NATIONAL INSTITUTE OF ELECTRONICS AND INFORMATION TECHNOLOGY OF INDIA (NIELIT), Aurangabad.



Synopsis

ON

**“Vehicle Accident Detection, Reporting And Safety System”**

BY

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**ABSTRACT**

Accidents – nowadays become a common word, especially on high ways. In many cases the casualty is very high not because of the accident but because of the delay in treatment. This happens because the appropriate authorities are not informed that promptly. And also the number of vehicles that come into the road has increased drastically. With more of modernization and vehicles cost coming down rapidly, the vehicle population has shown a steady increase and is expected to rise exponentially. As the population increases there is a continuous need for monitoring them and preventing them from misuse or theft by unauthorized persons.

A major problem also observed in these days is children dies due to suffocation in vehicles. So we are extending the project using safety system as O2 level detector which is also beneficial after the vehicle’s Accident to maintain the oxygen level.

A GPS and GSM systems are placed along with the Arduino. The GPS system gives the exact position of the vehicle by giving out its latitude and longitude. The GSM uses the existing mobile phones towers to transmit and receive information to and from another GSM terminal device. The project aims at providing a wireless information system that helps in transfer of information to a predefined station which can be an emergency service or police and third party(Insurance Company) immediately after the accident. The heart of the system is a Arduino that is connected to both the GPS and GSM system and also different sensors for detecting intrusion. The Arduino on detecting the accident receives the position of the vehicle from the GPS system and transmits it to the designated center using GSM network.

Hence the project provides Speedy action to the accident persons. This helps in the authorities to get the information on the vehicle that is caught into an accident. And take appropriate action immediately.

**INTRODUCTION**

MEMS Accelerometer detects the sudden change in the axes of vehicle and GSM module sends the alert message on your Mobile Phone with the location of the accident. Location of accident is sent in the form of Google Map link, derived from the latitude and longitude from GPS module. The Message also contains the speed of vehicle in knots. This Vehicle Accident alert project can also be used as a Tracking System and much more(like Oxygen analyser), by just making few changes in hardware and software.

LCD

GPS Module

Arduino

Mobile

GSM Module

DC Motor

O2 Level Detector

Accelero-meter

### Main Components Required:

* Arduino Uno
* GSM Module (SIM900A)
* GPS Module (SIM28ML)
* Accelerometer (ADXL335)
* 16x2 LCD
* O2 Level Detector
* DC Motor

1. Arduino Uno:

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. **Arduino** is a popular open-source development board for engineers and makers to develop electronics projects in an easy way. It consists of both a physical programmable development board (based on AVR series of microcontrollers) and a piece of software or IDE which runs on your computer and used to write and upload the code to the microcontroller board.

A circuit board

Description generated with high confidence

2. GSM MODULE (SIM 900A):

The SIM900 is a complete Quad-band GSM/GPRS Module which can be embedded easily used by customer or hobbyist. SIM900 GSM Module provides an industry-standard interface. SIM900 delivers GSM/GPRS 850/900/1800/1900MHz performance for voice, SMS, Data with low power consumption. It is easily available in the market.

* SIM900 designed by using single-chip processor integrating AMR926EJ-S core
* Quad - band GSM/GPRS module in small size.
* GPRS Enabled

A circuit board

Description generated with very high confidence

3. GPS Module(SIM28ML):

GPS stands for Global Positioning System and used to detect the Latitude and Longitude of any location on the Earth, with exact UTC time (Universal Time Coordinated). GPS module is used to track the location of accident in our project. This device receives the coordinates from the satellite for each and every second, with time and date. We have previously extracted **$GPGGA** string in Vehicle Tracking System to find the Latitude and Longitude Coordinates.

**GPS module** sends the data related to tracking position in real time, and it sends so many data in NMEA format. NMEA format consists several sentences, in which we only need one sentence. This sentence starts from **$GPGGA** and contains the coordinates, time and other useful information.

A circuit board

Description generated with very high confidence

4. Accelerometer (ADXL335):

**ADXL335** is a small, thin, low power, complete **3-axis accelero-meter** with signal conditioned voltage outputs. The product measures acceleration with a minimum full-scale range of ±3 g. It can measure the static acceleration of gravity in tilt-sensing applications, as well as dynamic acceleration resulting from motion, shock, or vibration.   
ADXL335 is 3v3 compatible device, it's powered by a 3.3v source and also generates 3.3v peak outputs. It has three outputs for each axis i.e. X, Y & Z. These are analog outputs and thus require an ADC in a micro-controller. Arduino solves this problem. We will be using the analog functions of Arduino.

**ADXL335** is used for detecting accident or sudden change in any axis. And an optional 16x2 LCD is also used for displaying status messages or coordinates.

A circuit board

Description generated with high confidence

5. 12V DC Motor:

A DC motor’s general specifications usually include weight, shaft length and shaft diameter as well as motor length and diameter. Other useful dimensions include the location of mounting holes and thread type. If only the length or diameter are provided, refer to an image, photo or scale drawing to get a sense of the other dimensions based on the one known value. Here we are using the DC motor for exhaust fan. So we can maintain the oxygen level.



6.O2 Level Detector:

Accurate oxygen (O2) level measurements are essential in preventing injury or death in situations where safe levels may be compromised. Oxygen gas detection instruments will typically trigger an alarm when the oxygen level drops below 19.5% volume, the OSHA-mandated level. But here we use it to start the exhaust fan using Arduino command The most common use of oxygen gas detection is in confined spaces – totally or partially closed areas generally not designed to be permanently occupied. It is essential that an O2 gas sample be drawn prior to entering these spaces, and continuing to monitor oxygen levels, as well as the presence of harmful gases, after entry.

