Iot based Vehicle Navigation System using GPS and GSM

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Abstract : A vehicle tracking system is a device put in a vehicle which is used by owner of vehicle to trace the vehicle's location and detect accident. Tracking device offer a cost effective and reliable solution to vehicle theft problem. This technique provides minute by minute update concerning vehicle location by SMS through GSM electronic equipment. Arduino UNO gets the coordinates from GPS electronic equipment, vibration sensor detect the vehicle vibration and accelerometer sensor determine the vehicle position, so it all values sends this information to users mobile application and GPS location send in text SMS. GSM electronic equipment is employed to send this information that's the position of the vehicle in terms of latitude and longitude in real time via SMS sent to the owner of the vehicle. The newest GPS are extremely helpful currently days, this technique permits the owner to look at and track his vehicle and establish vehicle movement and its past activities of vehicle.

Keywords: GPS, GSM, Navigation, IoT, Micro program Design Aids, Microcode Applications, Vibration Sensor, Accelerometer Sensor

I. INTRODUCTION

A vehicle tracking system consists of an electronic device mounted on the vehicle which relays its position or location to the vehicle owner all times. Most of today's vehicle tracking systems use the Global Positioning System (GPS) to get an accurate position of vehicle. In addition, components such as GSM and satellite transmitters are combined and used to communicate the vehicle's position to the user. The vehicle's information such as current location, past locations, and timeframe can be viewed by using a software on a computer, an application on a phone or a website. Following system use GPS technology to watch and find our vehicle anyplace on earth, however generally different types of automatic vehicle tracking location technology also are in used. This system is fitted within the vehicle, whenever user wants to know the location he can send the message to system and gets the real time location via using GSM modem that enables electronic devices to connect to the internet and transmitted data to the owner of vehicle thus reduce the cost of transmission. The information collected is viewed on google maps.

II. LITERATURE SURVEY

[1] Development and Performance analysis of a GPS GSM Guided System for Vehicle Tracking Bernard Akindade Adaramola, Ayodeji Olalekan Salau, Favour Oluwatobi Adetunji, Olatomide Gbenga Fadodun, In this paper, GPS-GSM based tracking system to detect stolen vehicles was designed. when user wants to get location of vehicle he sends the message to the sim inserted on GSM module in system and get the loction of vehicle through text.A vibration sensor present in system detects if accidents happen and send text message to the user.

[2] Automatic Messaging System for Vehicle Tracking and Accident Detection Rajvardhan Rishi, Sofiya Yede, Keshav Kunal, Nutan V. Bansode, In this paper, an automatic messaging system for vehicle tracking and accident detection was implemented where an AMS system will play a significant role within the field of road accidents. For accident detection it uses accelerometer sensor which detects the accidents by a change in present value of vehicle orientation and by using GPS it sends the location to the user via SMS.

[3] Real-time Location Tracker for Critical HealthPatient using Arduino, GPS Neo6m and GSM Sim800L in Health Care Pratik Kanani, Mamta Padole, In this paper IOT device is developed which trace the exact GPS coordinates of the patient so that doctors and hospital staff can track the location of patient. The system is made using sensors like GPS Neo 6m, Arduino, GSM Sim800L.ThingSpeak cloud is used to receive the GPS coordinates.By using google map it will display live location.

[4] IOT Based Real-Time Vehicle Tracking System Abdullah H. Alquhali, Mardeni Roslee, Mohamad Y. Alias, Khalid S. Mohamed, In this paper, smart vehicle tracking system, developed by using arduino Uno and GSM and GPS. An Arduino module is interfaced to GPS and GSM module a smart-phone used to coordinate geographical location of the vehicle. The GSM module is used to send data via internet to the ThingSpeak cloud whereby Freeboard receives data from ThingSpeak and display the data in Google maps.The limitation of this system is that if internet access discontinues the communication between system and user will break.

[5] Internet of Things (IOT) Based Ambulance Tracking System Using GPS and GSM Modules Aritra Baksi, Mayookh Bhattacharjee, Siddhanta Ghosh, Soham Kanti Bishnu1, Arindam Chakraborty In this paper system is proposed to help health care industry to track the location of Ambulance. Each ambulance will be provided with GPS and GSM modem which in case of emergency will send its GPS coordinates to the cloud server, which will then mark the shortest distance from its present location to the hospital via the place from where the emergency call has been raised. The components used for this project are GSM Module SIM900A along with Arduino UNO and Cloud computing. The data from the modules will be stored in a cloud server from where the paramedic officials can access it using a unique ID and password that will be issued to them on the integration of this system into their nfrastructure. A fourth signal, to be controlled by theArduino module, is to be implemented in the traffic lighting system.

[6] A Smart real-time tracking system using GSM/GPRS technologies Ali Mustafa, Mohammed I. A, Osama A. Awad, Developed an android application to trace the vehicles. Mobile application is utilized to detect the current location of vehicle. The system contains two embedded parts which is attached to vehicle 1st is GPS and GSM modules and 2nd is webcam which detect driver face and also count the no of passengers in vehicle by using image processing and send information to user.

III. COMPARISION OF EXISTING AND PROPOSED SYSTEM

The commonly used vehicle tracking systems and monitoring system are based on mobile signal to communicate each other. The technique used for existing system is to track vehicle is commonly used mobile signals, the problem is that when signal is week then vehicle tracking not possible.

So all these disadvantages overcome in the proposed system, to address limitation of existing system is proposed based on GPS, GSM, and mobile phone and android application. The owner will receive a short message sent by GSM module and GPS module sends the latitude and longitude values on owner mobile application.
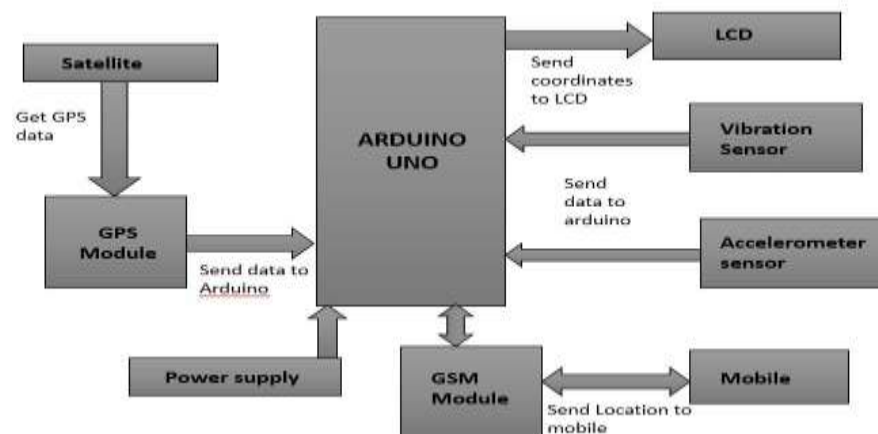
A. BLOCK DIAGRAM

Fig 1. Block Diagram

B. COMPONENTS :

1. Arduino Uno

Arduino Uno is a microcontroller board based on the ATmega328P

It has 14 digital input/output pins 6 analog inputs, a 16 MHz quartz crystal, a USB Connection, power jack, an ICSP header and a reset button as shown in Fig.(a)

Fig.(a) Arduino Uno

2. GPS (GPS6MV2)

GPS means Global Positioning System and it 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.

GPS module sends the data related to tracking position in real time, and it sends so many data in NMEA format (see the screenshot below). NMEA format consists several sentences, in which we only need one sentence.Which gives the url and other data.

Fig.(b) GPS

3. GSM SIM800L

The SIM800 GSM Module provides an industry-standard interface. SIM800 delivers GSM/GPRS 850/900/1800/1900MHz performance for voice, SMS, Data with low power consumption. It is easily available in the market.

Fig.(c) GSM SIM800L

4. LCD

One of the most common devices attached to a micro controller is an LCD display. Some of the most common LCD's connected to the many microcontrollers are 16x2 and 20x2 displays. This means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively. The LCD requires 3 control lines as well as either 4 or 8 I/O lines for the data bus.

Fig.(d) LCD

5. Accelerometer MPU6050

An accelerometer is an electroic device which is used to measures the acceleration force. The device will calculate acceleration simply due to cause of gravity i.e. g force. It measures acceleration in g unit. The accelerometer can be used for tilt-sensing applications as well as dynamic acceleration resulting from motion, shock, or vibration.

Fig.(e) Accelerometer MPU6050

6. Vibration Sensor

According to this project when a vehicle meets with an accident immediately Vibration sensor will detect the signal and sends it to Arduino UNO.

Fig.(f)Vibration sensor

IV. WORKING:

An economical vehicle chase system is supposed and implemented for chase the movement of any equipped vehicle from any location at any time.

The projected system created sensible use of a most popular technology that mixes a Smartphone application with a microcontroller. This may be simple to form and low cost compared to others.

The designed in-vehicle device works victimization international Positioning System (GPS) and SI system for mobile communication / General Packet Radio Service (GSM/GPRS) technology that is one in all the foremost common ways in which for vehicle chase.

The device is embedded at intervals a vehicle whose position is to be determined and tracked in period of time. A microcontroller is utilized to manage the GPS and GSM/GPRS modules and vibration sensor, accelerometer. The vehicle chase system uses the GPS module to induce geographic coordinates whenever we have a tendency to tend to send request and also when the serious accident is happend.

The Google Maps is utilized to indicate the vehicle location on the map.

Thus, users square measure about to be able to endlessly monitor a moving vehicle on demand by exploit the SMS to the GSM module and whenever the accident happend.

The vibration sensor is also called a piezoelectric sensor. These sensors are flexible devices which are used for measuring various processes. This sensor uses the piezoelectric effects while measuring the changes within acceleration, pressure, temperature, force otherwise strain by changing to an electrical charge.

An accelerometer is an electronic sensor that measures the acceleration forces acting on an object, in order to determine the vehicle position.
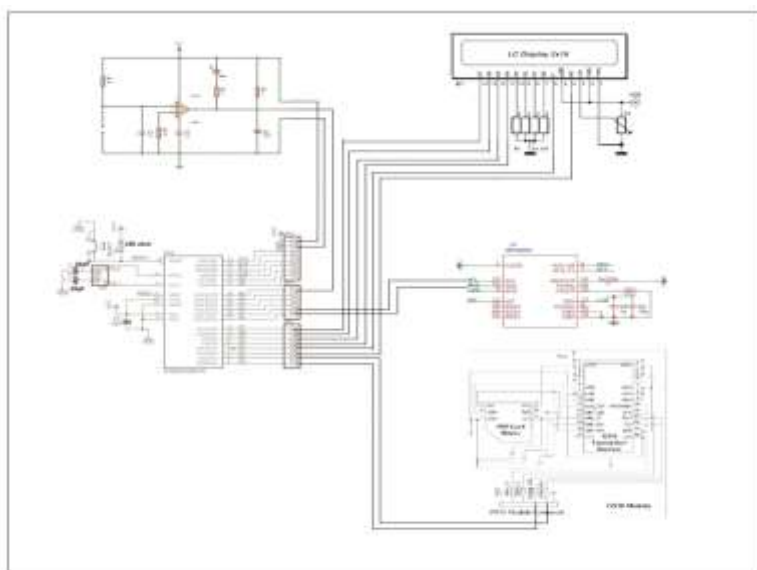
CIRCUIT AND RESULT

Fig 2. Circuit Diagram

Fig 3. Hardware setup

V.   RESULT

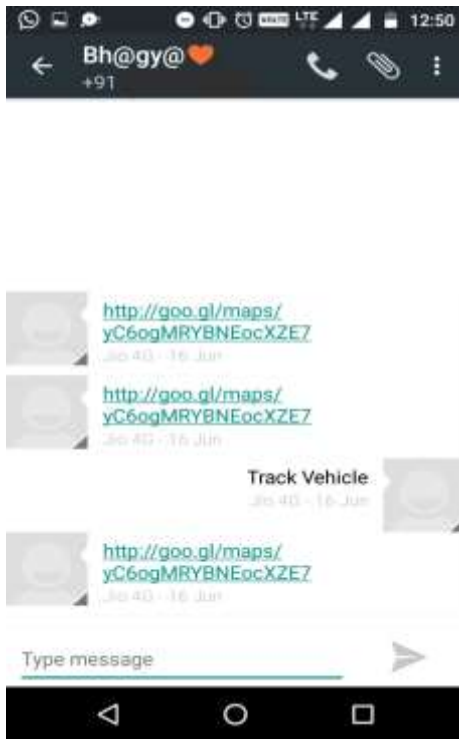**Fig.1.LCD Display**

Fig.2.LCD Display

Fig.3 Link sent on moblie phone

Fig.4.Location of vehicle on Google Map

VI. CONCLUSION

A GPS-GSM based vehicle tracking and accident detection system was designed and implemented in this paper to send text messages with coordinate information remotely.The occurrence of accident can be detected by vibration and accelerometer MPU6050 sensor which will give the accurate information and GPS can measure the exact location of vehicle in terms of latitude and longitude. It's primarily vital to upgrade the present manual Vehicle pursuit and observation system to boost transportation services. For the projected application, GPS primarily based system is employed to observe vehicle any time and GSM is employed to send the latitude and meridian to the user.

VII. ACKNOWLEDGEMENT

VIII. REFERENCES

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