

Design of a Vehicle Theft Detection System

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ABSTRACT

In this present era Security will plays an important role in the every situation or in everything and it was a big concern at present days. Fingerprint based vehicle theft recognition system provides us the best secure system from different type of theft attacks. Every individual have fingerprints and the prints can be scanned quickly by using proper devices and this uniqueness provides a height security and it was very easy to use, no need to do anything just placing of finger is enough. The proposed system is an attempt to make a highly secure recognition system using fingerprint scanner to identify the person and along with this GPS and GSM has been interfaced to detect the exact vehicle location and send this location to a mobile number using GSM. The main thing we aim at of our vehicle theft detection system is to give the Security to all the vehicles. For vehicles this is the improved security system. The most useful modules like GPS module are highly useful in present era (days), the proposed system allows the owner and user to observe the vehicle location and track the system fitted vehicle and it finds out the every moment of the vehicle.

Keywords – Security via fingerprint,GPS,GSM modules.

I. INTRODUCTION

Now a day's vehicle theft cases are increasing every day. It was difficult to give security to our vehicles when we parked our vehicles. The best way to secure the vehicle from thefts is locking vehicle framework. It is vehicle security system that gives a best to vehicles. This system framework cannot be established to give the full security system and directness to the vehicle. So mainly if we give more security framework it makes the use of an already inserted framework which is going to be focused the GPS and GSM module innovation. In this system we used thumb impression. By using thumb impression we can identify the theft when the thumb is not matched and the owner gets the message by using GSM module and allow only authenticated users. It also user friendly, fast access, fingerprint reorganization technology. Along with GPS and GSM system. This system model of the vehicle security system is made using micro controller which is based on embedded platform that control the all operations. The cost of this is less and it enhances the security. If the attempts to unlock the vehicle using a thumb impression, if it is not matched with the fingerprint which is already saved then it sends a SMS to owner. Thumb impression system is placed at the engine ignition .By using the GPS module technology vehicle tracking is very easy. Thus the our system provide high security at all the level. Initially from the satellite GPS module every time takes the input information and it will keep the latitude and longitude values that are getting in micro controller. If anyone wants to track and see the position of the vehicle, by using GSM module we want to send a message. It will activate by finding the accident on IR sensor, by finding the theft who is connected to the vehicle and parallel GPS module will deactivates. After activating GSM module it will take the positions of vehicle and sends the sms to the particular number already which we have kept. This new technology mainly called the vehicle theft detection and which are created the many useful things in the security of vehicles. This system hardware is assembled in the vehicle in such a way that it was not able to be seen to any person who is in the vehicle or outside the system vehicle. And thus it will be used as a hidden unit which always sends the vehicle location information to the monitoring division. Whenever the vehicle is stolen by the robber, the location information from the tracking system will be used to find the location of the vehicle(system fitted) and can be informed to police for the for taking action. Some of the Vehicle tracking System can able to sense the unauthorized actions of the vehicle and then it will ready.

Objective of the project:- To detect and track the theft vehicle using the GSM module, GPS module, Fingerprint sensor and solenoid pump. In this project by using GSM and GPS we track the vehicle. When the thief try to open the door without using a fingerprint sensor, the car owner will get the message. If he can't get a message with any issue. The car will be stopped less than one kilometer because a solenoid pump is connected between the engine and fuel tank and solenoid pump will not send the fuel to the engine. When the thief start the car by using wrong ignition key

1. 1 Literature Review

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II. RESEARCH GAPS:

1. In Vehicle theft tracking system project proposed by different authors had not been implemented or best use of the finger print sensor has not been implemented. By using this finger print sensor only the authorized person can access the system and unauthorized person cannot access the system.

2. In this project proposed by all authors who have been implemented or investigated, most of them have used voice detection system but by using the voice detection there are many drawbacks like thief can mimicry and sometimes owner voice can change due of his health conditions.

3. In vehicle theft tracking system GSM module and GPS module is used widely but with these finger print sensor has not been interfaced.

4. When comparing to face detection and finger print sensor the cost of face detection is high and efficiency also less.

5. In this Vehicle theft tracking system using finger print sensor project. We are aimed to implement theft tracking device with real time tracking and control by user and by using GSM and GPS modules.

6. Many of the authors has not proposed the prototype that can be used real time like implementing real engine of a vehicle

III. Research methodology

Arduino:-

Arduino is a platform that is open for all and it will be very easy for using and it is the combination of the hardware and the software. For many projects it was like a head. It has able to read the inputs from the sensors connected to it for example light detection, finger placed on something or a message from other services. And then it will collect these inputs and gives output appropriately. Like turning the LED ON and turning on the motor etc., it can read the Analog and the digital inputs but it can give output only in the form of digital. It has the six analog pins and 14 pins of digital and two serial pins (RX and TX). It has microcontroller ATmega328P. And the programming for this IDE is very easy and easy



GSM Module:-



GSM means Global system module is used for communication. A sim card has to be inserted for communication. Messages can be received for defined number using sim card. Time Division Multiple Access method is used for this process. It can communicate mobile, Computer over a network. It can also be connected to the computer through Bluetooth or serial ports. It has the abilities to make a call or send a message and it can delete messages also in the SIM card that are received or send by the GSM.

A sim card is required to activate communication with the networks which contains IMEI number issued for the sim card. GSM module can perform many operations like:

1. Receive , Send or Delete the SMS on SIM .
2. 2. Make , receive or reject the voice call



The GSM modem can be used for communication like messages. To and from the owner. It is a typical type of modem in which contains SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator view

, a GSM modem is like a mobile phone SIM900 is a complete GSM solution in a SMT module this can be execute in a the clients applications. Featuring an industry-standard interface, the SIM900 give GSM 850/900/1800/1900MHz performance for voice, SMS, Data, and Fax in a small form factor and with power consumption is very low. GSM carrier frequencies GSM networks manage in a number of different carrier frequency range separated into GSM frequency ranges for 2G and UMTS frequency bands for 3G with most 2G GSM networks handling in the 900MHZ or 1800 MHz bands .while these bands were previously assigned the 850MHz The transmission power in the handset is permitted to a maximum of 2 watts in GSM 850/900 and 1 watt in GSM 1800/1900.

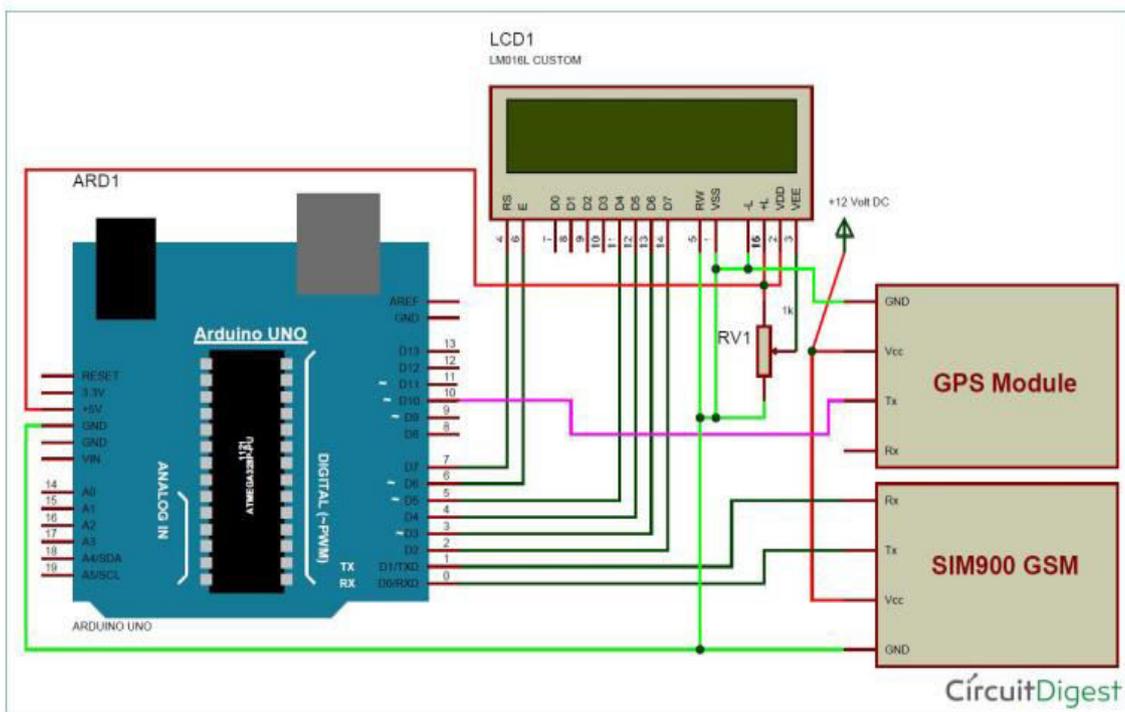
Features of GSM:

- 1 Single supply voltage
- 2 Typical power consumption
- 3 Tri-band
- 4 MT,MO,CB, text and PDU mode,
- 5 SMS storage: SIM card
- 6 Supported SIM card: 1.8V,

The appears the circuit of a GSM and GPS based vehicle detecting system. It is having a LCD, GPS module, GSM modem . GPS module obtain the details of exact location from satellites in the view of latitude and longitude. The micro-controller will process these details and transmits it to the GSM modem. The GSM modem then send the details to the owner’s cellular phone.

GPS Module:-

GPS is used to send the vehicle location and time where this module is fitted. It a satellite navigation system and performs in All sorts of weather conditions. It is connected with min of 4 satellites in the space. It sends the Latitude and Longitude details so that



we can search these details in the Google Maps and get the exact location of it. We can access it freely as US is maintaining. It is used in many fields in medical, military etc. The system should give prioritized capabilities to commercial users and military around the world. It can be available to anyone with a GPS receiver. GPS work in all weather conditions from any where in the



A Global positioning systems receiver should be sealed to the signal of minimum 3 satellites to evaluate the position of 2D (latitude and longitude) and trace movement. Receiver can find the clients 3D position (latitude, longitude and altitude) using fourth satellite . Once the vehicle position has been detected, the GPS unit can govern more details like, speed, time and distance to destination, etc. GPS receiver is used for this research work to detect the vehicle location and give the exact location of information to responsible person or vehicle owner. GPS server can do the checking of the distance of GPS satellite and gps receiver by sending a radio signal to go from the satellite to the receiver is done by GPS server. Exact clocks are used to get precise information, At exactly same time they can generate the code in a very synchronized way.

GPS frequency overview

Band	Frequency
L1	1575.42 MHZ L2
1381.05 MHZ L4	1227.60 MHZ L3
	1379.913 MHZ L5
	1176.45 MHZ

All satellites broadcast at the same two frequencies, 1.57542 GHz (L1 signal) and 1.2276 GHz for the (L2 signal).

The L3signal at a frequency of 1.38105 GHz is used to transmit data from the satellite to ground stations.

The L4 band at 1.379913 GHz is being studied for additional ionospheric correction .

The L5 frequency band at 1.379913 GHz was added in the process of GPS modernization Current applications of GPS

- A) Public safety
- B) Environmental resource agents
- C) Local planning

D) Surveying

E) Recreation

Print Sensor:-

Everyone has an individual finger prints, based on this the finger print sensor works. It reads the finger prints and gives the scanned information to the system and then the system recognizes the scanned print and checks the authorized person. It is used for Mainly security purpose to access something.

The following are the four types of fingerprint sensors:

1.Optical sensor

2.Ultrasound fingerprint sensor

3.Thermal sensor

4.Capacitive or CMOS sensor.

1.This optical sensor scan the fingerprint by using a digital camera

2.Ultrasound fingerprint sensor use capacitor and current to form an image of the fingerprint.

3.Thermal sensors sense the temperature differences on the contact surface, in between fingerprint ridges and valleys.

4.CMOS sensor use capacitor and current to form an image of fingerprint.

Fingerprint sensor has 4 parts

1.Digital Signal Processing

2.LCD

3.fingerprint scanner

4.micro controller

Digital Signal Processing (dsp) It is an IC which analyze the digital signals with accurate and efficient way.

Micro controllers behaves as the controlling unit of the total system. Fingerprint module to take the fingerprint of finger as an input. And finally lcd to display the relevant output or results.

In this project we have used optical finger print sensor and when comparing to the other fingerprint sensors it is less cost and which is connected to Arduino and the Arduino is programmed and it is scanned with fingerprints of owner. If any wrong fingerprint is scanned by fingerprint sensor the owner will get the message and location of the car.

Servo Motor

The servo motor is a very specific way to push or revolve a material. At different angles and speeds, a servo motor may rotate an object. Motor Servo made of a simple engine that runs via a servo mechanism. If the engine uses DC, it is referred to as the DC servo engine and the AC Servo engine. With a small and lightweight weight package, high torque servo motors can be obtained. Despite this, they are used in many sectors such as model vehicles, machines, computer, helicopters, etc. Most hobby servo motors have a weight of kg / cm or 6kg / cm or 12kg / cm. All are expressed in kilogram. It kg / cm shows you how a certain amount your servo motor will carry. For example, when loads are suspended 1 cm from the motor shaft, the more space the lower weight carrying capacity, a 6kg / cm Servo motor should be ready to lift 6 kg. The electrical pulse is positioned in the servo motor location and its circuit is mounted next to generator.

Servo Mechanism It consists of three parts: 1. Controlled device

2. Output sensor

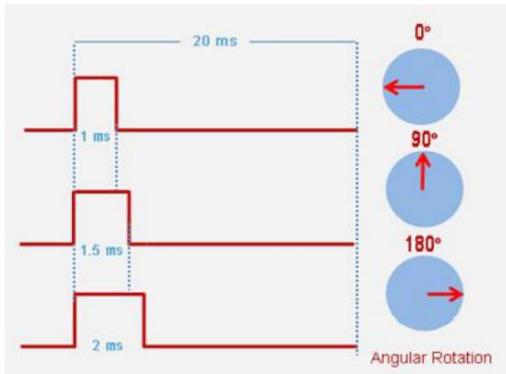
3. Feedback system

It's a device with a closed loop. Where regeneration mechanism is used to monitor rotation and shaft end position. A feedback signal generated when the output is compared with the reference entry controls the device. Output is contrasted with comparison output and the input mechanism thus generates the third signal. And this third signal serves as a computer control feed. This signal is present as long as the feedback signal is produced or the reference input is different. Serve function is mainly responsible for supplying the performance of a given value structure.

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Controlling Servo Motor:

Both engines have three wires at the start. Three of these would be used for input (positive and negative) and one for the signal to be transmitted from the MCU. A PWM (Pulse width Modulation) which is supplied by the control wires can be conveniently operated by 3 servo motor. A low pulse, a strong pulse, a repeat rate are possible. In any side, the servo motor may be neutral to 90 degrees. Each 20 milliseconds (ms) the servo motor requires a pulse to be measured, and hence the heartbeat can decide how fast the motor spins. The pulse of 1.5 ms would, for example, adjust the direction of the motor to 90 ° as if the traveling pulse were shorter than 1.5 ms, the shaft were 0 ° and the servor is longer than 1.5 ms. Servo engine operates on the PWM concept, which is that its rotation angle is regulated by the length of the pulsed in its Control Ring. In general, the servo motor consists of a DC motor operated by a rheostat (potentiometer) and a few transmitting instruments. Gears turn high speed DC motor into torque. The equation between work, force and distance is $WORK=FORCE \times DISTANCE$, here we know that In DC, the force is a minuscule portion and the distance (speed) is large and in Servo, the force is large and the distance is less. The potentiometer is attached to the Servo output shaft to determine the angle and avoid the DC motor at the required angle. The Servo motor is mostly rotated between 0 and 180 degrees with a output range of 210 degrees. This rotational degree is also regulated by adding the appropriate width of the electrical pulse to its control button. In every 20 milliseconds, Servo tests the pulse. The pulse will rotate to 0 degrees by 1 ms (1 millisecond), 1.5ms will

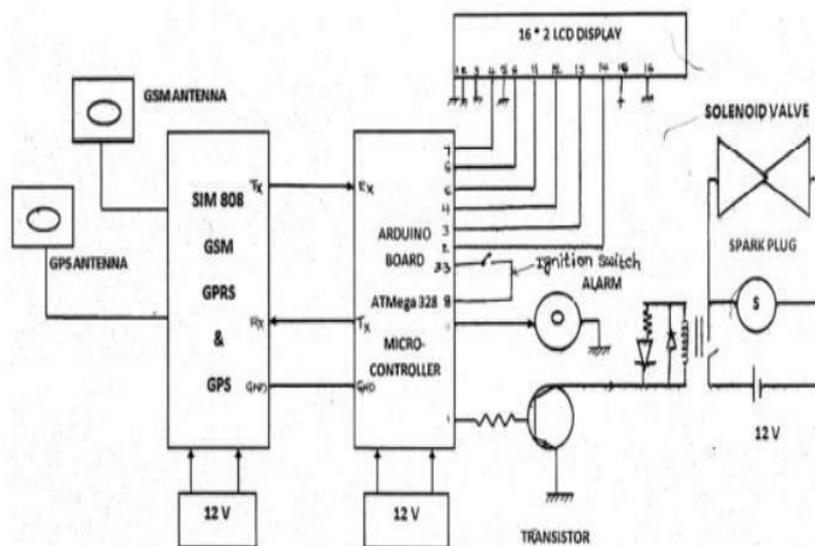


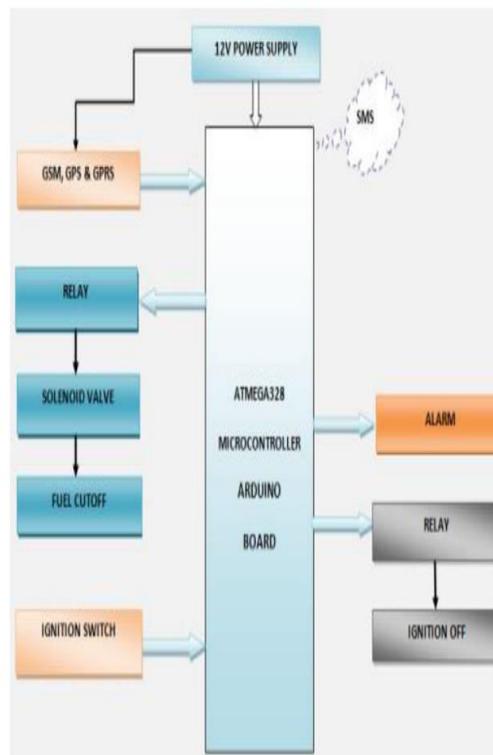
rotate to 90 degrees, and another 2 ms can take to 180. Each servo motor operates directly on your +5V supply boards, But if you plan to use two servo motors, a proper servo shield should be installed, the sum of current motor should be measured carefully.

Description of the project:-

This is one of those Arduino projects. Using this vehicle tracking based system user will get the spot information of the vehicle where it is present on his mobile phone and you can follow it on Google map. To implement this system Arduino Uno will be used as the main processing unit. The total system is controlled by Arduino Uno. mainly this Arduino is interfaced to liquid crystal display(LCD) used to display the longitude and the latitude. Also, it is interfaced to GSM module and GPS module. GSM module is used to send SMS to the registered owner of the vehicle. Once you start the vehicle it will start the sending location details to the owner. By using that SMS we can track the location of the vehicle. Nowadays every smart phone has Google Maps application per-installed. So the message will be opens in the Google Maps app. By using GPS module system it sends the locality of vehicle continuously to the vehicle owner where vehicle is placed. Using the google maps we can watch the places around the vehicle and also we can watch the road on that map which we will open.

Circuit diagram of system





Architectural Diagram of system propose

IV. Scope of the project

Now a days , security has been a major problem for us. So this project makes us easy to detect and track our vehicle if it was lost. This kind of Project need to be used in the tracking cabs and taxis, stolen vehicles and school buses. An automobile airbag system can also be integrated to this system. When the airbags has been opened then our system will send a automatic message to the Ambulance or hospital. So it can save lives when the accident occurs. We can also implement a feature called face detection to open the car door. Now a days humans are searching for their comfort, Why they will place a finger to open the door if it has a facility to detect the faces and unlock the door. Every family needs a vehicle for their transportation needs and this was a big dream for the middle and lower class families, they save money for the vehicle and buys it, hat if someone stoles the vehicle , so spending

thousands for our system is so better than loosing their vehicle. And if we develop and implement this it can get a huge profits to the company also. So the future people will be having a highly secure vehicles. And we can implement internet facility to receive information about the car instead of GSM by using internet. We can also implement alarm facility in the vehicle and we can give information of the vehicle and if the alarm has set to off owner can be informed.

V .CONCLUSION

Vehicle theft detection is a system for tracking theft vehicles by using GSM and GPS. This proposed project is mainly used for security purpose. The main part of this project is using of fingerprint sensor. By using this device we can find our lost vehicle by seeing our phones and we can find through the location send by this device. It sends the immediate information once it is theft to our mobile phone.

To keep our vehicle safe from unknown person. We have designed a project to detects whenever unknown person taking away..In this project ,The way of method is locking system and vehicle tracking is used to track the theft vehicle by using GSM and GPS technology. It will in two modes:

1.Active Mode

2.Sleeping Mode .

When authorized person,it is in sleeping mode. Otherwise Active Mode. Active Mode is main operating mode in this working model.

We have designed project with the help of Arduino .In addition,we have also used different components with that to design a complete project. Arduino Board control all other components with the help of Arduino board program.

The high security can be achieved from this project. Finger print sensor is main functioning operator. Finger print sensor accept the owner finger to get start the vehicle. It is useful in unknown person keep finger to start the vehicle. It is compulsory to finger print to start vehicle. After two or three wrong attempts of finger it will send a message to owner about some unknown person taking your vehicle. Global systems for mobile communications(GSM).Gsm module send message to concerned number .Solenoid pump mediator to pump fuel into engine. Whenever there was wrong finger attempts then it will stop pumping a fuel into engine. This is main functioning of the project do not get start vehicle by unknown person .After detecting a true finger of owner again solenoid pump fuel into the engine to get start vehicle. Global Positioning System tracks the location of vehicle .GPS location display in LCD. It is very comfortable working model to design. Lcd display messages according to working project. Like,display message "Engine stop".In this way vehicle theft can be stopped .The simple design our working model.

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