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# AUTOMOBILE DOOR ACCESS USING FACE RECOGNITION

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**Abstract-** The project gives an overview of automatic system to secure and safeguard the car, using signal image processing. To capture the image who wants to enter the car, a camera is placed in the frame of the car door, the captured image is sent to the database and stored in the system. To detect, recognize and compare the image with the stored dataset of the authenticated person Image analysis is performed. If the taken image does not match with the database then a mail is sent to the car holder. Raspberry Pi operates and controls by turning ON a relay for door lock /unlock.
**Keywords-** Raspberry pi, Pi camera, relay, image processing, database, Face recognition, security**.**

## I. INTRODUCTION

In the current technology, automatic personal identification accessibility control has become popular by using image processing in place of RFID, passwords, etc. The present security system available provides door lock or unlock facility based on the password entered, remembering a different password for different accounts or for different lockers can be tedious job. A person may forget a password when not used it frequently. One advance in the present password lock system are the one time password (OTP),which makes the system reliable but any person with the user OTP can access to the valuable data or stuffs. Hence there is a need of locker system that recognizes human face and opens the door, as human face is unique and can't be duplicated at any time.Most of the image data have to be collected and used as known images. Known images are identified by two types they are optimistic

image and unoptimistic image. Optimized images contains only faces and Unoptimized image contains background, but in our project we are only positive images.Once a person stands in front of the door,the face is automatically detected in ' Open CV ' by using face detection technique.It can only identify the facial part of an image,regardless of the background of this image, by using face detection.Detector is built using a socalled integral image in this system and some simple rectangular features reminiscent of haar wavelets.

Recognition of the face includes extraction of features, reduction of features and classification. Haar cascades are used for this operation. A Face Recognition is a method for automatically identifying and verifying a person's identity from digital images or from a video source.Using a stored faces database, the OPEN CV library is used to create given images of a scene to identify or

verify one or more people on stage.The basic facial recognition system flow isthat the camera captures the image. The algorithm for haar detects the face and extracts its characteristics.The system matches the captured images with the dataset after the extraction. The result of the matching in the command box is to determine which face match or no face match.After that, send the authorized person a security alert that is a successful or unauthorized person attempting to unlock.Our project aims to provide a highsecurity system using face recognition on the Raspberry Pi board and to send an alert through mail to the authorized person, which will increase our project's security.The purpose of this system is to help users improve the safety of sensitive locations through face detection and recognition.

## II.     RELATED WORK

The keyless entry system is an electronic lock that controls the vehicle by locking and unlocking without using the traditional mechanical key.[1 ] Also known as remote keyless entry or remote control locking, the keyless entry system refers to a lock that uses an electronic remote control as a key that is activated by a handheld device.Remote keyless system, which is widely used in automobiles, is used to unlock the system without physical contact. Some of the drawbacks are the remote keys can also be used by wrong persons, duplicate keys can also be produced and it uses non rechargeable battery hence the remote key has to be changed frequently.RFID reader is placed outside the door in this system. So if the person uses the correct RFID tag then the system of access control is granted. Similarly, if the person swipes with an unauthenticated RFID card, the data will not be loaded and the access will

be denied.[2] The disadvantage of this system is that if the RFID card is missing, the right person will not be able to open it. An application that can be used for multi-purpose activities to track and detect faces in videos and cameras.[3] The paper's intention is to study deeply face detection using open CV. To understand the algorithms more easily, a tabular comparison is performed. It discusses different algorithms such as Adaboost,Haarcascades.This paper aims to help understand the best facial detection prerequisites.A new method of face recognition is proposed based on the combined selection of features by DWT / DCT. The combination of DWT and DCT is used to extract face image features.[4 ] This reduces the original face image dimension and preserves the property of data distribution in the subspace of the feature.Then the support vector machine (SVM) is used to classify these feature vectors based on the structural risk minimization principle. The new strategy is being tested on ORL face databases and the results show that compared to other approaches it performs very well. Nowadays, the number of thefts and the identification of fraud has become a serious problem to avoid these thefts identifying fraud a system of face recognition must be established. The scope of this project is to develop a face recognition-based security access control application.[5] The haar-like features are used for face detection and the face recognition PCA algorithm is used. We use Open-CV libraries and python computer language to achieve greater accuracy. Embedded device known as Raspberry-Pi is used to train and identify. During our paper we focus on increased accuracy by controlling parameters such as background, light and training number. We also explain

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cost problems in our applications during our paperThe present security system available provides door lock or unlock facility based on the password entered, remembering a different password for different accounts or for different lockers can be tedious job. [6] A person may forget a password when not used it frequently.

## III. METHODOLOGY
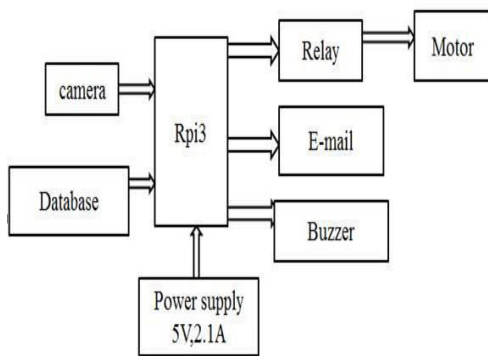


**Fig1:Face recognition system block diagram using Raspberry Pi**

In figure 1 above, show the basic block diagram for door unlocking / locking of the Raspberry pi B+ based face recognition system. The proposed work is as follows: First, camera module interfacing to capture live image face. Second, create an authorized person database to extract the facial characteristics. Third, Train the model with features on top of the face. Four, capture, save, and compare the current face with the image of the database. Fifth, when the locked door is unlocked, send security alert to the Authorized person. Sixth, as an output module, interface relay.
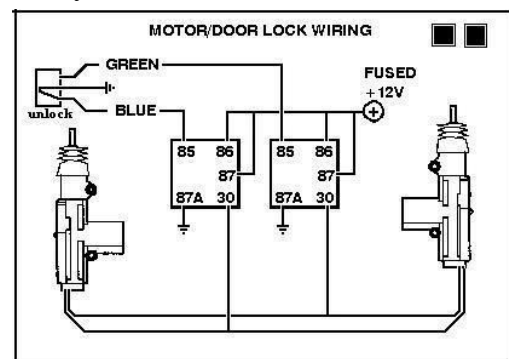
Digital camera module:

Pi camera module interfacing with raspberry pi module is a digital camera module. It is used to capture photographs and send photographs captured to the Raspberry pi module.

Raspberry pi module:

The Raspberry pi B+ module is a small computer board. When the picture of the raspberry pi is taken, the image of the trained face is compared. When we first capture the image to create a database module for raspberry pi, we capture six image types to create a system database and compare this database with thecapturedliveimage.The output is positive / negative after comparing two images, then it gives commands via gmail.

Locking System:

It's miles used to fasten and unlock the car doors. when the captured photo is matched with the stored photo it unlocks the door else it stays locked.



**Fig 2[7]: Locking System in Cars.**

Open CV software program is used for processing the picture and comparing. The saved picture is the reference image. subsequent while the photo is captured by the net digital camera the captured picture is as compared with the reference picture. If the picture gets matched to the reference picture the trigger within the locker system receives opened because of the backward electromotive force (EMF) created via the driving force motor else it stays locked.

### 1) RASPBERRY PI:

The Raspberry Pi 3 B+ Model is Raspberry Pi's third generation. It has an updated 64-bit quad core processor

running at 1.4GHz with faster 802.11 wireless LAN dual-band, faster Ethernet (300mbps), built-in heatsink metal, and PoE capable ethernet for 64-bit processor overheating, 1 GB RAM.It has separate microSD card slot for loading OS(operating system) and data storage.

## 2) PI CAMERA MODULE

Webcam module board for 1.3 generic 5M P video camera. It therefore offers 1080p HD video recording at 30fps and 720p at 6 0fps with 25x23x8 (LxWxH) mm dimensi ons. The camera is capable of 2592 x 1944 static piexel image in still image. 640x480 p video recording of 60/90. It has the interface type of CSI(Camera Serial Interface).In this project we are using this pi camera to capture the images.

## 3) PIEZO BUZZER

The piezo buzzer produces the piezoelectricity's reverse sound support. It is the underlying principle that generates pressure variation or strain through the appliance of electrical potential across an electrical material. These buzzers can be used to alert an event user to a switching action, counter signal or input sensor. They are also used in circuits of alarms.

## 4) 5V-2 CHANNEL RELAY MODULE

The 5 pins of Relay are NO(Normally Open),NC(NormallyClosed),COMM(Com mon) and two coil terminals. Where input signals used to be 1 and 0 were mechanically noted in terms of ON and OFF of a beep or light bulb, this means that the 1s and 0s pulses are converted to mechanical ON and OFF using electromagnet.

## IV. FLOW CHART
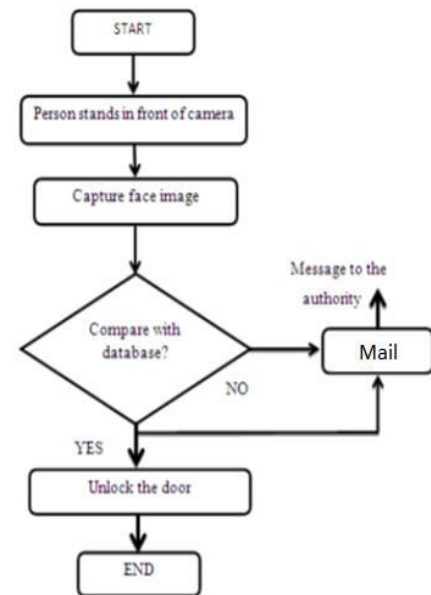


**Fig 3: Image capturing and database comparison**

## V. RESULT

Once the face is acknowledged and detected, the door opens the use of the face popularity generation.
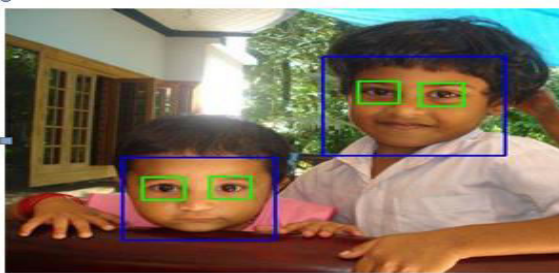This method encompass three most important steps:

- Storing the photograph of the respective character in the database.
- Evaluating the photo with the photograph save in the database.
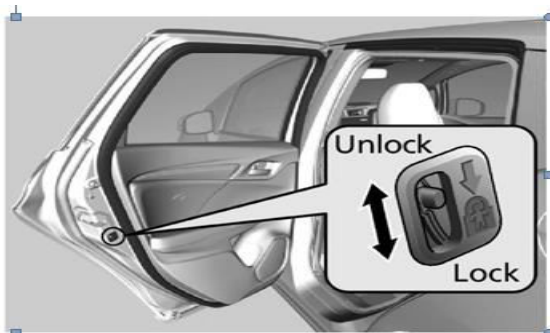- Automobile's door unlocks routinely at the very last steps.



**Fig 4: Hardware Interfacing**
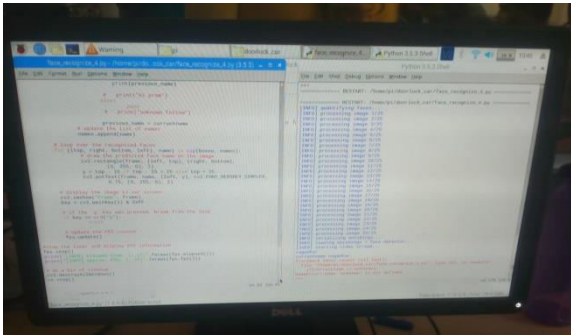
**Fig 5: Storing and training of images.**



**Fig 6[11]: Face Detection**



**Fig 7[7]: Lock and unlock state in car.**

## VI.    CONCLUSION

Door access / control in cars with face recognition in this project. Automatic face detection and recognition on raspberry pi using Open CV.The project mainly focus on the automatic door unlock using face recognition thereby minimizing the theft in cars and also remote keys can also be used by wrong persons. In case, if Pi-camera fails the web camera can be used. Further improvement can be made with multimodal biometric i.e fingerprint along with password.

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