accident is done with the help of GPS module. This solution provides the optimum solution to poor emergency facilities provided to the road accidents in a most feasible way.

## 2.2 Methodology

1. The crash sensor sends data into the micro-controller, which, based on data received predicts the amount of damage occurred to the person and based on its damage level, it decides whether to call an ambulance or not.
2. It has a camera to show the post-accident injury status of the person and helps the hospital to know and arrange for blood, etc.
3. Technology such as GPS, to know the location of accident and GSM to intimate about accident to the nearest hospital to save time and increase the probability of saving a person.
4. Once the hospital receives the message and confirms the location, there is a device fit in the ambulance that helps clear the traffic signal immediately so that the ambulance reaches the accident location faster.

Here the block diagram and components required for the design of project is shown in Fig-3. This project is designed using a microcontroller board computer used for embedded application. The Interfacing components used are PI camera, GSM & GPS Modem, Pressure Sensors, Orientation Sensors, Zigbee module, Wi-Fi Dongle. Whenever the accident occurs, the intimation of the accident is sent to the nearest hospital and to the family members of the driver using GSM module taking information from the database. The hospital is intimated with the exact location of the accident and images of post-accident injuries using GPS module and Raspberry-pi camera board respectively. Finally, once the hospital confirms the accident, Zigbee module fit in the ambulance helps clear the traffic signal immediately so that the ambulance reaches the accident location faster.

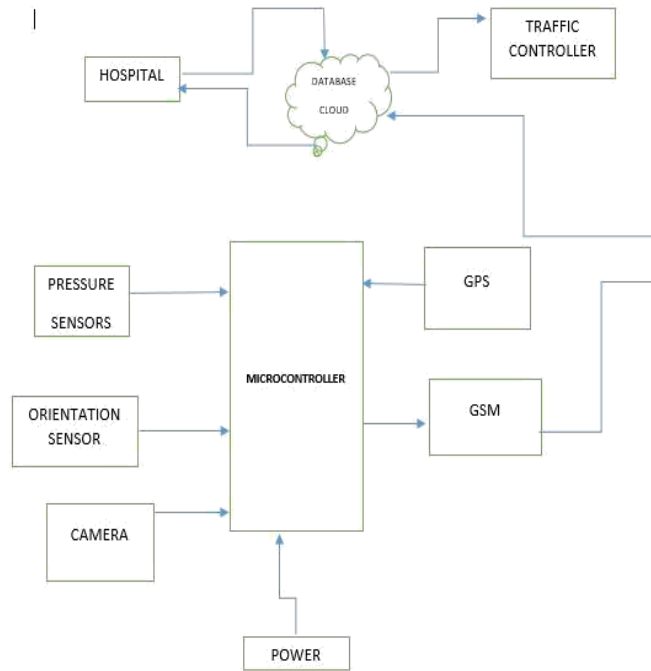


Fig. 3 Block diagram of Smart Save Our Souls

The important blocks of this project are:

1. Microcontroller
2. Ultrasonic Sensor
3. GSM module
4. GPS module
5. XBee 2mW Wire Antenna
6. Raspberry Pi Camera Board

**3. RESULTS AND DISCUSSION**

The Result of the Smart Save Our Souls is as shown in the Fig-4. The text message is sent to the nearest hospital and to the family members using GSM module.

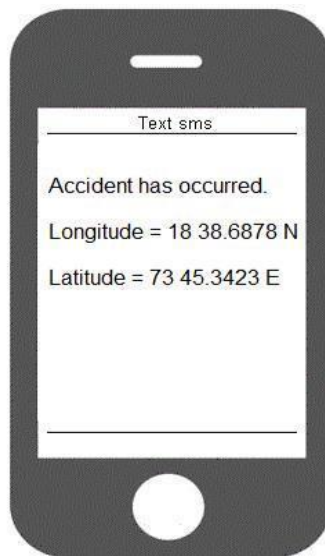


Fig.4 Text message received by the hospital

The simulation of the topic “GSM and GPS based accident detection System” is done in the Proteus. Fig-5 shows the simulation of the topic.

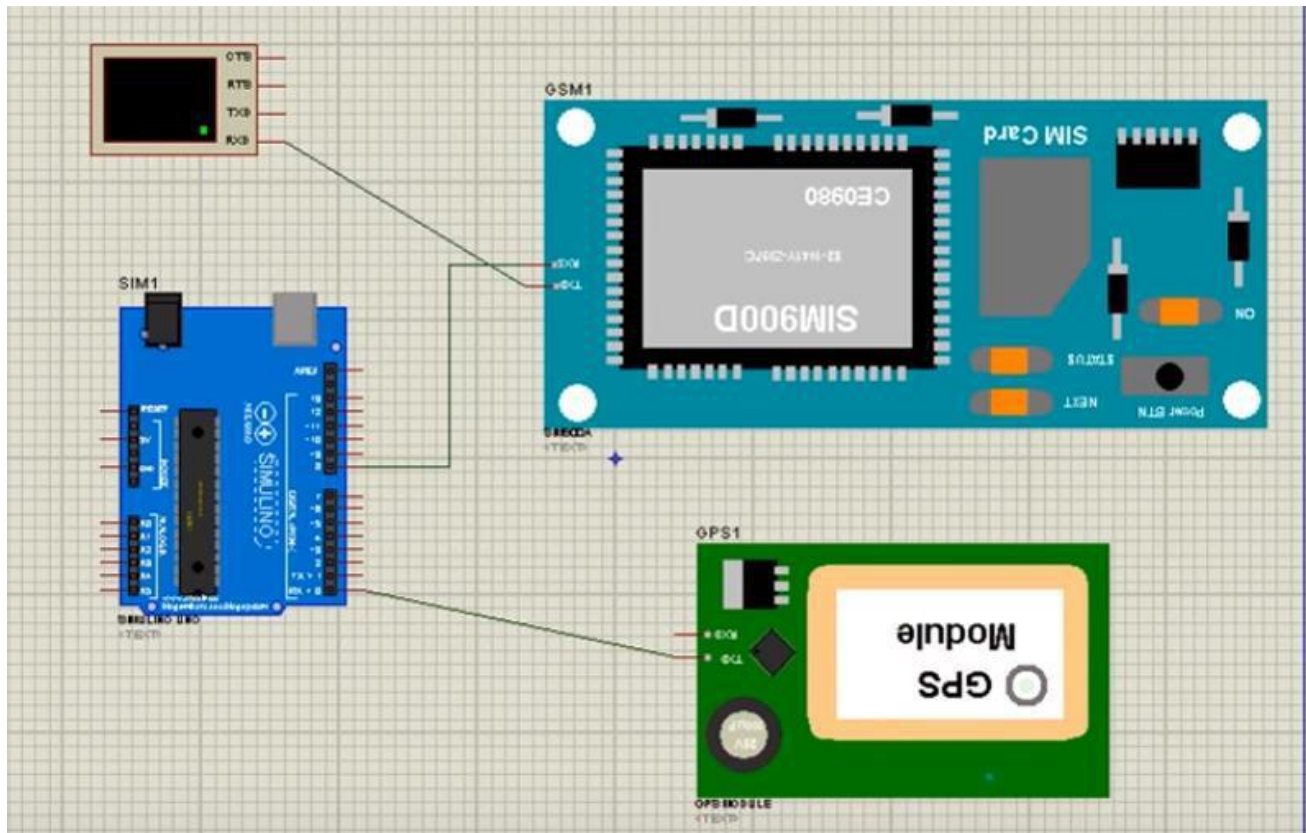


Fig.5 Simulation in Proteus

The Longitudes and Latitudes points captured by the GPS are sent over the mail. The GPS point can be applied to the Google map to trace the exact location of the Vehicle. The Snapshot of the map trace is affixed as shown in the Fig-6.

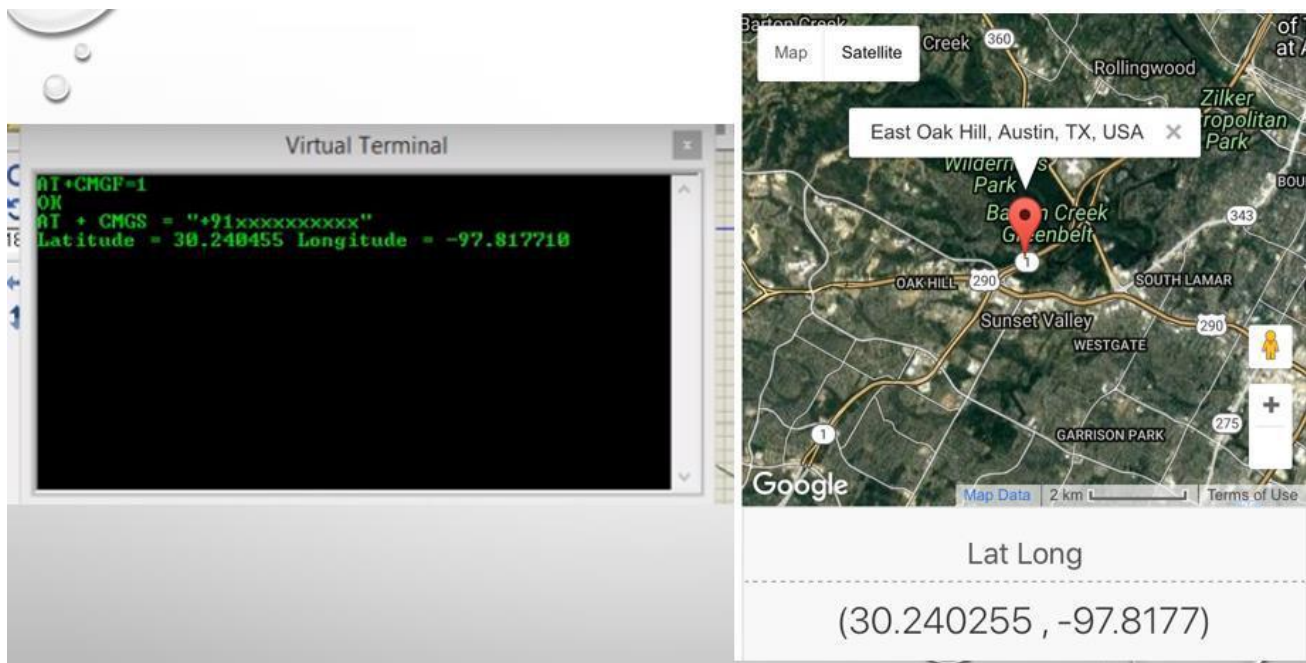


Fig.6 GPS location traced on Google Maps

#### 4. CONCLUSION

In this paper we have proposed the solution for the people who are dying due to road accidents because accident intimation is not sent to the nearest hospital so that they can send emergency to the accident location. Crash sensor and Orientation are used to predict degree of damage to the Vehicle based on which the condition of injury of passenger in vehicle can be protected. This data along with GPS coordinates of the vehicle and picture is sent to the nearby hospital or police station based on the principle of great circle confirming once when ambulance is ready click of confirm buttons in web or app. The GPS coordinates to traffic controller so as to clear the lane or as and how ambulance is within the range of (nearby traffic control) the lane is cleared by showing go (green) signal.

#### 5. ACKNOWLEDGMENT

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