

ARDUINO based Accident Indication and Message Alert System

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ABSTRACT

Increment in population is the significant purpose behind quick development of innovation and vehicles, which is additionally liable for some number of mishaps in this quick moving world. Numerous passing is caused because of absence of crisis administrations. Along these lines, in this undertaking we intend to give crisis administrations to the individual who meet with a mishap as quickly as time permits. At the point when a vehicle meets with a mishap, promptly the accelerometer sends varieties to the Arduino and subsequently the Arduino sends the alarm message through the GSM MODULE, including the area which is distinguished by GPS MODULE to recently spared crisis contacts. In the event that the mishap is not serious, at that point the alarm message can be ended by the driver by a key gave. This paper points in giving crisis benefits as quickly as time permits for future extension, we include numerous applications like liquor recognition and rest discovery and so forth.

Keywords: *Arduino, accelerometer, GPS, GSM*

INTRODUCTION

Quick development in populace has expanded the interest of vehicles, in this occupied and quick moving life mishaps may happen anytime of time. Numerous individuals lose their life in mishaps because of the absence of medical aid or crisis administrations. In India, mishaps are the significant wellspring of death just as wounds [1]. As per the National Crime Records Bureau 2016 report, there were 496,762 streets, railroads and rail line crossing-related car crashes in 2015 [2].

Reports from Autocarpro express, that on regular routine street mishaps have taken 405 lives and harmed 1020 individuals in 2017 [3]. On yearly premise, 1.5 lakh individuals are seen to have passed on in mishaps by a study directed by WHO [4]. There have been circumstances where delay in crisis administrations have additionally caused passings [5]. Since anticipation of mishaps is not in our grasp, we expect to give crisis benefits as quickly as time permits through our task. In this task we intend to follow the vehicle, so at

any place the mishap happens, since the vehicle is under following, promptly the spot of mishap can be followed and sent to crisis contacts in a couple of moments seconds so that the closest medical clinic can arrive at the spot as quickly as time permits and spare the life of the individual. On the off chance that the mishap is not extreme, we give a key which lets the driver end the framework, with the goal that the message has not been sent consequently helping in sparing the hour of rescue vehicle. The message is sent through GSM MODULE and the area is followed by GPS module. The mishap is recognized with the assistance of accelerometer sensor. The accelerometer is utilized as an accident or rollover identifier of the vehicle during and after an accident. With signals from an accelerometer, a seriousness of the mishap can be perceived. This venture gives answer for some serious issues. Vehicle following framework furnishes security to vehicles and furthermore with the assistance of GPS an individual can follow his vehicle and discover the vehicle development and its past exercises. Mishap ready framework primarily means to spare the valuable existence to the individuals. The gear is little and can be fit into any vehicle effectively. Taken vehicle recuperation will be simpler since we are following the vehicle. A basic framework can be utilized for different purposes.

COMPONENTS USED FOR THE SYSTEM

Arduino UNO

Arduino is fundamentally an open source stage utilized from building electronic ventures (Fig. 1). UNO is the most well-known board utilized [6]. It chips away at 5V supply at 16MHz clock speed and the processor is ATmega328. ATmega328 is a 8-piece AVR RISC-based microcontroller which has 32KB glimmer memory, 1KB EEPROM, 2KB SRAM, 23 GPIOs, 32 universally useful registers, three adaptable clock/counters with look at modes, inner and outer intrudes on, sequential programmable USART, a byte-arranged 2-wire sequential interface, SPI sequential port, 6-channel 10-piece A/D converter (8-diverts in TQFP and QFN/MLF bundles), programmable guard dog clock with inward oscillator and five programming selectable force sparing modes. Arduino IDE is a product used to type the code and transfer it on to the load up (Fig. 2). Arduino board can be controlled in two different ways. One, utilizing the USB link from the PC and two, from the AC mains utilizing the force barrel jack. The board has a voltage controller for giving balanced out DC voltages to all components. It has a precious stone oscillator to give the 16MHz clock recurrence, a reset catch to reset the framework, a 3.3V and a 5V yield supply pins and a ground pin.



Figure 1: Arduino UNO board.

Arduino UNO has six simple pins for perusing information from simple sensors and to change over it to computerized structure for comprehensibility of the microcontroller. It has 14 computerized I/O sticks in which 6 are PWM age pins

and 1 is UART pin. Arduino UNO board additionally comprises if the Tx and Rx LEDs and force LEDs. It gives a standard structure factor that breaks the elements of the smaller scale controller into an increasingly available bundle.

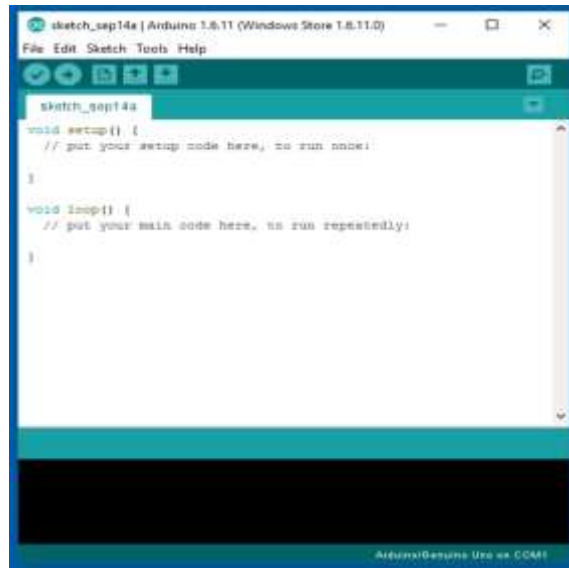


Figure 2: Arduino IDE.

GPS MODULE

Global positioning system (GPS) is a satellite-based framework that utilizes satellites and ground to quantify and registers its situation on earth (Fig. 3). GPS beneficiary

gets data signals from GPS satellites and figures its good ways from satellites. This is finished by estimating the time required for the sign to make a trip from satellite to the beneficiary.



Figure 3: GPS Module.

GPS beneficiary module gives yield in standard (National Marine Electronics Association) NMEA string design. It

furnishes yield sequentially on Tx pin with default 9600 Baud rate. This NMEA string yields from GPS recipient contains various

parameters isolated by commas like longitude, scope, elevation, time and so forth. Each string starts with '\$' and closes with carriage return/line feed arrangement.

GSM MODULE

GSM module or a GPRS module is a chip or circuit that is utilized to set up correspondence between a cell phone or a registering machine and a GSM or GPRS framework (Fig. 4). A GSM modem can be a devoted modem gadget with a sequential, USB or Bluetooth connection, or it can be tending to be a cell phone that gives GSM modem abilities. It needs AT directions, for collaborating with processor or controller, which are imparted through sequential correspondence.

1. These directions are sent by the controller/processor.
2. The MODEM sends back an outcome after it gets an order.
3. Different AT directions upheld by the MODEM can be sent by the processor/controller/PC to communicate with the GSM and GPRS cell arrangements.



Figure 4: GSM Module.

ACCELEROMETER

Accelerometer (when all is said and done) is an electromechanical gadget that estimates the quickening powers. These powers can be dynamic like any vibrations to the accelerometer or static like the consistent power following up on the body because of gravity. Accelerometer works in various manners. One such route is by utilizing piezoelectric impact this contains a gem like infinitesimal structures which produces voltages when the accelerative powers follow up on it.

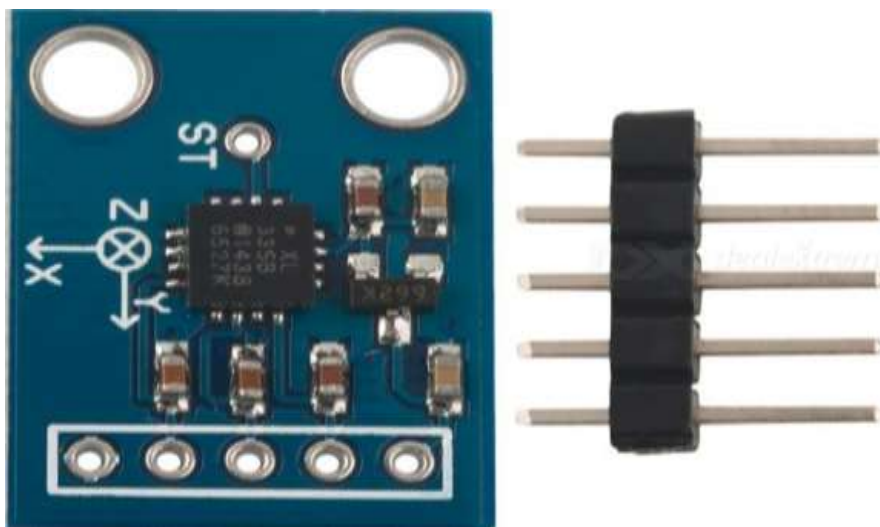


Figure 5: ADXL355 Accelerometer.

The other method for working is by utilizing capacitance sensor. This detects any adjustments in the capacitance if the microstructure is put beside the gadget. In the

event that if there is any development of these structures because of accelerative powers, at that point the capacitance will be meant to the voltage by the accelerometer. (Fig. 6 (a)).

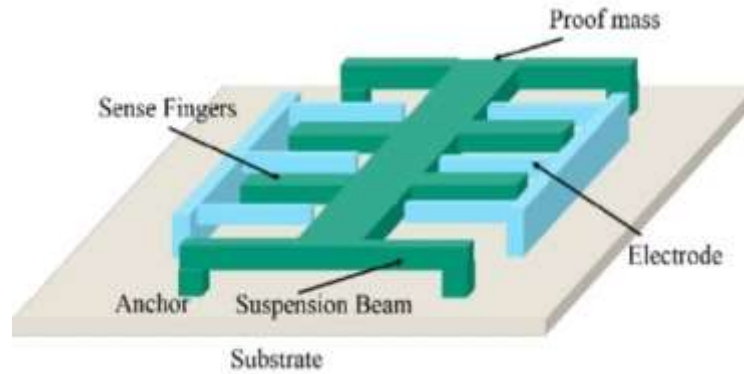


Figure 6 (a): Capacitive accelerometer.

The ADXL335 (Fig. 5) gives total 3-pivot speeding up estimation. This module estimates increasing speed inside range $\pm 3g$ in the x, y and z pivot. The yield signals are simple voltages which are relative to the increasing speed. It contains a poly-silicon surface-small scale machined sensor and sign moulding

hardware. As in Fig. 6 (b), speeding up avoids the moving mass and unbalances the differential capacitor which brings about a sensor yield voltage plentifulness that is relative to the increasing speed. Stage delicate demodulation procedures are then used to decide the size and bearing of the increasing speed.

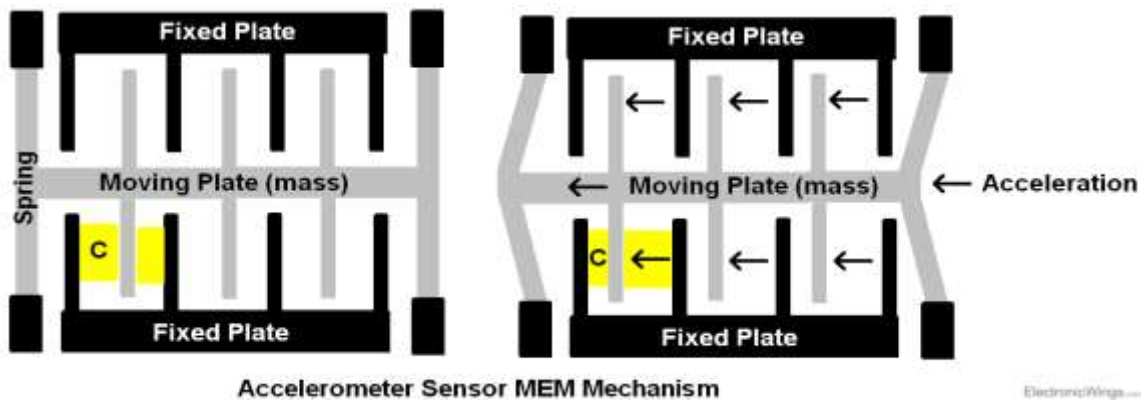


Figure 6 (b): Working of accelerometer.

LCD DISPLAY

Liquid crystal display (Fig. 7) is one of the advancements normally utilized as screens in screens, telephones, workstations and so forth. It is a mix of two conditions of issue, strong and fluid. LCD utilizes fluid gem to show an obvious picture.



Figure 7: 16x2 LCD display.

In contrast to CRTs and LCDs permit presentations to be a lot slenderer. As opposed to discharging light, they use backdrop illumination to create pictures in shading or monochrome. An LCD contains backdrop illumination which gives lights to the pixels. It has red, blue and green sub pixel which can be turned on or off utilizing pixels. The presentation seems dark when every one of the pixels and sub pixels gets off and it seems white when all the sub pixels are turned on. The backdrop illumination in the fluid precious stone showcase spellbinds the light by sending just 50% of the light through the layers. By

applying voltages, the strong and fluid parts in the presentation can be curved. This aids in actuating and deactivating the lights of the showcase.

IMPLEMENTATION AND WORKING

The Arduino UNO board is utilized for controlling the total system with the

accelerometer, GPS and the GSM module. Co-ordinates identified utilizing GPS module and the GSM module for sending messages (SMS). The LCD show is utilized for showing the status of the framework and even the co-ordinates. Fig. 8 shows the square graph of the framework.

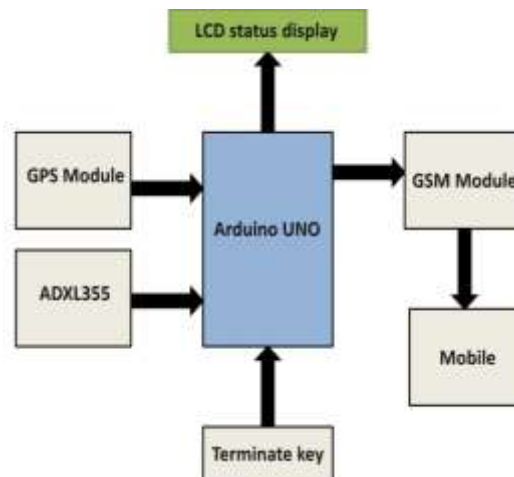


Figure 8: Block diagram of accident indication and message alert system.

This system is basically used for performing two operations, i.e., Vehicle Tracking and Accident detection.

VEHICLE TRACKING

On fuelling up the framework and establishment in the vehicle to be followed, a SMS is to be sent: "Track the vehicle" to the framework set in the vehicle. For appropriate ID of the string the prefix (#) or the postfix (*) can be utilized. ("#Track the vehicle*"). The SMS that is sent is gotten by the GSM module and it sends the information to the Arduino and henceforth the SMS is perused and removed by the Arduino on examination with the pre-characterized message. On coordinating with the pre-characterized message Arduino peruses the co-ordinates utilizing the GPS module by extricating the \$GPGGA string. When the co-ordinates are gotten, they are sent to the client utilizing the GSM module. Henceforth the vehicle is followed.

ACCIDENT DETECTION

The extra part of the mishap identification activity is the accelerometer. The accelerometer recognizes the mishap on premise of the adjustment in the pivot of development. In this way at whatever point there is a mishap, the tilt in the vehicle is utilized to change the hub estimations of the accelerometer. This adjustment in pivot esteems is perused by the Arduino and the qualities are contrasted and the edge esteems. When the variety is distinguished, the Arduino peruses the co-ordinates utilizing the \$GPGGA string from GPS module information and the framework checks for the terminate key status. In the event that the driver can press the end key, the co-ordinates removed are disposed of and the framework is reset. Else, the extricated co-ordinates are sent to the crisis contacts like police, rescue vehicle, family and so on. These co-ordinates can be utilized to find the mishap area and henceforth crisis administrations can be effectively given.

The status messages of the framework like "Prepared", "CALLIBERATING", "Introducing", "Instated SUCCESSFULLY", "Hanging tight FOR GPS" and "PLEASE WAIT" are imprinted on the LCD show. Additionally, the speed of the vehicle is likewise shown on the LCD. On Arduino Serial Monitor, this information is printed alongside the scope and longitude esteems.

Hence the system is used for vehicle tracking by sending a message and accident detection.

APPLICATIONS

1. Stolen vehicle recovery without extra cost.
2. Providing faster emergency services.
3. Tracking of trucks carrying valuable goods.
4. Home delivery and food delivery status tracking.
5. Vehicle security and smooth fleet management.

FUTURE SCOPE

This framework can be additionally created to distinguish the liquor levels of the driver. A sign on the measure of liquor expended can be sent to family/crisis numbers to ensure the driver is not driving while he is drunk. Another expansion to this framework can be rest level recognition. This can be utilized to show the sluggishness and the rest level of the driver in other to keep away from him from driving the vehicle while being drowsy and in this manner maintaining a strategic distance from further causalities.

CONCLUSION

To give the on-time crisis administrations we have structured a framework utilizing GSM and GPS modules which track the area of the client and sends the alarm messages to the crisis contacts separately and furthermore to identify the mishap accelerometer is utilized. The main aim of this paper is to save lives by providing

proper emergency service when an accident has occurred. The automatic location and accident detection will provide safety and security to the vehicles. It can also be used for location tracking when the vehicle is stolen. It can also collaborate with alcohol detection and sleep detection for future scope.

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