Vehicle Tracking System Using GPS and GSM

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Abstract: **In this project we are going to track a vehicle using GPS and GSM. This Vehicle Tracking System can also be used for Accident Detection Alert System, Soldier Tracking System and many more, by just making few changes in hardware and software. The ability to track vehicles is useful in many applications including security of personal vehicles, public transportation systems, fleet management and others. Furthermore, the number of vehicles on the road globally is also expected to increase rapidly. Therefore, the development of vehicle tracking system using the Global Positioning System (GPS) and Global System for Mobile Communications (GSM) modem is undertaken with the aim of enabling users to locate their vehicles with ease and in a convenient manner. The system will provide users with the capability to track vehicle remotely through the mobile network and if anyone starts the ignition of the engine the microcontroller sends the signal to send the SMS to the owner, if theft detected by the owner then he simply sends the SMS to stop the vehicle from his mobile then ignition fuel supply system gets off. The coordinates of GPS will further be converted into location by using google maps.**

Keywords: **Vehicle detection, GSM, GPS, MobileNet.**

1. Introduction

In today's world almost every common man owns a vehicle. Vehicle theft is a common issue which everyone faces in insecure parking places. This is a major problem which seemingly little being done about it. Several underlying problems have led to increase in vehicle theft, ranging from sheer human absent mindedness, to the lack of vehicle parking structures. The safety of the public vehicle is extremely essential. Current security systems have certain vulnerabilities.

GSM and GPS technologies are employed to make vehicle theft almost impossible. Global System of mobile communication is a globally accepted standard for digital cellular communication. Owner of the vehicle uses Subscriber Identity Module (SIM) inserted within his cell phone to send messages to GSM modem which is a part of vehicle theft prevention system that is attached to vehicle. A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone.

The development of satellite communication technology has made it easy to identify the vehicle locations. The proposed system integrates both GSM and GPS technologies. It provides real-time information such as location of user in moving vehicles in a concise and easy to-read format. Currently GPS vehicle tracking ensures user's safety while travelling. This vehicle theft prevention and tracking system is used in client's vehicle as a theft prevention and rescue device.

2. Hardware requirements

The hardware requirements are as follows,

A. Arduino Uno

Fig. 1. Arduino Uno

Arduino is an open source, PC paraphernalia and programming organization, endeavor, and client group that plans and produce microcontroller packs for constructing programmed devices and intelligent object that can detect and control questions in the real world. The inception of the Arduino extends began at the Interaction Design Institute in Ivrea, Italy. The equipment reference plans are appropriated under a Creative Commons Attribution Share. The device operates between 1.8-5.5 volts. The ATmega328 is a single – chip microcontroller created by ATmega in the mega AVR family. The device achieves throughput approaching 1 MIPS per MHz.

B. Power Supply

AC adapters are used with electrical devices that require power but do not contain internal components to derive the required voltage and power from mains power. The internal circuitry of an external power supply is very similar to the design that would be used for a built-in or internal supply. External power supplies are used both with equipment with no other source of power and with battery-powered equipment, where the supply, when plugged in, can sometimes charge the

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battery in addition to powering the equipment. Use of an external power supply allows portability of equipment powered either by mains or battery without the added bulk of internal power components, and makes it unnecessary to produce equipment for use only with a specified power source; the same device can be powered from 120 VAC or 230 VAC mains, vehicle or aircraft battery by using a different adapter. Another advantage of these designs can be increased safety; since the hazardous 120 or 240 volt mains power is transformed to a lower, safer voltage at the wall outlet and the appliance that is handled by the user.

C. GPS Module

Fig. 4. GPS module

The Global Positioning System (GPS) is a space based global navigation satellite system that provides reliable location and time information in all weather and at all times and anywhere on or near the Earth when and where there is an unobstructed line of sight to four or more GPS satellites.

D. GSM Module

Fig. 5. GSM module

GSM, which stands for Global System for Mobile communications, reigns as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. GSM module is a breakout board and minimum system of SIM900 Quad-band/SIM900A Dual-band GSM/GPRS module. It can communicate with controllers via AT commands (GSM 07.07, 07.05 and SIMCOM enhanced AT Commands). This module supports software power on and reset. It has a quad-band 850/900/1800/1900 MHz and a dual-band 900/1900 MHz. It has control via AT commands, a very low power consumption of 1.5mA (sleep mode).

E. Relay

Fig. 6. Relay

A relay is an electrical switch that opens and closes under the control of another electrical circuit. In the original form, the switch is operated by an electromagnet to open or close one or many sets of contacts. A relay is able to control an output circuit of higher power than the input circuit, it can be considered to be, in a broad sense, a form of an electric amplifier.

F. DC Motor

Fig. 7. DC Motor

A DC motor is designed to run on DC electric power. Two examples of pure DC designs are Michael Faraday's homo polar motor (which is uncommon), and the ball bear in motor, which is (so far) a novelty. brushless types, which use internal and external commutation respectively to create an oscillating AC current from the DC source so they are not purely DC.

3. Working principle

The main intention of this project is to find out the exact location of the stolen vehicle by thefts and inform to the concerned authority through an SMS. This GSM based vehicle theft control system retrieves the exact location of a vehicle in terms of its longitude and latitude. This data is fed to the Arduino, that is interfaced to a GSM modem. The Arduino, retrieves the exact location details from the GPS and sends an SMS to the concerned authority over GSM modem. An LCD display is connected to the Arduino for crossing the data received before being sent over GSM. This project will be very useful to people to keep track of their vehicles. Further, this project can also be able to stop the ignition of the vehicle by the owner remotely by sending an SMS in theft situations. An advantage of this project is that the owner of the vehicle can also send back the SMS, which will deactivate the ignition of the vehicle. The circuit setup is as shown in Fig. 8.

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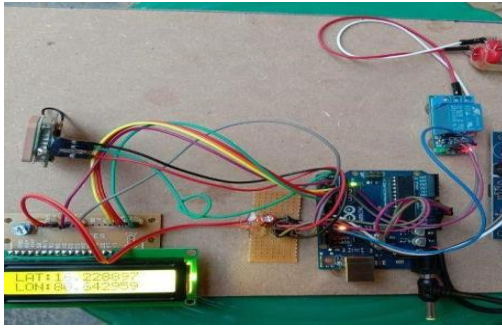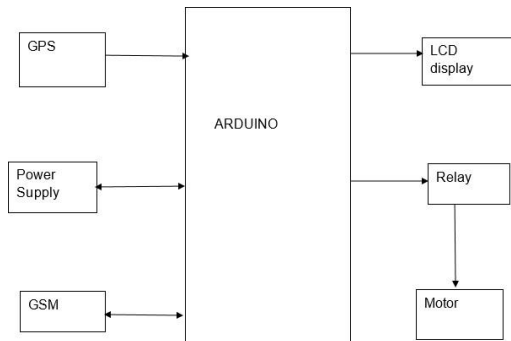**www.ijresm.com | ISSN (Online): 2581-5792**

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Fig. 8. Circuit Setup

Fig. 9. Flow chart

We used GPS to track the location of the vehicle, and also to stop the ignition of vehicle when the vehicle is theft.
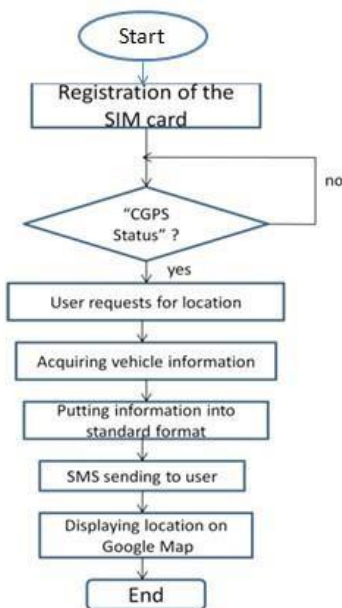

Fig. 10. Flow Chart

First power supply is given to Arduino then GPS and GSM modules will be initiated. The owner is also notified if his vehicle is started. The owner can respond with an SMS. The ignition of the vehicle will be disabled whenever *stop message is sent. GPS technology is used to track the vehicle. Location

co-ordinates of the vehicle are sent to owner whenever *start or *stop message is sent. GPS tracks the exact location of the vehicle and sends an alert message to the authority by using GSM module.

4. Results

A message is send on the registered number confirming about GSM and GPS configuration. Later an alert message is send to base station along with the precise location of the vehicle. The position of vehicle is shown in Fig. 11.
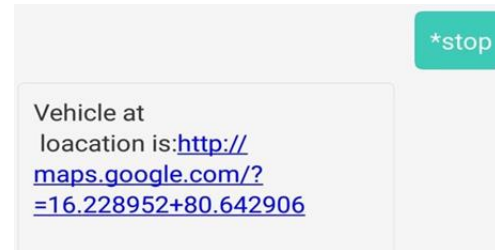

Fig. 11. Position of vehicle

5. Conclusion

The vehicle positioning system is thus designed by using Arduino Uno along with GPS, GSM and password modules. When the latitude and longitude values obtained and fed into Google Earth software, the location of the vehicle could be found out. Authentication is also provided so that only the authorized users can access the vehicle. The use of message from mobile makes it almost impossible for the thief to hack the password. A wide future scope guarantees that an enhancement to this system finds a great importance in real time system. The system can further be improved with speed control mechanism, that is, to stop the engine if the speed exceeds certain limits.

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