International Journal for Modern Trends in Science and Technology
Volume 11, Issue 04, pages 1039-1043.
ISSN: 2455-3778 online
Available online at: http://www.ijmtst.com/vol11issue04.html
DOI: https://doi.org/10.5281/zenodo.15313813

Real Time Vehicle Security System

U. Krupa[1], J. Vijayakumari[2], B. Jhansi[2], B. Nikitha[2], Y.Supraja[2]

[1]Assistant Professor, Department of Electronics and Communication Engineering, Vijaya Institute of Technology for Women, Enikepadu ,Vijayawada, India.
[2]Department of Electronics and Communication Engineering, Vijaya Institute of Technology for Women, Enikepadu ,Vijayawada, India.

To Cite this Article
U. Krupa, J. Vijayakumari, B. Jhansi, B. Nikitha & Y.Supraja (2025). Real Time Vehicle Security System. International Journal for Modern Trends in Science and Technology, 11(04), 1039-1043. https://doi.org/10.5281/zenodo.15313813

Article Info
Received: 17 March 2025; Accepted: 21 April 2025; Published: 25 April 2025.

KEYWORDS

Arduino, Python installed PC, Vehicle security, Relay, Inverter

ABSTRACT

A project named "Real Time Vehicle Security system" defends vehicles through the utilization of Python programming language. The system operates using facial recognition which enables authorized users to verify themselves through an integrated camera. The system performs checks for both helmet usage and alcohol involvement as part of its safety measures. The engine operates when authorization together with compliance is confirmed but stays deactivated whenever these conditions are not met. The system produces an alert sound through a buzzer whenever safety protocols or unauthorized entry occurs. The system delivers secure vehicle protection by combining machine learning technology with real-time monitoring systems.

1. INTRODUCTION

A system that merges shock mechanisms and facial recognition technologies through the Vehicle Anti-Theft Detection and Protection project works to increase vehicle protection. A camera supports facial authentication by using facial recognition technology implemented with Python algorithms. When an unapproved person seeks access to the system it automatically triggers an alarm. A shock mechanism operates through an electric device to deliver a non-vengeful charge which functions as a theft prevention measure. The management of security system components including facial recognition and shock mechanism is possible through Arduino microcontrollers. Real-time notifications alert the vehicle owner and authorities about suspicious activity. The system offers protection through SMS and email alerts which also activate law enforcement notification for immediate response. The complex solution delivers a strong defence platform for vehicle protection. The system delivers assurance to vehicle owners because it blocks entry attempts and keeps thieves unable to operate the vehicle. The project utilizes advanced technological elements to develop a complete security network..

II. LITERATURE SURVEY

Science teams have worked on developing various security measures which improve vehicle safety. Digital face recognition software operated together with cost-effective Raspberry Pi systems and Pi cameras to authenticate drivers before starting the vehicle. A system comprising an RF transmitter and receiver and microcontroller together with DC motor along with ultrasonic sensor enabled the control of vehicle speeds within restricted zones. The Arduino UNO board served as data processor and controlled vehicle location transmission through the GPRS module which in turn sent information to the cloud database. Anti-theft protection systems were created through research by combining LTE, GSM and GPS communication technologies. The systems provided users with remote tracking capability and enabled both engine control functions and automatic alarms activation. A device comprising GPS and GSM modules inside a microcontroller functioned to send SMS with vehicle location data after detecting theft. The solutions implemented goals to enhance vehicle safety and security features coupled with improved control elements in various operational environments.

III. SYSTEM MODEL

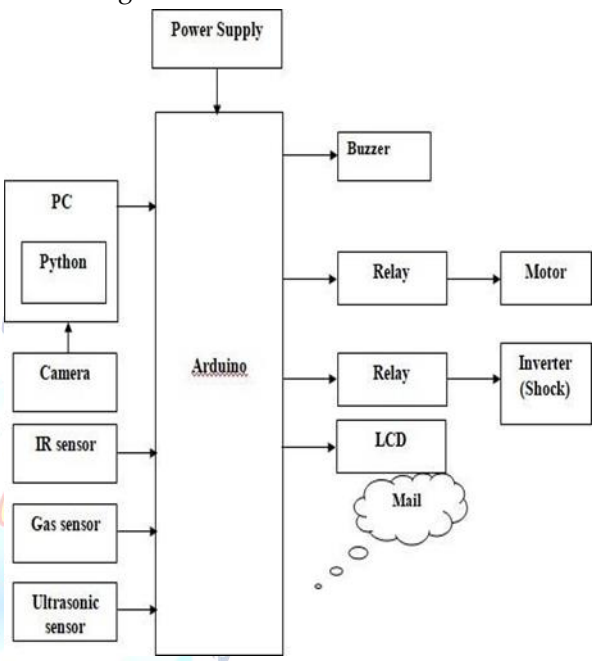
A. Existing system

The current vehicle anti-theft systems function through keybased ignition procedures and function with immobilizers and GPS tracking and incorporate RFID or fingerprint recognition for access control systems. Current security systems operate without an integrated process which combines safety measures with security features because they ignore helmet usage checks and alcohol tests and fail to provide immediate safety warnings. Modern security methods play a minimal role within their operations because these systems persist with conventional authentication mechanisms which do not feature advanced identification tools such as facial recognition and machine learning capabilities.

B. Proposed system

The designed system employs modern security precautions to fight car theft along with protective tools for users. The authorization datasets emerge from computer programs that operate on Python facial recognition processing. System authorization happens through face pattern analysis against security authorizations stored in the database to grant entry permissions. Unauthorized personnel who attempt entry will hear a buzzer sound but authorized users must complete additional tests using the connected equipment to show helmet verification and alcohol content checks. The system starts operating only after all necessary conditions are completed.

Block Diagram



IV. BENEFITS OF REAL TIME VEHICLE SECURITY SYSYEM:

Immediate Theft Detection: Real-time monitoring enables instant detection of unauthorized access, reducing the chances of successful theft.

Rapid Response: Instant alerts to vehicle owners and law enforcement allow for quick intervention and faster recovery of stolen vehicles.

Enhanced Safety: The system can deter potential thieves through mechanisms like alarms or shock devices, increasing overall vehicle security.

Remote Monitoring: Owners can track and monitor their vehicle's status from anywhere using mobile notifications via SMS or email.

Reduced Theft Risk: Advanced authentication methods, such as facial recognition, significantly decrease the possibility of unauthorized access.

System Integration: The system can work with other smart technologies, enabling comprehensive protection and seamless operation.

Customizable Alerts: Users can configure notifications for various scenarios, ensuring awareness of any suspicious activity.

Preventive Action: Deterrents such as shock mechanisms discourage unauthorized access before theft occurs.

V. APPLICATIONS

Automobile Security: Enhances vehicle security with facial recognition and shock mechanisms, preventing unauthorized access, especially in high-theft areas or for expensive vehicles. Fleet Management: Helps companies manage fleets by ensuring only authorized drivers can access and use the vehicles, reducing theft and unauthorized use. Car Rental Services: Streamlines the rental process by using facial recognition, allowing customers to access vehicles securely, ensuring only registered renters can drive them. Vehicle Sharing Programs: Ensures security in car-sharing or ride-hailing services by authenticating drivers before allowing access, reducing theft or misuse.

Personal Vehicle Security: Protects personal vehicles from theft or unauthorized access, with facial recognition ensuring only authorized users can start and drive the vehicle.

Commercial Vehicle Protection: Safeguards company vehicles from theft and unauthorized use, especially

important for businesses that rely on transportation or logistics.

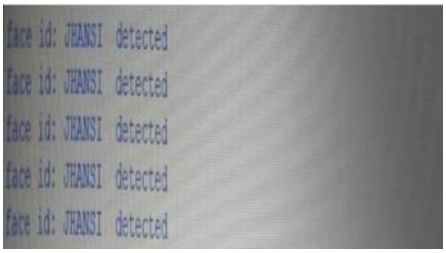
High-Value Cargo Security: Secures cargo vehicles transporting valuable goods, reducing the risk of theft or tampering during transit with facial recognition and shock deterrents.

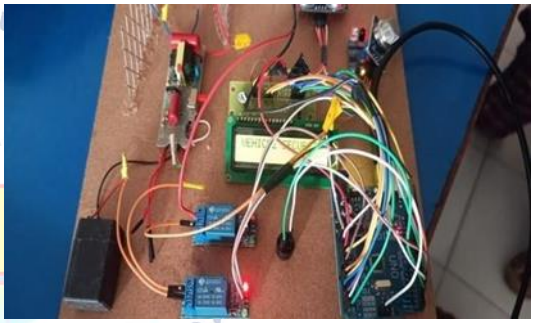
Parking Lot Security: Enhances security in parking lots by ensuring only authorized individuals can access their parked vehicles, reducing theft and vandalism.

Law Enforcement Vehicles: Protects police vehicles from unauthorized access, ensuring only officers can access important equipment and resources inside.

Custom Security Solutions: Offers tailored security systems for vehicle owners or businesses, addressing specific security needs with features like facial recognition and shock deterrents.

VI. RESULT





Vehicle security mechanism that incorporates several layers of protection to ensure that only authorized individuals can operate the vehicle. Let's break down how each component works:

Camera Capture & Unauthorized Person Detection:

The vehicle is equipped with a camera that scans the person near or entering the vehicle, likely through facial recognition or other identification methods.

If the camera detects an unauthorized person (someone who hasn't been pre-approved to access the vehicle), the system triggers two responses:

Gmail Notification: The system sends an automatic notification via Gmail to the owner of the vehicle, alerting them that someone unauthorized is attempting to access the vehicle.

Buzzer Activation: A buzzer (alarm) goes off, creating an audible alert to inform nearby people that there is unauthorized access attempt.

Shock Mechanism:

If the unauthorized person still tries to start the vehicle, the from system uses a shock mechanism to

deter the person proceeding. This could be a mild electric shock delivered through the vehicle's seat, steering wheel, or another part of the interior.

This shock is intended to discourage the unauthorized individual from attempting to start the vehicle.

Helmet Detection & Alcohol Monitoring: The system also checks whether the person is wearing a helmet (likely relevant for two-wheeled vehicles like motorcycles or scooters). If they aren't, the system recognizes this as a security concern.

The system also likely has a sensor or alcohol detection device that can determine whether the person is under the influence of alcohol. If the person is detected to be intoxicated, it triggers a buzzer as an alert, similar to the previous unauthorized access detection.

In these cases, whether it's due to not wearing a helmet or being under the influence of alcohol, the vehicle's engine remains disabled, meaning it can't be started until the issue is resolved.

Summary of Functions:

Unauthorized Access: If the person is unauthorized, they are notified by Gmail, and the system triggers an alarm (buzzer). The engine stays off, and the person may be shocked if they attempt to start the vehicle. Helmet & Alcohol Detection: If the person is not wearing a helmet or is intoxicated, the buzzer activates as a warning, and the engine remains disabled.

Shock Mechanism: The shock treatment is used as a deterrent to prevent unauthorized individuals from starting the vehicle, while the engine stays off for added security.

VII. CONCLUSION

The project implements vehicle security by merging facial recognition with shock functionality into its "Vehicle AntiTheft Detection and Protection with Shock using Facial Recognition" system. The security system delivers enhanced protection from thefts and unauthorized entry than basic lock and alarm security setups. The combination of new technologies including facial recognition with IoT enables exact user recognition and ongoing monitoring from any location to boost security measures. The system development twists equally between user experience convenience and functional practicality to achieve broad public adoption. When user needs guide protective methods the system provides improved vehicle defence capabilities that boost user satisfaction.

Security technology progresses substantially through the "Real Time Vehicle Security System" project. Facial recognition technologies together with shock systems work as a solution to protect vehicles against theft while preventing unauthorized access. The multiple important observations during both development and implementation demonstrate the strong potential of the system.

The project demonstrates how multiple protective measures function as essential components for vehicle defence in the modern security risks environment. Savings relied on traditional security tools including mechanical locks and alarms which criminals can easily overcome through modern theft methods. The implementation of facial recognition technology serves as an extra authentication method which enables only approved users to unlock their vehicles. The security stance becomes stronger because of shock mechanisms which simultaneously serve as deterrent measures to discourage potential thieves. Security solutions require user acceptance together with usability which the project demonstrates as a fundamental aspect. Safetyenhancing technologies need to combine better security options with user-friendly functionality to achieve mass market penetration. The user experience improved substantially through continuous usability testing and user feedback from project development until the point where the system interface and functionality reached their optimal. Constituted. This advancement of vehicle security shows dual achievements through its focus on user requirements and preferences which establishes better technological reception from users.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

REFERENCES

[1] M. S. Khan, F. Shah, and S. Ahmed, "An IoT-based Vehicle Security System with Facial Recognition," *IEEE Access, vol. 8, pp. 112435-112444, 2020. DOI: 10.1109/ACCESS.2020.3001429.

[2] A. A. R. Raja, S. Sundararajan, and S. K. Gupta, "A Secure Vehicle Monitoring System Using Facial Recognition and IoT," *IEEE International Conference on Intelligent Transport Systems,2019,pp. 235-240. DOI: 10.1109/ITSC.2019.8917304.

[3] S. R. Joshi, V. M. Gohil, and K. S. N. Raghavendra, "Facial Recognition and Vehicle Tracking System for Enhanced Vehicle Security," *IEEE International Conference on Signal Processing and Communication, 2019, pp. 125-130. DOI: 10.1109/ICSPC.2019.8924913

[4] R. Sharma and S. Sharma, "IoT-based Car Security System with Real-Time Vehicle Tracking," *IEEE 5th International Conference on Computing Communication and Automation, 2019, pp. 307-312. DOI: 10.1109/ICCCA.2019.8777626.

[5] S. Y. Kim, S. Lee, and Y. H. Lee, "Smart Vehicle Security System Using Facial Recognition and GPS Monitoring," *IEEE International Conference on Consumer Electronics, 2020, pp. 469-474. DOI: 10.1109/ICCE.2020.9024637.

[6] P. S. Balamurugan and S. S. Sivakumar, "Vehicle Theft Prevention Using Face Recognition and IoT-Based Systems,"IEEE International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT), 2016, pp. 219-224. DOI: 10.1109/ICEEOT.2016.7582899.