



# ACCIDENT DETECTION AND MESSAGE ALERT SYSTEM

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**Abstract:** All around the world, a sizable percentage of traffic deaths take place every day. Two effective methods for reducing traffic fatalities include shorter response times from the time an accident occurs and the dispatch of initial emergency personnel. The incidence of automobile accidents has increased as technology and auto manufacture have advanced. Due to limited emergency facilities, the survival rate following an accident is quite low. Our plan would assist in locating an accident and identifying it, which would then be communicated to the rescue team and the rider's emergency contact.

**Index Terms –** *Arduino uno, impact sensor, ADXL335, GSM, GPS*

## INTRODUCTION

Traffic accidents have become more common as technology and motor manufacture have advanced. Since there are inadequate emergency facilities, the survival rate following an accident is incredibly low. Our plan would assist in identifying and finding an accident, which would then be communicated to the rescue team and the rider's emergency contacts. Accident detection systems use car-built sensors to determine when an accident has occurred. These systems immediately dispatch emergency medical personnel to serious accidents. Rapid arrival of emergency personnel at the scene of an accident reduces mortality. So, the Arduino Uno board, to which all the sensors are connected, is used in this project.

Moreover, a collision is detected using an impact sensor. ADXL335 is used to determine the flip angle and acceleration. The location is determined using GPS and GSM technologies, which are also used to deliver alarm messages.

## 1. SENSORS AND MODULES

### 1.1 Impact Sensor

Impact sensors are designed to detect when a collision occurs. Its other name for it is a collision signal sensor. The impact sensor has at least two terminals between which the sensor material is electrically coupled, as well as at least one strain-sensitive sensor element made of a sensor material.

### 1.2 GPS Module

A satellite-based navigation system that delivers position and timing data is the Global Positioning System (GPS). Anyone with a GPS receiver and clear visibility of at least four GPS satellites can use the system for free.

### 1.3 GSM Module

The European Telecommunications standards Institute created the standard known as GSM (Global System for Mobile Communications) Alert messages are sent using GSM Module. A circuit known as a GSM module is used to provide a communication link between a mobile device and a GSM or GPRS system.

## 1.4 ADXL335 SENSOR

It is a sensor that measures acceleration. The ADXL335 is a compact, thin, fully functional 3-axis accelerometer with voltage outputs that have been signal-conditioned. An electromechanical instrument that measures acceleration force is called an accelerometer. It only displays acceleration when gravity, or g force, is the causing factor. It uses g units to measure acceleration. It monitors acceleration using a 3g full-scale minimum range.

## 2. METHODOLOGY

In this study, vehicle collision detection is proven. To detect collisions that happen during the accident, we use an impact sensor. The impact sensor is installed on the car's bumper. The orientation of the vehicle is determined using ADXL335. ADXL335 offers comprehensive 3-axis acceleration measurements. As output signals, this module generates analogue voltages that are proportionate to the voltages. Data input from the ADXL335 is processed by the Arduino. A microcontroller board called the Arduino is open source. The board may be interfaced with other circuits and expansion boards thanks to its wide range of digital and analogue input and output pin sets. With the processed data from the Arduino, the position may be identified, and the alert messages may be sent via the GSM module to the nearby emergency services, hospitals, or private contacts. Here, we use a 5V power source for the GSM and impact sensor module and a 3.3V power source for the GPS and ADXL335. A GPS module is frequently a small board with a GPS sensor and other components. The GSM shield also makes it possible for an Arduino board to use the GSM library to connect to the internet, send and receive SMS, and make voice calls. A GSM module has been added to the receiver side so that messages can be delivered to the emergency contacts in the event of a collision. Impact switches are designed to activate or deactivate a circuit or device when they detect sudden impacts and output a value from the impact sensor.

## 3. FLOW GRAPH

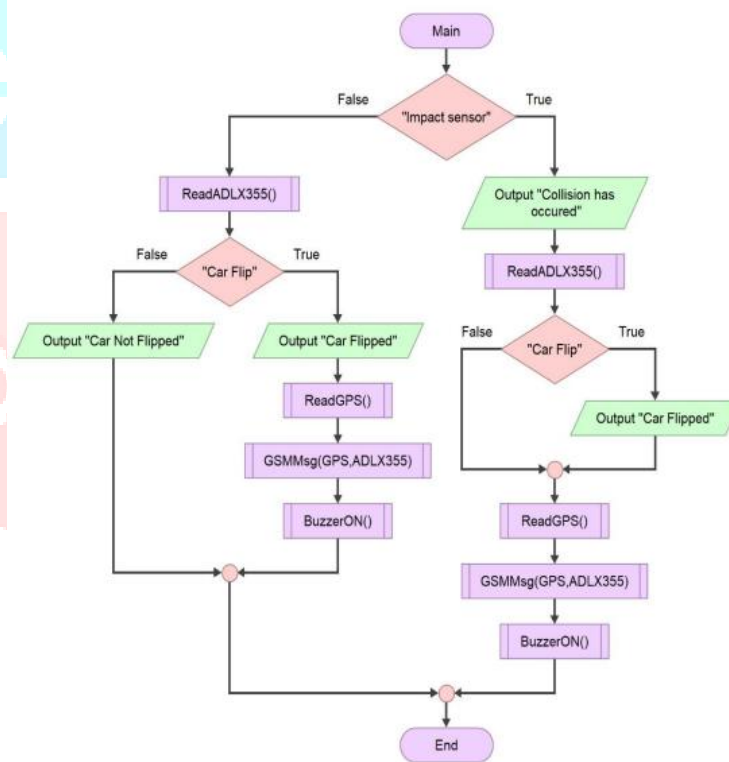


Fig 3.1: Flow Graph

## 4. DESIGN

The function of the impact sensor is collision detection. It is also referred to as a collision signal sensor as a result. We use the Touchpad tool in the proteus programme for impact sensor-like behavior for an input that we would treat as a collision if it were tapped. To alert the passengers that an emergency message had been sent following the crash or flip, we also used a buzzer. Three linear potentiometers are employed as a variable voltage source for each axis because the ADXL335's acceleration is inversely proportional to the output voltage of each axis. As the modelling software proteus does not support the ADXL sensor, we used three parallel potentiometers as an equivalent model. The message will contain details about and readings from the sensors because we used GSM1 to transmit the message, we coded it suitably, and Arduino is programmed to collect sensor readings, to establish the current location, and to transfer those data to GSM code.

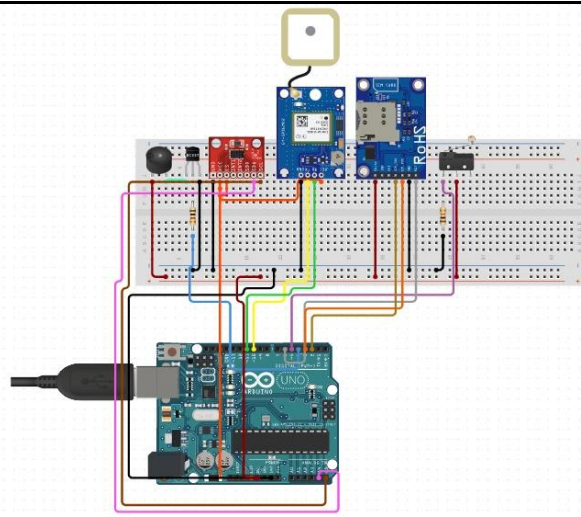


Fig 4.1: Pin Configuration

### 5. RESULTS

The project's final product is an application that provides assistance to those who require it but are unable to ask for it. They can use the programme to transmit a request for help along with their location at the accident scene, which will help emergency services provide assistance as fast and effectively as possible. Just a few cheap sensors are used to do this.



### 6. CONCLUSION

A vehicle accident alert and detection system is provided by this project, and it delivers SMS messages to user-specified mobile numbers. A GSM alert system and GPS tracking have been used to create an algorithm. The recommended Automobile Accident Detection System might send an SMS accident alert and automatically track geographic data. The suggested method is expected to have a significant positive impact on the automobile sector.

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