



# Smart Accident Alert System

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**Abstract:** The development of a transportation system has been the generative power for human beings to have the highest civilization above creatures in the earth. 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. Speed is one of the most important and basic risk factors in driving. It not only affects the severity of a crash, but also increases risk of being involved in a crash. Despite many efforts taken by different governmental and non-governmental organizations all around the world by various programs to aware against careless driving, yet accidents are taking place every now and then. However, many lives could have been saved if the emergency service could get the crash information in time. As such, 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. This paper proposes to utilize the capability of a GPS receiver and accelerometer to monitor the location of the vehicle and detect an accident basing on the tilt and send the location and time of the accident from the GPS data processed by a microcontroller by using the GSM network to the Police control room.

## LITERATURE SURVEY

Name of the Project or Product (Existing)	Commercial or Non-Commercial	Features
Car accident protection system	Commercial	<input type="checkbox"/> Airbags are released when car crashes. <input type="checkbox"/> Major drawback is that the system doesn't provide help to the people inside the car if car crashes

## PROPOSED PROJECT

Features	Advantages
1. The location of the accident is sent to the police control room. 2. In turn the police informs the nearby hospitals about the location of the accident.	<input type="checkbox"/> Project focus is to save the people involved in the crash if a car crash occurs. <input type="checkbox"/> More reliable system to save people's lives

## HARDWARE AND SOFTWARE REQUIREMENTS

Hardware requirements:

1. Arduino UNO
2. Accelerometer ADXL335
3. GSM Module SIM900A
4. ESP8266-01 Wi-Fi Module
5. NEO-6M GPS Module
6. 10K Resistor
7. Breadboard
8. Connecting Wires

Software Requirements:

1. OS: Windows 8 and later versions

2. IDE: Arduino IDE

3. Cloud Used: ThingSpeak

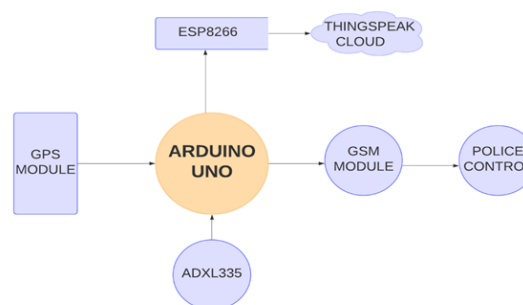
## Cost Estimation

Component	Cost
Arduino Uno	350
Accelerometer ADXL335	300
GSM Module SIM900A	900
GPS Module NEO- 6M	450
ESP8266-01 Wi-Fi Module	200
Resistors, Breadboard and Wires	200
RC Car	600

**TOTAL : INR 3000**

## DESIGN

Architectural diagram:



## EXPLANATION

In this project, Arduino UNO is used for controlling the whole process with a **GPS Receiver and GSM Module**. GPS Receiver is used for detecting coordinates of the vehicle, GSM module is used for sending the alert SMS with the coordinates and the link to Google Map. **Accelerometer** namely **ADXL335** is used to detect the accident or sudden change in any axis. **We have used GPS Module NEO-6M and GSM**

**Module SIM900A.** When we are ready with our hardware after programming, we can install it in our vehicle and power it up. Now whenever there is an accident, the car gets tilted and accelerometer changes its axis values. These values read by the Arduino UNO and checks if change occurs in any axis. If any change occurs then Arduino UNO reads coordinates by extracting \$GPGGA string from GPS module data and sends an SMS to the predefined number to the Police Control Room or family member with the location coordinates of accident place. The message also contains a Google Map link to the accident location, so that location can be easily tracked. When we receive the message the only thing we need to do is click on the received link and we will be redirected to Google Maps where we can see the exact location of the vehicle.

### IMPLEMENTATION

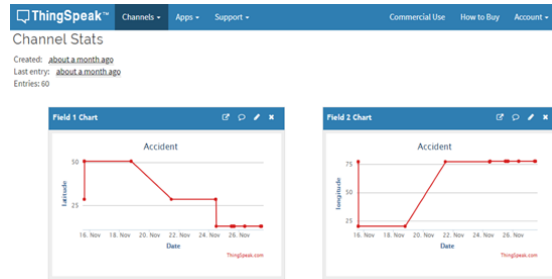
Steps to be followed to execute:

Circuit Connections of this **Smart Accident Alert System Project** is simple. By using Software Serial Library in the **GPS Module**, we have allowed serial communication on pin 10 and 11, and made them Rx and Tx respectively. By default Pin 0 and 1 of Arduino are used for serial communication but by using the SoftwareSerial library, we can allow serial communication on other digital pins of the Arduino. 5V supply is used to power the GPS Module. **GSM** Module's Tx and Rx pins are directly connected to digital pins 4 and 5 of Arduino. We have used Software Serial library even for GSM interfacing. GSM module is powered by 9V power supply. An **Accelerometer** is added in this system for detecting an accident and its x, y and z-axis ADC output pins are directly connected to Arduino analog pins A1, A2, and A3. A **Wi-Fi Module** is also present in the project to enable communication between Arduino and cloud. It's Rx and Tx pins are connected to Arduino digital pins D2 and D3. Upload the code from the Arduino IDE onto the Arduino Board. Mount the whole setup on the RC car. Move the car manually or with controller. When there is a tilt in the car in either of the axes, the actuator system is triggered. The tilt can be shown manually. An SMS is sent to the police control room with precise GPS coordinates to seek help immediately by sending an ambulance. Also, data is uploaded to Cloud Server if the system is connected to internet.

### Cloud Storage

With each accident occurring, latitude and longitude co-ordinates are sent to ThingSpeak cloud if the system is connected to the internet. This data can be analyzed using Machine Learning and Data Analytics after a period of time to identify potential accident-prone areas and alert the commuters with this data and inform the nominal

speed to be maintained at those locations with sign boards.



### CONCLUSION

Vehicle tracking both in case of personal as well as business purpose improves safety and security, communication medium, performance monitoring and increases productivity. So in the coming years, it is going to play a major role in our day-to-day living. The proposed method is highly beneficial to the automotive industry. Main motto of the accident alert system project is to decrease the chances of losing life in such accidents which we can't stop from occurring. Whenever accident is alerted, the paramedics are reached to the particular location to increase the chances of life. This can be extended by providing medication to the victims at the accident spot. This system is much more useful for the accidents occurred in deserted places and midnights. This vehicle tracking and accident alert feature plays much more important role in day to day life in future. Finally, there is always scope for new improvements by interfacing it with different systems.

### ACKNOWLEDGEMENTS

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