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Live GPS Location Tracking using GPRS

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Abstract: ***In this paper, a real time tracking system is put forward. In this we are going to design a system which is used for tracking and positioning by using (GPS) and (GSM). This design is based on embedded application, which will regularly monitor location and report the status. This tracking device which is used in real time vehicle location tracking is done using the Arduino Uno Atmega328P, SIM800A module and NEO 6M GPS module. For doing so, the Arduino Uno Atmega328P is combined serially to a GSM module and GPS module. The design make use of RS-232 protocol for serial communication between the modems and the microcontroller. A serial driver IC is used for transforming TTL voltage levels to RS-232 voltage levels. The GSM module is used to regularly send the position of the vehicle from distant place. The GPS module that makes use of satellite technology for its navigation system will regularly give information like longitude, latitude, speed, distance travelled etc. For this purpose, Amazon Cloud Services is used for location data handling. The MySQL database is used to reserve all the data of the GPS.***

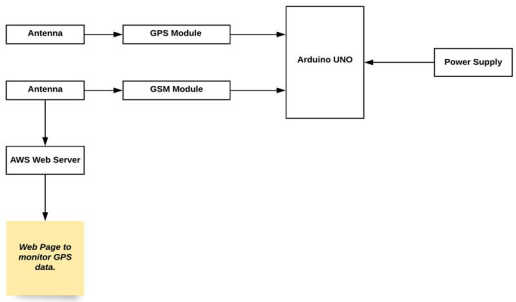
Keywords: Arduino UNO, NEO 6M GPS module, SIM 800A GSM module,

I. INTRODUCTION

1) *Embedded Programs:* An embedded system is a special-purpose computer system which is designed to perform one or a few dedicated functions, sometimes with real-time computing restrictions. It is usually embedded as part of a whole device including hardware and mechanical parts. In contrast, a general-purpose pc, such as a personal computer, can do many distinct tasks depending on programming.
2) *Need for Embedded Systems:* The uses of embedded systems are virtually limitless, because every day new products are released to the market that utilizes embedded computers in new ways. In this decade, hardware such as microprocessors, microcontrollers, and FPGA chips have become much economical. So, when executing a new form of control, it's wiser to just buy the generic chip and write your own customized software for that. Lot of embedded systems even are coming with ample libraries, so that "writing your own software" becomes a very petty task indeed. From an execution viewpoint, there is a lot of difference in between a pc and an embedded system. Embedded systems are mostly needed to provide Real-Time response.
3) *Applications:* TV, Radio, CD player of your main room, Washing Machine for washing or Microwave Oven in your kitchen, Card readers, Access Controllers, Palm devices which are present in your work space enables you to do so many of your tasks very productively. Apart from all these, many controllers embedded in your vehicle take care of vehicle functioning between the bumpers and often you tend to ignore all these controllers because you can't even realize their work.

II. PROPOSED SYSTEM

The following block diagram of vehicle tracking system is showing how the proposed system actually works:



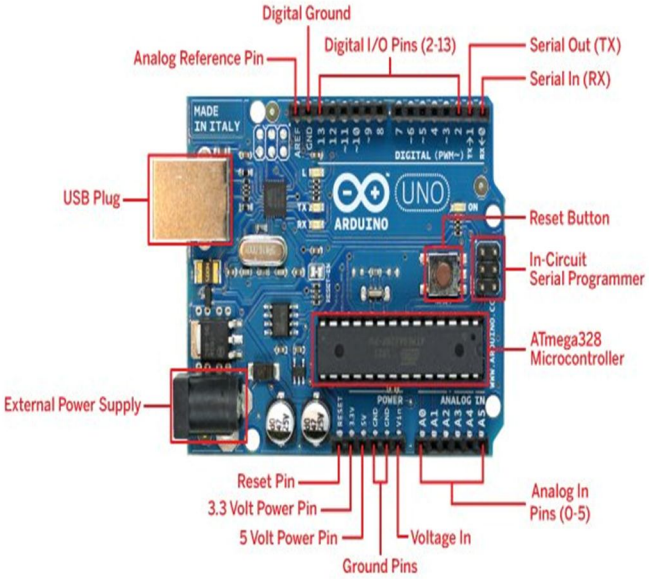
Block diagram of the proposed system

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In the implementation of the proposed real-time vehicle tracking system, navigation technology such as GPS, GPRS and background technology are used. The system is installed on the car to allow the owner to track the location of the car, this system will use GPS and GPRS module. The Global Positioning System can determine the exact location of a vehicle. The GPS antenna attaches to the GPS receiver module receives data from the GPS satellite in NMEA format (National Marine Electronics Association) and this information is transmitted to the server using the GPRS module. GPRS provides HTTP connection and tracking server. Tracking the server has acquired vehicle location information over the network and stores this information in a database. This information is available to online application users on the map. GPS is a satellite-based navigation system; is made up of 24 satellites, these placed satellites. These satellites transmit coded information to the GPS receiver, this information is used to pinpoint the locations of vehicles in the world by measuring the distance from satellites. The GPRS network is "always on", a private data network. It uses an existing GSM network to transfer and receive HTTP-based data to and from a GPRS device / module. It supports data transfer services such as email and web browser. GPRS can transmit data at a maximum speed of 115.2 kbps. Ideal for real-time tracking management system.

The major technologies which are used for the suggested system are:

1) Arduino UNO: - Arduinos are built around the AT mega microcontroller - actually a full computer with CPU, RAM, Flash memory, and input / output pins, all in one chip. Unlike, for example, the Raspberry Pi, it is designed to attach all kinds of sensors, LEDs, small motors and speakers, servos, etc. directly to these anchors, which can read or emit between 0 and 5 digital or analog cables. volts. Arduino connects to your computer via USB, where you edit it in simple language (C / C ++, similar to Java) inside a free Arduino IDE by uploading your integrated code to the board. When set up, Arduino can run with the USB link back to your computer, or stand-alone without it - no keyboard or screen required, just power.

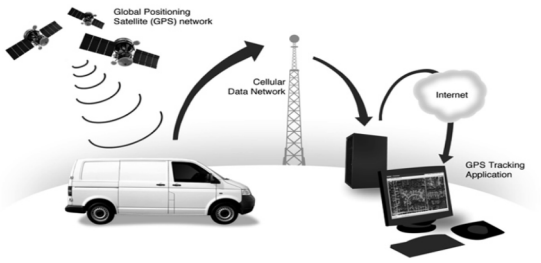


Arduino UNO

2) *Global Positioning System:* Global Positioning System: GPS could be a satellite navigation system wont to determine the bottom position of any object. GPS could be a worldwide radio navigation system formed from the constellation of 24 satellites and their ground stations GPS use satellite data to calculate a precise location on the planet. It can even track the movement of a vehicle or person. These calculations can relate the user's position to almost any projection within Milliseconds. GPS is tracking the movement by using TrackPoint. Typically, the receiver will store a price of co-ordinate and ID location either at periodic interval or when it detects a selected change in user direction. GPS tracking system is employed by a corporation to look at the route and progress of a delivery vehicle, and by parents to test the placement of their child, or maybe to smell round high valued assets in transit.

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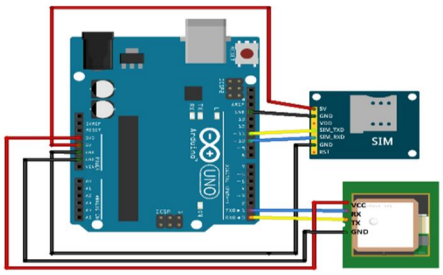
A GPS tracking system which is used in the worldwide for the purpose of Navigation Satellite System (GNSS) network. This network inclusive a spread of satellites that use microwave signals that are transmitted to GPS devices to present information on location base services, vehicle speed, time and direction. So, a GPS tracking system can give potentially strong both real-time and historic navigation data on any reasonably journey. A GPS tracking system can add several ways. From an advertisement perspective, GPS devices are usually wont to gather information about the position of vehicles as they create their journeys. Some systems or devices will store the info within the GPS tracking system itself (known as passive tracking) and other send the knowledge to a centralized database.



GPS Tracking system

3) *Global System for Mobile Communication:* GSM is a widely used digital mobile phone system in many parts of the world. GSM uses a variety of Time Division Multiple Access (TDMA) and is widely used in three wireless technology (TDMA, GSM, and CDMA). GSM is digital and compresses data, then sends down a channel with two other user data streams, each in its own time. GSM operates on 900MHz, 1800MHz, or 1900 MHz frequency bands.

III. CIRCUIT DIAGRAM



Circuit Diagram

The hardware requirements for the suggested system are:

1) Power Supply
2) Arduino UNO Atmega328P
3) NEO 6M GPS Module
4) SIM 800A GSM Module

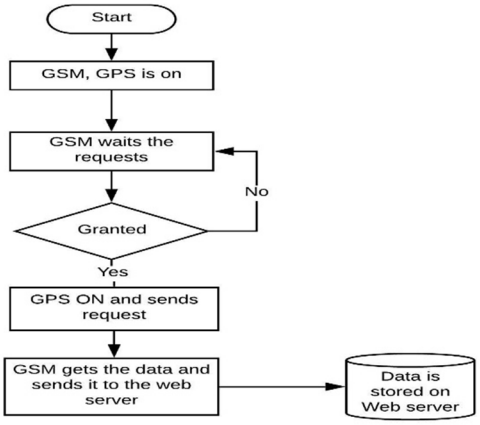
IV. WORKING

The main component of the location tracking system is the microcontroller Arduino Uno. Geo location can be captured with a GPS module and that data is transmitted to a web server using GSM technology. The SIM800A module requires a current 2A. Therefore, an external power supply such as a 12V-2A battery is used for power supply. The GPS module and GSM module are connected to a microcontroller.

The GPS module is easily connected to digital input / output pins in Arduino Uno. The thing to note is that the TX pin of the GPS module was connected to the RX pin of Arduino Uno. The main reason for this was that, TX represents the Transmit in which the data is sent and the RX represents the source of the data. Therefore, GPS-TX sends data to Uno RX and GPS RX receives data from Uno TX. GPS RX (receive) is connected to Uno TX (transmit) and GPS TX (transmit) is connected to Uno RX (receive).

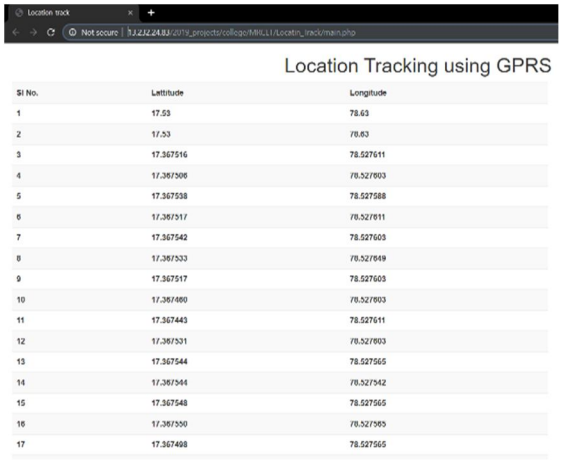
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The GSM module is connected to Arduino Uno digital input / output pins. The TX pin of the GSM module was connected to the RX pin of Arduino Uno. This is because Uno (TX) D3 transfers data to GSM (RX) and the Uno (Rx) D2 receives from GSM (TX) shown . Modules and Arduino have the same location. The tracking unit collects location information via GPS, converts this information into a specific application packet format and sends it to the server via GPRS. After establishing a GPRS connection it attempts to connect to the server of the service provider using the HTTP protocol. After a successful connection, GPS information is sent to the server as a character unit. After some time, it checks GPRS availability and connects to an HTTP server. The current and remote location of the device is sent to the HTTP server using GSM and GPS modules. In this way the device will communicate with the server and sends the location to us so that we can track and find it .



Flowchart of the proposed model

V. RESULTS



Sl No.	Lattitude	Longitude
1	17.53	78.63
2	17.53	78.63
3	17.367516	78.527611
4	17.367506	78.527603
5	17.367538	78.527588
6	17.367517	78.527611
7	17.367542	78.527603
8	17.367533	78.527649
9	17.367517	78.527603
10	17.367460	78.527603
11	17.367443	78.527611
12	17.367531	78.527603
13	17.367544	78.527565
14	17.367544	78.527542
15	17.367548	78.527565
16	17.367550	78.527565
17	17.367498	78.527565

Web page displaying the GPS data

VI. CONCLUSION

This system presents an efficient real time location tracking system that is flexible, customized and accurate location tracking system using GPS and GPRS for the GSM network, which is suitable for many types of applications worldwide. The combination of GPS and GPRS provides continuous and real-time tracking. Arduino brain system and GSM module controlled by AT commands that allow data transfer over the GSM network while GPS provides location information. Whenever GPS receives new data, it is updated to the database so it can detect links on a Web page. In the case of vehicle tracking, the proposed system provides vehicle location information including latitude, longitude, altitude, date, satellites, OTG speed and course. The results of the program are as good as the results of industrial devices.

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VII. FUTURE ENHANCEMENTS

In the case of vehicle tracking, the projected system gives the vehicle location data include latitude, longitude, altitude, date, satellites, speed OTG and course. The outcomes of the system are smart like the results of the industrial devices. For the long run work, a variety of services can be added to this system by using sensors or actuators. An Android mobile application can be developed to map the data from the web server on to google maps. A solar panel can be integrated to the system where there can be uninterrupted power supply.

VIII. ACKNOWLEDGEMENT

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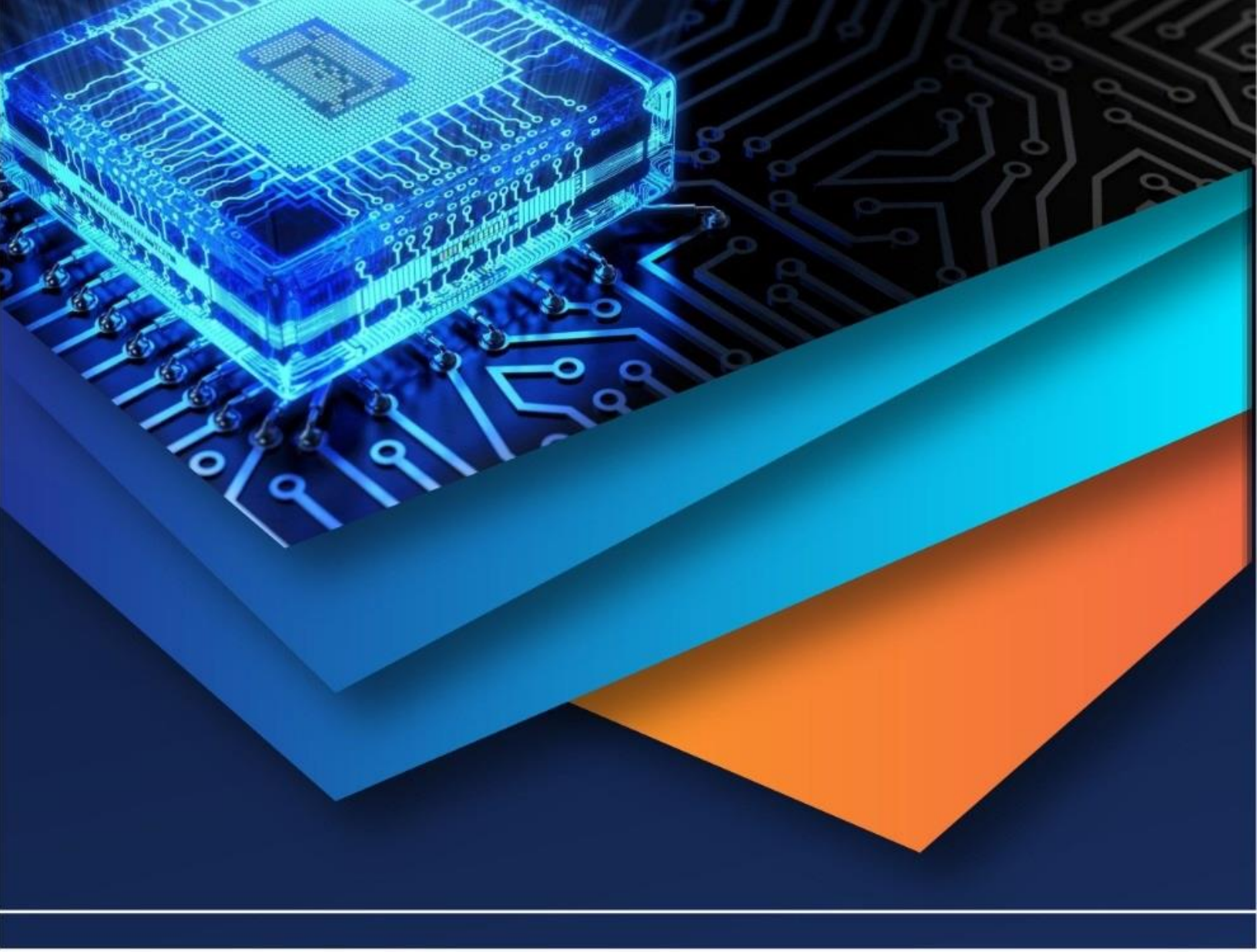
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