

ACCIDENT ALERT SYSTEM USING GPS AND GSM

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ABSTRACT:

Vehicle tracking today is getting tougher with the passage of time, and it is getting difficult to keep track of these vehicles for safety purposes. People today are more concerned about keeping them safe using the latest technology. We must verify the vehicle's condition and location. In this project, we can monitor the location of the vehicle and send accident notifications. If the vehicle meets with an accident, the vibration sensor detects the vibration above the threshold range and the mems sensor detects the axis of the vehicle, then a message will be sent to the respective person along with GPS location.

1. INTRODUCTION:

Recently, traffic on roads has been increasing rapidly a result of which it is becoming extremely difficult to manage vehicles in terms of traffic management, vehicle theft, and accidents. According to Mansell, one in every 42 vehicles in the United States is stolen estimating a loss of over \$9 billion per annum. Several tools and techniques are used to minimize the probability of such incidents while preserving the safety of the people involved. Vehicle tracking is an old concept and has been implemented across the globe for tracking stolen vehicles or sometimes for personal safety. Several methods have been proposed and implemented worldwide to overcome these issues. However, the cost of

these solutions varies and is dependent on the technology used. The most common tool used today is Global Positioning System (GPS), which is discussed further in this paper.

2. LITERATURE REVIEW:

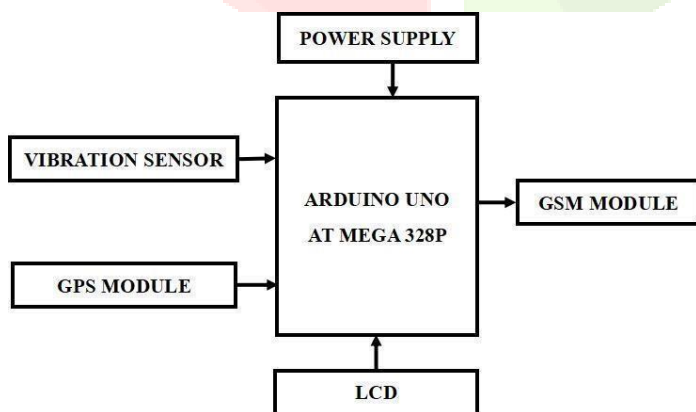
As indicated by an investigation and insights of WHO (World Health Organization), every year more than 50% of people lose their lives due to street traffic Accident. When an accident occurs, there is a delay in rescuing the person and so various proposals have been studied to develop the system.

- I. " An IoT Based Automatic Accident Detection and Tracking System for Emergency Services". The proposed research work aims to work on this topic by building an automated system to alert the family member as soon as the occurrence of the accident.
- II. "Categorized Accident Alerting System Using Bike Gloves". Accidents can be detected and informed to the authorized person and rescue team according to the category of the accident. .
- III. "Accident Alert system application using a privacy preservation block chain-based incentive mechanism". This paper provides an innovative solution by developing an Accident Alert Message System using an Android Smartphone Application that can be used from the accident zone

- IV. “Airbag ECU coupled Vehicle Accident SMS Alert System”. This design of the system uses the in-built vibration sensor in the Airbag Electronic Control Unit to detect accident.
- V. “Characterizing the role of vehicular cloud computing in road traffic management”. Vehicular cloud computing is envisioned to deliver services that provide traffic safety and efficiency to vehicles.

3. PROPOSED SYSTEM:

In our proposed system, the vehicle security system has been implemented. Accident detection has been developed by using vibration sensors as well as MEMS sensors. Whenever the accident is detected, an alert will send to the respective person with a GPS location. The alert is sent automatically when the accident occurs. So no need for an individual to contact the medical services. In this SIM 900 is used which is a complete Quad band GSM module which provides industry level interface. So, signal transmission speed is high, and information is sent without any delay. Below the block diagram of the proposed system.



4. HARDWARE REQUIREMENTS:

- Arduino UNO.
- MEMS sensor
- Vibration sensor.
- GPS module.
- GSM module.

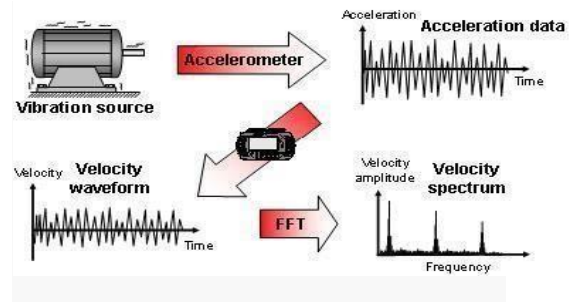
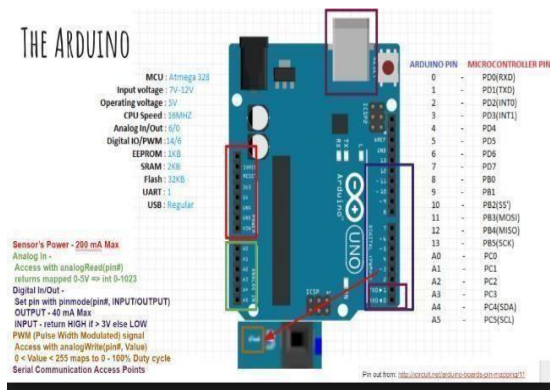
SOFTWARE REQUIREMENTS:

- Arduino IDE.
- Embedded C.

WORKING:

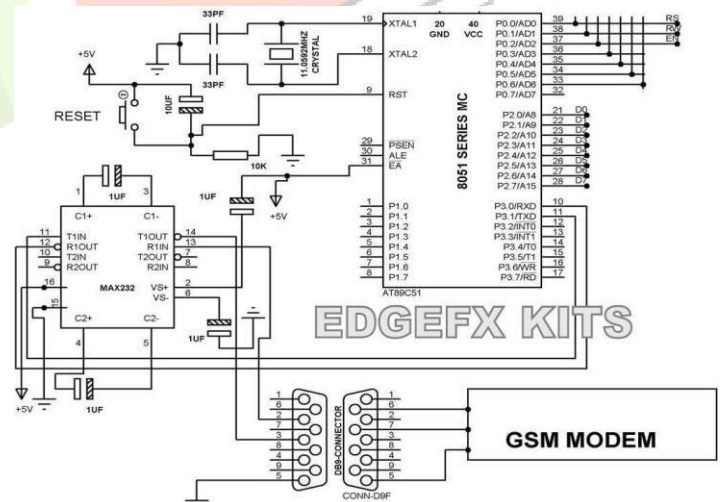
When an accident occurred in any place then GPS system tracks the position of the vehicle and sends the information to the particular person through GSM by alerting the person through SMS or by a call.

- 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 ceramic resonator, 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 an AC-to-DC adapter or battery to get started.



- **POWER: 5V.** This pin outputs a regulated 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7 - 12V), the USB connector (5V), or the VIN pin of the board (7-12V). Supplying voltage via the 5V or 3.3V pins bypasses the regulator, and can damage your board.
- **MEMORY:** The ATmega328 has 32 KB (with 0.5 KB used for the bootloader). It also has 2 KB of SRAM and 1 KB of EEPROM (which can be read and written with the EEPROM library). Input and Output Each of the 14 digital pins on the Uno can be used as an input or output, using pin Mode (), digital Write (), and digital Read () functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50 kilo Ohms.
- **Vibration sensors are sensors for measuring, displaying, and analysing linear velocity, displacement, proximity, or acceleration.** The diagram below is a very simplistic explanation of how vibration data is acquired.

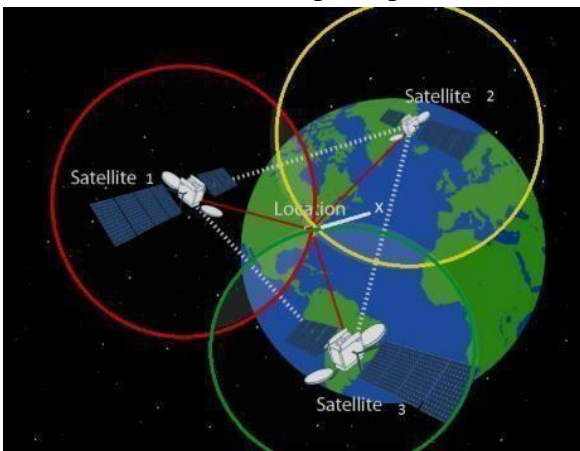
- **MEMS SENSOR:** Micro-Electro-Mechanical Systems, or MEMS, is a technology that in its most general form can be defined as miniaturized mechanical and electro-mechanical elements. MEMS inclinometers and accelerometers are low-cost, high precision inertial sensors that serve a wide variety of industrial applications. When the tilt is applied to the sensor, the suspended mass creates a difference in electric potential which is measured as a change in capacitance. The signal is then amplified to get a stable output signal in digital. 4-20mA or VDC.
- **GSM:** From the below circuit, a GSM modem duly interfaced to the MC through the level shifter IC Max232. The SIM card



mounted GSM modem upon receiving digit command by SMS from any cell phone send that data to the MC through serial communication. While the program is executed, the GSM modem receives the command 'STOP' to develop an output at

the MC, the contact point of which is used to disable the ignition switch. The command so sent by the user is based on an intimation received by him through the GSM modem 'ALERT' a programmed message only if the input is driven low. The complete operation is displayed over a 16×2 LCD display.

- **GPS:** GPS Stands for "Global Positioning System." GPS is a satellite navigation system used to determine the ground position of an object. Each GPS satellite broadcasts a message that includes the satellite's current position, orbit, and exact time. A GPS receiver combines the broadcasts from multiple satellites to calculate its exact position using a process called triangulation. Three satellites are required to determine a receiver's location, though a connection to four satellites is ideal since it provides greater accuracy.
- **LCD DISPLAY:** The principle behind the

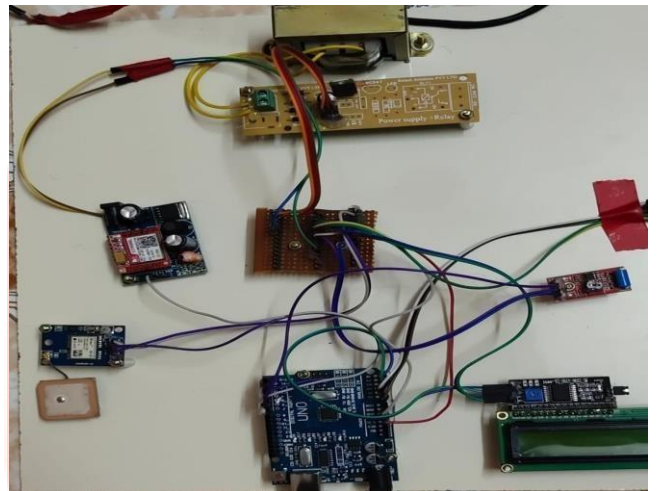


LCDs is that when an electrical current is applied to the liquid crystal molecule, the molecule tends to untwist. This causes the angle of light which is passing through the molecule of the polarized glass and also causes a change in the angle of the top polarizing filter. As a result, a little light is allowed to pass the polarized glass through a particular area of the LCD. Thus, that particular area will become dark compared to others. The LCD works on the principle

of blocking light.

5. RESULTS AND DISCUSSION:

The below figure shows the hardware implementation of the project where the Arduino is integrated with the components such as accelerometer, vibration sensor, GSM, and GPS modules. In this An accelerometer or vibration sensor is used to detect the accident and then GPS will identify the location and then GSM will establish the network connection so with the geolocation can be sent to the registered mobile number.



6. CONCLUSION:

In our country, many people have lost their lives in accidents, because of causalities or improper communication. So, an automatic vehicle accident and theft detection system are implemented. By using this system we can reduce death due to accidents and we can take immediate action after the accident. Also, it is used in theft detection. A fingerprint recognition system and an eye blink sensing system are used in this project. GSM module is used for conveying information about the vehicle theft to the owner. GPS technology is implemented to restrict the vehicle within a particular area by the owner. The system can be used to track and monitor the vehicle by the owner at anytime from anywhere. Thus, techniques presented in this project provide high security and dependability to the vehicle. The scope of the proposed methodology lies in achieving a faster and more efficient vehicle security system. The demand for auto-guard systems for protecting the vehicle from theft and loss is increasing day by day. The proposed system will be an intellectual system to meet this demand.

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