

Design & Fabrication of Electric Cycle using SMS Warning-GPS Tracking & Mobile Operating System using ARDUINO UNO Technique

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ABSTRACT- Today we are surrounded by Automobile vehicles & Insecurity; the safety & Pollution Problem of vehicles is one of the major problems the entire world faces. So In this paper, my main concern is to solve this problem by using Electric cycles, parked in any area in any country or state to safety from being stolen or driven by an unauthorized person. If anyone starts the Electric cycle, Firstly the microcontroller sends the signal as an SMS alert to the Owner, if theft is detected by the owner then he simply sends the SMS to stop the vehicle from his mobile then the electric power supply system gets off and buzzer gives a loud sound. Here I made a security system for the Electric cycle with SMS warning and GPS tracking that can prevent theft of an Electric cycle is needed. The aim of this research is to design a security system for the Electric cycle consisting of a SIM800L GSM Module to send warning messages, and a GPS tracker to provide information in latitude and longitude coordinates to track the stolen Electric cycle using Google Maps. GPS Tracker worked by reading the coordinates where your Electric cycle was located. Basically this project help in minimizing the Electric cycle stolen cases and make your Electric cycle more secure, money, and time.

KEYWORDS- GPS (global positioning system), GSM (global system for mobile communication), SMS Warning, Tracking, Security System, Map Electric cycle.

I. INTRODUCTION

In today world vehicle stealing is a major issue so the purpose of making a GPS tracking system for any vehicle to prevent it from stealing or unauthorized activity. A dual safety system on the Electric vehicle has been designed to prevent Electric cycle theft using SMS [2], [4], [5] and GPS Tracking system [2], [4], [6]–[11], integrated directly into the internet network on a smartphone, and monitor the location of the electric cycle via Google Maps [11], [12]. Several researchers have created an Electric cycle security system using GPS (global positioning system), GSM (global system for mobile communication), and RFID (Radio Frequency Identification) [2], [5], [6], [8], [13] – [16] and short message service (SMS) [2]. Sriborirux designed and realized a security system based on GPS, GSM, using the arduino android application on mobile phones [2]. When

the electric cycle is stolen [8], [14], [17], an alarm that sends an SMS warning to the Android smartphone is activated. That way, the owner will soon find out that the electric cycle has been stolen. If the thief has managed to remove the electric cycle, the electric cycle location can be identified by tracking the coordinates sent by SMS Module SIM800L. To track the location of the stolen electric cycle, the owner can access the SIM card number installed in the GSM Module [1] – [4], [6], [8], [10] – [12],[17] and the GPS Tracker [4], [6] – [12], [14], [18] using Google Maps. At the same time owner will be intimidated by a message in his smartphone if unauthorized person successful in stealing of electric vehicle. At the same time the concerned person will get a location coordinates. At present GPS is the most accurate and easy method to find the exact location of vehicle for a tracking system and it work through SMS receive and sending through GPS satellite. GPS Tracker works to obtain electric cycle location coordinates (latitude and longitude) and the Google Maps plays the map of the location, while the GSM module as an intermediate device that connects communication to the Arduino UNO microcontroller [6]. In this project our goal is to intimate by some mean (message) to the concerned person through GPS tracking system.

II. RELATED WORKS

[9]Make an Electric cycle tracking and locking system based on GSM and GPS using GSM Modem SIM800L.This GSM modem SIM800L was designed such that it can accept SIM card. SMS-based carding. Now a days SMS based system is quick and accurate and popular means of communication. GSM is very popular in smartphone at present and all the cellphone can communicate now with GSM. GPS is a technology which based on navigation and it provider actual information to the system. With real-time of GPS and GSM module track you electric cycle in live location and find where is my Electric cycle moving. [4] designed a electric cycle tracking system which consists of fixing of an electronic device in a electric cycle which uses to send the SMS through the owner mobile number the tracking of the electric cycle by the owner and as such it collect data which is send to through the Radio Frequency (RF) transmitter. The location coordinates of the vehicle are firstly sent by GPS to the microcontroller and we get

pictorial view on map. As we get the exact location of on vehicle. The authorized person will take immediate action on unauthorized activity by the demobilized the vehicle automatically. The benefit of this GPS tracking system is

- Easy to use
- Every one familiar about GPS
- Cost effects
- Easy to install
- Plug and play
- The specifications and characteristics for GSM-GPRS +GPS pus follow some GPS module

A. General features

- Quad-bandwidth(850-900-1800-1900)Mega Hertz
- Mobile station based on GPRS class-B
- Accommodation to GSM phase 2/2 plus
- -Class 4 (2 watt at 850-900) Mega Hertz
- -Class 1 (1 watt at 1800-1900) Mega Hertz
- Control as a mean AT commands (3GPP TS 27.007, 27.005 & SIMCOM enhanced AT Commands)
- Rang of supply voltage(3.40 volts to 5.01 volts)

B. GPS Specification

- Receiver type
- 22 tracking /66 acquisitions
- Channel- GPS L1 C/A code
- Sensitivity
- Tracking: -165 dBm
- Accuracy

C. Horizontal position

- Specifications for SMS via GSM/GPRS
- Point to point MO and MT
- SMS cell broadcast
- Text and PDU mode

D. System Pictorial Diagram

The operating method of the electric cycle security system as show in figure (1) is that when the key is on, starts, the security system activates the electric cycle controller [5], [6], [12], [13], [15] and at the same time, it activates the alarm and transmits signals to be processed by Arduino microcontroller. The SMS gate way technique send every minute send to the authorized person as a SMS (Every last coordinate point). GPRS (General Packet Radio Services) Shield SIM800L. The controller lock output enters the Arduino UNO input for access and sends an SMS alert when an electric bicycle is stolen by unlocking the motor key. The GPRS (General Packet Radio Services) Module SIM800L allows access to these alerts. Data connections from smart phones to Arduino Uno and vice versa are made possible by the SIM800L GPRS module. Data communication is not feasible without the use of a GPS (Global Positioning System) intermediate satellite. The location of the electric cycle continues to be monitored by GPS satellites while it is moving.

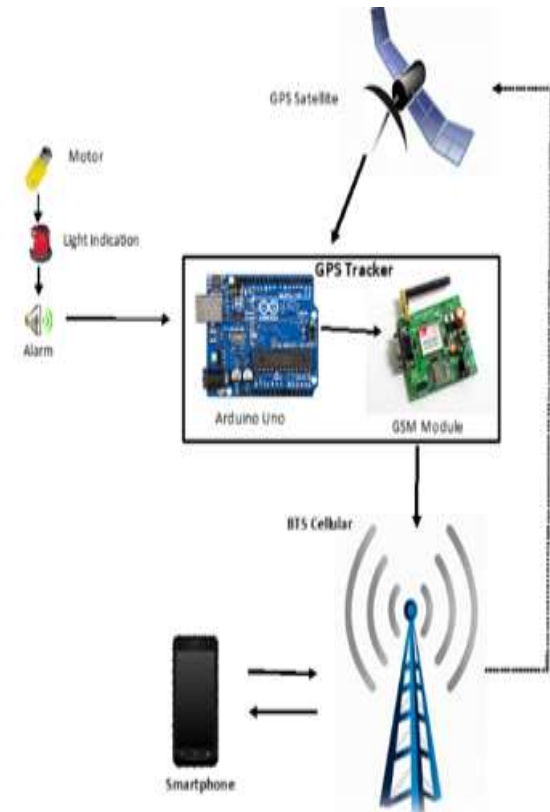


Figure 1: System Pictorial Diagram

The GPS tracker device that was mounted on the electric cycle was programmed to transmit information about the location of the electric cycle as determined by GPS communication with GPS satellites. SMS alerts with the coordinate values are sent. To locate the electric bike visually, users must have the Google Maps software installed on their smartphone. After doing so, they must copy and paste the SMS data with the GPS coordinates. The smartphone will continue to track the whereabouts of the electric bike.

E. System-Working line Diagram

When GPRS (General Packet Radio Services) is enabled and the GPS sensor on the GPRS Shield SIM800L determines the location of the electric cycle, as shown in Figures (2) and (3), the operating process begins. The GPS sensor will read the location coordinates when an SMS request is made for a position, and it will then communicate those coordinates by SMS. Every minute, the GPS sensor will read the data and send it repeatedly by SMS.

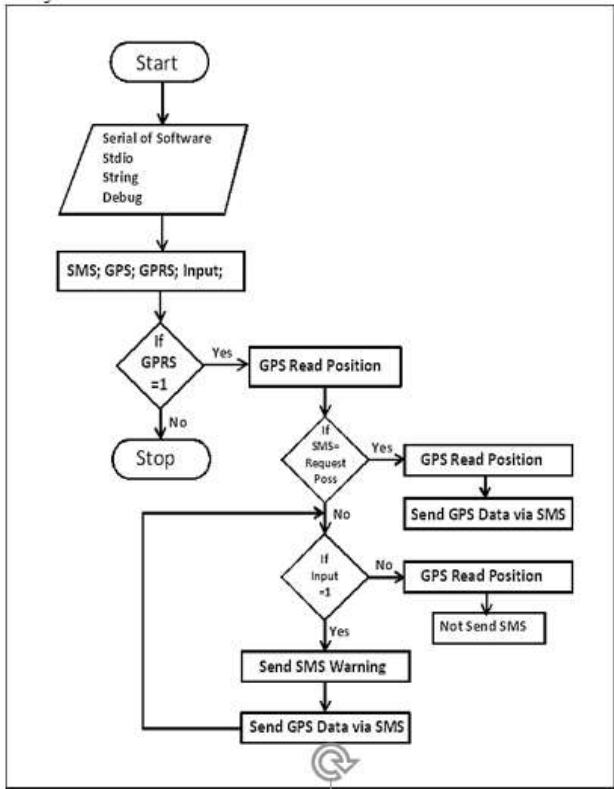


Figure 2: Line Diagram Of a GPS Tracker

Generally, the work of the GPS and GNSS (Global Navigation Satellite System) starts when the electric cycle security system is activated.

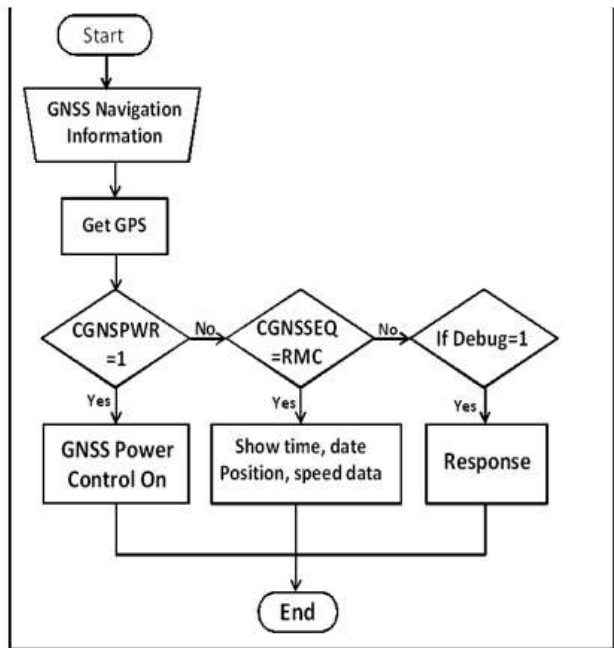


Figure 3: Line Diagram GPS Monitoring Monitoring

Figure (3) display of GPS tracking demonstrates how many AT commands are required to organize some GPS functions when looking for places. The GNSS Power Control is on and active if the AT Command directs CGNSPWR to be active, at which point the GPS will

begin processing the data. The last sentence of the NMEA (National Marine Electronics Association) sentence is read when AT Command orders CGNSSEQ = RMC. Time, date, location, path, and data speed commands are all contained in the RMC, which is an AT command. To display the response as data with latitude and longitude coordinates, debug the program's functionality.

III. PARTS DESCRIPTIONS

A. Global System For Mobile Communication SIM-800L Module

The SIM800L is a tiny cellular module that supports GPRS transmission, SMS sending and receiving, and voice calls making and receiving. This module is the ideal choice for any project that needs long distance connectivity because of its low cost, compact size, support for four bands of frequencies, and low cost.

1) Technical specs

IC Chip	Cellular Chip SIM800L Global system For Mobile Communication
DC Power Range	3.4 Volts to 4.4Volts
Suggested DC voltage	4Volts
Energy Consumption	Not in Use < 2 milliampere Idle < 7 milliampere Average transmission - 350 milliampere Peek transmission - 2000 milliampere
Power Transmit	Class 4 (2Watt) for GSM(850) Class 1 (1Watt) for DCS1800
SIM Pocket	Micro SIM Pocket

2) Arduino Uno Unit

A microcontroller board called Arduino UNO is based on the ATmega328P. It contains 6 analogue inputs, a 16 MHz ceramic resonator, 14 digital input/output pins, 6 of which can be utilized as PWM (Pulse Width Modulation) outputs, a USB port, a power jack, an ICSP header, and a reset button. It comes with everything needed to support the microcontroller; to get started, just plug in a USB cable, an AC-to-DC adapter, or a battery. Without too much concern, you can experiment with your UNO; in the worst case, you can replace the chip.

3) Specifications

Micro-controller	ATMega328
Operational DC voltage	5 Volts
Input DC Supply (Suggested)	7-12 Volts
Input & output Pins	14 (6 provided for Output of PWM)
Memory	32 Kilo Bytes
SRAM	2 Kilo Bytes
EEPROM	1 Kilo Bytes
Clock-Speed	16 ertz

B. Micro- controller ATMEGA328

One of the high-performance AVR technology microcontrollers with a lot of features and pins is the

ATmega328. It is built with 8-bit CMOS technology and an RSIC CPU, both of which improve performance. Auto naps and an inbuilt temperature sensor increase power efficiency. Multiple programming techniques and inherent safeguards on this ATmega328 IC enable engineers to priorities this controller for various applications. The ATmega328P microcontroller has been increasingly used recently because the IC supports numerous modern era connectivity techniques for other modules and microcontrollers themselves.

C. Global Positioning System Module

A GPS (Global Positioning System) module called the NEO-6MV2 is utilized for navigation. The module only verifies its position on the planet and outputs data, including its longitude and latitude. It belongs to a group of independent GPS receivers that use the powerful u-bloc 6 positioning engine. These adaptable and reasonably priced receivers come in a small (16 x 12.2 x 2.4 mm) box and offer a wide range of connecting choices. You can track your electric bike and view all of its activity with the aid of a GPS module.

D. Relay Module

The relay is the device that opens or closes the contacts to cause the operation of the other electric control. It detects the undesirable condition with an assigned area and gives the commands to the circuit breaker to disconnect the affected area through ON or OFF.

IV. RESULTS & CONCLUSION

This essay will discuss vehicle tracking systems. When the owner parks the vehicle in a lot and if someone decides to steal it. After sending the signal, we can access the vehicle and the GPS tracking system will immediately determine the vehicle's location. Additionally, if he sends the SMS to the vehicle again to stop, the power cutoff, controller automatically cuts off power supply and the vehicle stops right away with a loud alarm. If he then uses this system to reset the SMS, the vehicle will restart in its original state. An Arduino-Uno board, a GPS module, a GSM module, and a Google Map application make up this system. It is both user-friendly and economical. Additionally, it may be said that the project's objectives were achieved. Built a vehicle tracking system that can be operated by an embedded smartphone. Cost-effective yet effective vehicle tracking system developed and implemented. This project's Maine motto is to reduce the number of stolen vehicle.

A. Google Maps Testing

In order to identify the location and accuracy of Google Maps throughout the tracking process, the user location had to be defined before the object could be tracked. The user's starting point's latitude and longitude coordinates were entered to complete this operation. The next action was to open Google Maps and selecting "current location."

Finally, by providing the coordinates of latitude and longitude, for instance, -7.645625, 111.5198. Tracking when users and objects are in the same place on Google Maps.

It indicates that Google Maps works and can identify the starting location latitude and longitude, which are the

same as the location of the vehicle (the initial position is denoted by the arrow), when testing the system by searching for the coordinates for the analysis findings.

B. Pros

- In the case of unauthorized use, this system sends the owner immediate alerts to their mobile phone.
- Since anyone attempting to enter the vehicle unlawfully is swiftly apprehended, the owner of the vehicle need not worry about the security of the vehicle any longer.
- Through this device, you simply track your vehicle.

C. Cons

- Signal jammer.
- Extra SIM required.
- Power supply.
- Sensitivity (ability to detect the satellites)

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