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RASPBERRY PI BASED FACE RECOGNITION SYSTEM FOR DOOR UNLOCKING

Akshay N. Patil [1], Rohit B. Ranavare[2],

Dayasagar V. Ballal[3],Asst. Prof. P. P. Kotekar[4]

[123]Student, [4]Assistant Professor, Department of Electronics & Telecommunication, DMGOI, Kolhapur (India)

ABSTRACT

This paper deals with the design and implementation of Secure locking Automation using Raspberry Pi for Door unlocking to provide essential security to our homes, bank lockers and associated control operations and send security alert through the GSM module. Raspberry Pi operates and controls the video camera for capturing it for turning ON a relay for door unlock. The module contains a secured face recognizer for automatic door opening.

***Keywords*: Raspberry pi B+ model, Pi camera, PCA, SIM 300.**

I.INTRODUCTION

A Face Recognition System is a system which automatically identifies and/or verifies the identity of a person from digital images or a video frame from a video source. We use OPEN CV library that can be formulated as given images of a scene identify or verify one or more persons in the scene using a stored database of faces. The basic flow of the face recognition system is the image is captured by camera. The PCA algorithm detects the face and extracts its features. After the extraction, system matches the captured images with data base images. In the decision box the result of the matching is decide which is face match or the no face match.

After that SIM300 GSM module sends an security alert to the authorised person which is entry successful or unauthorised person trying to unlock. Tools used are normal and widely applied for current applications and python as the main programming language & Linux based operating system, one can use C, JAVA or Perl also. On being successful, with further optimizations and improvements, the system may be implemented in real time systems requiring user authentication such as attendance systems, ATM security, Network security, In Bank locker, Home automation.

II. PROPPSED WORK

The aim of our project is to provide a high security system using face recognition on Raspberry Pi board and send an alert to the authorised person via GSM module, this will increase the security of our project. The proposed work is as follows:

1) Interfacing of camera module to capture live Face image.
2) Create a database of authorized person

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3) Capture current face, save it and compare with data base image.
4) Interface GSM module to send security alert to Authorized person while unlocking the locked door.
5) Interface relay as an output module.

III.METHODOLOGY

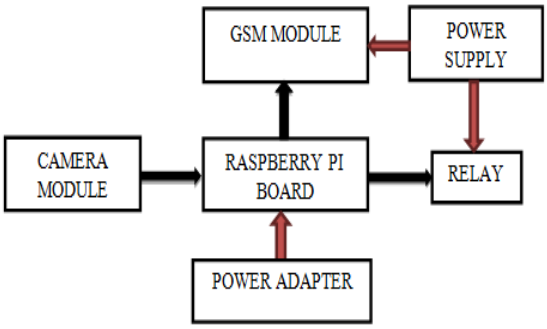

Fig 1: Block diagram of "Raspberry pi based face recognition system for door unlocking".

IV.WORKING

In above figure 1 show the basic block diagram of the Raspberry pi based face recognition system for door unlocking. Our project system can be operated in two different sections, i.e. one for capturing and creating a data base and the other section is to capture the image and which is used for identifying or comparing the images in the database. Here in the second section we use Eigen faces methodology of face recognition for finding the matches.

Camera module: Camera module is Pi camera interfacing to the raspberry pi module. It is used for captures an image and send captured image to the Raspberry pi module.

Raspberry pi module: Raspberry pi B+ module is small computer board. When image taken by the raspberry pi it is compared with Eigen face image. At the first time when we capture the image to create a data base raspberry pi module capture six types of the images to create a data base in the system and this data base is compared with the live captured image. After comparing two images output is positive/negative then it gives commands to GSM module.

GSM module: GSM module is used to sending a message to the authorities after comparison output is positive or negative. If output is positive then "Person Identified!! DOOR OPENS!!" message send to the authority person otherwise send "unknown person is trying to unlock the door".

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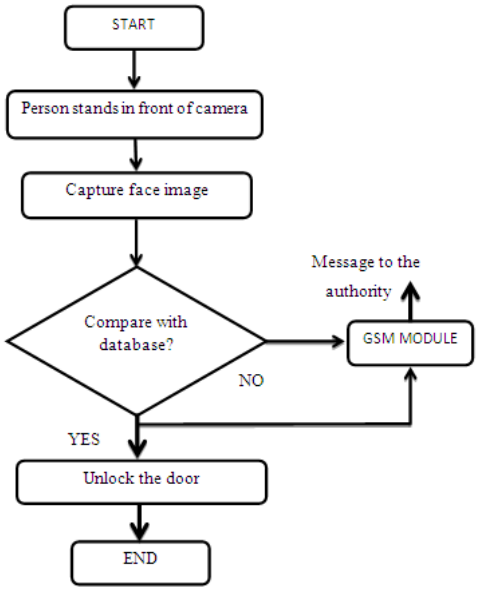

Fig 2: Flowchart of Image capturing and database comparison

Figure 2 shows the basic flow of the system to Image capturing and database comparison.

V.CONCLUSION

The design of the face recognition system using Raspberry pi can make the smaller, lighter and with lower power consumption, so it is more convenient than the PC-based face recognition system. Because of the open source code, it is freer to do software development on Linux. We use Principle component analysis algorithm for the face recognition and detection process. Also send a security alert message to the authorized person utilities. The developed scheme is cheap, fast, highly reliable and provides enough flexibility to suit the requirements of different systems

VI. FUTURE SCOPE

Using raspberry pi the current project can be modified by an Infrared camera interfacing it can be used in Smart Surveillance Monitoring security system which any type of public security is using Living body detection or spying, Also it can be used in Attendance system of the class, Also some profound applications can be implemented using interfacing of Raspberry pi and Arduino UNO board like sensor application of smartcard swapping, finger detection, alcohol detection, agriculture humidity sensing, Temperature sensing using web server, and many more.

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