Anti-Theft Protection System for Vehicles Using Intelligent Sensors, GPS Tracking, and AI-Based Intrusion Detection for Road Safety and Emergency Response

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ABSTRACT

Recently vehicle tracking system is getting vast popularity because of the rising number of the stolen vehicles .Vehicle theft can happen mainly in areas which lacks in security. People have started to use the theft control systems installed in their vehicles. The commercially available antitheft vehicular systems are very expensive. And this project is developed as low cost vehicle theft control scheme using a microcontroller and with usage of GPS and GSM technology along with lock keypad. The system contains ARDUINO board which is the main part . Using this system we can control the vehicle ignition and get the location of the vehicle by sending message to the GSM module. We can also lock and unlock the vehicle by sending a message. If the vehicle seems to be stolen, the owner can stop the vehicle ignition and lock the vehicle by sending message. It is exceptionally straightforward method which provides more security for vehicles with robbery assurance. The simplicity of this work makes it unique.

1. INTRODUCTION

A vehicle tracking system is a device in a vehicle to enable the owner to track the vehicle's location and collecting data in the process. Modern Vehicle Tracking system (VTS) is the technology used to determine the location of a vehicle using different methods like GSM and GPS module and other radio navigation systems operating through satellites and ground based stations. GSM and GPS based vehicle location and tracking system provides effective, real time mapping based vehicle location tracking. By using gps we can get the geographic position from the Global Positioning Satellites. The prevention of the vehicle from probable theft is the main aim of the project. To achieve this we are incorporating security by including lock system. In the beginning the owner of the vehicle must store his/her own password to the system. The GSM modem is used to send and receive messages to and from the owner. The owner's mobile number has to be set fixed during the coding. To start the ignition of the four-wheeler one should enter the authorized password. If anyone enters an unregistered password, the owner will immediately receive a message and the local alarm system will be turned on. For theft prevention, we can also trace the four-wheeler by giving a message to the GSM modem which is embedded on the system. Then real time tracking begins and the GPS location of the vehicle is sent to the owner by SMS. The ignition of the vehicle can also control through message notifications to the system.

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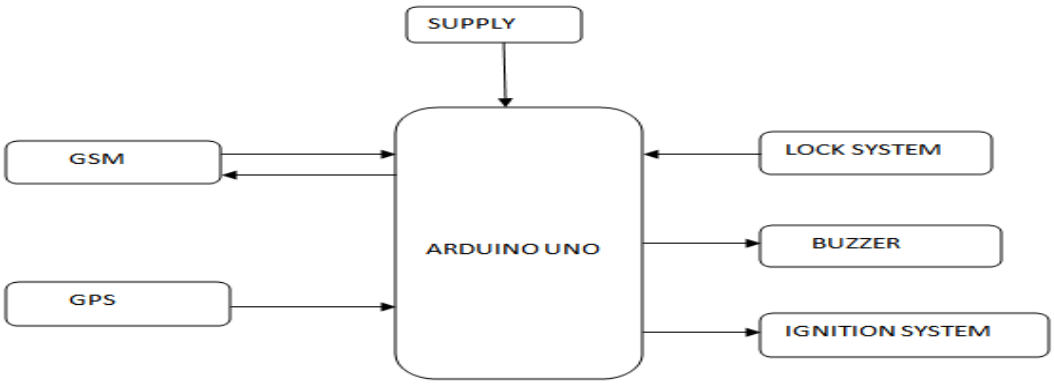
2. MATERIALS AND METHODS

Proposed working

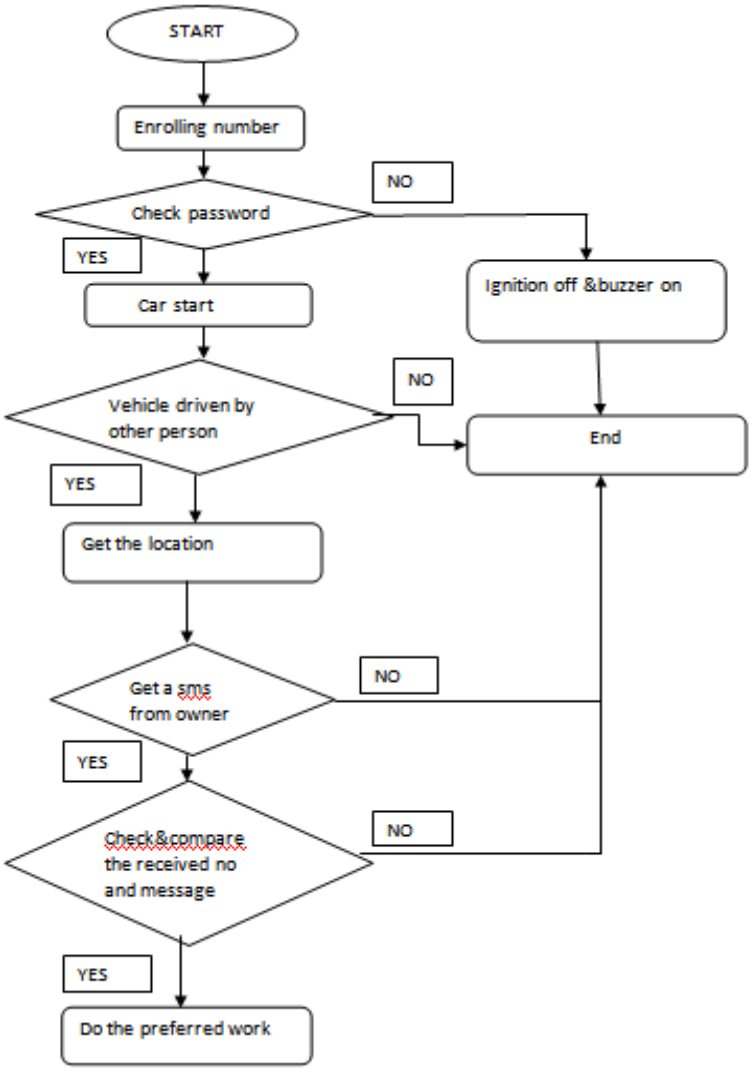
The vehicle tracking system consists of a GPS receiver which provides real time position of the automobile. This real time data is deposited in MMC (Main Memory Module) after a set time of intermission by the MCU (Main Control Unit). GSM module is undoubtedly associated with the MCU which is then used to propel and receive the SMS. GSM module takes the information from the MMC and sends this information to the registered user's mobile cell phone. This data consists of longitude and latitude. By using Google maps we can then locate the exact location of vehicle. The vehicle tracking system also has another singular feature which tells not only the whereabouts of vehicle but also securing the automobile. To know the location of the automobile, it is necessary to stop the automobile as soon as possible. For repossessing the automobile, we are using to convey the message in such a way they are allied to the buzzer and other is associated to the power supply of the engine of automobile. User can simply deactivate the engine of automobile by sending a message from his cell phone and we can get the automobile back very soon.

Here we use number lock system for higher security because fingerprint can easily hacked using new technologies. We save password in the time of coding and when we enter the password the system will compare it with the saved password, if the password is correct the ignition system will turn on. Otherwise the owner gets a message about the vehicle and a buzzer will turn on in the car. In this system we can also control the ignition system of the vehicle and know about the where about of the vehicle with a message sending to the GSM module. We can lock and unlock the whole system using a lock message sending to the GSM module.

Block diagram



Flow chart



Components required

Arduino UNO

The Arduino UNO is an open-source microcontroller board based on the microchip ATmega328P microcontroller. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) via a type B USB cable. It can be powered by a USB cable or by an external 9 volt battery, though it accepts voltages between 7 and 20 volts.

- Operating Voltage: 5 Volts
- Input Voltage: 7 to 20 Volts
- Digital I/O Pins: 14 (of which 6 provide PWM output)
- Analog Input Pins: 6
- DC Current per I/O Pin: 20 m A
- DC Current for 3.3V Pin: 50 m A
- Flash Memory: 32 KB of which 0.5 KB used by boot loader
- SRAM: 2 KB
- EEPROM: 1 KB
- Clock Speed: 16 MHz

GSM-SIM800a

This is dual frequency 900/1800MHz SIM800A based GSM/GPRS Modem. It can be easily interfaced with range of microcontrollers or microcontroller based development boards such as Arduino Uno . It can also be connected with Computer through RS232

- Supply voltage range: 3.4 ~ 4.4V
- Low power consumption
- Operating temperature range: -40 ° C ~ + 85 ° C
- Size: 24 * 24 * 3mm
- Dual frequency 900 / 1800MHz

GY-GPS 6MV2-NEO6M GPS MODULE

- It is a I2C compliant GPS module using serial communication
- Using U center GUI in visualization, as well as using tiny GPS library to extract fine grained results from the module output.
- Voltage range – 33V to 6V
- NEO 6M would be able to handle 5V logic signal coming from arduino

KEYPAD

A **keypad** is a set of buttons arranged in a block or "pad" which bear digits, symbols or alphabetical letters. Pads mostly containing numbers are called a **numeric keypad**. Numeric keypads are found on alphanumeric keyboards and on other devices which require mainly numeric input such as calculators, push-button telephones, vending machines, ATMs, Point of Sale devices, combination locks, and digital door locks.

3. RESULTS AND DISCUSSION

This GSM based vehicle theft control system retrieves vehicle status whether it is in theft mode. This data is fed to the Arduino, which is interfaced to a GSM and GPS module. This project will be very useful to people to keep track of their vehicles. Further, this project can be developed by making an arrangement to stop the ignition of the vehicle by the owner by sending an SMS at anytime. The kit consists of an Arduino UNO, GSM Module and GPS module are interfaced on a single board and is embedded to a vehicle as a control unit. When “STOP” message sent by the owner of the vehicle to the ‘GSM based vehicle theft control system’ then the engine of the vehicle will turn off. Similarly when “START” message sent by the owner of the vehicle ,then vehicle’s engine will turn on .When we send “Lock” the whole system will turn off and system can be turn on by sending "Ulock’’ as a message.

4. CONCLUSION

In this paper we studied and implemented a complete working model using an Arduino Uno. The main purpose of this paper is to prevent vehicle theft. Using the ‘GSM based vehicle theft control system’, one can control his vehicle’s engine by means of an SMS. This functionality is achieved by detecting vehicle status in theft mode and sending a SMS which is generated automatically. This SMS is then sent to the owner of the vehicle .The

owner can sent back the SMS in order to disable the ignition of the vehicle. In this way stolen of vehicles can be reduced to a great extent with the help of this application.

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