

# To Design and Implement an Advance Anti-Theft Vehicle Security System using Arduino and Integrated with OTP

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**Abstract:** The use of the vehicle is must for everyone, so it is very essential to save our vehicle against theft. The research paper entitled “Advance Anti-theft Vehicle Security System” is a system which is designed to provide high security in the vehicle. This project is based on Arduino micro-controller with GSM and GPS. The model of existing system to be used is obsolete, where the siren is the only way for alerting the owner which can be easily turned off. The system consists of ATmega328 micro-controller, GSM, GPS, keypad and LCD. GPS can only track the current location of the vehicle and GSM can send and receive the information and commands for micro-controller. If the user fails to enter correct the OTP in three trials, a text message is sent to the owner’s mobile with vehicle location using GPS and by the “JACK” command user can stop his vehicle as the fuel injector of car is deactivated. So that unauthorized person can’t start the vehicle anyhow.

**Keywords:** Global Positioning System (GPS), Global System for Mobile Communications (GSM), microcontroller ATmega328, Liquid Crystal Display (LCD), Keypad.

## I. INTRODUCTION

This research paper presents an automotive localization system using GPS and GSM SMS services. The system permits localization of the automobile and transmitting the position to the owner on his mobile phone as a short message (SMS) at his request. This system is also provided with emergency switch which can be turned off through an SMS. This switch takes the responsibility to turn OFF the engine and can be turned ON only after receiving a predefined password from the owner of the vehicle.

The system can be interconnected with the car alarm system and alert the owner on his mobile phone. This tracking

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system is composed of a GPS receiver, micro-controller and a GSM Modem GPS Receiver gets the location information from satellites in the form of latitude and longitude. The micro-controller processes this information and this processed information is sent to the user/owner using GSM modem. Micro-controller also gets the speed of the vehicle and sends it to the user/owner. The presented application is a low cost solution for automobile position and status, very useful in case of car theft situations, for monitoring adolescent drivers by their parents as well as in car tracking system applications. The proposed solution can be used in other types of application, where the information needed is requested rarely and at the irregular period of time (when requested).

The robbery of the vehicle is increasing day by day so that engineers developed an anti-theft security system for the vehicle in a few previous years.

## II. MATERIALS AND METHODOLOGY

In this research paper, the following are the main components used:-

**Arduino:** The Arduino Pro Mini is a micro-controller board based on Atmega328. It has 14 digital input/output pins, 6 analog inputs, on-board resonator and a reset button holes for mounting pin headers.

**DC Motor:** DC Motors consist of one set of coils, called an armature winding inside another set of coils or set of permanent magnets called the stator. Applying voltage to the coils produces torque in the armature, resulting in motion.

**Servo Motor:** These are electromechanical devices which convert electrical pulses into discrete mechanical movements. They can be used where controlled movement, rotation angle, speed, position & synchronism is required.

**GSM (Global System for Mobile Communication):** It is one of the representative wireless networks which have low-power, low-cost and convenience to use for communication process.

**GPS Tracker (Global Positioning System):** It is used to monitor the position of the object in which the GPS device is fixed.

**PCF 8574 Port Extender:** it is used to expand the ports of Arduino. The "PCF8574" chip is an I2C I/O expander that free some of your Arduino pins by controlling them over I2C. The PCF8574 is directly powered by the 5v rail of your

Arduino and let you control 8 I/O with only two common wires (I2C bus).

When you place the key in door lock, then the System, TURN ON and ask for the password and close the door, then the only door system automatically TURN OFF. When you place the key to start the car, then system again TURN ON and it will ask for an unique OTP (which is sent to the owner's mobile). After starting of the car a notification message will be sent to the owner by the micro-controller through GSM. If you felt theft then you can send a "ASK" message to your anti-theft system. After receiving the "ASK" message by the owner, the system will track the current position of your vehicle and will send to the synced mobile number selected by owner. Now you can control your vehicle by sending several message commands such as "JACK", "TURN ON/OFF" etc...

In case of "NO-SIGNAL" vehicle does not OTP and will normally start till then it will not access any network and once network access then vehicle automatically will be sent an OTP again and jack. Once you have entered OTP and start the vehicle, then you no need to enter the OTP till then you TURN OFF whole system by key in door of the vehicle.

### III. RESULTS AND DISCUSSION

This system protects the vehicle by OTP recognition unlocking method and it provides extremely high security to the vehicle as only owner should have the OTP to unlock the vehicle. In case of any malpractice, the owner can get the current location of his vehicle by GPS can stop his vehicle as required by "JACK" command message sent to the GSM which is installed in the system, activates microcontroller to stop ignition by blocking the fuel and air supply with the help of servo motor.

#### Model of Anti-Theft Vehicle Security System Using Arduino and Integrated With OTP

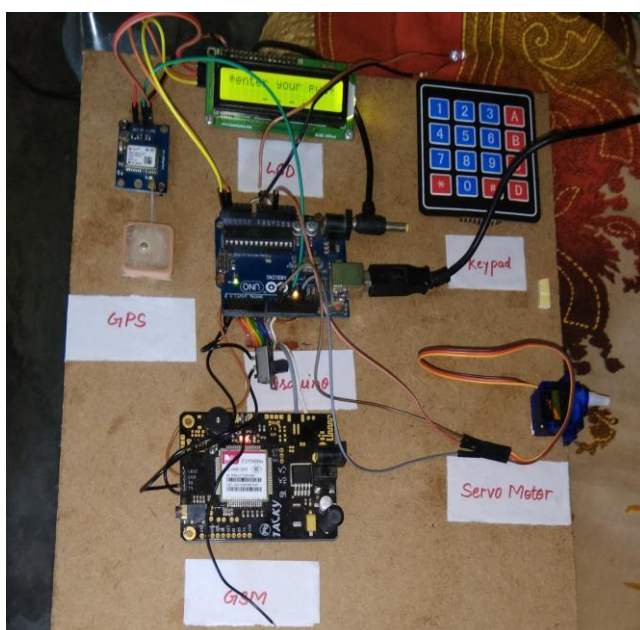


Fig. shows Anti-theft vehicle security system using Arduino

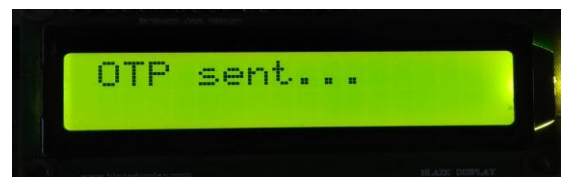
and integrated with OTP.

These are the following steps to require for completing the project:

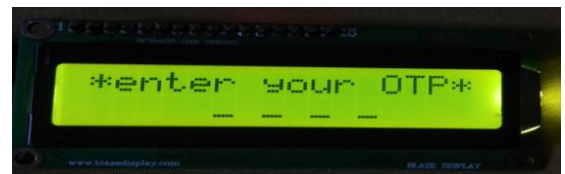
1. Starting of the project will shows "WELCOME TO CAET ETAWAH" on LCD screen.



2. When system has sent OTP, the system notifies you on the LDC screen that the OTP has been sent successfully.



3. After sending the OTP to the owner, now the system asks for the OTP which is showing on the LCD screen.



4. The picture showing the LCD screen that the OTP is entering.



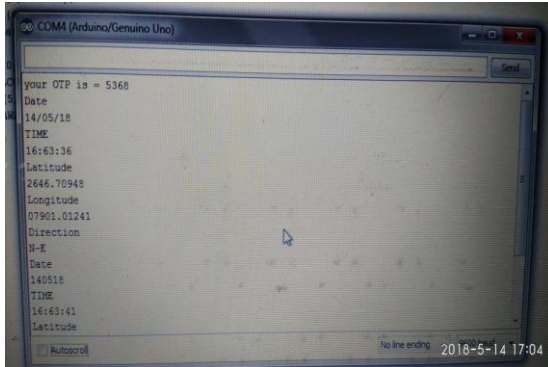
5. If your OTP is correct then the system will unlocked and it shows "MATCHED" on the LCD screen.



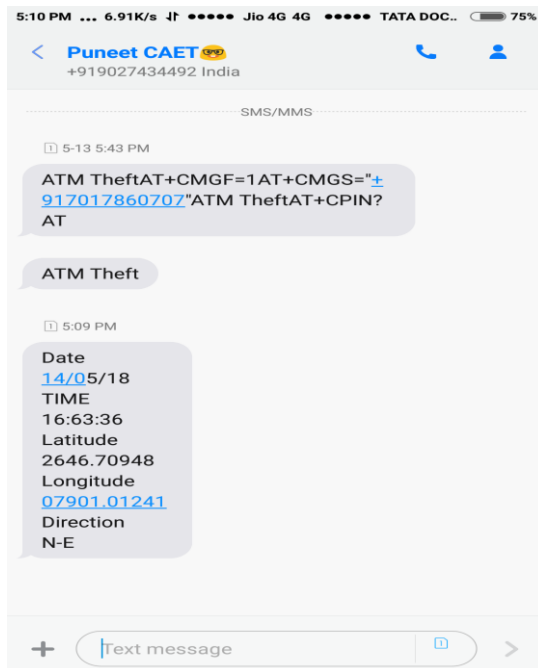
6. If the OTP is not correct then the system will show "SORRY" on LCD screen.



7. Output of serial monitor showing the OTP and GPS location along with date, time and direction.



8. GPS location sent on mobile through SMS.



#### IV. CONCLUSION

By a brief study of all the research papers, we can come to the conclusion that this project is indeed helpful to the common people. Now a day's peoples makes use of CCTV cameras for security of their home or shop but it have disadvantages as it can't inform to owner about theft, also GSM based electronics system are there but in that we can't take the picture of theft. Hence to overcome this disadvantage of existing systems we are implementing this project. In this project we are implementing an anti-theft vehicle security system using Arduino and integrated with OTP to avoid theft.. However as every works have got particular disadvantages, certain defects are also present in these works. So the main aim is to

make a project where the rectification of all the errors is to be done. As, for instance, a GSM module is basically based on queue base techniques, so there occur a particular delay in sending and receiving of the message to the owner.

Sometimes the GPS module also takes time in initializing Geo-location, so by rectifying these demerits a better and more efficient system can be achieved.

#### V. FUTURE ASPECTS:

As we all know, now a days the theft of the vehicle is increasing rapidly in all over the world. This project provides a reliable security system for safeguarding the vehicles It involves the wireless communication for real time monitoring of the vehicle with low power consumption.

- We can control the various functions of vehicle by a mobile application synced to the system installed in the vehicle.
- We can get the information of distance covered in 24 hours by message.
- We can get the information of top speed to which it was driven.

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## VIII. BIOGRAPHIES



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