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Car Theft Detection and Tracking System

Pritam Patil[1], Shubham Jagtap[2], Karan Ghuge[3], Suprriya Lohar[4]
[1, 2, 3, 4]*Department of E&TC, AISSMS IOIT*

Abstract: ***The Anti-theft system is installed in the car, it tracks the location of the car continuously and has user's mobile number stored in it for alerting purpose. The location of the car is obtained by global positioning system (GPS) and sent to user through global system mobile communication (GSM). There are two modes of operation of the system - Active Mode and Sleep Mode. When the system is turned on by connecting to power supply, it is initially in the Sleep Mode. In the Sleep Mode, the door sensor is inactive and ignition of motor is active, can be used to start the engine of the car. To switch to Active Mode, user needs to send letters 'A1' as text msg through their mobile phone to the theft system's phone number. In Active Mode, the door sensor is active and the ignition in inactive. When the door sensor is pushed by movement of the door by unauthorized person, the system will keep sending the location of the car as text message to the user's mobile phone. The text SMS will include google maps link with longitude and latitude of the location of car. The ignition doesn't work in Active Mode. The user will have to send '1' as text message to theft system's mobile number to stop receiving the location of the car. By this method, the owner of the car will get notified if theft happens with the car and can track the location of the car with ease.***
Keywords: GSM, GPS, Controller, SMS, Switch, LCD, Motor, Location

I. INTRODUCTION

In 2019, around 46,725 cars were stolen in Delhi, the capital of India. It was the highest in the whole country. Uttar Pradesh had 28,417 and Maharashtra had 25,780 car theft cases that year. Cars are becoming more and more common therefore, the chance of theft is also greater because of such large availability. Theft about car accessories, components are happening everyday around the world. Therefore, car theft should be taken seriously because it questions safety of many people and their private properties Most of the car theft systems are high end and cost abundant amount of money. There is a requirement of a cost-friendly yet effective and featured system which can be implemented on any type of car. As well as which can provide necessary functions and informative data to acknowledge the theft.

In this system, GPS technology is used to find out the accurate location of the car and GSM is used to alert the authorized person and give them the location of the car. The system operates on two modes. The modes are designed for the purpose that the system should allow only the owner to use the car.

II. LITERATURE REVIEW

A. Automatic Car Theft Detection System Built on GPS and GSM Technology

The project uses Global Positioning System and Global System for Mobile Communication for fulfilment of its main operation. It has online and offline tracking options. GPS collects the location data and GSM sends the location data to the user. The authorized person can control the ignition/engine cut-off feature through SMS system. The system is implemented on a printed circuit board. As the car is forcefully started by the thief (push button is used for this purpose), the system sends message to the owner in 15 to 20 seconds. This project has minimum cost and user friendly and its installation is easy in the car. It shows correct location on google maps.

B. Car Tracking Detection and Tracking Based on GSM and GPS

Car tracking system is installed on the car. The place of the car is located through GPS and user is alerted through GSM. The system constantly monitors the location of the moving car. It can report the location whenever demanded by the owner. The owner needs to send the password to the microcontroller to open the doors and restart the engine of the car. The engine motor speed gradually decreases when the owner locks the engine. It is a secured and low-cost system. The system has two parts – mobile unit and controlling station.

C. IOT Based Car Theft Detection

The system proposes a mechanism to reduce car thefts and ensures to provide safety in real time by sending alarming message whenever the car is stolen.

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The system is based on Internet Of Things to provide continuous location of the car. GPS module is used to provide location and GSM module is used to send alerting message, as usual. The alert message is delivered to the owner of the car as soon as the motor starts running and location is also sent as a link to the user. The system provides car safety at very low cost.

D. A Certain Investigation On Smart Car Theft Detection and Position Tracking System.

The system has an embedded chip and a vibration sensor. The vibration sensor senses vibration changes in the surrounding environment of the system. The system is installed inside a car and has password methodology. If a person enters a wrong password in the system, then the system alerts the owner through an SMS. The location is obtained over GPS module. The system also blocks the ignition of the car to prevent it from using by the unauthorized person. The system also has an ultrasonic sensor which can determine a lift in the car position.

III. COMPONENTS SPECIFICATIONS

A. Atmega 328p PCB circuit

It is a single board microcontroller and it has open-source hardware. It has the design of 8-bit Atmel AVR or 32-bit Atmel ARM. It has a software with standard compiler and a bootloader. It used to control the functions of all the other components. It has Atmega-328p as its controller.

1) Operating Voltage : 5V
2) Input Voltage : 12V
3) Digital I/0 Pins : 14
4) Analog Input Pins : 6
5) Flash Memory : 32KB
6) SRAM : 2KB
7) EEPROM : 1KB
8) Clock Speed : 16Mhz

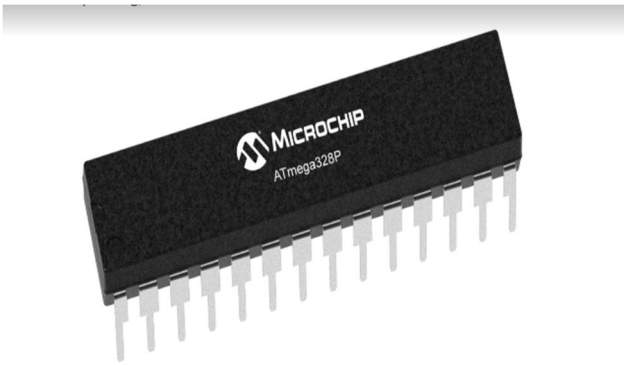


Fig 1. Atmega 328p

B. LCD

A Liquid Crystal Display is a display which can show letters, alphabets, digits, symbols, etc. It consists of two lines and these two lines can fit 16 characters per line. It is used to show current operations being performed in the project.

1) Operating Voltages : 4.7V to 5.3V
2) Operating Current : 1mA without backlight.
3) The display bezel is 72 x 25mn
4) LED color for backlight is green.



Fig 2. LCD

C. GPS

The global positioning system is a navigation device which collects the location data in the form of longitude and latitude. It operates on 24 satellites that are working in space continuously. It is used to locate the exact place of the car on earth.

1) Operating Voltage : 3.3V
2) UART baud rate : 9600bps
3) Interface : RS232 TTL
4) 25 x 25 x 4mm ceramic antenna



Fig 3. GPS

D. GSM

A Global System for Mobile Communication is the second standard of digital communication developed for calling voice and data service in the network area. It makes use of Time Division Multiple Access. It makes use of low power transmitters with frequency reuse method and it has a dipole antenna.

1) Mobile to Base Transceiver Station (uplink): 890-915 MHz
2) Base Transceiver Station to Mobile (downlink): 935-960 MHz
3) Bandwidth: 2 * 25 MHz
4) Operating Voltage : 5V



Fig 4. GSM

E. Limit Switch

Limit switches automatically detect whether there has been a contact with an object or if there is a certain pressure limit an object has crossed. They have Normally Open and Normally Closed Mechanisms. The user can choose between these mechanisms according to their needs.

1) Operating temperature range : -40 °C to 125 °C
2) Mechanical endurance : 5,000,000 min.
@400 cycles/minute max.
3) Switch Resistance : 100 mOhm max
4) Contact Material : silver alloy



Fig 5. Limit Switches

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F. Dc Motor

A device which works on the principle of converting electrical power into mechanical force and operates on DC voltages is called as DC Motor. It has electromechanical internal mechanism and has a rotary motion as an end effect. It can be used to drive various components like wheels.

1) Input Voltage : 12V DC
2) RPM : 500
3) Length : 80MM
4) Torque : 1.5KG.CM
5) Shaft Diameter : 6MM



Fig 6. GPS

G. Relays

A relay is a electrically operating switch used to isolate two parts of the system which have different voltage sources. By using a relay, we ensure that there is no mix-up of voltages between both the sections of the system.

1) Voltage Offset : 20Uv
2) Minimum Current : 100pA
3) Insulation Resistance : 10e10 Ohms
4) Power use per relay : 120Mw



Fig 7. Relays

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H. Buzzer

A buzzer is an alerting or signal device which produces sound as its output. It can be used as an alarm or timer to alert the user. It is used in this project to indicate that the theft is happening.

1) Operating Voltage : 3V to 24V DC
2) Operating Temperature : -20 °C to 60 °C
3) Frequency Range : 3,300 Hz
4) Supply Current : below 15mA



Fig 8. Buzzer

IV. BLOCK DIAGRAM

As shown in diagram the door sensor & ignition work as input to Arduino. The GPS & GSM systems work in serial communication with Arduino. LCD, Buzzer, Relay &Motor are connected as outputs to Arduino. Mobile device communicates serially with GPS module.

1) The modes of operation can be switched through SMS system by the owner. When the owner handles the car, the system should be put into Sleep Mode. When the owner has parked the car and has left, then the system should be put into Active Mode.
2) In Active Mode, if anyone pulls the car door, the limit switch which is used as the door sensor get pushed, the Buzzer beeps and SMS is sent to user.
3) The SMS has the location of the car & is being sent to the car owner's mobile phone number.
4) The ignition doesn't work and the engine motor is locked.
5) LCD basically displays the current operation being performed on its screen like sending SMS.
6) In this method, tracking of car is easy & engine stops in a safe way.
7) In sleep mode, the limit switch sensor doesn't work & ignition is free to use for authorized person.

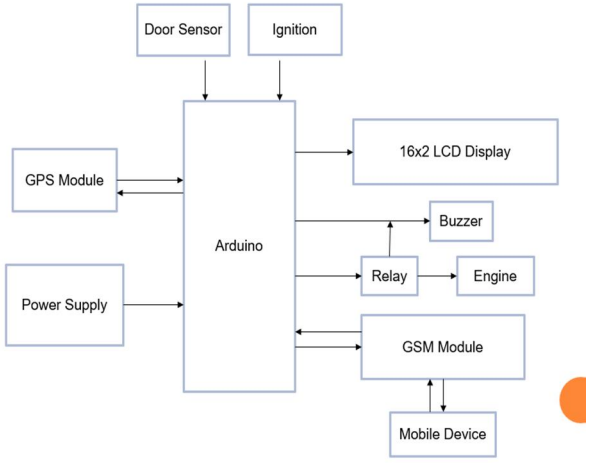


Fig 9. Block diagram

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V. HARDWARE DESIGN

Software serial is used for serial communication with the GPS module and Actual Serial Communication pins are used to interface GSM with Arduino. A DC motor is connected as output to show an engine. One Limit switch is connected as a door sensor & another is connected as ignition (both work as inputs to Arduino) and a buzzer is connected as an output to Arduino to indicate an alarm. Two relays are connected to avoid voltage mix-up and to drive motor and buzzer simultaneously.

VI. METHODOLOGY

The car theft system is based on GPS and GSM. The user can change the current mode through SMS. A GPS module is used to collect location of the car in real time. GPS stores the location of the car as in longitude and latitude in the memory of the controller of the system. Microcontroller uses GSM module to send the location of the car to the authorized person's mobile phone. To show the current mode of operation and various operation being performed, a Liquid Crystal Display is used.

VII. EXPERIMENTAL RESULTS

Text SMS 'A1' was sent by user through their mobile phone to system's phone number to switch to Active Mode. We also did performance test by turning on/off the system and constantly switching to active mode. The LCD screen showed 'Active Mode'. After switching to the Active Mode, the limit switch which is used as the door sensor was pushed, then the LCD showed 'SMS Sent' on its screen. The location of the system was received by the user's smartphone. User clicked on the SMS and it opened Google Maps to show the recent location the system. The dc motor's ignition was switched off in Active Mode.

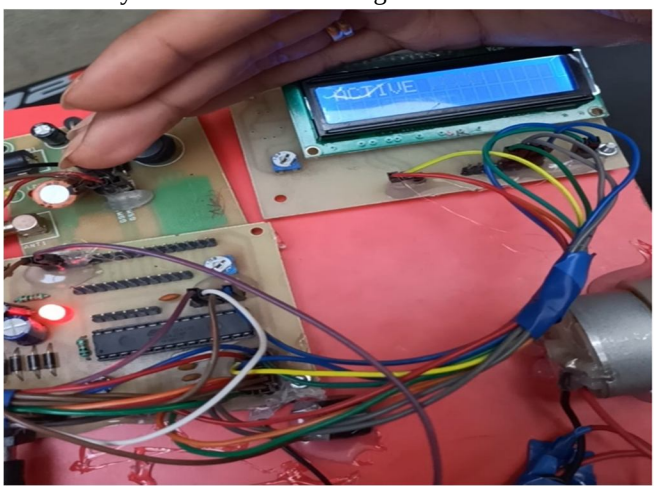
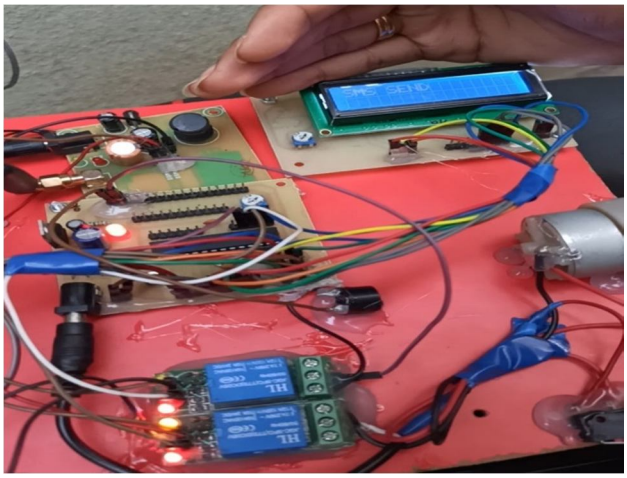


Fig 10. Switched To Active Mode


Fig 11. SMS Sent to user

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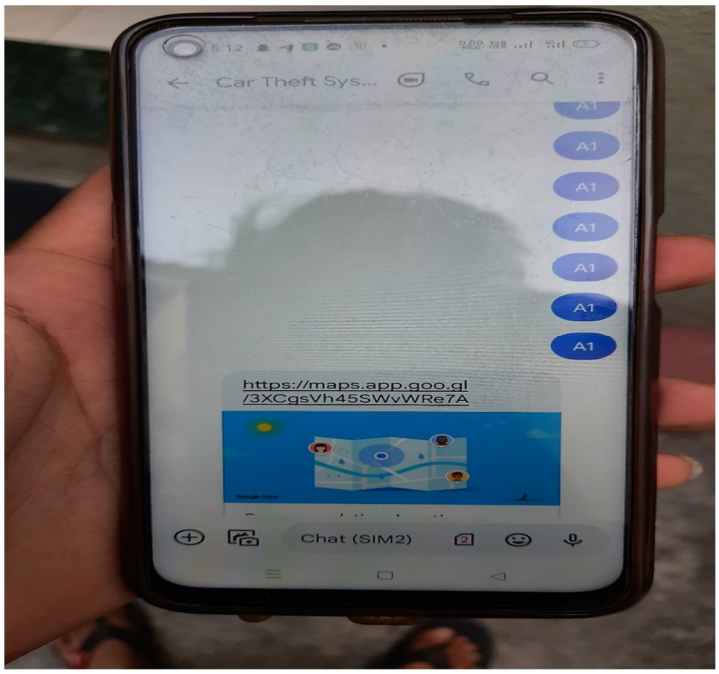


Fig 12. Location SMS

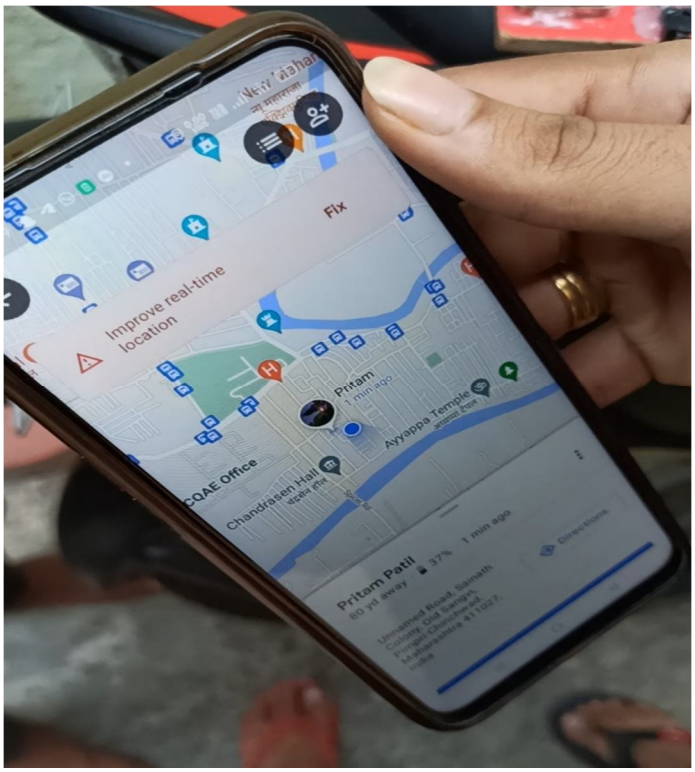


Fig 13. Location of the car on Google Maps

VIII. CONCLUSION

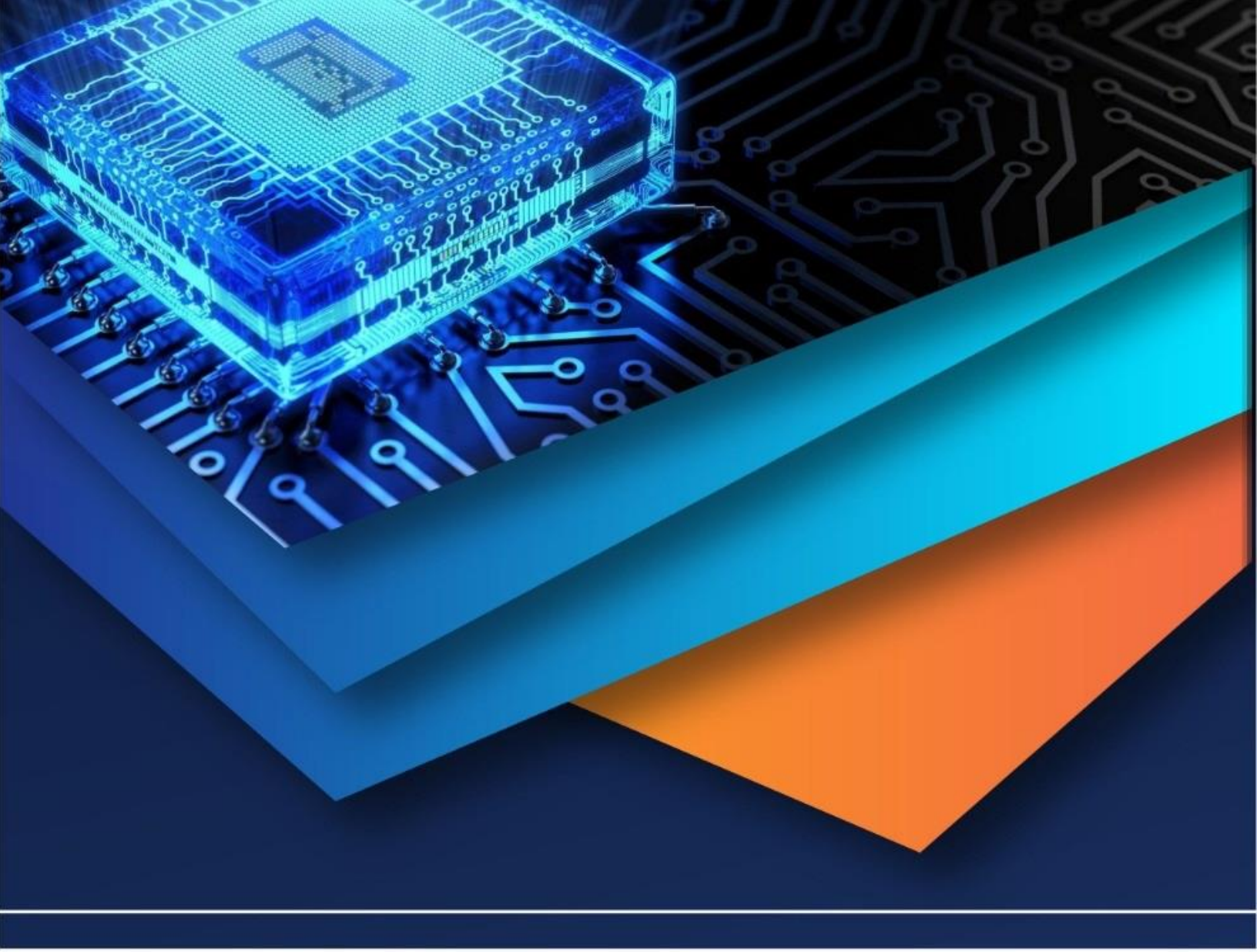
The system has a good performance in terms of theft alert and location providing functions. It is a cost efficient and yet featured anti-car theft system. The system alerts the user about theft in matter of seconds. The accuracy of the location provided to user can vary according to environmental conditions but the error is minimalistic. The system can be further developed into mobile app to increase the user-friendliness. Therefore, the system is low cost and effective in every manner.

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REFERENCES

[1] H Song, S Zhu, and G. Cao, "Svats: A sensor- network based car anti-theft system" IEEE INFOCOM 2008, pp.2128-2136, April.2008.
[2] Shihab A Hameed, Othman Khalifa, et,el "Car monitoring, Altering and Tracking and Tracking model Enhancement with Mobility and Database Facilities," International Conference on Computer and Communication Engineering(ICCCE 2010), pp.1-5, May 2010.
[3] Wei Yuan, " Automatic Tracking System of Cars Based on GPS and GSM," Shanxi Electronics Technology , vol 4, no. 4, pp.28-29, April 2011.
[4] Hiqing Liu, "integration and Application Design of GPS and GSM system," Heilongjiang Science and Technology information, vol 23, no.12, pp.85, Dec 2010.
[5] Tapas Kumar Kundu and Kolin Paul , " Android on Mobile Device: An Energy Perspective ," 2010 10th IEEE international Conference on Computer and Information Technology (CIT 2010), pp.2421 - 2426, Jun 2020.
[6] Heloise Pieterse and Martin S. Oliviver, "Android Botnets on the Rise: Trends and Characteristics," Information Security for South Africa (ISSA), pp. 1-5, Aug, 2012.
[7] Minglun Ren and jia Shu, "design and Realization of GSM- based Car Alarm and Remote Monitor System," Progress of computer Technology and Application in 2006, pp.129-132 July 2006
[8] Le-Tien, Vu Phung – The, "Routing and Tracking System for Mobile Cars in Larger Area," Electronics Design , Test and Application, 2010. DELTA'10. Fifth IEEE international Symposium on , vol. No. pp. 297,300, 13- 15 Jan. 2010
[9] Hu Jian-ming; Li jie; Li Guang-Hui, "Automobile Antitheft System Based on GSM and GPS Module " Intelligent Networks and intelligent System(ICINIS), 2012 fifth International Conference on , vol., no., pp.199,201, 1-3 Nov.2011

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