



Smart Anti-Theft System For Two Wheeler Vehicles

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Abstract: Security of two-wheeled vehicles in public parking lots is now of utmost importance in the current global context. With the aid of the Global Positioning System (GPS) and Global System for Mobile Communication (GSM) technologies, this system implements straightforward and less expensive two-wheeler vehicle tracking. With the use of a smartphone, it is also possible to track any moving object and pinpoint the precise location of a two-wheeled vehicle. The GPS module, GSM modem, and microcontroller are the system's primary components. The GPS technology is used to monitor the two-present wheeler's location. GSM technology is also deployed in two wheeler vehicles because GPS can only receive information about the location of two wheeler vehicles from satellites.

Keywords: Arudino nano, Ignition Key, GPS, GSM, Battery, rf tag , adxl35.

I. INTRODUCTION

The primary goal of a vehicle monitoring system is to ensure the security of all cars. This technique enhances vehicle security. Modern technology, such as the GPS system, is highly helpful and allows the owner to monitor and track the car. This technology aids in tracking vehicle travel and previous activities. In the event of a system interruption, the monitoring device receives location data. In the event that a car is stolen, location data from a tracking system is utilised to locate the vehicle so that police can take appropriate action. By detecting illicit movement of the car, it also warns the owner.

For people to secure their cars against theft, a vehicle security system is essential[1]. If the car crosses a predetermined range that we define in the software, the system will send an alarm message and send location. The technology will take a picture of anyone tampering with the vehicle without authorization. The modem is of the GSM (Global System for Mobile) variety.

Numerous devices, including television, radio, cell phones, radar, and automatic identification systems, utilise radio frequency technology[2]. Radio frequency identification, or RFID, refers to the process of automatically identifying objects using radio frequency signals. RFID is used in car immobiliser systems to prevent theft by uniquely identifying a key with an integrated chip, as well as in mobile speed pass systems to pay for gas without coming into the store.

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Automated systems have less manual labour, are flexible, reliable, and accurate today[3]. Because of this desire, automated control solutions are preferred in all fields. Automated systems are performing well, particularly in the sector of electronics. By including a password at the beginning of the message and sending an OTP to the registered mobile number if the password is entered correctly, we can secure vehicle access here. ignition relay ON unless the vehicle is off. In every other situation, send a live location connection to Google Maps for car theft.

II. LITERATURE REVIEW

According to Pritpalsingh et. al[1], the GPS module, GSM modem, infrared sensors, DTMF decoder IC MT8870DE, 8051 microcontroller, relay switch, vibration sensor, paint spray, and high voltage mesh are all included. The present location of a vehicle is tracked by a GPS system using one of two tracking methods: online tracking or offline tracking. Since GPS systems can only receive information about a car's location from satellites, GSM systems are also installed in vehicles to convey information to the owner of the vehicle. This method automatically alerts one's family members to seek assistance in the event of an accident.

In order to develop the system, Shakir M. Ahmed et al. [2] used an Arduino microcontroller, vibration sensor, GSM SIM 800L module, and Bluetooth HC-05. The vibration sensor's function was to detect vibrations brought on by the running



of the car engine. The alarm whistle turns "ON" and a message is transmitted via the GSM unit when a vibration is detected, alerting the car's owner. When a car owner wishes to operate his or her vehicle, he or she must input a secret code into the 4-keypad and transmit a precise instruction over Bluetooth from a smart phone in order to turn the engine "ON." In order to make the system more dependable and safe, when a burglar tries to enter the password more than twice, the alarm will turn "ON" and all cases will appear on the screen of special software.

M. Poushya et al. [3] proposed a system outlining a mechanism to reduce car thefts. When the car is stolen or moved without the owner's consent, it sends an alarm message, which increases security. Through the internet of things, the system also provides recurring location updates to the registered user. With the help of location-based services, GPS technology offers this feature for tracing stolen vehicles. An alert message to the owner is sent using GSM technology when the vehicle is started.

In this research, M. Mohammad Azharuddin et al [4] study ways to prevent this form of theft and increase vehicle security. The implemented system consists of a single-board embedded system that includes a microcontroller put in the car as well as GSM and GPS capabilities. The system is able to track the object and deliver the most recent information about ongoing excursions thanks to the use of GSM and GPS technology. In comparison to other systems, the one that has been implemented is very straightforward, provides higher car anti-theft protection, and is also less expensive.

According to Utkarsh et al., [5] the safety and protection of the vehicle are essential. In addition, each present system, even if there are multiple, has disadvantages and costs money. So it is necessary to have a strong protection structure. Detecting auto theft is the goal of this research. The GPS and DC motor are connected by the GSM function. A vehicle's location was determined using the wireless ESP 8266 module, GPS, and GSM connection. Being a satellite-based navigation system, a GPS gadget provides the latitude and longitude of a location, allowing it to pinpoint a car accurately in any weather.

A strategy to increase safety and lessen the likelihood of car theft was suggested by Deepali Virmani et. al. [6]. This provides a clever mobile phone-based anti-theft solution for vehicles. It relates to mobile phone-based Short Messaging System engine control (SMS). The system's goal is to enable communication between the driver and the car so that the driver can operate the engine remotely.

By utilising sensors and a camera attached to a Raspberry Pi, Ahmed Nagy et al. [7] introduced in smart automobiles. The location of the vehicle is determined using GPS and GSM/GPRS [10] modules, which transfer the information to the owner's phone via the IoT system. This system's major goals are to prevent theft and create a connection between the car and its owner. The security system will notify the owner and provide the position of the vehicle if anyone tries to start the car other than the owner. Additionally, the system will lock the car and off the electricity. The technology introduced by this concept is effective, easy to use, and reasonably priced.

Limitations

- Remote Keyless System (RKS) could use the hopping code method for increased security.
- Currently, only the SMS feature is accessible, but we may add the Call feature for simplicity of use.
- A single seven segment display might be utilised to show the position of the gear using a Hall Effect sensor.
- Include the growth of Android applications for the programme for automobile owners, system durability testing, and long-term evaluation.
- Longer range coverage, better mobile application design, and battery consumption optimization are the main focuses of sensor design optimization.

III. PROPOSED METHODOLOGY

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IV. RECOMMENDED METHODOLOGY

Vehicle thefts have become a major problem in the auto industry, with alarmingly high rates. The security systems firms offer exhibit misleading warning rates with high costs and are readily disabling, and the automotive manufacturers are



unable to match the requirements and security aims of the people. Therefore, we have created a design and implementation of a security technology that is totally platform-independent and accessible through any mobile phones, computers, tablets, etc. system in this paper.

METHODOLOGY

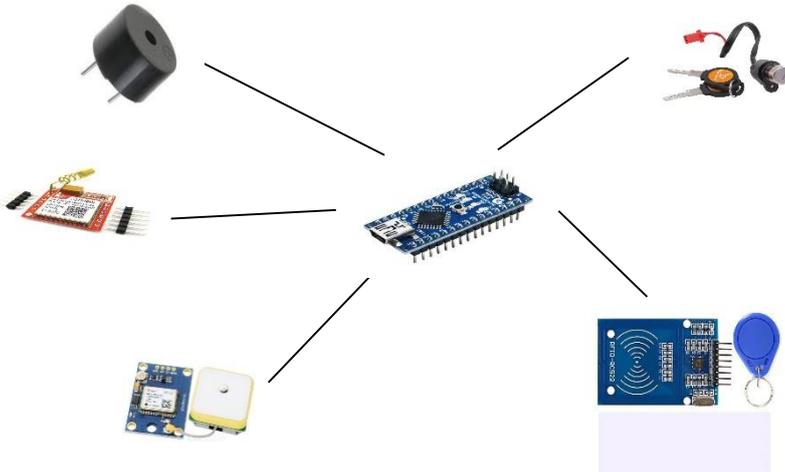


Fig 1. Working process

The following components will be used in the device's implementation: a battery, an arduino nano, an adxl35, a GSM module, and a GPS. The device will be equipped with all of these components.

When the security switch is turned on, the ignition relay is wired to the key wire and uses an RF tag reader to determine if the user is authenticated or not. The block diagram below shows components.

Think about the IOT-based smart anti-theft components for vehicles. The Arduino Nano functions as a microcontroller and is linked to many devices, including the SIM800L, GPS antenna, buzzer, RF tag reader, and ignition relay. First, we must determine whether the user is authenticated. When the RFID tag is placed, it specifies the user's authentication, and the ignition key should be on. Once the user has been verified, the security switch will turn on and the GPS will be processed to determine the current location of the stolen car. Other keywords are used to optimise the battery voltage, turn on the buzzer, and determine the ignition state.

A. Hardware and Software

A variety of analogue and digital I/O pins are available on Arduino circuit boards, allowing you to connect various circuits and expansion boards. In order to control a large current using a low current signal, a 5 volt relay is a type of automatic switch that is frequently used in automatic control circuits. A small cell module known as the SIM800L supports GPRS transmission, SMS sending and receiving, and voice call making and receiving. With a maximum data rate of 10 Mbps, the reader may interface with a microcontroller using a 4-pin SPI connector. Additionally, it supports serial and I2C protocols for communication. The battery has a 3.6v voltage and a capacity between 2600mAh and 3500mAh.

An open source programme called Arduino Studio is used to upload code to Arduino Boards. The Integrated development environment application works with various operating systems, including Windows, Linux, and Mac OS X. C and C++ are supported programming languages. Sketching is a common term for writing a programme or other document in the Arduino IDE. To upload the sketch created in the Arduino IDE software, we must connect the Genuino and Arduino board with the IDE.



IV. EXPERIMENTAL RESULT AND DISCUSSION

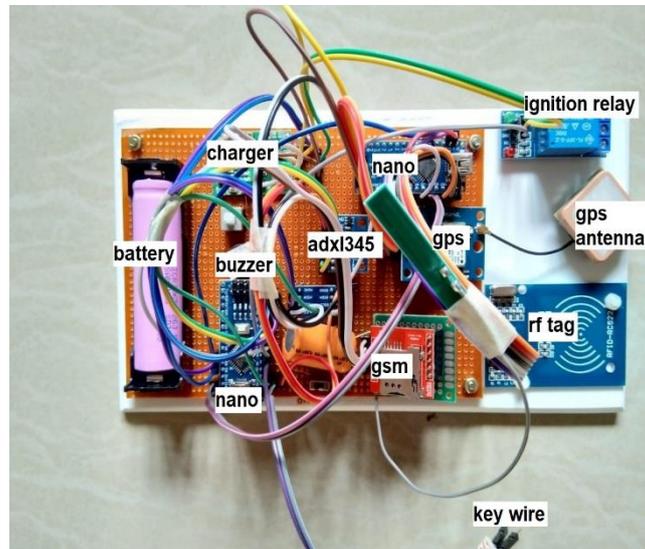


Fig 2. Components used in Arduino Nano

The components used in the smart anti-theft for automobiles utilising IOT illustrate in Fig. 2 how they connect to the other components. Each component has its own functionality, and based on those functionalities, it outputs the outcome via messages. The RF tag reader verifies user authentication before moving on to the next step if the user is legitimate. It will transmit a message identifying the location of the car after authenticating the prototype.

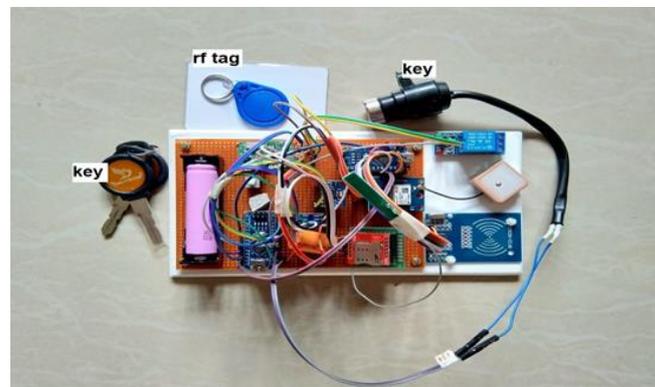


Fig 3. User Authentication Process

Before examining the Fig. 3 user authentication The device state must first be on before both the Master and Slave switches can be turned on. When the master switch is on and the slave switch is off, the battery optimization device will begin charging. The battery connection wire should also be disconnected.

V. CONCLUSION

The anti-theft security system for autos has undergone a slight improvement. In this work, additional functions are shown, including the ability to dial an emergency number and halt the vehicle from the registered mobile number when it is stolen. As a result, this enhances the vehicle's accessibility and safety. The growing infrastructure actually allows for the usage of connected devices or the Internet of things in transportation. The system has a combined GPS and GSM module that uses the GPS antenna installed in the vehicle to track the location of the vehicle. Because mobile network providers uphold security standards, the network is very secure, which makes the system ideal for the market because it is less expensive than Accessible alternative anti-theft systems It is also simple to use because it includes tracking and theft protection in addition to a simple SMS command to "Stop" the vehicle. Additional uses for this technology include vehicle control and condition monitoring.



Only the message feature is offered. Future versions of this could incorporate a call feature to increase vehicle security. The GSM module can be interfaced with a microphone to enable voice communication with the owner during stealing activities.

A modified version of this security system could work as an integrated data security system. It would make sure that all data shared within and outside of the car is secure.

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