GPS AND GSM VEHICLE TRACKING SYSTEM USING AURDINO NANO

[1]V.Suma Deepthi,[2]S.Jayanthika , [3]Maryam Riyaz, [4]B. Priyanka, [5]V. Sai Chaitanya, [6]Y. Phanitha

[1]Assistant Professor, G.Narayanamma Institute of Technology and Science (For Women)
[2,3,4,5,6] B.Tech Student, G.Narayanamma Institute of Technology and Science (For Women)

[1]sumadeepthi.veeraganti@gmail.com,[2]jayanthikasapavath@gmail.com,[3]riyazmaryam67@gmail.com, [4]priyabanoth444@gmail.com,[5]saichaitanya2074@gmail.com, [6]phanithayerukula@gmail.com

1. ABSTRACT

The proposed design is cost-effective, reliable and has the function of accurate tracking. When large object or vehicles were spread out over ground, the owner corporations often found it difficult to keep track of what was happening. They required some type of system to determine where each object was at any given time and for how long it travelled. Also the need of tracking in consumer's vehicle use to prevent any kind of theft because police can use tracking reports to locate stolen vehicle using aurdino nano GSM and GPS based tracking system will provide effective, real time vehicle location, and reporting. A GPS-GSM based tracking system will inform where your vehicle is and where it has been, how long it has been. The system uses geographic position and time information from the Global Positioning Satellites (GPS). The system has an "On-Board Module" which resides in the vehicle to be tracked. This project consists of three main designs **(i) Arduino Nano (ii) GPS-Neo(6M) (iii) GSM-900M** Initially what happens is that we make a program in Arduino (C language) regarding interfacing the GSM device and GPS device and we also set a mobile number in the program as per our need, on which we get information regarding the vehicle location.

2. INTRODUCTION

Vehicle Tracking System is the technology used to determine the location of a vehicle using different methods like GPS and other radio navigation systems

operating through satellites and ground based stations. This system is an important tool for tracking each vehicle at a given period of time and now it is becoming increasingly popular for people having expensive cars and hence as a theft prevention and retrieval device.

Vehicle Security:

Vehicle security is a primary concern for all vehicle owners. Owners as well as researchers are always on the lookout for new and improved security systems for their vehicles. One has to be thankful for the upcoming technologies, like GPS systems, which enables for the owner to closely monitor and track his vehicle in real-time and also check the history of vehicles movements. The security system uses GPS, to find the location of the tracked vehicle and then use satellite or radio systems to send the coordinates.

3. METHODOLOGY

3.1 Overview of Purpose System Based on block diagram from Figure 1, Arduino NANO is used to control the whole process between GPS module and GSM module. GPS module is used to get the coordinates of the vehicle while GSM module is used for sending coordinates to user by message. In order to track the vehicle location, first it needs to find the coordinates of vehicle. GPS module will connect with satellite continuously to get the coordinates.

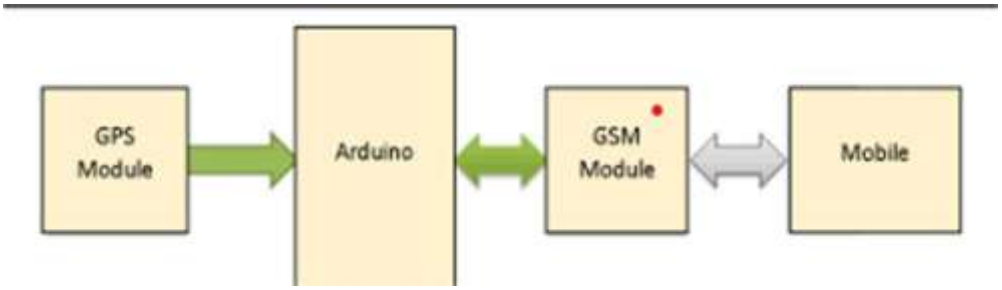


FIGURE 1

HARDWARE DEVELOPMENT

3.2 Aurdino Nano: 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. 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 anti-theft system. It is an embedded system which is used for tracking and positioning of any vehicle. For doing so an Aurdino nano microcontroller is interfaced serially to GSM Modem . This module is used to send the position of the vehicle. When the request by the 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.

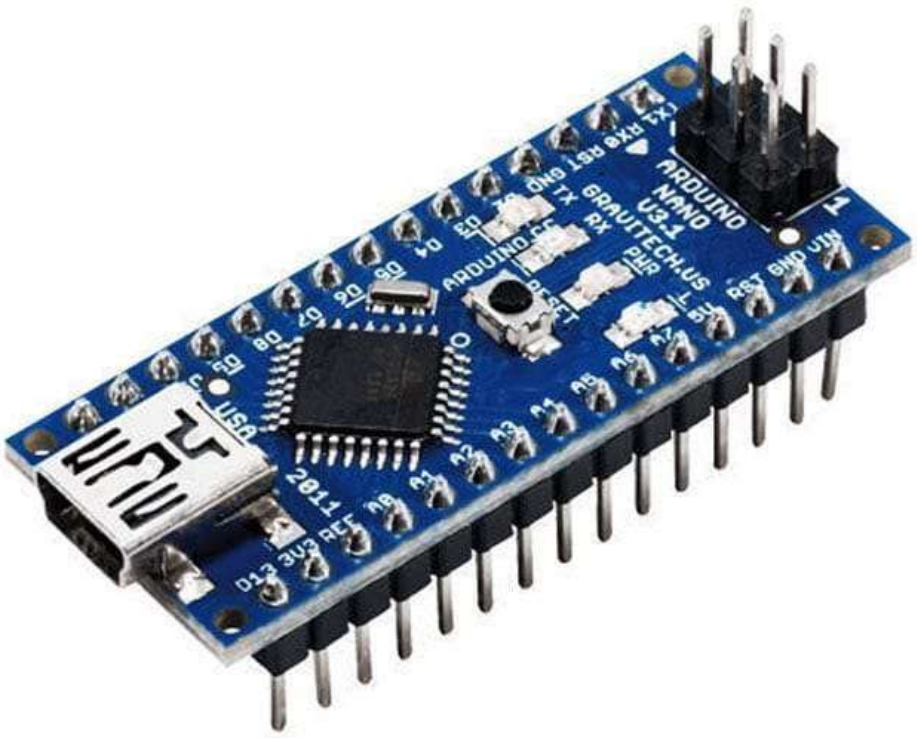


Fig. of AURDINO NANO

GPS NEO-6M MODULE: The Neo 6M module receives signals from multiple

GPS satellites, as well as other satellite constellations like GLONASS, GALILEO, and BeiDou. These satellites transmit signals containing precise timing information and their own orbital data.

SIGNAL PROCESSING: The module processes the received satellite signals to extract essential information. It uses a combination of algorithms, including trilateration, to determine the distance between the module and each satellite.

DATA OUTPUT: Once the module has determined its position, it formats the information into NMEA(National Marine Electronics Association) sentences. GPS parameters , such as latitude, longitude, altitude, speed, time.

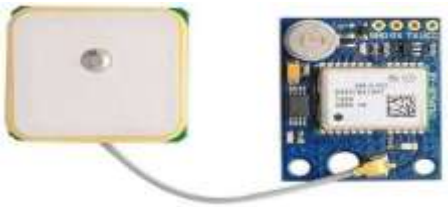


Fig of GPS NEO-6M MODULE

GSM SIM 800I MODULE: The SIM 800I module requires an external antenna in order to connect to the network, so choosing the right antenna is very important. There are two options available.

The first is a helical antenna that comes with the module and can be soldered directly to the PCB. This antenna is very useful for space-constrained projects.

Another option is a 3dBi GSM antenna with a U.FL to SMA adapter, which can be found online for less than 3$. You can snap-fit antenna into the small u.fl connector located on the top_left corner of the module.

The SIM800I, depending on its state, can be a relatively power-hungry device. The module's maximum current draw is around 2A.



Fig of GSM 800I

LCD (Liquid-Crystal Display): The working principle behind the LCD's 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. While constructing the LCD's a reflected mirror is arranged at the back. An electrode plane is made of indium-tin-oxide which is kept on top and a polarized glass with a polarizing film is also added on the bottom of the device.



Fig of LCD

BOOST CONVERTER: The Boost Converter is used to "set-up" an input voltage to some higher level, required by a load. This unique capability is achieved by storing energy in an indicator and releasing it to the load at a higher voltage. This brief note highlights some of the more common pitfalls when using boost regulators. These include maximum achievable output current and voltage, short circuit behaviour and basic layout issues. The references at the end of this document provide excellent overviews of the operation of a boost regulator, and should be consulted if the reader is not familiar with the basic operations of this type of converter.



Fig of Boost Converter

PCB DOT BOARD: One way of making connections in a DOT PCB is employing as much as feasible without excess wire.

You can accomplish this by twisting component leads into place of components such as capacitors and resistors . Furthermore, you cut out the excess length, and form appropriate electrical connections by soldering the leads. However, bending surplus component leads for wiring purposes can make component removal later, such as during repair, difficult.

Wire selection is down to preference and availability.

There are several wires you can choose from including bare copper abd isolated wire like verowire. Verowire is typically enameled copper containing insulation made from polyurethane which melts on soldering.



Fig of PCB dot board

3.7 V Li ion Battery: Now, your Li-ion batteries voltage primarily depends on the anode and cathode material of its cells. 3.7V is the voltage of ternary lithium batteries, not all lithium batteries are the same voltage, lithium iron phosphate is 3.2 V. General lithium cobalt oxide, ternary positive electrode with graphite anode can obtain a full charge voltage of about 4.2 V, while lithium iron phosphate can only reach 3.6 V with that in mind, you'll find out that most of lithium-ion batteries have a nominal voltage of 3.7V

The maximum voltage 3.7 V lithium ion battery can have is 4.2 V, also known as the maximum safe voltage/charge cut-off voltage. When the battery is completely discharged, it will have a voltage of 2.75V, also known as the minimum safe voltage.



Fig of Li ion Battery

Jumper wires: A jumper wire is an electric wire that connects remote electric circuits used for printed circuit boards. By attaching a jumper wire on the circuit, it becomes possible to control the electricity, stop the operation of the circuit, and operate a circuit that does not operate with ordinary wiring. Also, when specification change or design change is necessary on the printed circuit board, reinforcement of the defective part, partial stop of the unnecessary function , and change of the circuit configuration of the unnecessary output part by attaching or detaching the jumper wire can do. In general it is said that hot plating is difficult to control the plating thickness compared with electroplating, but we control the plating thickness by the original processing method.



Figure of Jumper wires

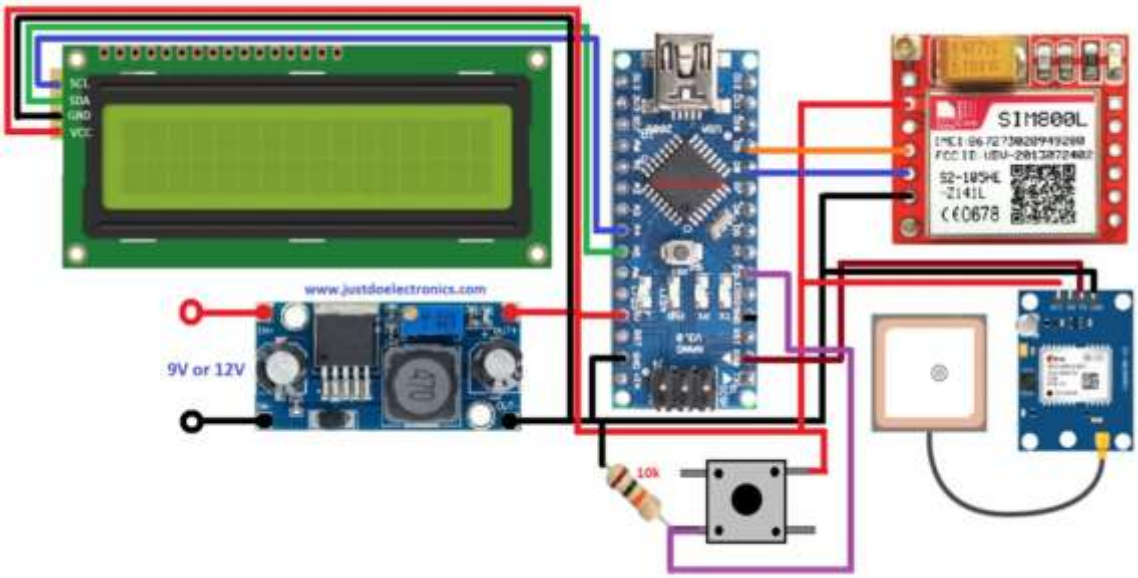
10Kohm Resistor: resistor is a passive component used in electrical circuits. It is used in circuits to add some resistance. Resistors come in different color-coding that helps to find the ohmic value of resistance for use in circuits.

The color code of resistors is used to show the resistance value of the resistor. Resistor colors can made with 3,4 or 5 color combinations or bands. Every band comes with its number for resistance number.

Figure of 10khm resistor

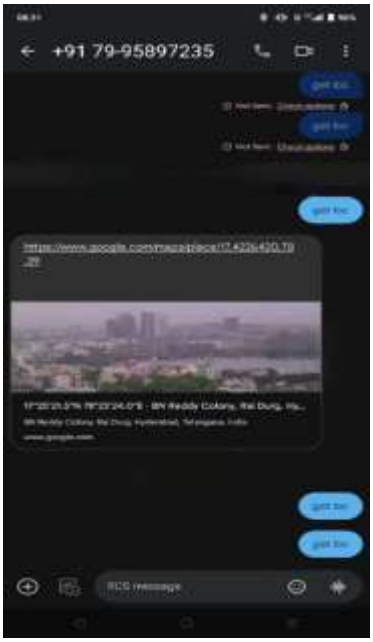


3.3 Design Of the Project



4. RESULT:

A GPS Based Vehicle Tracking System prototype has been developed for the project.



5. CONCLUSION

The purpose of this project is to develop a system that can track the location of vehicle when the car had been stolen or loss. Otherwise, this project also perhaps to reduce the number of stolen vehicles in our country. The idea is when the vehicle was stolen, the owner will send a massage to GSM module and the massage will be reply by GSM module. The reply massage will contain coordinate and URL link to Google Maps. Once the system was start, it will constantly updated the current location every one minute.

When the user clicks on the URL link, the link will bring to Google Map. There, the user can see the location of vehicle with a marker. Using the satellite view at the map, the real location of vehicle can be seen. User can see the road on the map, the time for searching the stolen car can be reduced. Therefore, by using the method user can get the location of the vehicle and real-time vehicle location details.

6. References

[1] Sathe Pooja,‖Vehicle Tracking System Using GPS‖, International Journal of Science and Research (IJSR), India Online ISSN: 2319-7064, 2013.

[2] Abha Damani, Hardik Shah, Krishna Shah, Manish Vala, Department of Computer Science and Technology, Uka Tarsadia University,Bardoli, Gujarat ― Global Positioning System for Object Tracking‖ International Journal of Computer Applications (0975 – 8887) Volume 109 – No. 8, January 2015.

[3] Pankaj Verma, J.S Bhatia, Centre for Development of Advanced Computing, Mohali, Punjab, India ―Design and Development of GPS-GSM Based Tracking System with Google Map Based Monitoring‖ International Journal of Computer Science, Engineering and Applications (IJCSEA) Vol.3, No.3, June 2013.

[4] A. EI-Rabbany, Introduction to GPS: The Global Positioning System, Norwood, MA: Artech House, 2006.

[5] Pham Hoang Oat, Micheal Drieberg and Nguyen Chi Cuong, ―Development of Vehicle Tracking System using GPS and GSM Modem‖ Electrical and Electronics Engineering Department, Universiti Teknologi PETRONAS, Malaysia. 2013 IEEE Conference on Open Systems (ICOS), December 2 - 4, 2013, Sarawak, 282