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Development of Vehicle Theft Detection using GPS and IoT with Fuel Locking System

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ABSTRACT

Vehicle theft is a persistent challenge worldwide, causing financial losses and safety concerns for vehicle owners and society at large. In response to this problem, integrating advanced technologies such as Global Positioning System (GPS), Internet of Things (IoT), and fuel monitoring systems has emerged as a promising approach to enhance vehicle security. This research paper explores the design, implementation, and potential benefits of a system that utilizes GPS and IoT technologies along with a fuel monitoring system to provide real-time theft intimation and tracking capabilities for vehicles. The paper discusses the components, working principle, and advantages of such a system, highlighting its potential to mitigate the risks associated with vehicle theft.

Keywords— Vehicle theft, GPS, GSM, IoT, Fuel monitoring, Security, Theft intimation, Tracking.

Introduction

Vehicle theft continues to be a significant issue encyclopedically, with millions of vehicles stolen each time, performing in substantial fiscal losses and safety enterprises. To stop this issue, there's a need of theft alert system which helps to proprietor of the vehicle to insure theft forestallment and give speedy identification of an unauthorized person who was trying to steal the vehicles or trying to damage our vehicle. The theft alert system used GPS(Global Positioning System) and GSM(Global System for Mobile) which are placed in vehicle to communicate with vehicle's proprietor mobile phone. In GSM technology, the communication make either by an SMS or calling but we prefer the communication via SMS(between proprietor's mobile phone and GSM). The communication established include – transferring an SMS by GSM to proprietor's mobile phone to give all information about vehicles. The GPS technology is used then to give the exact position of vehicle to the vehicle's proprietor. It means that whenever an unauthorized person will try to steal our vehicles, also we can fluently descry the position of theft with vehicle by using the GPS technology and catch that theft veritably fluently. In this system we're going to use two keys to open the vehicle cinch, one is the proprietor's key and other is direct key. proprietor key is used by proprietor and direct key is used by unauthorized person. Whenever the unauthorized person used direct key, the alarm come active and give the beep sound which indicate that the pincher is detected. At the same time a warning SMS is transferred by GSM to registered mobile number of the vehicle's proprietor. After entering the communication, the vehicle's proprietor transferred a communication to ever locked the machine, after that the machine is turning off and the motor of the vehicle can not start without authorization of word. In this way, an IOT grounded vehicle theft discovery and remote machine locking system helps in precluding the culprits from stealing vehicles.

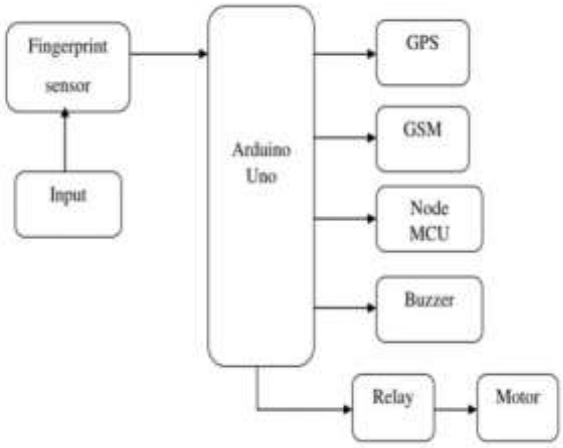
Literature Review

Previous research has explored various approaches to vehicle security, including GPS-based tracking systems and IoT-enabled anti-theft devices. GPS technology allows for accurate real-time tracking of vehicle location, while IoT facilitates connectivity and data exchange between vehicles and external systems. Additionally, fuel monitoring systems can provide valuable information about fuel levels and usage patterns, which can be leveraged to detect unauthorized vehicle usage. However, there is limited research on the integration of these technologies into a comprehensive vehicle security solution.

System Design And Components

The proposed system consists of several key components, including GPS modules, IoT devices, fuel level sensors, and a central monitoring platform. The GPS module tracks the vehicle's location and transmits this information to the central platform via the IoT device. The fuel level sensor monitors fuel levels in the vehicle's tank and alerts the system of any anomalies or suspicious activity, such as sudden decreases in fuel level indicative of theft.

BLOCK DIAGRAM -



HARDWARE REQUIREMENTS -

- Arduino Uno
- GPS
- GSM
- Relay
- Microcontroller
- LCD Display

- Arduino Uno -

The Arduino IDE allows you to write C/C++ code to process the data collected from the sensors. The Arduino IDE is used to write a code in C or C++.

- GPS -

GPS stands for Global Positioning System. GPS module is a navigation process that monitors the precise position of the device or a position. GPS enable us to pinpoint the exact position of the contrivance which reducing the threat of thievery.

• GSM -

GSM stands for Global System for Mobile Communication. To transmit and admit information on a cell phone is easier by using GSM module. The GSM module has an antenna for accepting network signals through the stoner's mobile phone. To grease communication, this GPS system is equipped with AT instructions. The Transmitter(TX) and Receiver(RX) legs which is employed to communicate serially with the microcontroller. AT instructions are used to corroborate the SIM state, enhance signal strength, and insure connectivity is established.

• RELAY -

Relay is an electrically operated switch. Relays frequently employ an electromagnet to activate a switch. Relays are used when there necessary to control a circuit by a separate low signal, or when there are several circuits must be controlled by one signal.

• Microcontroller –

Microcontrollers play veritably important part in an IoT grounded vehicle theft discovery & remote machine locking system. They're also called as the" smarts" of the system, responsible for uniting with detectors, collecting data, recycling information, and controlling the IoT bias.

Working principle

Upon detection of unauthorized vehicle activity, such as movement without proper authentication or tampering with the fuel system, the system triggers an alert and notifies the vehicle owner or relevant authorities. Real-time tracking data provided by the GPS module enables quick response and recovery efforts, potentially leading to the apprehension of the thief and recovery of the stolen vehicle.

- ž In order to start the ignition system user will be asked to provide the pre-stored password.
- ž If he enters wrong password 2-3 times, the security system sends the message to user's mobile using iot module in first time only.
- ž System will give the fake response of re-entered password to thief up to 3 times. In that time user can come & catch the thief.
- ž Also user can control system suing mobile phone by sending text message.
- ž Also if theft will try to move bike without starting ignition system, then IR sensors connected near back wheel can track motion of wheel & will give a siren.
- ž Also we have situated the LCD & keypad system near to speedometer and it is covered by glass envelope Press switch is attached below the glass envelope.
- ž If thief tries to damage the system or to remove glass cover then switch gets open & system will sound the buzzer.
- ž System reset button is also there. We hide the button at such place that user will only know the position of it.
- ž We can ON/OFF the system only when we require.

Benefits and applications

The integration of GPS, IoT, and fuel monitoring systems offers several benefits for vehicle security, including:

Real-time theft intimation and tracking

Improved recovery rates for stolen vehicles

Enhanced deterrence against theft due to increased risk of detection

Optimization of fleet management and logistics through real-time vehicle tracking and monitoring

Conclusion

The integration of GPS, IoT, and fuel monitoring systems represents a promising approach to enhance vehicle security and mitigate the risks associated with theft. By leveraging these technologies, vehicle owners and fleet operators can benefit from improved theft intimation, tracking, and recovery capabilities, ultimately reducing financial losses and improving overall safety and security. Further research and development in this area are warranted to refine the system design and address any technical challenges, with the ultimate goal of widespread adoption and implementation in the automotive industry.

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