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## Collision Detection and Message Alert System

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### Abstract

A significant portion of fatalities from road accidents occur each day worldwide. Reduced response times between the time an accident occurs and the dispatch of initial emergency personnel are two successful strategies for lowering road deaths. As technology and auto manufacturing have evolved, the frequency of traffic accidents has grown. The survival rate after an accident is exceedingly poor since there are inadequate emergency facilities. Our idea would help in identifying an accident and pinpointing its position, which would subsequently be shared with the rescue crew and the rider's emergency contact.

**Keywords**—Arduino uno, impact sensor, ADXL335, GSM

### Introduction

As technology and auto manufacturing have developed, the frequency of traffic accidents has increased. The survival rate after an accident is exceedingly low since proper emergency facilities are not available. Our idea would help in spotting an accident and locating it, which would subsequently be shared with the rescue crew and the rider's emergency contacts. Sensors built into cars are used by accident detection systems to identify when an accident has happened. These systems send emergency medical personnel to major accidents right away. Getting first responders to the scene of an accident faster minimizes fatalities. Hence in this project we use the Arduino uno board in which all the sensors are connected.

And an Impact Sensor is used for detecting collision. To find the flip angle and acceleration ADXL335 is used. GPS and GSM Technologies are used to detect the location and sending alert messages.

### Methodology

Vehicle collision detection is demonstrated in this research. We employ an impact sensor to identify those impacts that occur during the accident. The car's bumper is where the impact

sensor is mounted. We use ADXL335 to determine the vehicle's orientation. Complete 3-axis acceleration measurements are provided by ADXL335. This module produces analogue voltages that are proportionate to the voltages as output signals. The Arduino processes the ADXL335's ADXL335 input data. The Arduino is a microcontroller board that is free source. The board has a variety of digital and analogue input and output pin sets that can be interfaced with other circuits and expansion boards. The location may be determined using the processed data from the Arduino, and the alert messages can be delivered to the nearest emergency services, hospitals, or personal contacts using the GSM module. Here, we use a 3.3V power supply for the GPS and ADXL335 and a 5V power source for the GSM and impact sensor module. A GPS module is often a tiny board that includes a GPS sensor and other parts. Additionally, the GSM shield enables an Arduino board to make voice calls, send and receive SMS, and connect to the internet using the GSM library. On the receiver side, a GSM module has been included so that, in the event of a collision, messages can be sent to the emergency contacts. Impact sensors are made to recognize instances of sudden impact and output a value or, in the case

of impact switches, activate or deactivate a circuit or device.

## Design

The impact sensor's operation, which is used to detect collisions. As a result, it is also known as a collision signal sensor. For impact sensor similar behavior for an input that we would treat as a collision if tapped, we use the Touchpad tool in the proteus programme. We also employed a buzzer to notify the passengers that an emergency message had been issued after the collision or flip. Since the acceleration of the ADXL335 is inversely proportional to the output voltage of each axis, three linear potentiometers are used as a variable voltage source for each axis. We utilized three parallel potentiometers as an equivalent model because the ADXL sensor is not supported by the simulation tool proteus. Since we used GSM1 to transmit the message, we programmed it appropriately, and Arduino is programmed to accept sensor readings, to determine the current location, and to communicate those facts to GSM code, the message will include information about and readings from the sensors.

## Result

The end result of this project is an application that helps those who need assistance but are unable to ask for it. With the use of the programme, they are able to send a request for assistance together with their location at the scene of the accident, aiding emergency services in providing assistance as quickly and effectively as they can. All of this is accomplished with merely inexpensive sensors.

## Conclusion

This project offers a vehicle accident alert and detection system that sends SMS messages to user-specified mobile numbers. An algorithm based on GSM alerts and GPS monitoring has been developed. The suggested Vehicle Accident Detection System may automatically track geographic information and deliver an accident alarm SMS. The automotive industry is anticipated to benefit greatly from the suggested technique.

## Future Scope

Future work could include additional analysis to increase detection phase

precision and lessen the likelihood of false positive signals produced while a user is inside or outside the automobile when the car is moving slowly.

In order to distinguish between airbag deployment and harmless sounds, the proposed system can also be enhanced with a voice recognition module. By making this improvement, the suggested system's reliability would rise and the number of false positive signs would drop.

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