

Vehicle Position Tracking System Using GPS and GSM

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ABSTRACT: Each year number of stolen vehicle is on rise. To prevent this, a physical type counter measure like padlock, disk break lock and other devices are used but it is not enough safe. This paper describes the design of a system that can give information of vehicle position every time there's a request for it. The main aim of this project is to design the controllable system that combines GPS receiver module with GSM communication network. GPS(to point the location) and that data can be transmitted using GSM modem(as a means for communicating with the vehicle) through SMS(Short Message Service).The information accessed by the website and the position of the vehicle will be displayed through the Google Map. The system can be installed in vehicle at hidden place, the action starts by activating the engine without a key this will cause a signal to be sent to the microcontroller. The microcontroller will detect the signal and send a message to the owner via mobile phone and can stop the engine immediately by disconnecting the power supply. The system will work normally when the owner disables it. The proposed system is simpler, reliable and more efficient.

KEYWORDS: Location Finder, GPS, GSM, SMS, Microcontroller .

I. INTRODUCTION

Measurement demonstrates that there are more than 20 million vehicles this number expanded around 10 percent yearly and for the most part about 75% are buys in huge cities. As the quantity of vehicle expands, the quantity of issues related with them likewise increments, for example, road turned parking lot, vandalism and robbery. Every day around seventy vehicles are stolen with numerous cases stay unsolved expanding each passing year. This is a genuine issue and on the off chance that it isn't ceased, it will handicap the vehicle business. To counteract such wrongdoing, there ought to be a superior security framework for the vehicle. Right now, the main sort of wellbeing item broadly accessible for vehicles are physical bolts just, for example, latch, chain bolt and other physical bolt, which have a tendency to fizzle more often than not because of the way that they are effectively picked or broken. Some quality security item that are superior to others had an extremely costly cost because of their security highlights and for that reason motorcyclist can't bear the cost of such things while shoddy secures will dissolve due time because of wear and tear. Even if the bolt is quality bolt, the criminal can basically lift the cruiser into a van and take it away. Another kind of bolt is electronic bolt, which is organized of alert framework and disabler framework or immobilizer. The alert framework buzz sounds at the point when the vehicle is messed with and it demonstrates that burglary is in advance and the framework is intended to stop motor if the position of sensor and key isn't at the privilege put. The frameworks just open motor capacity by sending grouping of direction to controller by means of SMS in this way the framework is an immobilizer. The worldwide number of vehicles is relied upon to increment as possession turns out to be more moderate because of the developing economies of nations, for example, India and China. Theft of vehicle is a major misfortune for the proprietor of vehicle. The proposed framework can be utilized all around and is relied upon to be less expensive.

II. RELATED WORKS

In paper [1], The utilizations of Location-Based Services are mix of land area (i.e. spatial directions) with the general idea of administrations. Cases of such applications incorporate open administrations, crisis administrations, auto route, resource following. Existing works about moving items administration center around information administration, remote correspondence and framework engineering. Jang plans a document based moving items administration framework, which bolsters embeddings and seeking extensive measure of objects. Hage and Taniguchi utilize database to oversee information uniformly. Mobile correspondence has a few benchmarks which incorporate purported 2.5 age remote correspondence innovation created in the vicinity of 2G and 3G and analysts have created different LBS applications utilizing these correspondence gauges. SMS can just transmit the position data in content organization, and each message is at most 160 characters. GPRS is Internet-empowered innovation, and it can give higher transmitting speed than circuit-exchanged correspondence.

In paper [2], Around the globe and in Malaysia, the quantity of vehicles robbery cases has been expanding at a disturbing rate while the rate of recuperation of the stolen vehicles is as yet negligible. Besides, numerous specialist organization organizations need appropriate armada administration framework which causes low effectiveness of administrations and diminished benefit as the organization couldn't screen transportation activities. An ongoing remote vehicle following framework is one of the conceivable answers for beat these issues. This paper exhibits the advancement of the remote vehicle following framework which coordinates the Global System for Mobile Communications (GSM) Modem and Google Map. The GSM modem at the control focus will get the directions through Short Message Service (SMS) and updates the primary database. The data at that point will be gotten to by the site and the situation of the vehicle will be shown through the Google Maps application.

In paper [3], The capacity to track vehicles is valuable in numerous applications including security of individual vehicles, open transportation frameworks, armada administration and others. Moreover, the quantity of vehicles out and about internationally is additionally anticipated that would increment quickly. Consequently, the advancement of vehicle following framework utilizing the Global Positioning System (GPS) and Global System for Mobile Communications (GSM) modem is attempted with the point of empowering clients to find their vehicles effortlessly and in an advantageous way. The framework will give clients the ability to track vehicle remotely through the versatile system. This paper shows the improvement of the vehicle following framework's equipment model. In particular, the framework will use GPS to get a vehicle's facilitate and transmit it utilizing GSM modem to the client's telephone through the versatile system.

In paper [4], One of the paper demonstrates the framework being tried when the vehicle is moving and the framework is displayed as a guarding gadget against burglary by sending the proprietor the area of the vehicle when it quits moving. This likewise has no outcome to decide the precision of the framework. Paper exhibit a framework that is continually being screen by an administer framework and demonstrate the present area of the vehicle on Google delineate, GPS persistently refresh the present facilitate to the controller and occasionally send SMS to direct framework to store the way that the vehicle have taken. It give a thought regarding the GPS arrange need to refresh consistently with the goal that the client always know position of the vehicle. The two framework demonstrate that the controller can be seemed well and good nature for an endeavor of burglary rapidly send a SMS to the client show the vehicle have been alter. Thought it is a decent measure to act when the robbery is in the demonstration, the thought must be made to the controller a yield framework as an acting physical bolt with the correct device.

In paper [5], In this paper, we propose another area refresh plot in which to expand the consecutive paging exactness, clock based area refresh is performed inside an area zone. We decide the ideal clock estimation of the MS in light of the speed and call entry rate of the MS for zone and clock based area enlistment technique. Expository model of cost to advance and decides the ideal clock esteem which yields the base cost esteem.

III. SYSTEM DESIGN

There are two different kinds of inputs for this system. The first one is the input gained from GPS which is the sentence based on NMEA 0183 standard. The other one is the input received from cellular phone. But there is only one output for this system which is AT Command for sending the SMS. This system is divided into three main parts, which are the SMS receiver, the GPS receiver and data processing, and the SMS transmitter modules. GPS module is adopted to receive the position and velocity of car in the guard system. The microcontroller MSP430F149 is used to control and

process the information. GSM module-GTM 900 is used to communicate with user. The system is combined with CPU-control module, GSM-communication module; GPS-receiver module and power management module. The software of guard and alarm system is programmed in C language. The main program is composed of initialization and testing circulation. Meanwhile, the main program is also used to control the alarm circuit and message receiving or transmission. User’s commands including set up and inquiry are received by GSM for microcontroller. After these commands are processed, the microcontroller responds them. When the microcontroller finds that the car moves in the guard status, alarm message with position of car will be sent to the owner of car. There is a parallel interrupt in the middle of main program, which consumes 4 milliseconds. Once an interrupt appears, the corresponding subprogram of interrupt will be turned to.

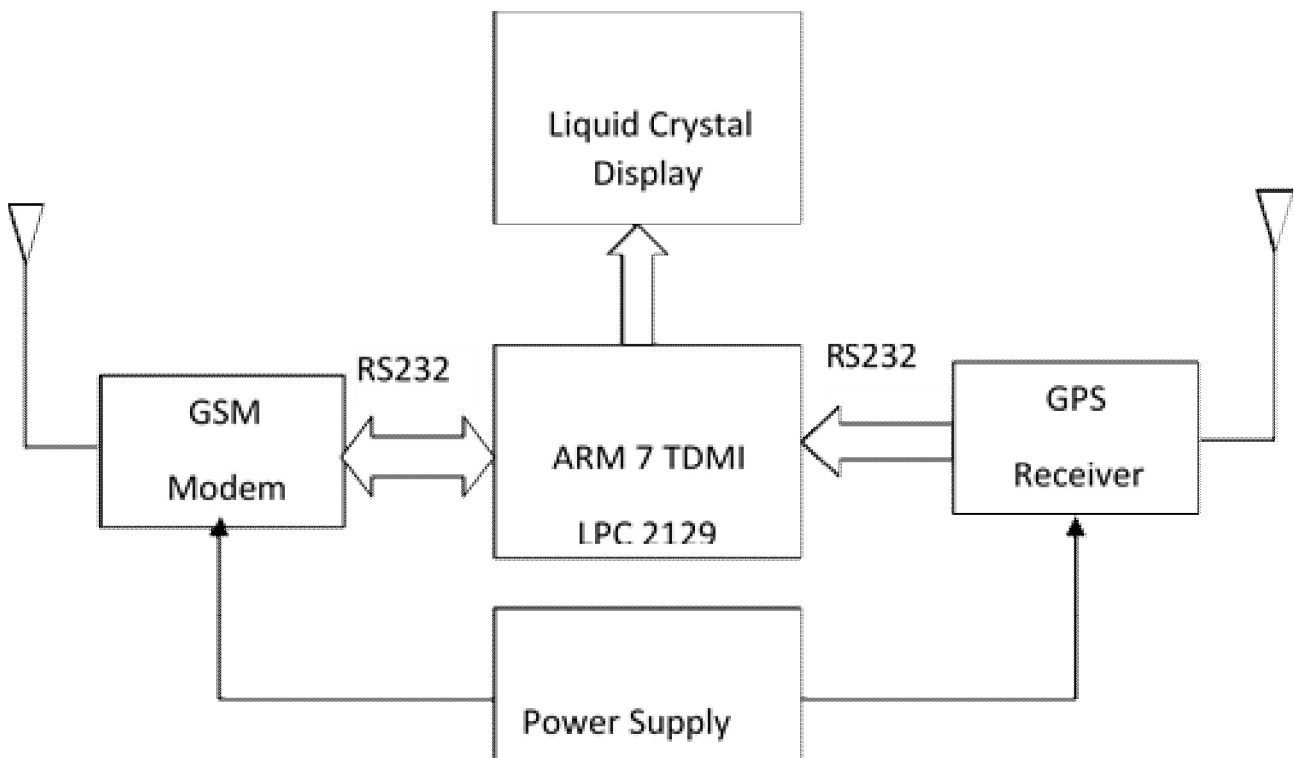


Figure 1.2 : Block Diagram GSM GPS based vehicle tracking system

A. CPU-control module

Low-power consumption 16 bits microcontroller is used as CPU in the control circuit. It is an RISC microcontroller with ultra low power consumption FLASH memory. Plenty of hardware resources are in MSP430F149. It is an industrial chip with high performance to price ratio. In application, MSP430F149 need not be added with other components. It is adapted to the real time system which needs be responded quickly. Low voltage ranged from 1.8v to 3.6v is used in MSP430F149. There is a 12 bits AD converters with 8 channels in MSP430F149. It has six 8 bits parallel interfaces, 64k bits FLASH ROM and 2k bits RAM. Because it pertains to FLASH type, debugging and downloading is convenient online for this microcontroller. At the same time, the JTAG interface can be connected with FET without other simulation tool. It is easy to use. Moreover, it can be used in ultra lower power consumption mode. Its radiation to human and environment is little. It has high reliability. The working voltage is 3.3v for MSP430F149. So the voltage

level of I/O is only 3.3v. There are two asynchronous communication interfaces, which are used to connect GPS and GSM individually.

B. GSM communication module

GTM 900- wireless module of HUAWEI is used as GSM communication component, which is a wireless module with three frequency bands. It supports AT commands and enhanced AT commands. There are lots of audible function and much data available. So it is a fitted solution for high speed data transport in various applications. AT commands are used in GTM900. GTM900 communicates with outer CPU by UART interface. Its main functions are wireless transmission and receiving, fundamental band processing and audible signal processing and so on. There are forty pins in GTM 900 module, which include power supply, data inputs/outputs, SIM card, audible interface and controlling part. The maximal input voltage amplitude of power supply is 4.8v. 4v is used for power supply in this design. GTM900 can be connected with SIM card and antenna. UART interface communicates with the USART0 interface of MSP430F149. It supports 3.0v input voltage level and output voltage level. All the signals of UART interface except RXD0 and TXD0 are valid at low voltage level. These two signals-RXD0 and TXD0 are valid at high voltage level.

C. GPS localization module

GPS localization module is used to find the position of car. GPS receiver is placed in the car. Messages about longitude, latitude and direction are transmitted by global position satellites. These messages received by the GPS receiver in the car can be used to localize the current position of car precisely. The GPS module-HOLUX M-89 is a (12×12×2.05 mm³) GPS engine module with minimal volume, which is designed according to low power consumption Mediatek GPS solution. The advantage of this module is treatment for excursion. Its current consumption is 30mA. It excels SIRF3 chip in many aspects including price. For navigation, it can provide good sensitivity up to -159dBm and little time of first localization. So it is adapted to car navigation, ship navigation, fleet organization, AVL and service of localization, automatic navigation, personal navigation or tour device, track device or system and map device. M-89 communicates with serial communication interface of MSP430F149 by its pin 4th and 5th. The pin 4th is used for serial data input and pin 5th is used for serial data output.

D.SMS System module:

In the wake of setting up the GSM Modem, the following stage is to setup the SMS system. Diafaan SMS Software was picked as the SMS framework. Diafaan SMS Software offers a decent availability with database, for example, Microsoft Access and MySQL. The point by point strategies and technique to setup the SMS programming can be discovered on the web. In the wake of checking that the SMS framework can effectively get SMS from transmitter, the following stage is to incorporate the SMS System to a MySQL database. It is prudent to test the association between the GSM Modem and SMS System by sending a SMS to the GSM Modem at the control focus (the number relies upon the SIM card embedded to the modem). The motivation to interface the SMS server with MySQL database is on the grounds that it will be simpler for the Google Map API content and code to get the required data, for example, scope and longitude (LatLong) and date and time (keeping in mind the end goal to distinguish the sequence request of the area) as the codes and contents are composed in PHP and HTML arrange.

E.Google Map module:

To show the followed vehicle area data in an easy to use graphical interface, Google Map was picked among other Web Mapping Service Application. Google had given a Google Map Application Programming Interface (API) under Google Developer site for clients who are intrigued to build up their own Google Map Application. Google likewise gives great help to the engineers by reporting all the JavaScript capacities and grammar under the Google Developer's site. Google Map API v3 is the most recent form and has additional functions. The following stage is to build up the Google Map API codes and contents which serve the capacity to show and present the got arrange into a graphical technique which is in Google Map. The initial segment is to interface the PHP code to the MySQL database.

IV. EXPERIMENTAL RESULTS



Fig 1: Displaying the command



Fig 2: IOT device receiver side

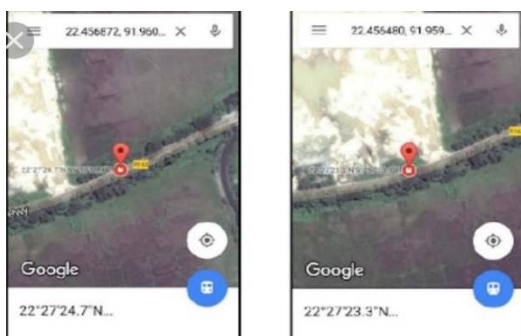


Fig 3: Location tracking using gps



Fig 4: Getting outputs for the actions

FEATURES OF PROPOSED SYSTEM

1. We have a fingerprint based security. The finger print is checked through the mobile phone of the owner. It's been programmed that only one person s fingerprint is stored in one mobile. If the owner wants to have one more fingerprint another phone should be connected.
2. When the ignition key is inserted to the vehicle to start then the message will be sent to the owner through GSM. If the owner knows about the vehicle he can neglect the message.
3. There will be an option to send police complaint. When the complaint is sent to that police station the information of the vehicle will also be sent including the vehicle s location.
4. We have programmed that we can store our close friends details in the program and that will be considered during friend s alert system. When the owner is very far away from his vehicle he can activate friend's alert system so that the vehicle s location can be tracked by those friends.
5. We have one more feature that is DND (Do Not Drive). When the owner activates the DND if the vehicle crosses more than 10kmph vehicle's engine will be off for 8 seconds. This is done just to confuse the thief.
6. We have a feature which can take the benefit of the public. This is called voice announcement system. When the owner activates it then the voice announcement like "Driver is thief" will start shouting. While the owner keep on tracking the vehicle he gets to know that if the vehicle is in a crowded area then he can activate this.

7. Lastly we have a feature that is suppose if the thief theft the vehicle by taking away by lifting it this can also be found . If the jerk happens for more than 3 seconds then the message will be sent to the owner.

V.CONCLUSION

In this paper, GPS worldwide position framework and GSM correspondence arrange are utilized to acknowledge limitation and protect. Bi-heading exchanging and control of information is refined. GSM overcasts a wide range without extra correspondence arrange. Information can be exchanged by GSM arrange rapidly and has a high unwavering quality. The protect framework has a little volume with the goal that it can be put subtly. Two power supplies of the framework help to enhance unwavering quality. The proprietor of auto can screen the situation of his auto independent from anyone else without screen focus. The monitor framework has gotten a decent impact in functional application.

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