

Smart Door Lock Opening In Cars Using Face Recognition

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Abstract: This paper explains the use of Biometric such as face recognition in automobiles such as cars. Nowadays the door lock in cars is released using keys, and then they can also be accessed using fingerprint, RFID etc. The use of keys to unlock the doors in cars is not efficient sometimes. Because the keys may be sometimes used by the wrong person. Hence this proposed system uses the face recognition for unlocking the doors in cars. This system is an efficient method to unlock the cars and at the same time provides security for the cars. Here raspberry pi is used for storing and processing.

Keywords: Biometric, face recognition, security, automobile, raspberry pi.

I. Introduction

The development in the technologies paved the way for safety and security. In case of automobiles such as cars they can be accessed using keys using keyless remote system. But the use of biometrics in this System will make it even more secure. The biometrics can be a Fingerprint, palm print, DNA, voice pattern, irises, eye retinas and Face recognition etc. This paper uses face recognition for the unlocking in cars. Face recognition can be made through face recognition sensor and the data's are stored in the micro controller .here raspberry pi is used for storing the data's and for processing. Once the image of the person is captured and it is compared with the stored data in the raspberry pi .when the image is matched with the stored image then the door will be unlocked in the respective cars else it remains locked. Only the right person can unlock the car hence it will be a more secure technology when comparing to others.

II. RELATED WORKS

Remote Keyless Entry System

The keyless entry system is an electronic lock that controls the vehicle by locking and unlocking without using the traditional mechanical key. The keyless entry system is also known as remote keyless entry or remote control locking refers to a lock that uses an electronic remote control as a key which is activated by a handheld device. Which are widely used in automobiles, remote keyless system is used to unlock the system without the use of physical contact.

Drawbacks:

- The remote keys can also be used by wrong persons.
- Duplicate keys can also be produced
- It uses non rechargeable battery hence the remote key has to be changed frequently.

RFID and Arduino Based Automatic Door Unlocking System

In this system RFID reader is placed outside the door. So if the person uses the right RFID tag then the access control system will be granted. In the same way when the person swipes with an unauthenticated RFID card then the data will not be loaded and the access will be denied.

Drawback:

- In case of missing of RFID card even the right person cannot open the door.

III. Proposed System

This method consist of three major steps

- (i) Storing the image of the respective individual in the database.
- (ii) Comparing the image with the image store in the database.
- (iii) Car's door unlocks automatically at the final steps.

Here biometric is used for storing and comparing data .since it is unique for every individual.

Block Diagram:

The block diagram for the given system comprises of webcam, filter circuit, raspberry pi, power supply, locker system.

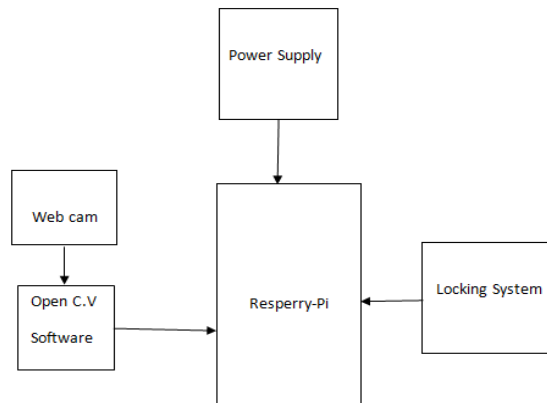


Fig 1: Block Diagram for the Proposed System

RASPBERRY –PI:

Here Raspberry pi 3 models B is used. The Raspberry Pi 3 Model B is the third generation Raspberry Pi. This powerful credit-card sized single board computer can be used for much application and supersedes the original Raspberry Pi Model B+ and Raspberry Pi 2 Model B. It adds wireless LAN & Bluetooth connectivity making it the ideal solution for powerful connected designs.



Fig 2: Raspberry Pi 3 Model B

Pin Description:

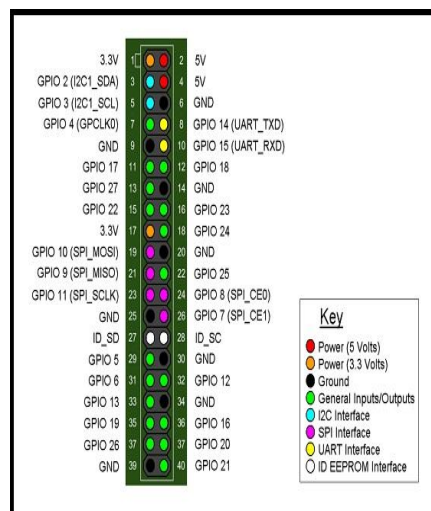


Fig 3: Pin Description of Raspberry Pi Model B

Web Camera:

Webcam is a compact digital camera which works same as conventional digital camera but is designed to interact with the web pages and other internet pages. It captures the real time images through a tiny grid of light-detectors, known as charge-coupled device (CCD) from the location where it is placed. The CCD converts the image into digital format so that PC can access this data. Webcams don't have the internal memory to store the images so it transmits the data immediately to the host device through the USB or other analog cable.



Fig 4: Web Camera

Here the web camera is used to capture the image of the respective individual. Then the captured image is sent to the raspberry pi using USB.

OPEN CV:

Open CV (open Source Computer Vision) is a library of programming functions mainly used for real-time computer vision. Open CV is written in C++. There are bindings in Python, java and MATLAB/OCTAVA. Here the open CV is used for processing the given image and for comparing the image.



Fig5: Open CV Software

Locking System:

It is used to lock and unlock the car doors. When the captured image is matched with the stored image it unlocks the door else it remains locked.

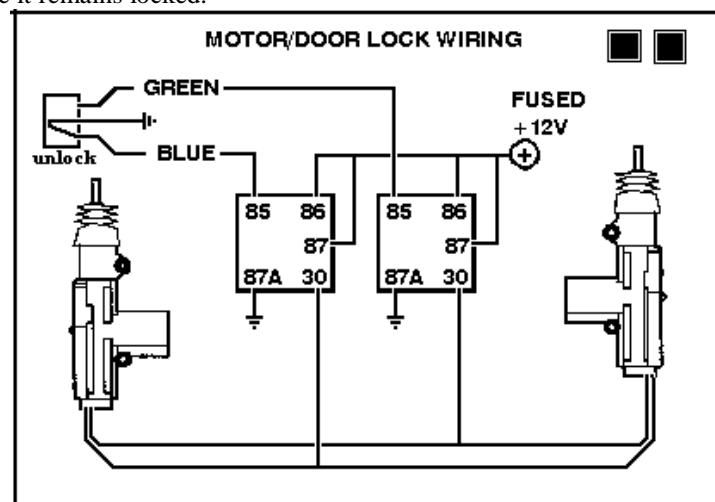


Fig 6: Locking System in Cars

IV. Working

This method mainly focus on the automatic door unlock using face recognition. First the images of the person are captured by the web camera and stored in the processor for further comparison.

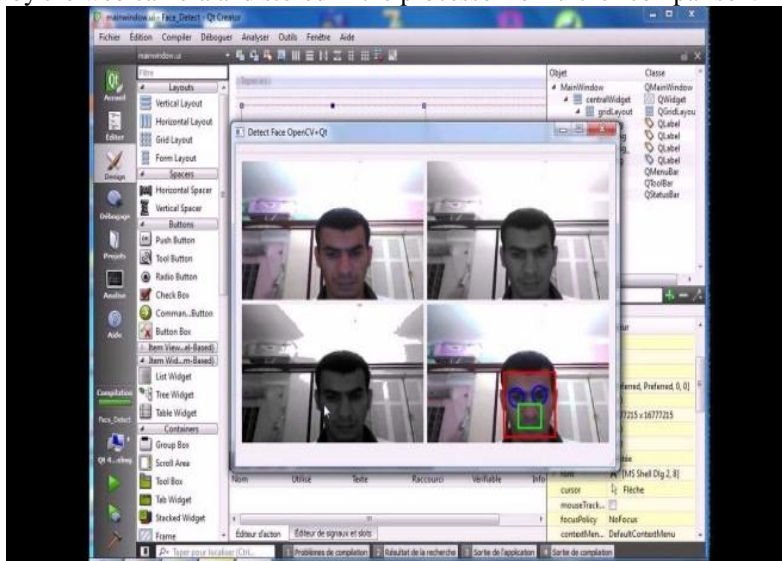


Fig 7: Captured Image in the Web Camera

Open CV software is used for processing the image and comparing. The stored image is the reference image. Next when the image is captured by the web camera the captured image is compared with the reference image. If the image gets matched to the reference image the trigger in the locker system gets opened due to the backward electromotive force (EMF) created by the driver motor else it remains locked.

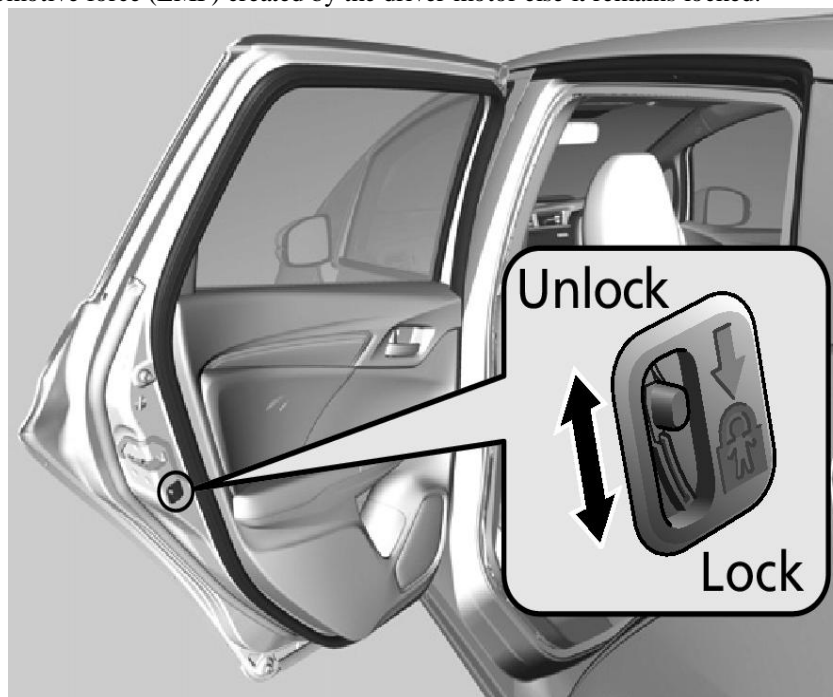
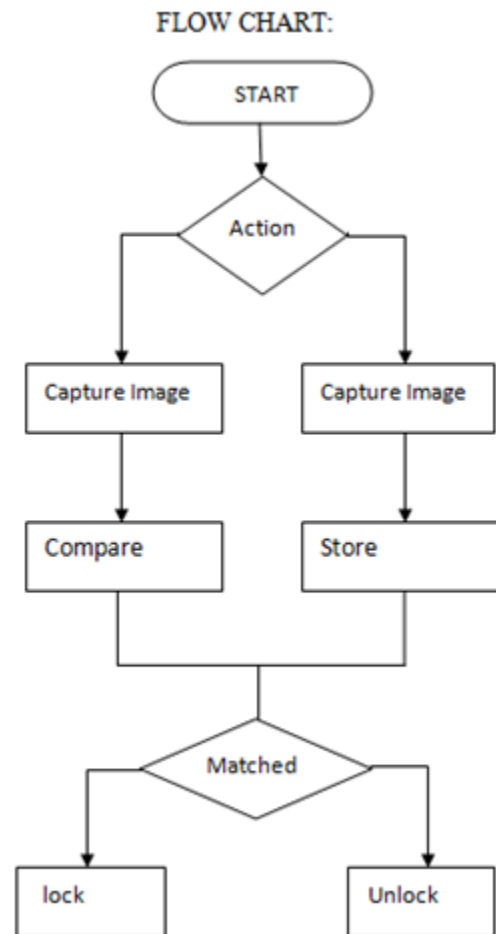


Fig 8: Lock and Unlock State in Cars



V. Conclusion

In this paper door access in cars using face recognition is presented. Automatic face detection and recognition is done using Open CV on raspberry pi .This paper mainly focus on the automatic door unlock using face recognition thereby minimizing the theft in cars. In case, if web camera fails the secret pin can be used. Further improvement can be made with multimodal biometric.

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