

GPS/GSM AND IOT BASED VEHICLE TRACKING AND ACCIDENT ALERT SYSTEM

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ABSTRACT

A vehicle tracking system is an electronic device installed in a vehicle to enable the owner or a third party to track the vehicle's location. This paper proposed to design a vehicle tracking system that works using GPS and GSM technology, which would be the cheapest source of vehicle tracking and it would work as an accident alert system. It is an embedded system which is used for tracking and positioning of any vehicle by using Global Positioning System (GPS) and Global system for mobile communication (GSM). This design will continuously monitor a moving Vehicle and report the status of the Vehicle on demand. For doing so an Arduino UNO is interfaced serially to a GSM Modem and GPS Receiver. A GSM modem is used to send the position (Latitude and Longitude) of the vehicle from a remote place. The same data is sent to the mobile at the other end from where the position of the vehicle is demanded. When the request by user is sent to the number at the GSM modem, the system automatically sends a return reply to that mobile indicating the position of the vehicle in terms of latitude and longitude in real time. Because there is no emergency facilities available in our country. So we design a technology which facilitates the emergency facility. This project also inform about an accident that is occurred to vehicle to rescue team and family members of the travelling persons. It uses MEMS sensor which can detect the abrupt vibration when an accident is occurred.

Keywords – GPS, GSM, Vehicle tracking, accelerating or MEMS Sensor

The roots of Vehicle Tracking Systems lie in shipping industry. They required some sort of system to determine where each vehicle was at any given time and for how long it travelled. Initially vehicle tracking systems developed for fleet management were passive tracking system. In passive tracking system a hardware device installed in the vehicle store GPS location, speed, heading and a trigger event such as key on/off, door open/closed. When vehicle returns to a specific location device is removed and data downloaded to computer. Real time tracking system was required that can transmit the collected information about the vehicle after regular intervals or at least could transmit the information when required by monitoring station. Active systems were developed that transmit vehicle's data in real time via cellular or satellite networks to a remote computer or data centre. Many vehicle systems that are in use now days are some form of Automatic Vehicle Location (AVL). It is a concept for determining the geographic location of a vehicle and transmitting this information to a remotely located server. The location is determined using GPS and transmission mechanism could be a satellite, terrestrial radio cellular connection from the vehicle to a radio receiver, satellite or nearby cell tower. After capture, the tracking data can be transmitted using any choice of telemetry or wireless communications systems. GSM is the most common used service for this purpose.

In this project a microcontroller is used for interfacing to various hardware peripherals. The current design is an embedded application, which will continuously monitor a moving Vehicle and report the status of the Vehicle on demand. For doing so arduino UNO is interfaced serially to a GSM Modem and GPS Receiver. A GSM modem is used to send the position (Latitude and Longitude) of the vehicle from a remote place. The GPS modem will continuously give the data i.e.

1. INTRODUCTION

the latitude and longitude indicating the position of the vehicle. And also gives alert signal to the third person regarding the accuracy of accident to the vehicle to save life.

2. EXSTING SYSTEM :

The exsting system only gives the information about the location of the vehicle provided by GPS and GSM based technoly. But The advent of technology has also increased the traffic hazards and the road accident take place frequently which causes huge loss of life and property because of the poor emergency facilities. This drawback can be overcome by this proposed system.

3. PROPOSED SYSTEM :

Our project work on the principle of tracking the vehicle loction and giving alert to the rescue team or family about accident of vehicle. The system is on and initialization. If vehicle is normal, no information sends related to the accident only gives vehicle location. Whenever accident occurred, the vehicle changes it's direction randomly and vibrates with high frequency. The MEMS sensor detects the angle difference happening with vehicle. The controller get the input from sensor and send the accident alert information to rescue team and family member and location of the accident place through GPS. It can facilitate connectivity to the nearest hospital and provide medical assistance through IOT technology.

Advantage:

- very economical and less errors and easy maintenance.
- Sophisticated security.
- Monitors all hazards and threats.
- Wireless monitoring and user friendly

4. BLOCK DIAGRAM:

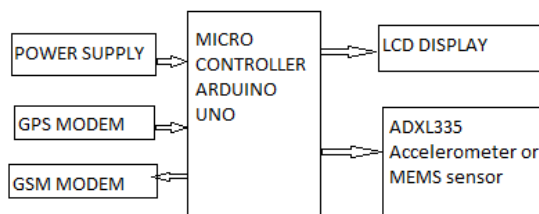


FIG: block diagram of vehicle tracking and accident alert system

Power supply:

This section is meant for supplying Power to all the sections mentioned above. It basically consists of a Transformer to step down the 230V ac to 9V ac followed by diodes.

ARDUINO UNO Microcontroller:

The ARDUINO UNO is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the ARDUINO IDE (Integrated Development Environment) via a type B USB cable. It can be powered by a USB cable or by an external 9 volt battery, though it accepts voltages between 7 and 20 volts. It is also similar to the ARDUINO NANO and Leonardo. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the ARDUINO website.

GSM:

GSM (Global System for Mobile communications) is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile devices such as mobile phones and tablets. It was first deployed in Finland in December 1991. As of 2014, it has become the global standard for mobile communications – with over 90% market share,



operating in over 193 countries and territories.

GPS Module:

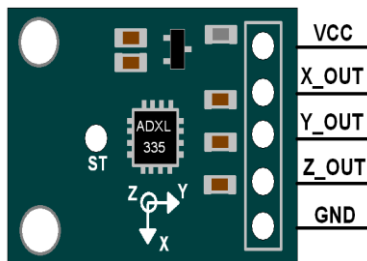
A GPS modem is used to get the signals and receive the signals from the satellites. In this project, GPS modem get the signals from the satellites and those are given to the microcontroller. The signals may be in the form of the coordinates; these are represented in form of

the latitudes, longitudes and altitudes.



ADXL335 Accelerometer Module:

An accelerometer is an electromechanical device that will measure acceleration force. It shows acceleration, only due to cause of gravity i.e. g force. It measures acceleration in g unit. On the earth, 1g means acceleration of 9.8 m/s² is present. On moon, it is 1/6th of earth and on mars it is 1/3rd of earth. Accelerometer can be used for tilt-sensing applications as well as dynamic acceleration resulting from motion, shock, or vibration.



5. WORKING OF VEHICLE TRACKING AND ACCIDENT ALERT SYSTEM.

The current design is an embedded application. It is continuously monitor a moving vehicle and report the status of vehicle on demand. For doing an Arduino is interfaced serially to a GSM modem and GPS receiver. A GSM modem is used to send latitude and longitude of the vehicle from a remote place. The GPS modem gives the data i.e., the latitude and longitude indicating the position of the vehicle. The GPS modem gives many parameters as the output, but only the National Marine Electronics Association NMEA data coming out is read and displayed on to the LCD.

The same data is sent to the mobile at the other end from the place of the vehicle's position is demanded. An EEPROM is used to store the data received by GPS receiver. That is used for detecting coordinates of the vehicle, GSM module is used for sending the coordinates to

user by SMS. And an optional 16x2 LCD is also used for displaying status messages or coordinates.

It has used GPS module and GSM module SIM 900A. The hardware interfaces to microcontroller are LCD display, GSM modem and GPS receiver. In order to interface GSM modem and GPS receiver to the controller, a MUX is used. The system automatically sends a return reply to that particular mobile indicating the position of the vehicle in terms of latitude and longitude when a request by user is sent to the number at the modem. A program has been developed that it is used to locate the exact position of the vehicle and also true navigated track of the moving vehicle on Google map.

Accelerometer can be used for tilt-sensing applications as well as dynamic acceleration resulting from motion, shock, or vibration. when accident occurs then vehicle moves or tilts from normal direction. In that case this accelerometer sensor senses inclination angle difference of reference angle and actual angle and sends the message "ACCIDENT OCCURED" and automatically call to the particular mobile to alert and to save the life's in that vehicle.

6.OUTPUTS:

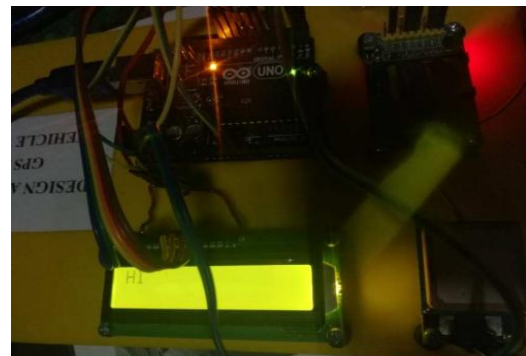


Fig 6.2: Result for the Active System



FIG: Result for finding location



FIG: Result for showing location of vehicle on LCD

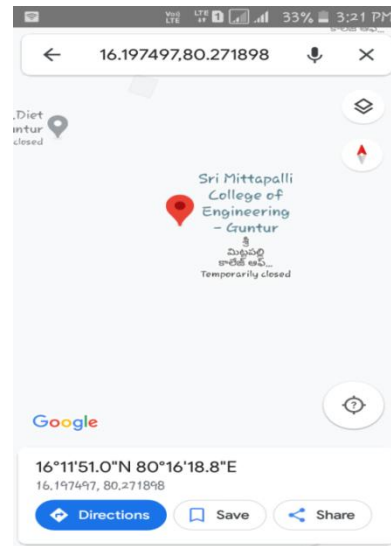


FIG: vehicle location on Google maps

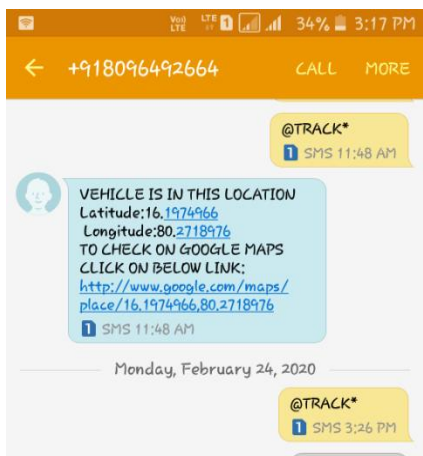


FIG: Result for GSM module sends SMS to mobile

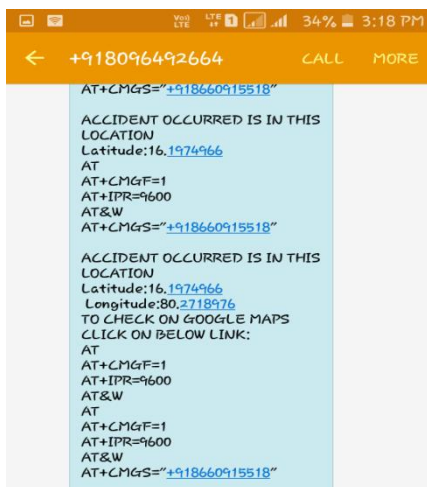


FIG: Result for GSM module sends SMS to owner when accident occurs.

7. CONCLUSION:

Tracking system is nowadays the most important system for the person, they want their car security in efficient hands this is the main reason. So the vehicle tracking system are getting popular day by day not only in metropolitan areas but also in small cities. This system is completely integrated and it becomes possible to the user to track their car very easily at any time and from anywhere. As the vehicle theft is increasing day by day but due to this people wasn't avoid buying vehicles but they found an efficient way to keep an eye on their vehicle without being very close to them. These systems keep a good control on the thefts and help avoiding them to some extent. Basically in all these systems the GPS and GSM are used to track the vehicle. Using this system the user determine the position of the vehicle, and the distance completed by it.

The user is able to access the position of their vehicle at any instant of time. This system is reliable any very secure. Upgrading this setup is very easy which makes it open to future requirements without the need of rebuilding everything from scratch, which also makes it more efficient. GSM module used in this paper to send and receive SMS. GSM module can supported 2G, 3G and 4G but only 2G can supported in this country. Because each country used different frequencies bands for GSM sim 900A. So, MPT and telenor were used and ooredoo and mytel were not used in this thesis. And then GSM module can also interfaced with Arduino when using AT command. Adding that, GPS module was not get the signal from GPS Satellite easily.

8.REFERENCE:

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