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Ateya Anveshanam – Vehicle Crook Discoverer

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ABSTRACT

In this current world where technology is growing up day by day and scientific researchers are presenting new era of discoveries, the need for security is also increasing in all areas. At present, the vehicle usage is basic necessity for everyone. Simultaneously, protecting the vehicle against theft is also very important. Traditional vehicle security system depends on many sensors and cost is also high. When the vehicle is stolen, no more response or alternative could be available to help the owner of the vehicle to find it back. The main goal of this paper is to protect the vehicle from any unauthorized access, using fast, easy-to-use, clear, reliable and economical fingerprint recognition technique. This vehicle security system intimates the status of the vehicle to the authoritative person (owner) using cloud-based communication technology. If the person is certified, vehicle access is allowed. Else alert will be sent to the owner and the engine will be immobilized. The prototype model for the security system is built on the embedded platform using AVR Microcontroller which controls all the processes and cost is also very stumpy. On higher end theft attempts like cutting battery power supply, protection to the vehicle is provided by Engine Control Unit (ECU) embedded on microcontroller. By using GPS technology, vehicle can be identified very easily. Thus, the system provides security at both levels, i.e. when battery supply is provided or not.

Keywords: Microcontroller Unit (MCU); bio metric authentication Penalty generation; Engine Control Unit; Global Positioning System (GPS); Anti-theft mechanisms.

I. INTRODUCTION

Vehicle Security System is based on GPS and IOT technology. It is a classic example of wireless communications. The wireless communications industry is one of the fastest growing industries. Over the past few years, there has been an explosive increase in the theft of vehicles. With the help of study of GPS and IOT technology. From Times of India, we found that vehicles are been stolen in India in every 23 minutes. So, crime branch and national bureau of crime has brought the theft intimation format in year 2001. But it was based on only buzzers. Now with the help of GPS and IOT technology, theft can be

prevented at a high security based system. There is no problem when your vehicle is in your vicinity. By using the detection of theft using vehicle buzzer it's easy to protect your vehicle from getting theft. But when your car is far away from you the buzzer detection might not be that beneficial. Here more efficient protection method is required to protect your vehicle. This is the reason for creation of Vehicle Security system. This system uses GPS and IOT technology. It provides the optimum level of safety to your vehicle when it's not in your vicinity. By using Vehicle Security, you can protect your vehicle positioned miles away from you. As system uses IOT technology so, just by sending a alert so you can control the ignition system of your vehicle.so it is more easier way to protect your vehicle from getting theft.

1.1 Existing System

Mostly used systems are beepers, alarms, and biometrics. But, all these commercially available products are very high-priced. By using the car buzzer it's easy to protect your vehicle from getting theft. But when your car is far away from you the buzzer or alarm detection might not be that beneficial. Car alarm techniques are used to prevent the car theft with the help of different type of sensors like pressure, tilt and shock & door sensors. These systems however bear some limitations such as high cost, high false alarm rate, and easy to be disabled. In order to solve these problem recent advancements in computer hardware and software have enabled automobile industry to develop affordable automated biometrics-based identification and verification systems. Many biometrics, including face detection, facial features, hand geometry, handwriting and voice have been used for the identification and verification of individuals. But biometric has its own disadvantages such as the systems are not 100% accurate, they require integration and/or additional hardware and cannot be reset once compromised, you can always change your password if somebody learns it, but there's no way to modify your iris, retina or fingerprint. Once somebody has a working copy of these, there's not much you can do to stay safe, other than switching to passwords or using another finger. Some of the reasons due to which vehicle protection using alarm is limited like due to longer distance (range), siren cannot be heard, most of the cars have similar sounds, and physically, alarms can be disabled on theft attempts, alarm sound can be mitigated in crowded areas.

1.2 Proposed System

This paper presents an IOT based vehicle theft detection system. As there are many systems used till date to detect the robbed vehicle, proposed system overcomes most of the limitations of existing systems and methods. In this mechanism as soon as the dc motor starts i.e., vehicle theft occurs, Arduino activates GPS, GSM and sends an alert message to the owner and the longitude and latitude readings of vehicle are posted using internet of things with the help of Wi-Fi module. The entire mechanism can be operated with a switch for user convenience. Advantages of Proposed System Prevents the unauthorized person from stealing the vehicle. Helps in tracking the vehicle. Detection and notification with remotely locking the engine mainly aims to reduce vehicle theft to a great extent.

II. METHODOLOGY

Biometric fingerprint technology can be used in vehicle theft detection to provide an additional layer of security. Fingerprint recognition is a popular biometric technology that uses a person's unique fingerprints to verify their identity.

- **Enrollment:** The first step is to enroll authorized users in the system. This involves capturing their fingerprints using a fingerprint scanner and storing them in a secure database.
- **Authentication Process:** When an authorized user attempts to access the vehicle, the system prompts

them to provide their fingerprint. The fingerprint scanner captures the user's fingerprint and compares it to the stored fingerprints in the database.

- **Verification:** The system verifies the user's identity by checking if the captured fingerprint matches the stored fingerprint. If the fingerprints match, the user is authenticated and granted access to the vehicle.

Fuel level monitoring is an important aspect of vehicle theft detection as it can provide information about the location of the stolen vehicle and help recover it. Here is a general methodology for implementing fuel level monitoring in vehicle theft detection:

- **Fuel Level Sensors:** The first step is to install fuel level sensors in the vehicle's fuel tank. These sensors can be ultrasonic, capacitive, or resistive sensors that measure the fuel level in the tank.

- **Fuel Consumption Analysis:** The fuel level monitoring system continuously analyzes the fuel consumption pattern of the vehicle. If there is a sudden change in fuel consumption, it may indicate that the vehicle has been stolen and is being driven by an unauthorized person.

- **Real-time Monitoring:** The system provides real-time monitoring of the fuel level in the tank. If the fuel level drops suddenly or goes below a pre-set threshold, the system can send an alert to the owner's phone or the central station.

RFID card swapping by the police, whether authorized or unauthorized, can potentially compromise the security of the vehicle theft detection system. However, it is important to note that police officers may have legitimate reasons for accessing a vehicle without the owner's presence, such as during an emergency or investigation. Here are some considerations for preventing unauthorized RFID card swapping by the police in vehicle theft detection:

- **Authorization:** The vehicle owner can authorize specific police officers or departments to access the vehicle using RFID cards/tags. This can be done by enrolling the authorized officers in the system's database and providing them with RFID cards/tags with unique identifiers.

- **Notification:** The system can notify the owner or monitoring station when an authorized police officer accesses the vehicle. This can help prevent misunderstandings and improve transparency.

This paper also proposes a GPS based vehicle tracking system that tracks the vehicle and sends the tracking data over through a SMS. The microcontroller acts as the controlling head of the system. When the system goes in Theft mode the owner gets the alert message. The system includes a GPS modem that tracks the vehicle location in the form of latitude and longitude. This location can be accessed via SMS that is being sent to the owner.

Android Based Smart door locking system is designed to prevent unauthorized access. Owner can control the door through the android application.

Ignition controller technology uses an Android app to control the vehicle's ignition system. The app communicates with the vehicle's hardware, which then sends commands to the ignition system. The app can also be programmed to send alerts to the owner's smartphone if the ignition is turned on or off without authorization.

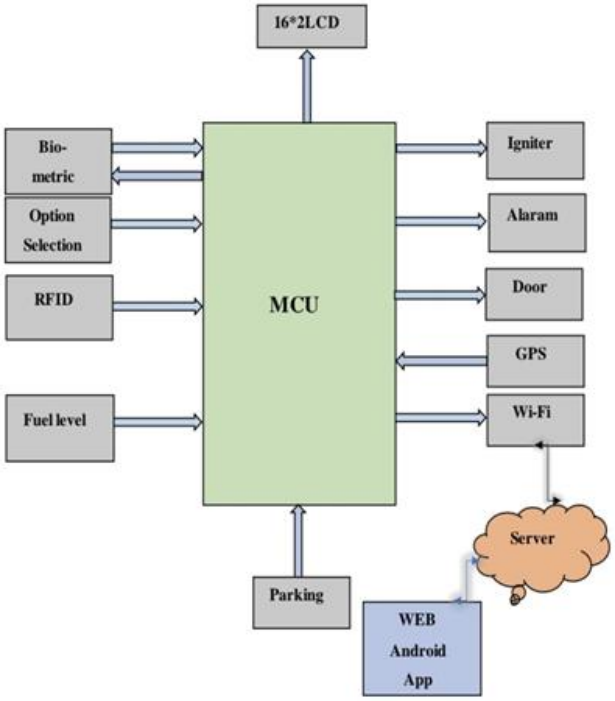

Figure 1: Block Diagram

III. WORKING PRINCIPLE

Biometric fingerprint technology uses a scanner to capture the unique fingerprint pattern of an individual. The scanner uses optical or capacitive sensors to capture the fingerprint, which is then converted into a digital image. The image is analysed by software to extract unique features, such as ridge endings, bifurcations, and other minutiae. The extracted features are then stored in a database, along with other information such as the user's name, address.

When a user attempts to access the vehicle, the scanner captures their fingerprint, and the software compares it to the stored database of authorized users. If the fingerprint matches, the software grants access to the vehicle. If the fingerprint does not match or is not recognized, access is denied.

Fuel level monitoring technology uses a sensor, the sensor sends fuel level data to the software, which then analyses the data to determine whether the fuel level has changed significantly. If the fuel level drops significantly, the software sends an alert to the owner's smartphone, indicating that fuel may have been stolen or leaked.

GPS tracking technology uses a GPS device installed in the vehicle to provide real-time location data. The location data is sent to the software, which then analyses the data to determine the vehicle's current location and route.

The software can also be programmed to set up geofencing, which sends an alert to the owner's smartphone if the vehicle moves out of a designated area.

Ignition controller technology uses an Android app to control the vehicle's ignition system. The app communicates with the vehicle's hardware, which then sends commands to the ignition system. The app can also be programmed to send alerts to the owner's smartphone if the ignition is turned on or off without authorization.

The app can also be used to remotely start or stop the engine, lock or unlock doors, or activate other security features. This technology provides an added layer of security and control, allowing the owner to monitor and control the vehicle remotely.

IV. RESULTS AND DISCUSSION

Figure 2: Working Prototype

Biometric authentication is technology that uses physical, behavioral characteristics to identify and verify an individual's identity. In context of vehicle theft detection, biometric authentication can be used to ensure that only authorized individuals are able to access and operate a vehicle.

Controlling the door open and close of a vehicle remotely is a potential application of vehicle theft detection technology. This involves the use of remote-control systems that allow authorized individuals to lock and unlock the doors of a vehicle from a remote location. When a vehicle equipped with this technology is parked and secured, the owner or authorized personnel can use a mobile app or remote control device to remotely lock or unlock the doors. This allows them to control who has access to the vehicle and can prevent unauthorized access or theft.

Figure 3: Biometric Based Authentication

When a vehicle is parked in a no parking area, it is in violation of local parking regulations and can result in fines or other penalties. No parking areas may include designated fire lanes, loading zones, handicap parking spots, or other restricted areas.

Vehicle theft detection technology can be used to detect when a vehicle is parked in a no parking area and alert the owner or authorities to the violation. This can be accomplished using GPS tracking and geofencing technology, which allows the vehicle's location to be monitored in real-time and alerts to be sent when it enters or exits a designated area.

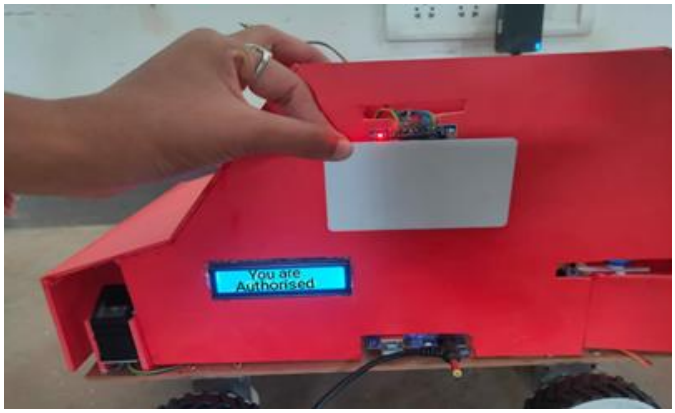

Figure 4: Authorized RFID Card

Fuel theft from vehicles is a common problem, and detecting and preventing fuel theft is an important application of vehicle theft detection technology. Fuel theft can occur in several ways, including siphoning fuel from the tank, drilling holes in the tank, or stealing the entire tank.

Fuel theft detection technology can be used to detect when fuel is being stolen from a vehicle and alert the owner or authorities to the theft. This can be accomplished using fuel sensors that monitor the level of fuel in the tank and alert the owner or authorities when it drops below a certain level or changes rapidly.

Figure 5: Fuel Theft Detection

Alert notifications or SMS messages are commonly used in vehicle theft detection systems to notify the owner or authorities when a theft is detected or a violation occurs. These notifications can be sent in real-time to the owner's mobile device or other designated contacts, allowing them to take the immediate action.

When a theft or violation occurs, the vehicle theft detection system will typically send an alert notification or SMS message to the designated contacts. This alert message can include information about the location of the vehicle, the type of violation, and any other relevant details.

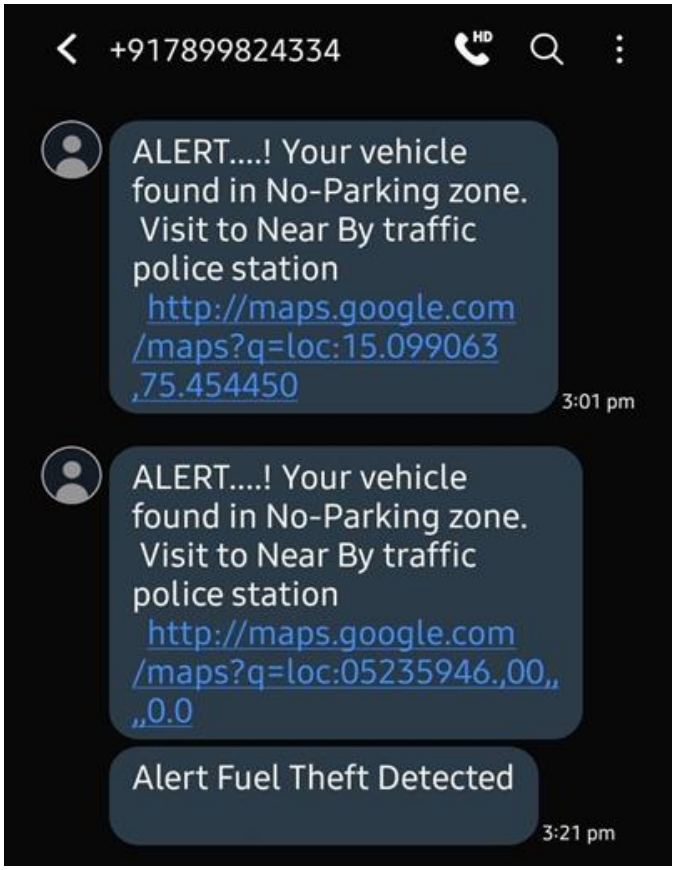

Figure 6: Alert Notifications

V. CONCLUSION

Vehicle theft is a major concern for vehicle owners, and it can result in significant financial losses and emotional distress. However, with the advancement of technology, there are several effective methods of vehicle theft detection and prevention. These include biometric fingerprint, fuel level monitoring, RFID generator, GPS tracking, and ignition controller through an Android app.

Each of these technologies provides a unique layer of security and can be integrated into a comprehensive vehicle theft prevention system. For example, a system that combines biometric fingerprint technology with GPS tracking and RFID generator can provide strong security against theft and unauthorized access. Fuel level monitoring and ignition controller through an Android app can further enhance the security of the vehicle.

Overall, it is important for vehicle owners to invest in a reliable and comprehensive theft prevention system to protect their vehicles from theft and unauthorized access. With the help of advanced technologies, vehicle owners can rest assured that their vehicles are secure and protected.

VI. FUTURE SCOPE

Integrating the smart theft detection system with cloud based platforms can offer numerous benefits, such as real-time data analysis and reporting. This integration can aid authorities in identifying theft patterns and alerting them in advance. With data analysis from various sources, such as GPS tracking, the system can provide insights into driver behaviour and identify unusual activity or potential theft.

Furthermore, incorporating machine learning algorithms into the system can enhance its security. These algorithms can learn from user behaviour patterns and detect unusual activity or potential theft before it occurs, making the system even more reliable and effective in preventing vehicle theft. The use of biometric technology can also be extended beyond fingerprint verification, with facial recognition or voice recognition incorporated into the system, adding an extra layer of security. This will ensure that only authorized individuals can access the vehicle, making it more challenging for thieves to steal it. Overall, the future scope of the smart theft detection system is promising. By integrating cloud-based platforms, machine learning algorithms, and biometric technology, the system can become even more reliable and effective in preventing vehicle theft.

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