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REAL TIME APPLICATION OF VEHICLE ANTI THEFT DETECTION AND PROTECTION WITH SHOCK USING FACIAL RECOGNITION AND IOT NOTIFICATION

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ABSTRACT:

The advancement of vehicle technology systems is gaining significant research attention, particularly the integration of vehicle theft prevention mechanisms for safeguarding vehicles in parking areas and insecure locations during driving. The suggested system offers enhanced security and improved theft prevention through the utilization of facial recognition and the application of a shock deterrent when an unauthorized individual attempts to initiate the ignition. Furthermore, the system leverages IoT technology for immediate notifications. The system's foundation is built on a Microprocessor Raspberry Pi, complemented by a Pi Camera and a Wi-Fi controller installed within the vehicle. This implementation boasts a straightforward yet highly effective approach to vehicle anti-theft protection, offering cost-efficiency in comparison to alternative methods.

INTRODUCTION:

These days, car theft is on the rise worldwide, prompting automobile manufacturers to enhance the security features of their products with advanced technologies, particularly for cars. Typically, security measures involve both biometric and non-biometric methods. Non-biometric methods rely on passwords and personal IDs to verify authorized individuals, but the risk of theft remains. In contrast, biometric methods eliminate such risks by utilizing techniques such as voice recognition, fingerprint recognition, signature recognition, eye retina recognition, iris

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recognition, and facial recognition. Among these methods, the facial recognition and detection system stands out as particularly sophisticated.This project focuses on creating a real-time facial recognition system using the HAAR cascade algorithm. This surveillance system allows entry into a car only to authorized individuals, swiftly determining their identity. When an unauthorized person attempts to operate the vehicle, a relay triggers an alarm.

The use of vehicles is indispensable worldwide, and safeguarding them from theft is essential. Automobile manufacturers are bolstering the security features of their products by introducing advanced automated technologies, especially in the case of cars. Biometric and non-biometric methods play a key role in providing this security. While non-biometric systems may sometimes fail due to hacked passwords and data decryption, it is nearly impossible to replicate unique biometric characteristics. Biometric systems, employing techniques like fingerprint and iris recognition, along with facial recognition and detection systems, offer a more advanced and deploy-able solution.

These systems can identify individuals without their awareness. Some advantages of facial recognition for vehicle security include its convenience, immediate recognition upon seating, cost-effectiveness, compatibility with existing methods, and the absence of active user participation.

LITERATURE REVIEW:

The goal of this project is to develop a real-time vehicle anti-theft system that utilizes facial recognition technology and IOT (Internet of Things) to detect and prevent unauthorized access to vehicles. The system should be capable of providing immediate notification to the vehicle owner or authorized personnel when a potential theft is detected, along

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with the ability to deliver an electric shock to deter the thief.

The issue of vehicle theft is a worldwide concern, prompting researchers and engineers to dedicate years of effort to developing diverse anti-theft mechanisms. Conventional anti-theft systems typically rely on methods such as key-based mechanisms, immobilizers, and alarms, although these methods are not infallible. More sophisticated anti-theft systems have integrated features like GPS tracking, remote engine immobilization, and automated notification systems. Facial recognition technology has gained significant traction across security applications, particularly in access control and surveillance, with studies showcasing its precision and dependability in individual identification.

EXISTING SYSTEM:

Current vehicle anti-theft systems encompass a range of components and technologies. A common element is the key-based immobilizer system, which necessitates a specific key or transponder to start the engine. This system employs cryptographic protocols to ensure that only authorized keys can initiate vehicle operation, providing a fundamental level of security. Car alarm systems are another widely used feature. When activated, these alarms emit loud sounds and flashing lights to attract attention and deter potential thieves.

They use satellite signals to provide real-time location information, enabling vehicle owners to monitor their vehicles remotely. In case of theft, GPS tracking systems can aid in recovery by providing precise location data.

Furthermore, certain aftermarket security systems offer remote control capabilities, allowing vehicle owners to use remote controls or smartphone apps to manage security features such as locking/unlocking doors and activating alarms. Steering wheel locks can be forcibly removed, and security cameras may lack

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real-time alert functionality.

PROPOSED SYSTEM:

The proposed system seeks to create a comprehensive and cutting-edge vehicle anti-theft detection and protection solution, integrating technologies like facial recognition, IoT connectivity, and shock deterrence to elevate the security of vehicles. Key features of this system comprise:Facial Recognition: Employing facial recognition algorithms for precise identification and authentication of vehicle owners and authorized users by capturing and matching their images or videos with a pre-registered database.Unauthorized Access Detection: Installation of sensors or cameras within the vehicle to detect any unauthorized access attempts, including door openings or tampering with the ignition system, with real-time alerts triggered upon detection.IoT

Notification: Swift transmission of notifications via IoT protocols (e.g., MQTT or SMS) to the vehicle owner or designated personnel upon detecting unauthorized access, facilitating immediate preventive action against theft or damage.Electric Shock Deterrent: Integration of a non-lethal electric shock mechanism to deter unauthorized individuals attempting vehicle access, dissuading potential thieves from proceeding.Real-Time Monitoring and Control: A user-friendly interface (e.g., smartphone app or web platform) enables remote real-time monitoring of the vehicle's status, providing access to live video feeds, sensor data, and control over anti-theft system features.Secure Communication: Encryption and safeguarding of communication between components such as sensors, cameras, facial recognition modules, and IoT gateways to prevent unauthorized access or manipulation.Integration with GPS Tracking: Seamless integration with GPS tracking technology to enable real-time

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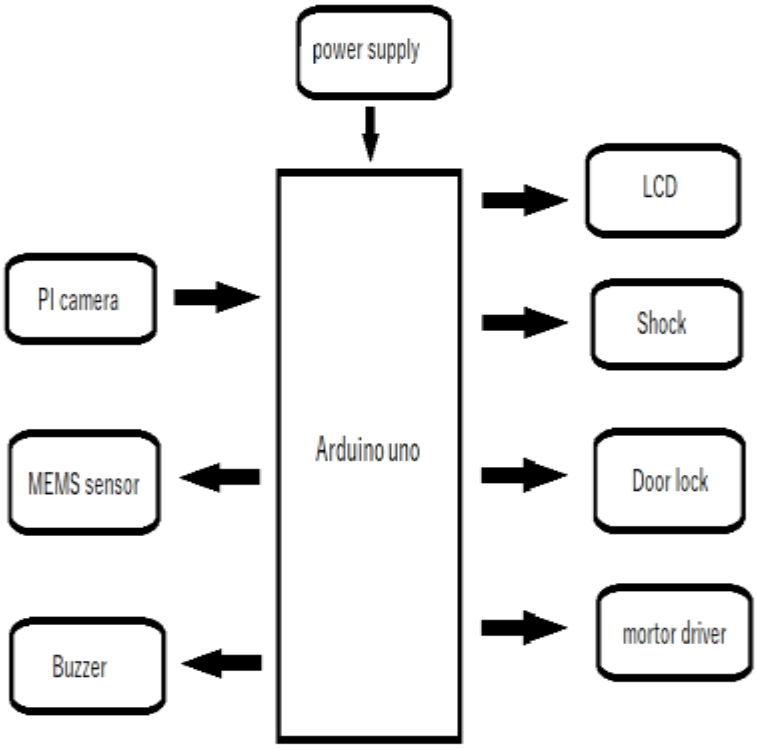
tracking of the vehicle's location in case of theft, thereby enhancing the chances of recovery.Multi-factor Authentication: Incorporation of additional security layers, fingerprint scanning or voice recognition, to fortify security measures and prevent unauthorized access.

BLOCK DIAGRAM:



WORKING PRINCIPLE:

"*REAL TIME APPLICATION OF VEHICLE ANTI THEFT DETECTION AND PROTECTION WITH SHOCK USING FACIAL RECOGNITION AND IOT NOTIFICATION*"

The system described as the "Real-Time Application of Vehicle

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Anti-Theft Detection and Protection with Shock Using Facial Recognition and IoT Notification" is engineered to bolster vehicle security and deter theft. The system's operation relies on the seamless integration of various components and technologies working in concert. Here is a breakdown of how the system functions:

The system leverages facial recognition technology to identify and validate the vehicle owner or authorized users.

When an individual approaches the vehicle, the system captures an image or video of their face utilizing the Pi Camera.

The captured facial data is subsequently cross-referenced with a per-registered database of authorized individuals.

If the facial data matches that of an approved user, the system grants access to the vehicle.

Sensors or cameras, strategically placed within the vehicle, continuously monitor access points, including doors and the ignition system.

These sensors are designed to detect any unauthorized access attempts or tampering with the vehicle.

The system facilitates real-time monitoring through IoT (Internet of Things) connectivity.

Data from the sensors and cameras are instantaneously transmitted to the system's central unit, the Raspberry Pi.

When an unauthorized access attempt is identified, the system promptly initiates an alert.

Alerts are conveyed through IoT protocols like MQTT or SMS to promptly notify the vehicle owner or designated personnel.

As an added layer of security, the system has the capability to activate an electric shock deterrent mechanism.

This mechanism administers a non-lethal electric shock to any unauthorized individual attempting to access the vehicle.

The system incorporates a user-friendly interface, which can manifest as a smartphone app or a web-based platform.

Users are granted the ability to remotely oversee the vehicle's status in real time, gain access to live video feeds, and manage system features. To maintain the system's security, all communication between the diverse components is both encrypted and shielded from unauthorized access. This guarantees that hackers are unable to intercept or manipulate the communication.

The system securely retains authorized user data and access logs, ensuring accessibility for

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future reference and auditing purposes. The system is meticulously designed to align with all pertinent legal and safety regulations, particularly with regard to the deployment of shock deterrent mechanisms.

"The core working principle of this system centers on preemptive facial recognition, real-time surveillance, instantaneous alerting, and, when necessary, the activation of a shock deterrent to deter unauthorized access and theft. The amalgamation of facial recognition, IoT connectivity, and a user-friendly interface contributes to a potent and contemporary anti-theft solution for vehicles."

IMPLEMENTATION:

The Raspberry Pi is a compact 32-bit single-board computer with a quad-core ARM cortex-A53 running at 1.2GHz and a videocore4 GPU. It lacks a real-time clock but can use a network time server or an added RTC with a battery. It's powered by a 5V, 2A DC supply from a USB hub. The board connects to a laptop via an Ethernet cable and runs the Raspbian Squeeze OS with Python IDE. A 16 GB SD card with Linux serves as storage, and there's a built-in Wi-Fi option. Three sensors are integrated: a PIR motion sensor, a pressure sensor to detect vibration, and an MQ-2 gas sensor for fire detection. An alarm buzzer is also added for security. In case of intrusion or fire, the buzzer sounds, and the system displays the coordinates and a theft alert on the Pi terminal. It sends an email to the user with an image and a Google Maps link for tracking. If the vehicle is moved, an updated link is provided. This results in an affordable and feature-rich vehicle theft detection system

KEY FEATURES:

The system encompasses a range of pivotal features aimed at bolstering vehicle security and deterring theft:

One such feature is the implementation of facial recognition technology, which serves to accurately identify and authenticate vehicle owners and authorized users. This sophisticated system ensures that only those with authorization can gain access to the vehicle, enhancing security significantly.

Furthermore, the system is equipped with sensors and cameras installed within the vehicle, which continuously monitor various access points, including doors and the ignition system. These surveillance mechanisms are designed to

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promptly detect any unauthorized access attempts or tampering, triggering immediate alerts.

RESULT :

Facial recognition and instant IoT alerts ensure swift responses to security threats, strengthening theft prevention. The electric shock deterrent, coupled with remote monitoring, adds an extra layer of security, forming a comprehensive system. Vehicle owners feel secure as the system accurately identifies users, issues immediate alerts, and enhances theft deterrence.

CONCLUSION:

the proposed vehicle anti-theft system, featuring facial recognition, IoT notifications, and an electric shock deterrent, presents substantial improvements over existing solutions. These innovative elements enhance security, deliver rapid alerts, ensure precise user authentication, offer remote monitoring and control, and provide additional theft deterrence measures.

Facial recognition technology integration guarantees accurate identification and authentication of vehicle owners and authorized users, minimizing the risk of unauthorized access. Real-time IoT notifications enable swift responses to unauthorized access attempts, increasing the likelihood of preventing theft or damage to the vehicle.

In essence, the proposed system signifies a substantial leap forward in vehicle security, providing a comprehensive set of features and capabilities to safeguard vehicles and grant peace of mind to vehicle owners and users.

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