

# Anti-Theft System in Electric Vehicle

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**Abstract:-** As electric-powered automobiles are meant to be the destiny of car industries, mean even as there's a question springing up in our thoughts approximately the protection of the automobile & their highly-priced components. Security, especially robbery safety of the vehicle in commonplace parking locations has come to be a be counted of challenge. An efficient EV car safety system is applied for anti-robbery the usage of an embedded machine included with Global Positioning System (GPS) and Global System for Mobile Communication (GSM). This proposed system is a try to design and construct a clever EV anti-robbery machine that uses GPS and GSM technologies to prevent robbery and to track the exact location of the vehicle. If the EV is attempted to transport with the aid of an unauthorized person, it intimates and the GPS device tracks the modern region of an automobile and intimates the region to the registered numbers as a message. GSM gadget is also hooked up in the automobile for sending the data. And a point to feature is that this gadget senses the placement of steeply-priced and critical parts of the Electric vehicle like battery and so on. If there may be an exchange in the role that is, trying to scouse borrow parts, it intimates the proprietor via message. This entire machine is designed to take attention to the low variety of electric vehicles to provide them extreme safety at effective value. Among this, electric vehicle robbery is more predominant and often happens in many elements of the world. There are so many current technologies evolving and brand-new strategies are being upgraded to eradicate this difficulty. The strategies concerned with vehicle theft detection have become aware to every person inclusive of the burglars and they are trying to interrupt the device and steal the automobile. This paper proposes a system offering a mechanism to reduce automobile thefts. The gadget affords safety utilizing sending an alert message by using the Wifi module as quickly as the automobile is stolen or moved without the information of the owner. The system also sends location updates with latitude and longitude values, periodically to the registered user through ESP8266 module. This provision for electric vehicle theft monitoring is furnished by using GPS technology through sending location. GSM module is used to ship an alert message to intimate the owner when the vehicle is being stolen.

**Keywords:-** GSM, GPS Technology, Alert Message, ESP 8266 Module, SMS, Vehicle Tracking System.

## I. PROJECT AND THE WORLD

In current years vehicle theft has come to be a prime difficulty that should be tracked and located. The protection and safety of the automobile are necessary. Even there are many present mechanisms which have got a few limitations and high value and they are less efficient. So, a green security mechanism is essential. This mission tracks electric vehicle theft. PIC Microcontroller is the main element which is used to interface dc motor and GPS, GSM. The location of the vehicle is diagnosed using the Global positioning system (GPS) and Global system mobile communication (GSM) with the assistance of Wi-Fi module ESP 8266. GPS is an area-based navigation machine used to locate the electric vehicle and it offers the area of the robbed device in all critical situations. It gives the range and longitude of the tool using a GPS antenna. GSM is a specialized sort of modem which accepts a SIM card and operates much like a cell phone. It is used to provide data to the owner and alert him with a message having latitude and longitude of the exact location where the vehicle is being stolen. This general system is operated with a switch which is made on when we park the vehicle out. Now if the vehicle robbery befall, the DC motor stops immediately and the above process maintains, and the facts are posted using a net of factors. This vehicle robbery prevention and location tracking system are used in customer's electric vehicle as an anti-theft system and rescue tool. In India in accordance to automobile robbery, housebreaking census from 2019 the vehicle thefts are growing almost forty-seven percentage on a mean, and during such situations, the technology which is used to avoid the theft of the vehicle must also be discovered, and in such cases a Microcontroller based real-time vehicle anti-theft system offers a solution for such troubles. The Global system of mobile communication (GSM) is a very common technology widespread for cell communication. The automobile proprietor makes use of the Subscriber Identity Module (SIM) inserted in his cellular smartphone to send messages to the GSM modem and GPS device which is a part of the electric vehicle theft prevention device that is connected to the vehicle. This device can be used for any automobile like bus, bikes and is noted with high degree of accuracy. The predominant scope of this assignment is to send an alert message to the proprietor of the vehicle whilst the automobile is stolen. This project consists of a GSM modem, GPS module, PIC microcontroller, ESP 8266 Wifi module and a vibration sensor to trace vehicle theft. When somebody tries to scouse borrow the vehicle the microcontroller is interrupted and orders the GSM Modem to send the SMS, the owner receives an SMS that his smartphone that his vehicle is being stolen and also the exact vicinity of the vehicle via GPS gadget. With a message from the proprietor cell, the

exact location of the vehicle can be traced by using Google maps. The vehicle monitoring system's important purpose is to provide security to all motors. This is a stepped forward protection system for cars. The modern-day GPS is incredibly useful nowadays, this system permits the owner to have a look at and music his vehicle and discover vehicle movement and it is beyond the activities of an automobile. This new generation, popularly known as vehicle Anti-Theft systems has created many wonders inside the safety of the electric vehicle. This hardware is geared up onto the vehicle in such way that it isn't always visible to each person who is nearby to the vehicle. Hence, it's far used as an anti-theft unit that continuously or by any interrupt to the machine, sends the area facts to the tracking unit. In today's world where technologies are developing every day and scientific researchers are designing innovative vehicles, the need for vehicle security is also increasing in all regions. At present, a vehicle anti-theft system is a necessity for people around the world. Conventional automobile protection gadget relies upon on many sensors and fee is also high. Our work on this region is present-day and modern.

### 1.1 OBJECTIVES

- The foremost objective of this project is to design, assemble and take a look at a GSM-primarily based automobile anti-robbery machine that can be used to enhance the overall performance of vehicle security machines.
- It additionally guarantees electrical automobile protection at a completely excessive stage but with a completely low price.

### 1.2 EXISTING SYSTEM

The existing systems mostly use components like buzzers, alarms, and biometrics which are not highly efficient. All such commercially available products are expensive in nature. Auto buzzer is good enough to guard the automobile against robbery. But when the automobile is far away from the user, the alarm or buzzer indication may not be that efficient. The reasons due to which electric vehicle safety using alarm is not preferred is because of long-distance, alarm sounds can't be heard, most of the electric vehicles have similar sounds, alarms might get damaged during robbery attempts, alarm sound may not be effective in crowded areas.

### 1.3 PROPOSED SYSTEM

The primary idea in this layout is to introduce cell communications into the embedded device. Internet of things is a superb desire of the verbal exchange to replace the traditional siren because it could be completed and does now not require an awful lot fee. It is proposed that a GSM-based vehicle anti-robbery system improvement is designed and evolved to enhance the overall performance of the present-day automobile safety machine. In the designed machine we can easily speak with our car from everywhere with the assist of GSM and we can command our automobile in line with our need through the message to keep away from stealing of automobile. The proposed approach is used for tracking, locating and navigating the electric vehicle with an accuracy of distance of about ten meters. The exact location of the electric vehicle is displayed in the form of latitude and longitude values which can be traced with the help of Google maps. The gadget detects the location of the electric vehicle and intimates it to the user's smartphone in form of records and also to the PIC microcontroller. The facts that are obtained in the form of latitude and longitude, are used to determine the vehicle's location at the Google maps. Additionally, we can see the output which is displayed on the LCD. An IOT based vehicle theft detection system is presented in this paper. A switch can be used to control the entire mechanism for the user's convenience. The block diagram of the proposed system is shown below in Fig 1.4.

1.4 BLOCK DIAGRAM

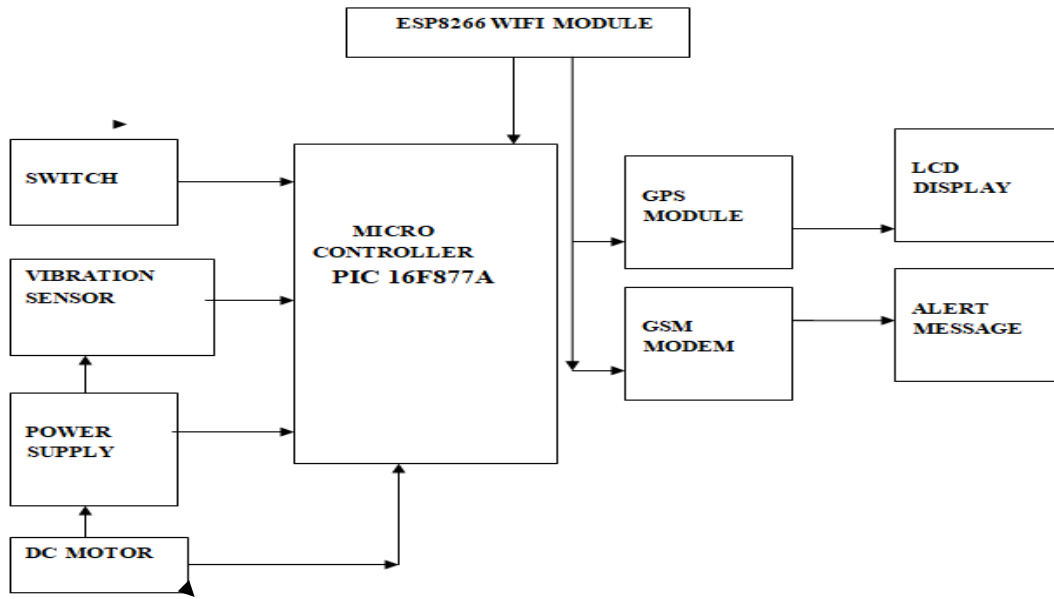


Fig.1.4 Proposed System - Block Diagram

The block diagram depicts the entire view of the proposed system. The essential blocks that are connected in this block diagram are the Microcontroller (16F877A), LCD, ESP8266 Wifi module which consists of GPS and GSM, Power supply, Vibration sensor, and a relay coil that drives the DC motor.

- LCDDISPLAY
- LIGHT EMITTING DIODE (LED)
- VIBRATION SENSOR
- POWERSUPPLY
- ESP8266 MODULE
- GSM MODULE
- GPS MODULE
- DC MOTOR

1.5 SYSTEM DESIGN - COMPONENTS USED

- PIC MICROCONTROLLER(PIC16F877A)

1.6 CIRCUIT DIAGRAM

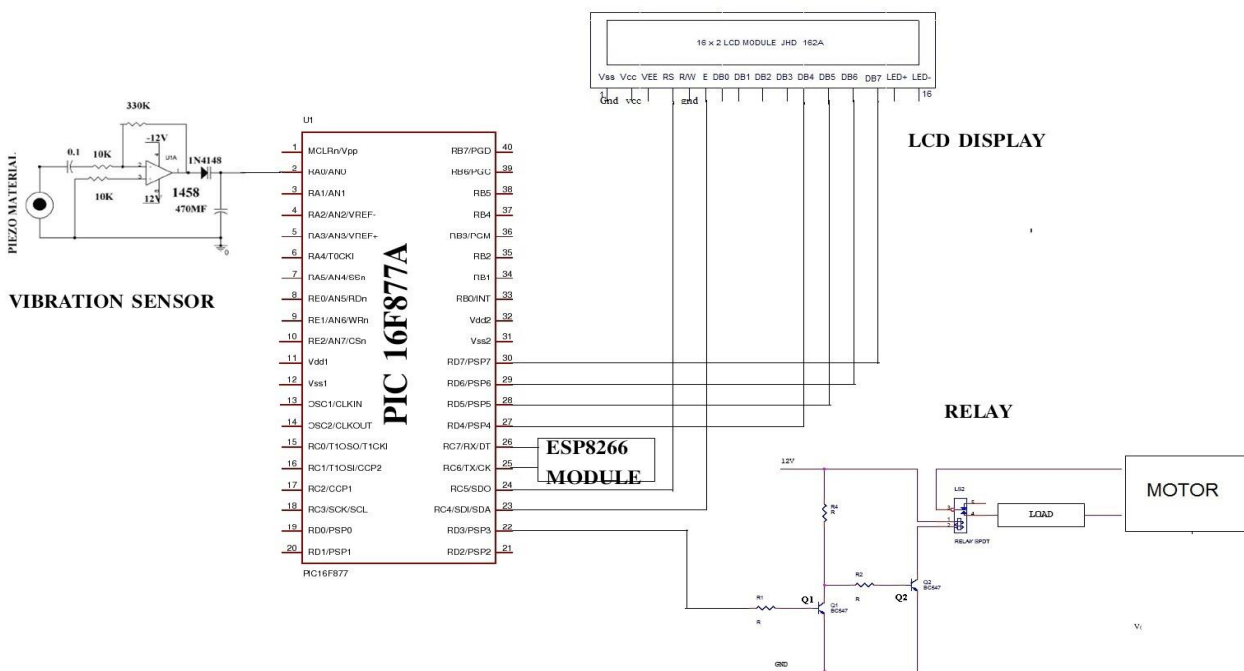
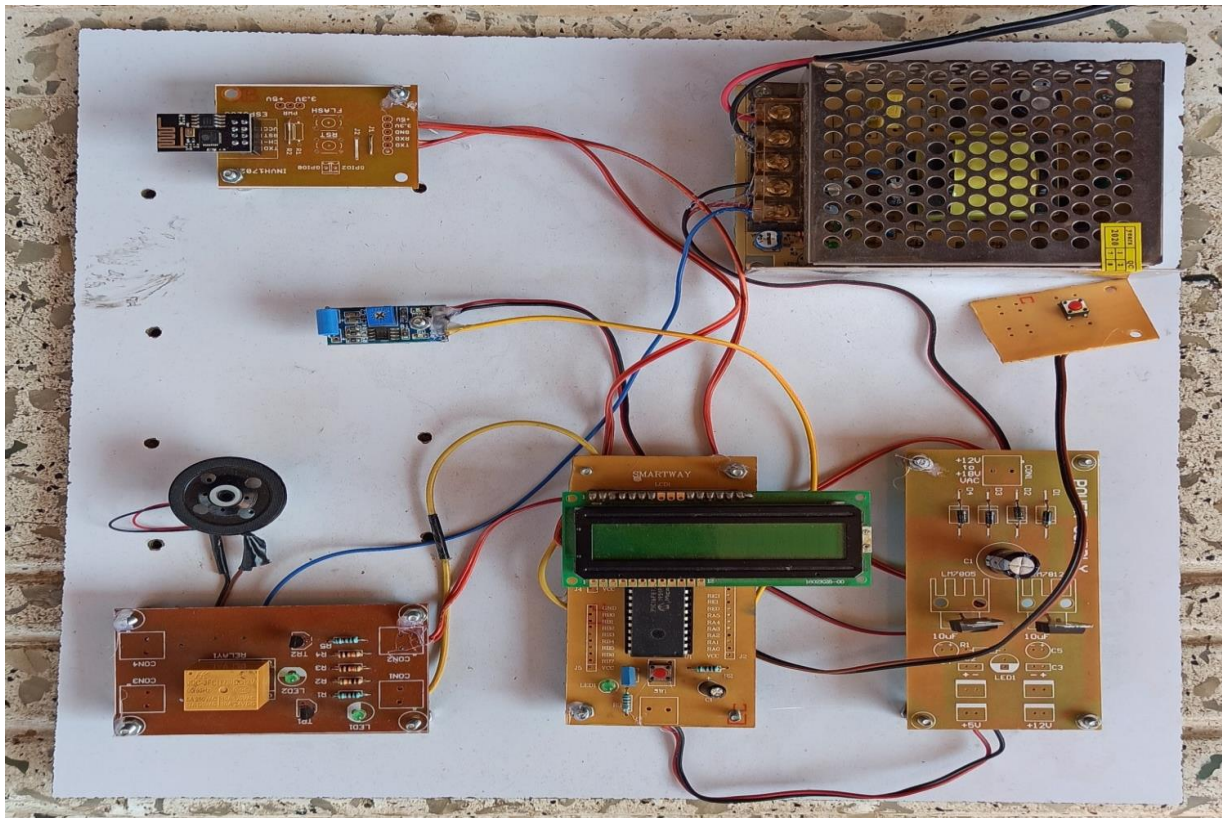


Fig.1.6 Proposed System Circuit Diagram



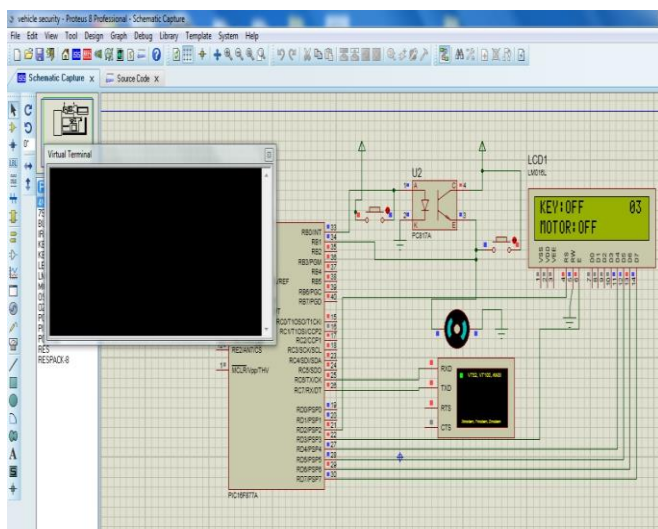
**1.7 HARDWARE SETUP**



**Fig.1.7 Hardware model – Anti-theft system**

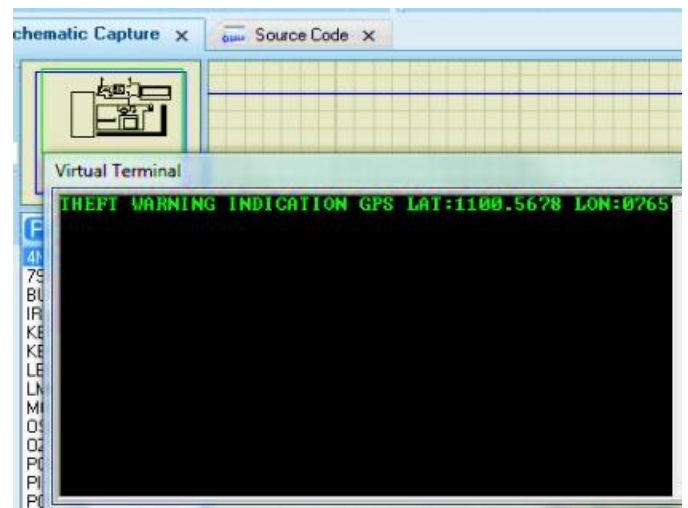
**1.8 PROTEUS SIMULATION**

a) When the key is OFF, the motor does not show any vehicle theft warnings in the virtual terminal as shown in Fig.1.8.1



**Fig.1.8.1. Normal mode of operation**

b) When the key is ON, and when the motor starts running, it shows alert message in the virtual terminal. on the output side as shown in Fig.1.8.2



**Fig.1.8.1. Theft Indication**

**1.9 WORKING OF ANTI THEFT SYSTEM**

In this project, it's proposed to construct an embedded system that is used for detecting and positioning of any electric vehicle with the aid of Global Positioning System (GPS) and Global machine for cellular communication (GSM). In this device, the 16F877A microcontroller is used for interfacing the device to hardware peripherals. Hence a PIC 16F877A microcontroller is interfaced serially to a GSM Modem and GPS Receiver, as serial communication is the mode of communication used here. The GPS modem will constantly supply the statistics that is, the latitude and

longitude denoting the position of the electric vehicle. The GPS module offers many parameters as output, however best the statistics obtained are initiated to the cell at the opposite side from where the location of the vehicle is required. When the request by the user is despatched to the range at the modem, the gadget automatically sends a return to respond to that cell indicating the position of the vehicle in phrases of range and longitude. The project includes a GPS receiver and GSM modem with a microcontroller. The whole gadget is hooked up to the vehicle. In the alternative give up (essential vehicle station) one GSM cell phone is

attached to the pc with vehicle tracking application. Hence the GPS modem will send the longitude and latitude values similar to the place of the vehicle to GSM. The SMS sent will be received via the GSM service provider due to the fact the ESP 8266 Wifi module has a GSM tool with a SIM card. This GSM modem will acquire the SMS and intimate it to the controller in the anti-theft system. The microcontroller will acquire the SMS and examine the command. If everything suits, it will perform the request required from the user.

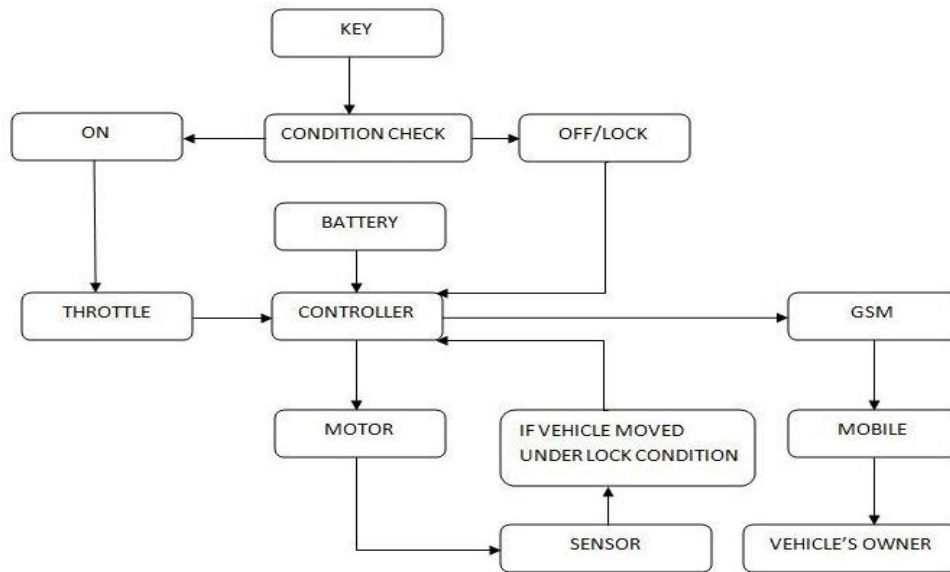


Figure.1.9 Vehicle tracking flowchart

A region call is assumed for each longitude & latitude. The GSM receiver in the automobile workplace gets this information & offers it to the controller through the serial port. The anti-theft system application within the vehicle verifies this information and indicates the exact place of the vehicle on the LCD screen. This device is password handiest capable of function. In case of any mishaps together with theft or impediment, the device will immediately send an alert message to the registered user, this is the wide variety this stored in the memory of the PIC microcontroller (16F877A). When we park the electric vehicle, the anti-theft system should be kept in an active mode with the help of a switch or a key in the proposed device. If all people during danger try to begin the electric vehicle that is already in the lively mode, the voltage in the circuit turns high, which offers a signal to the controller. The microcontroller again sends the signal to the GSM, GPS, vibration sensor and ESP 8266 Wifi module to ship an alert message to the proprietor, and additionally location like Longitude and Latitude is intimated to the user through ESP 8266 module to GSM and GSM sends the message to the proprietor.

First, the microcontroller takes facts from the GPS and then sends the information to the owner in the form of an alert message with the assistance of a GSM module. A GPS receiver that operates on 9600 baud rate is used to receive the notification from space segment (from Satellites), the GPS values of various Satellites are sent to microcontroller 16F877A, in which these are processed and forwarded to GSM. From those values, the microcontroller takes the handiest range and longitude values except for time, altitude, call of the satellite tv for pc, authentication, and so on. The power supply is taken from the supply. The supply voltage is about 220V. The pic microcontroller and DC motor operates at 5v and 12v, for this purpose step down transformer is used to reduce the voltage to 12v. The voltage regulator provided in the circuit regulate the voltage for devices in the PCB board. The 5V DC supply is fed to the motor drive, ESP8266 module, PIC-Microcontroller, LCD display and the vibration sensor. When the switch is ON, the motor starts running and if there is any vibration detected by the vibration sensor, the motor immediately stops running. The piezo material present in the vibration sensor converts the mechanical input into electrical voltage. The vibration detected is indicated in the LCD display and after the motor stops running, a message is sent to the user to track the exact location with the latitude and longitude values. E.G.

LATITUDE: 1758:3479 LONGITUDE: 7843.3089. GSM is a Global gadget for cellular communication in this tool it acts as an alert message receiver and message sender. The electricity is supplied to additives like GSM, GPS, and Micromanage circuitry with the use of a 5V/3.2A battery. GSM calls for 12V, GPS, and microcontroller calls for 5v. With the help of voltage regulators, we alter the electricity among these additives.

## II. CONCLUSION

The simulation model has been evolved from the use of Proteus software and also the vehicle theft manipulates device of the DC motor has been carried out the use of GPS, GSM technologies with PIC16F877A microcontroller. Simulation effects which are demonstrated with the prototype are pleasing. The evolved manipulate and energy circuits function nicely and meet the application requirements. By the use of microcontroller programming, a PIC 16F877A microcontroller are serially interfaced to a GSM Modem and GPS Receiver. A GSM modem is used to ship the placement (Latitude and Longitude) of the electric vehicle from a far-flung location. The GPS modem will constantly provide the statistics, that is the range and longitude indicating the exact location of the vehicle and this technology has executed excessive overall performance, dependable operation, smooth control, and higher protection. Different kinds of sensors along with vibration sensors are used for identifying extraordinary sorts of troubles detected inside the electric vehicle such as robbery. In any of those cases, messages could be routinely sent to the predetermined receiver. A vibration sensor is used for detecting exclusive forms of the trouble identified in the electric vehicle such as robbery. In any of those instances, alert messages can be routinely sent to the intended receiver. Vehicle robbery, even though no longer as intense as offensive actions, causes huge loss to the victims in phrases of capital fee and also in marginal financial repercussions.

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