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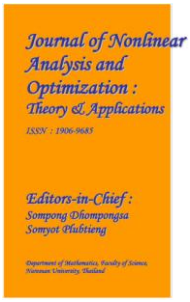

VEHICLE ANTI THEFT DETECTION AND PROTECTION WITH SHOCK USING FACIAL RECOGNIZATION

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Abstract:
Vehicle Anti-Theft Detection and Protection with Shock employs a robust security system integrating facial recognition technology and shock protection mechanisms. A camera, connected to a Python-installed PC, facilities facial recognition to identify authorized users. In the event of an unrecognized face, the system triggers an immediate response by sending an alert email to the registered user. This aspect adds an extra layer of security to deter potential thefts.
In addition to the facial recognition feature, the project incorporates a shock protection mechanism inspired by a mosquito bat. This innovative approach involves integrating a shock mechanism that can be activated remotely. If unauthorized access or tampering is detected, the shock mechanism provides an additional deterrent, enhancing the security of the vehicle. The combination of facial recognition and shock protection contributes to a comprehensive anti- theft system, ensuring both user authentication and a swift response to potential threats.
Keywords: Arduino, Python Installed PC, Vehicle Security, Relay, Inverter.

1.Introduction

The latest car anti-theft systems incorporate car alarms, flashing lights, and various sensors such as pressure, tilt, shock, and door sensors. However, these systems have shortcomings such as cost and their inability to trace thieves. Traditional car security systems rely on multiple sensors, initially consisting of electromechanical devices and later evolving into fully integrated microprocessor-based systems using diverse electronic sensors. Advancements have been made in the hardware and software of GPS and GSM grids. A vehicle tracking system, utilizing GPS and GSM technology, enables the owner or a third party to track the vehicle's location. This system, based on embedded systems, continuously monitors a moving vehicle and provides its status upon request. Rashed et al. proposed a GPS-based tracking system that monitors a vehicle's location and speed using a mobile phone text messaging system. The system provides real-time text alerts for speed and location changes, and it can lock onto the current location, alerting the owner if the vehicle is moved from that position.Pethakar et al. developed an RFID, GPS, and GSM-based Vehicle Tracking and Employee Security System. This system involves installing an electronic device in a vehicle and implementing purpose-designed software to enable the organization to track the vehicle's location. When an employee boards the vehicle, they must swipe their RFID card. The microcontroller matches the RFID card number with its database records and sends the employee's ID, taxi ID, and taxi position coordinates to the organization unit via the GSM module. If an employee encounters a problem, they can press a button, triggering the

microcontroller to send a signal to the GSM module, which communicates with the organization unit and the police[1-8].

2.Proposed system

The proposed method introduces a robust vehicle anti-theft system with advanced security features. A camera, connected to a Python installed PC, employs facial recognition technology to identify authorized users. If an unrecognized face is detected, the system triggers a notification by sending an email to the registered owner. This enhances the security layer by combining facial recognition with immediate alerts, ensuring quick responses to potential theft situations. To provide an additional deterrent against theft, the project incorporates a shock mechanism using a mosquito bat. This mechanism activates upon unauthorized access, adding a physical barrier to the theft attempt. The integration of shock technology not only alerts potential thieves but also aims to discourage further attempts by creating a tangible consequence for unauthorized access. Together, the facial recognition system and shock mechanism create a comprehensive and effective anti-theft solution for vehicles.

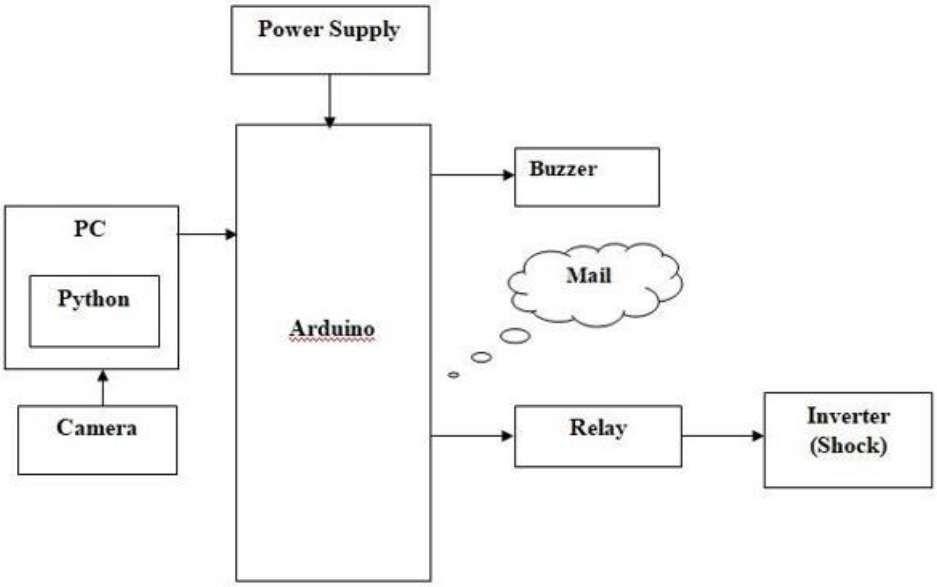


Figure.1. BLOCK DIAGRAM

2.1 Hardware description

2.1.1 Introduction to Arduino

Arduino is an open-source electronics platform based on easy-to-use hardware and software. It consists of a microcontroller that can be programmed to sense and control objects in the physical world. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. They are used for a variety of purposes, including creating interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical outputs. Arduino boards come in various shapes and sizes, each with its own set of features and capabilities. Some of the most popular Arduino boards include:

Arduino Uno: The Uno is one of the most popular Arduino boards. It features a microcontroller, digital and analog input/output pins, USB connection, and a power jack.

Arduino Mega: The Mega is similar to the Uno but with more digital and analog input/output pins, making it suitable for larger projects that require more I/O.

Arduino Nano: The Nano is a compact board with similar features to the Uno but in a smaller form factor, making it ideal for projects with space constraints.

Arduino Due: The Due is based on a more powerful microcontroller than the Uno, making it suitable for projects that require more processing power.

Arduino Leonardo: The Leonardo is similar to the Uno but with built-in USB communication, making it easier to interface with computers.

In addition to the hardware, Arduino also provides a software development environment that allows users to write, compile, and upload code to their Arduino boards. The Arduino IDE (Integrated Development Environment) is a simple yet powerful tool that is used to write code in the Arduino programming language, which is based on Wiring, and upload it to the board.
Overall, Arduino is a versatile platform that is used by hobbyists, students, and professionals alike to create a wide range of projects, from simple blinking LED lights to complex robotics projects. Its ease of use, coupled with its affordability and flexibility, has made it one of the most popular platforms for electronics prototyping and experimentation.

2.1.2 Features of the Arduino

Arduino boards come with a variety of features that make them suitable for a wide range of projects. Some of the key features of Arduino boards include:
Microcontroller: Arduino boards are equipped with a microcontroller, which is the brain of the board. The microcontroller is responsible for executing the program and controlling the inputs and outputs of the board.
Digital Input/Output Pins: Arduino boards come with a number of digital input/output (I/O) pins that can be used to connect the board to external devices such as sensors, LEDs, and motors. These pins can be configured as either inputs or outputs, allowing the board to read data from sensors or control external devices.
Analog Input Pins: In addition to digital I/O pins, Arduino boards also feature analog input pins that can be used to read analog signals from sensors. These pins allow the board to measure variables such as light intensity, temperature, and sound level.
PWM (Pulse Width Modulation) Pins: Some Arduino boards come with PWM pins, which can be used to generate analog-like signals. PWM is often used to control the brightness of LEDs or the speed of motors.
USB Connection: Arduino boards feature a USB connection, which allows them to be connected to a computer for programming and serial communication. The USB connection also provides power to the board, eliminating the need for an external power source.
Power Jack: Arduino boards come with a power jack that can be used to connect an external power source, such as a battery or a wall adapter. This allows the board to be powered independently of the USB connection.
Reset Button: Arduino boards feature a reset button that can be used to restart the board and re-run the program.
Integrated Development Environment (IDE): Arduino boards are programmed using the Arduino IDE, which provides a simple and intuitive interface for writing, compiling, and uploading code to the board.
Open-Source: Arduino is an open-source platform, which means that the hardware designs and software libraries are freely available for anyone to use and modify. This has led to a large community of Arduino users who share their projects and collaborate on new ideas.
Overall, Arduino boards are versatile and easy-to-use platforms that are ideal for beginners and experienced makers alike. Their combination of features, affordability, and flexibility make them a popular choice for a wide range of projects, from simple blinking LED lights to complex robotics applications.

2.1.3 Arduino Pinout

- Arduino Uno is based on an AVR microcontroller called Atmega328. This controller comes with 2KB SRAM, 32KB of flash memory, and 1KB of EEPROM. The Arduino Board comes with 14 digital pins and 6 analog pins. ON-chip ADC is used to sample these pins. A 16 MHz frequency crystal oscillator is equipped on the board. The following figure shows the pinout of the Arduino Uno Board

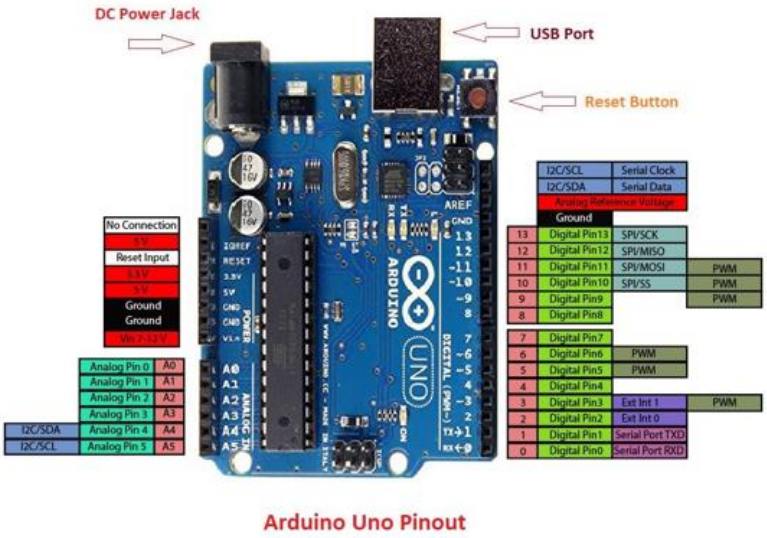


Figure.2. Arduino UNO Pinout diagram

3.Results and Discussion

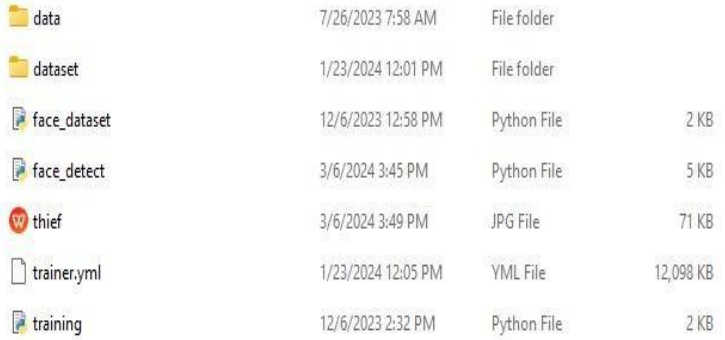


Figure.3.DIFFERENT SET OF FILES

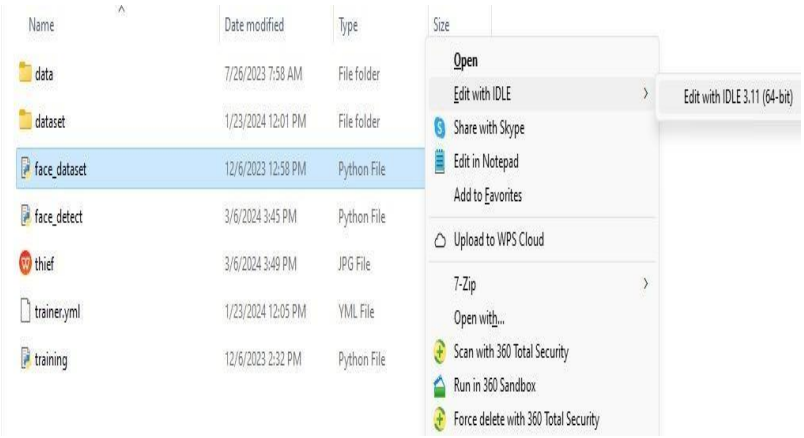


Figure.4. FACE DATASET

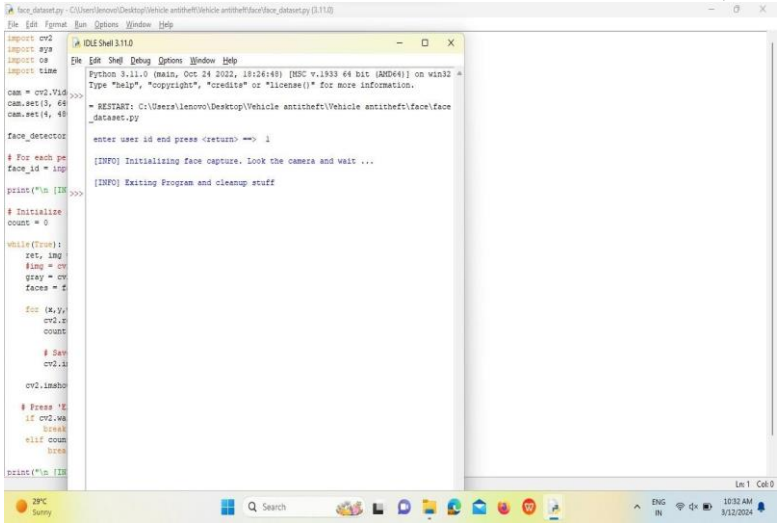
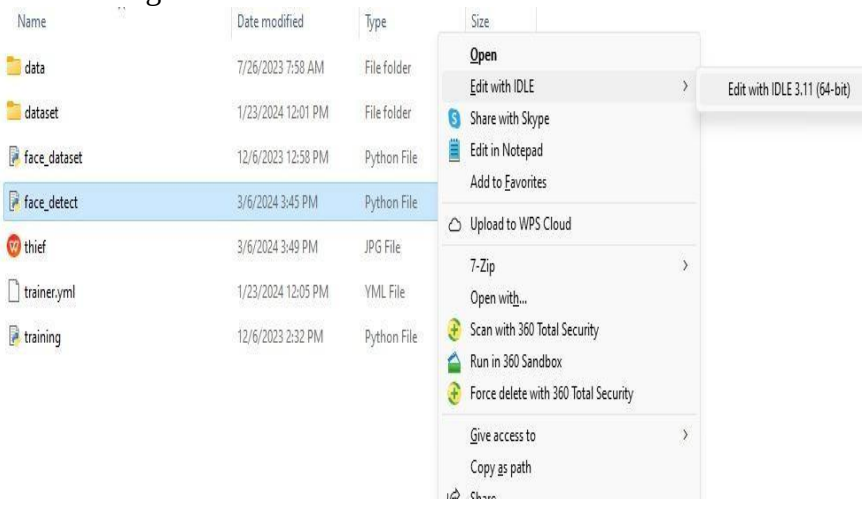


Figure.5.FACE REGISTERING PAGE

Figure.6. EGISTERED FACE

Figure.7.PENING FACE DETECTION DATASET



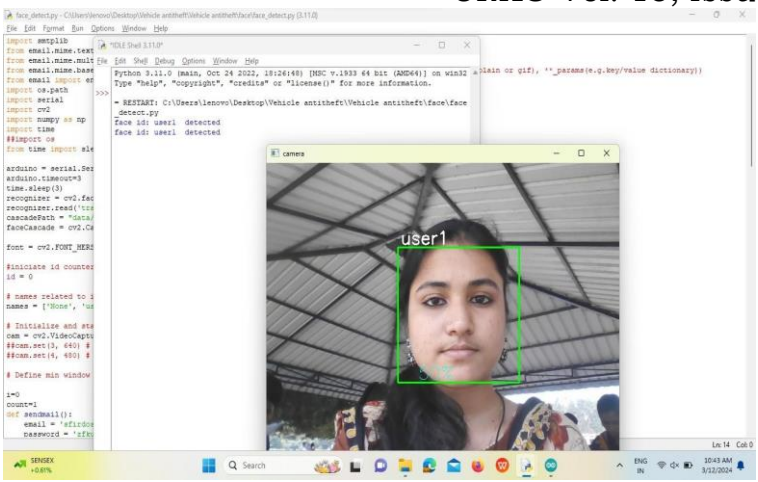


Figure.8. AUTHORIZED USER

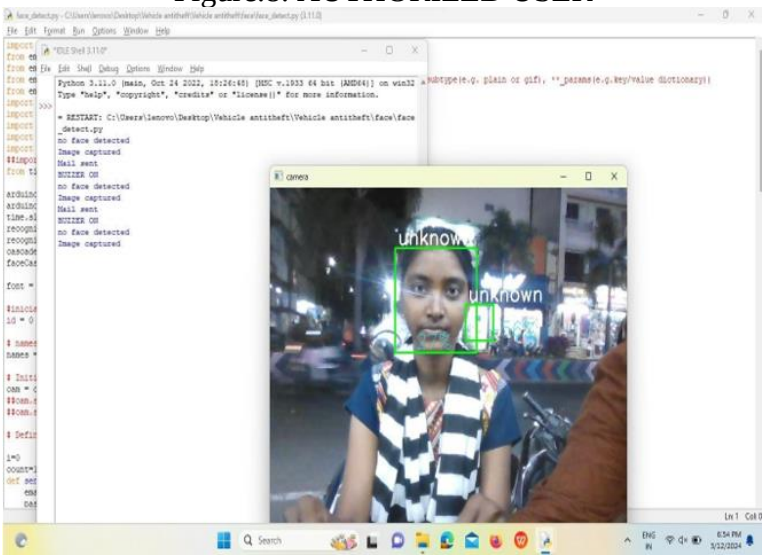


Figure.9.UNAUTHORIZED USER

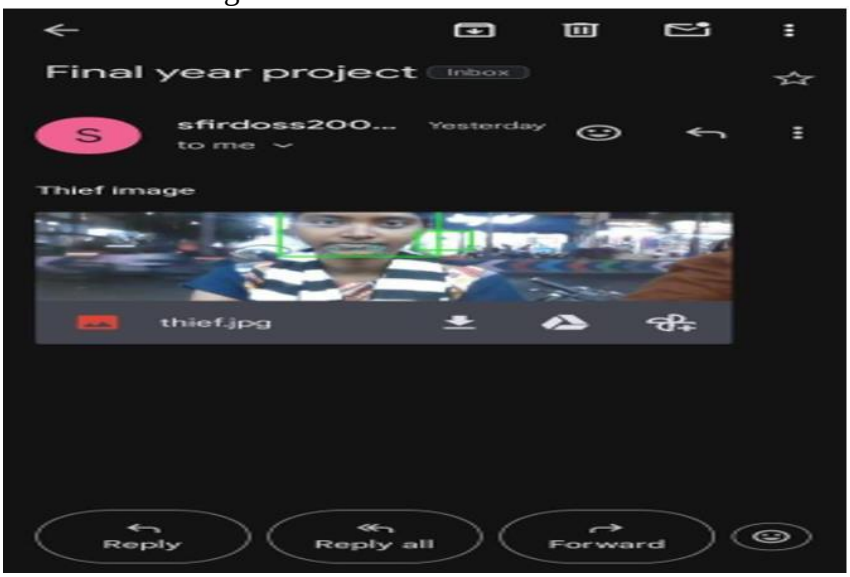


Figure.10.MAIL ALERT

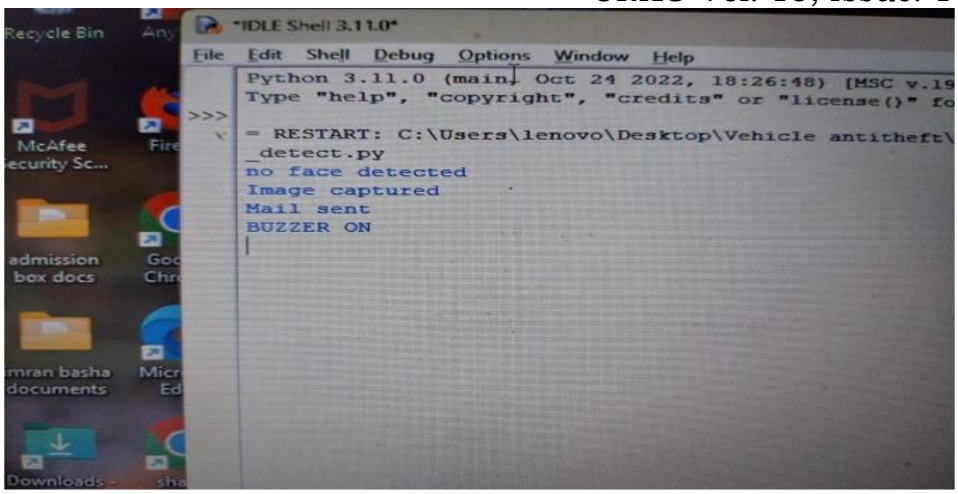


Figure.11.BUZZ RESPONSE

4.Conclusion

In conclusion, the "Vehicle Anti-Theft Detection and Protection with Shock using Facial Recognition" project signifies a substantial leap forward in vehicle security. Combining facial recognition and shock mechanisms, it offers robust defense against theft and unauthorized access. The project underscores the necessity of multifaceted security solutions in the face of evolving threats. While traditional measures falter, facial recognition adds authentication layers, and shock mechanisms act as deterrents. This approach addresses vulnerabilities in an increasingly complex threat landscape. Moreover, the project showcases the viability of incorporating emerging technologies like facial recognition and IoT for practical vehicle security applications. Through accurate identification and real-time monitoring, the system responds adeptly to security breaches. Finally, the emphasis on user acceptance and usability is paramount. Despite advanced features, user-friendly interfaces and usability testing are pivotal, ensuring not only heightened security but also widespread acceptance and adoption in real-world scenarios.

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