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## Study Based implementation of Human Face Recognition by using Raspberry Pi

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### ABSTRACT

*This scheme can categorize a person from image capture. Nowadays security and surveillance are the most essential aspects of human being deduction. Face reorganization system using raspberry pi can simply unlock and lock the door through the image capture. Face detection is apprehensive with finding whether or not there are any faces in a specified image. Our paper describes a simple and uncomplicated hardware realization of face finding system using a raspberry pi. The results description that the anticipated system can be used for face exposure even from unfortunat quality images and shows excellent performance efficiency.*

**Keywords**— Solar Cell, Face Detection, Infrared Camera, Rasperry Pi, Security.

### 1. INTRODUCTION

Our venture is to open the door and close the door automatic with high security. In this current scenario, a lot of incidents occurs like robbery, theft, unwanted person enters our room. People always remain busy to do their work sometimes they forget to lock the door. Ancient security system requires the key, password, fingerprint, ID card. When compare to other security system face exposure is higher harmless. Because everyone has a unique face. We have to compare that single face image with multiple images from the input images. The PCA (Principle Component Analysis) algorithm uses mathematical tools such as Eigen value, eigenvectors, Eigen faces and Euclidean distance for recognition. As each image can be viewed as a matrix of aspect  $M \times N$ , this development is hushed handy and effortless to implement.

The image with the least Euclidean distance predicts the most accurate face. We use OPEN CV (Curriculum Vitae) records

that can be formulated as known images of a prospect make out or prove one or more people in the view using a stored record of faces. The fundamental flow of the face identification system is the image is captured by the camera. The PCA algorithms detect the face and extract their facial appearance. After pulling out, the system matches the captured descriptions with database metaphors. In the termination box, the result of the identical is settled on which is face equal or the no face contest.

### 2. RASPBERRY PI

To realize such a venture, the main and most essential step was a decision the hardware to use for the tool. We have preferred a Raspberry Pi model B3 to use in our device. We have done a lot of examining and compared rudiments in diverse microcontrollers, like, cost, processing, and user responsiveness. The main reasons why we have elected this definite element are the high dispensation capacity, rather a low charge, and its facility to adjust in unusual programming modes. The appliance uses Linux as a working system, which has admittance to a large number of libraries and applications well-suited with it. Raspberry Pi model B is shown in figure 1.



Fig. 1: Raspberry Pi

Raspberry Pi has an Ethernet port allowing us a network correlation as long as we are in the same subnet with the tool we want to contact and direct 4 USB ports used to unite diplomacy like a keyboard, mouse, camera, and other devices that connect through a USB(Universal Synchronized Bus) port. Raspberry Pi does not have an effective scheme earlier installed, but that can be downloaded from the Raspberry website, and transferred to an SD (Secure Digital) card. The system is programmed using Python programming language. We have urban algorithms, for face revealing and detection for security.

### 3. FACE DETECTION SYSTEM

In this section, we will describe an about Face detection which has numerous modules that are effective mutually as one to make the structure to run suitably. The segment consists of capturing a picture and Detecting face in the picture. The icon can be captured in existent time from USB webcam coupled to Raspberry Pi. Face detection is shown in figure 2 and 3.



Fig. 2: Face Detection



Fig. 3: Face Recognition

The utility of face detection element is to clarify whether a feature is accessible through real-time submission. The face detection is done by scan a reflection and verdict some model that represents a face. When the structure detects the face, it will construct a sub-icon such that face appears in the center and has identical size.

### 4. PROPOSED WORK

The aim of our scheme is to afford a high-security system using face detection on Raspberry Pi plank and send an observant to the authorized person via GSM (Global System for Mobile Communication) module, this will increase the protection of our project. The proposed work is as follows:

- a) Interfacing of camera element to arrest live Face image.
- b) Build a database of an authorized individual.
- c) Capture current face, save it and compare with database image.
- d) Interface GSM module to send safety prepared to an Authorized person while unlocking the locked door.
- e) Interface convey as an output section.

Here we are using a raspberry pi for door automation. By using this interfacing camera we are capturing a live image. Raspberry Pi has an SD card (memory card) for storing the data.

We are storing a required person image for a memory card. Then this memory card will insert a raspberry pi. When a

person entering in front of the door an image will capture by using interfacing camera. Layout face detection is shown in figure 4.

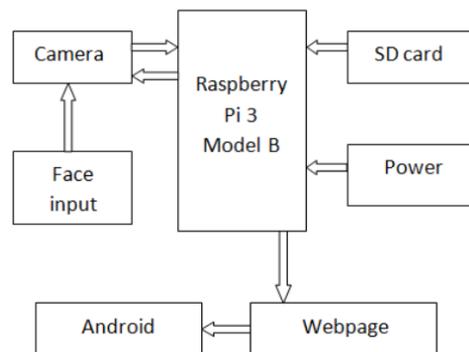


Fig. 4: Layout of Face Detection

This capturing image will send to the raspberry pi. Then this live capturing image will compare to the database. After comparing these images if the output is positive, a door opens automatically. If the output is negative, a door will not open a security system will alert a system. When a person is detected at the door, the camera will detect and imprison the features of the person. The icon is given to the Raspberry Pi during the USB haven in the Raspberry Pi. After getting the icon, which is agreed to the mainframe for extra dispensation. Initially, the annals documents and the programs installed in the SD card. This SD card is inserted in the SD card. The face recognition program will sprint but receiving that image. Outline of face detection is shown in figure 5.

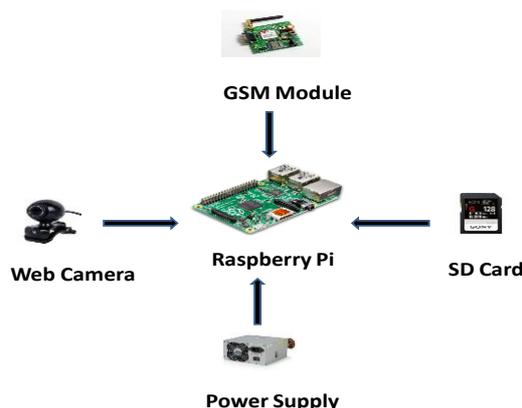


Fig. 5: Outline of Face Detection

For recognizing the face, Local dual example Histogram algorithm is used. That algorithm divides the icon keen on the block and segregates both block keen on 3\*3 porthole stir it crossways one likeness. The captured film is located on the webpage that is twisted for the consumer by using the actual Time stream Protocol (RTSP). Survey of face detection is shown in figure 6.

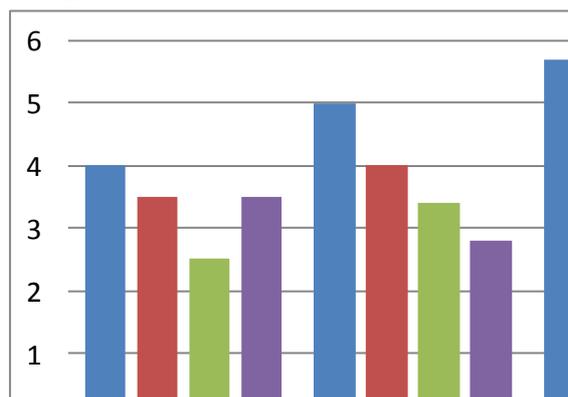


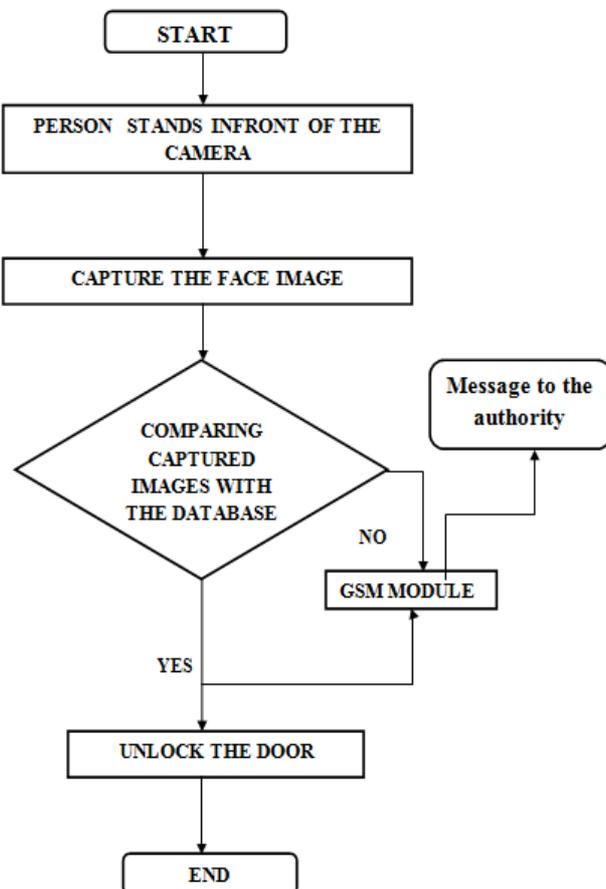
Fig. 6: Survey of face detection

At both move, evaluate the pixel at the axis, with its immediate pixels. symbolize the neighbors with passion charge less than or like to the midpoint pixel by 1 and the break by 0 behind you convert these 0/1 morals below the 3x3 transom n a clockwise regulate, you will have a binary model like 11100011 that is narrow to a fastidious locale of the photo. When you close doing this on the full figure, you will have a record of the general dual pattern. If it does not match with the images in the database, the camera starts to record the video of the affair for a particular time period. The RTP protocol converts the captured video into RTP packets and sends the packets one by one to the webpage. Microcontroller, Arduino and Raspberry Pi processor speed and memory are shown in table 1.

**Table 1: Comparisons of Three Device**

S. no	Speed	Memory
Microcontroller	700KHz	8KB
Arduino	8-16MHz	32KB
Raspberry Pi	1.2GHz	1GB

Each packet consists of cause talk to, target address, packet extent, and cassette frame. Once the video located at the webpage, the customer will obtain the notice of the incident, which is located on the webpage. The web page is a paper that is fit for www (World Wide Web) and web browsers. The web page is view on the Android mobile with the facilitation of web browsers such as Mozilla Firefox, Google chrome etc. To vision the webpage on a mobile phone, the web view purpose is used which is natural in the machine itself. Web view can help if your request provides data to the user that forever require an internet connection for retrieving the data. Usually, the evasion web browser opens and loads the purpose URL (Uniform Resource Locator). Finally, the video on the web page is viewed in the robot.



**Fig. 8: Procedure for face identification**

That time episode will be specific in the course and the record will be captured. The RTP practice is guilty of converting the video into RTP packets and transmitting them to the webpage. RTCP does not involve in the transmission of RTP packets but it controls the operations. That time episode will be specific in the course and the record will be captured. RTSP is accountable for transmitting the record to the webpage. It is the grouping of equally Real Time move procedure (RTP) and Real-Time Control practice (RTCP). RTCP does not involve in the transmission of RTP packets but it controls the operations.

**5. CONCLUSION**

The can be used several places like hospital bank home etc., the design of the face organization system using raspberry pi can safer, easy to use, smaller, low power consumption. Theses system was programmed using python programming language. The propose of the face detection system using Raspberry Pi can build the lesser, lighter and with lower power spending, so it is more suitable than the PC-based face gratitude system. Because of the open source code, it is freer to do software advance on Linux. We use attitude module analysis algorithm for face detection. Also, send a protection alert message to the approved person utilities. The residential scheme is low-priced, express, and highly consistent and provides sufficient litheness to suit the necessities of diverse systems.

**6. FUTURE SCOPE**

Using raspberry pi the recent project can be customized by an Infrared camera interfacing it can be used in elegant observation Monitoring defense system which any type of unrestricted security is using existing body finding or intellect work, Also it can be used in the present system of the class, Also some insightful applications can be implemented using interfacing of Raspberry Pi and Arduino UNO board like sensor application of smartcard swapping, alcohol detection, finger detection.

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