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VEHICLE ANTI-THEFT DETECTION AND PROTECTION WITH FACIAL RECOGNITION AND IOT NOTIFICATION

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Abstract:Due to the fast growth in the number of automobiles in the 21st century, both domestically and globally, there has been a surge in car theft attempts. Owners are concerned about having their cars stolen from the street or from outside their house due to the development of effective stealing techniques. Face detection system (FDS) is employed in this suggested vehicle security system to find the driver's face and contrast it with a predefined face. Computer vision-supported real-time vehicle security systems offer a solution to the current issue. The suggested vehicle security system carries out picture processing based on real-time user authentication with the aid of face detection and identification methods. As the individual climbs into the driver's seat of the parked vehicle.

Keywords:Facial recognition, camera, Raspberry pi, python software

I.Introduction:

Vehicle theft is a serious problem everywhere, and it puts a heavy emotional and financial strain on owners. Vehicle anti-theft systems have progressed recently, utilising cutting-edge innovations like facial recognition and IoT notification to offer a more complete and efficient solution. This demonstrates a real-time use of facial recognition with IoT notification for car anti-theft detection and prevention. To verify that the driver is the authorised user of the vehicle, the system uses a camera mounted on the dashboard of the car to capture the driver's face image, which is then processed using facial recognition software. An IoT network attached to the facial recognition software transmits real-time notifications to the owner's smartphone.

II.Methodology:

Only authorised individuals are permitted to operate the vehicle, which has an advanced technology that can be used to identify facial expressions. the system's implementation of a facial detection algorithm, which is used to identify the driver. The facial recognition system uses that result to determine how to start the car. The Raspberry Pi is used to operate the prototype of this system. When an unauthorised user tries to use the vehicle, the face of the person is scanned to see if it matches the authorised user or not. Legacy systems are unable to recognise faces that are partially or completely masked or notify the home owner of a theft in real time. Using a CCTV camera without night vision on an old system to find the burglar in the dark is also difficult. The main problem with this type of system is that it requires either manual video surveillance, which is nearly impossible, or the constant availability of a homeowner or family member Additionally, if a potential theft has been discovered, it is time-consuming to watch through every recorded.

III.Block diagram:

Both hardware and software mechanisms are used in this system; the hardware system consists of a power supply unit, a raspberry pi, a pie camera, a dc motor, and buttons; the software system consists of python code that is loaded onto the raspberry pi, which serves as the system's central processing unit. And in this manner, this technology is used for the safety of the car's electronic systems.

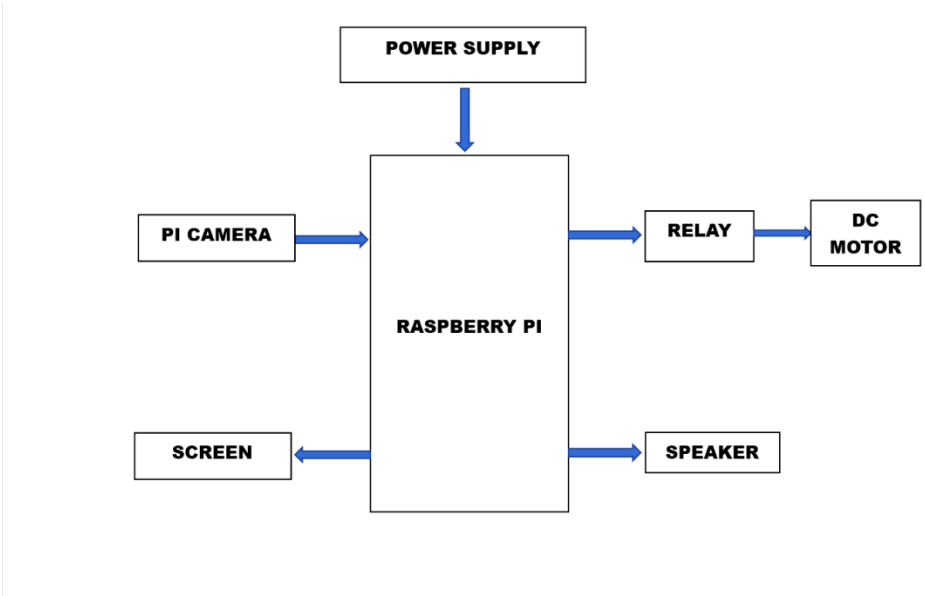


FIG 1: BLOCK DIAGRAM

IV.Design:

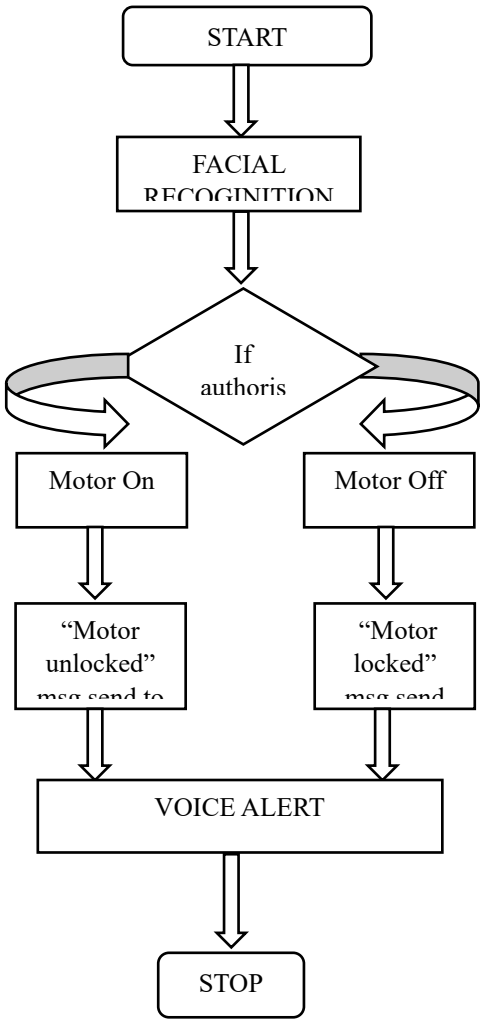
Hardware, software, and algorithms are all important parts of the design of a facial recognition and IoT notification anti-theft system for a car. The system's primary parts are as follows:

Camera: A camera is mounted on the car's dashboard to take pictures of the driver's face.

Software for facial recognition: To confirm that the driver is the vehicle's authorised user, facial recognition software is used to process the facial image acquired by the camera.

IoT network: The facial recognition programme is linked to an IoT network, which updates the owner's smartphone in real time.

V.Flowchart:



VI.Proposed work:

The proposed study intends to create an IoT-based facial recognition vehicle anti-theft system. A Raspberry Pi, a relay, and a DC motor will serve as the system's foundation. The driver's or owner's face will be photographed using the Raspberry Pi. To confirm the driver's identification, the image taken will be compared to the photographs that have been saved in the database. The system will trigger the relay to turn on the DC motor and start the car if the user's identity is confirmed. In contrast, if the owner's identification cannot be confirmed, the system will send them a notification through email or a mobile device informing them of the attempted theft of the car The planned system would also feature a remote access option, enabling the owner to check on the state of their car using a smartphone app. Real-time updates on the position of the car and the anti-theft system's operation will be available via the app.Through the use of cutting-edge facial recognition technology and Internet of Things connectivity, this system provides a practical and dependable method of preventing car theft. This system can offer a reliable and affordable method of preventing vehicle theft by utilising a RaspberryPi, relay, and DC motor.

SOFTWARE:

In this project we use PYTHON IDLE and PYTHON CODE for the programming of raspberry pi microcontroller.

VII.EXPERIMENTAL RESULTS:

The training set consists of many different frontal images of the authorized to drive the vehicle as shown below:

Fig 2:Image of person

When a potential driver enters the car, the system quickly recognises them. If the recognised face matches the authorised one that is stored in the training data set, the car will start once the potential driver presses the ignition button. Additionally, we can provide the algorithm n different training data sets. When a stranger enters the vehicle, as in the figure below, a face recognition system identifies him as a thief and notifies the owner of the theft.

Result:

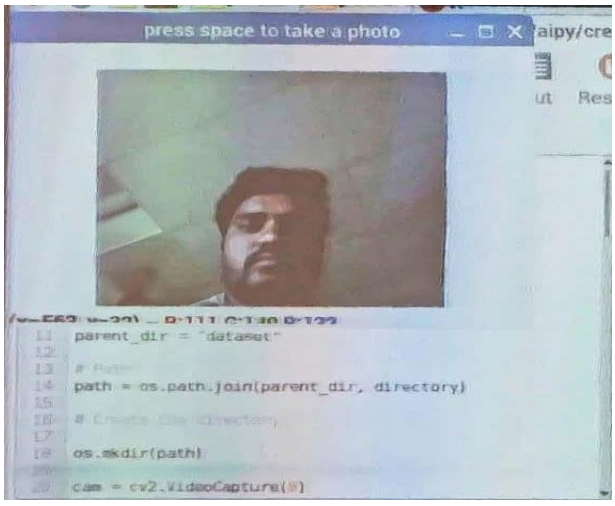


Fig 3:Image of authorized person

Fig 4: image of unauthorised person

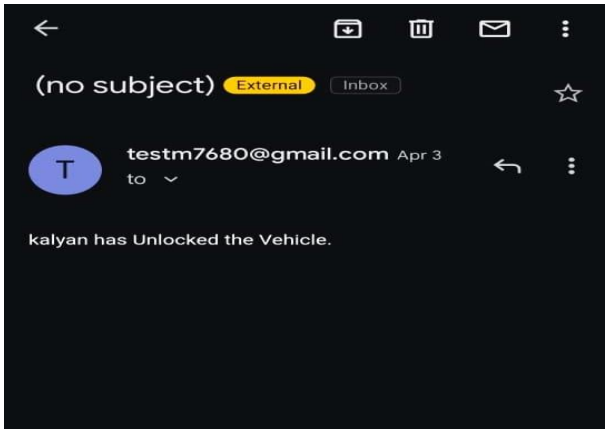


Fig 5:Screenshot of mail sent to owner

VIiI.Conclusion:

The main components of the proposed system are a raspberry pi pie camera, the internet, and a real-time application for the protection and detection of moving cars using IOT wireless notification. The pi-camera's hybrid mechanisms, such as the cascade algorithm, are used to identify and recognise the images that are recorded. The device is affordable, safe, and very effective, making it a great vehicle guard for the automotive industry.

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