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IOT BASED DOOR LOCK AND UNLOCK SYSTEM USING FACE RECOGNITION

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Abstract – *A day to day home security level grown up to provide security to our house IOT based face recognition can be implemented. A standard web camera to capture the image to identify the visitor. It's a method that identifies the visitor. If the face recognizes visitor, it will greet them by name and the door will be unlocked name opened. If they are not identified door will unlocked. The system will perform detection and recognition rapidly in real time when face in front of camera. This project basic utilizes the camera, and then internet connection to create a door unlocks itself by facial recognition. If the user at the door is recognized, door will be unlocked! This project is mainly for future features: safety, monitoring, security and control to home automation. Firstly the system needs a face authentication for the visitor to be able to enter the home (lock/unlocked). When an unauthenticated tries to log into system, this face will be capture the image of visitor And it will be sent to Gmail address to an admin person. The system should also support the password unlocked system.*

Key Words: *IOT- Internet of Things, USB- Universal Serial Bus*

1. INTRODUCTION

The Face is commonly used biometric to recognize people. Face recognition has received substantial attention from security guard due to human activities found in various applications of security like forensic, airport, face tracking, criminal detection, etc. Compared to other biometric traits like palm print, finger print, palm print etc. They can be taken even without visitor knowledge and further can be used for security based applications like criminal detection, face tracking, airport security, and forensic etc.

Face recognition involves capturing face image from a from a web camera. They are capture image of visitor and compared image with the stored database. Classify them with known classes and then they are stored in the database. Face biometrics is a challenging field for researchers with various limitations imposed for machine face recognition like variations in change in illumination, head poses, facial expression, occlusion, aging etc. Various approaches were suggested by researchers in overcoming the stated. Automatic face recognition involves feature extraction and face recognition, face detection. Face recognition algorithms are classified into two classes as geometric feature based and image template based. The template based methods compute correlation between one or more model templates and face to find the face identity. Principal component analysis, kernel methods, linear discriminate analysis etc. are used to create face templates. The geometric feature based methods are used to analyze explicit local features and their geometric relations .Multi resolution tools such as ridge lets were found to be useful for analyzing information content of images and found its application in pattern recognition, and computer vision, image processing.

1.1 PROBLEM IDENTIFICATION AND PROJECT OBJECTIVES

A) PROBLEM IDENTIFICATION:

a. POSE VARIATION:

Comparing pose is another fundamental challenge for face recognition system. Some unavoidable problems appear in the variety of practical applications such as the people are not always front of the camera, so the pose problem is a big problem for the face recognition system to be detection. The difference between the different persons under the same poses, it is difficult for the computer to do the face identification when the poses of the gallery images are different. Pose variation still presents a challenge for face recognition.

b. OCCLUSION:

The face recognition context, occlusion involves that some parts of the face cannot be find. For example a face photography taken from a web camera could be partially hidden behind column. The recognition process couldn't find of a full input face. Hence, the absence of some parts of the face may lead to not find full face. There are also objects that can occlude facial features goggles, beards, certain haircuts, hats etc.

c. EXPRESSION:

Comparing faces with different facial expression is another problem for some face recognition applications. Faces undergo large deformations under facial expressions. Human can easily handle this variation, but the algorithms can have problems with the expression databases. Face

recognition under extreme facial expression still remains an unsolved problem, and temporal information can provide significant additional information in face recognition under expression. The performance of face recognition system significantly decreases when there is a dramatic expression on the face. Therefore, it's important to automatically find the best face of a subject from the images. Using the neutral face during enrollment and when authenticating, so that we can find the neutral face of the subject from the six universal expression like Happiness, unhappiness, anger, horror , surprise.

d. AGING:

Face recognition across aging is most challenging in that it has to address all other variants as well. Pose expression and illumination changes are bound to happen for two images of a person taken years apart. In addition to this, textural properties of the skin can be different as well makeup, eyeglasses, weight loss/gain, hair loss, etc. The facial changes that occur due to aging are influenced by numerous environmental factors like solar radiation, smoking, drug usage, stress level, etc. The different biological and environmental factors can either delay or expedite the process of aging. Aging results in changes in both the hard and soft facial tissue of an individual. Loss of tissue elasticity and facial volume and alteration in skin texture are some of the other changes with aging. Drifts in facial landmarks appear to reasonably characterize the shape variations associate with aging, especially in ages 2-18.

e. TRANSFORMATIONS:

The same face can be presented to the system at different scales. This may happen due to the focal distance between the face and the camera. As this distance gets close the face image gets bigger. Head orientations may change due to translations and rotations.

f. ILLUMINATION:

Comparing two faces with different illumination is one of the fundamental problems for face recognition system. Face images of the same person can be taken under different illumination conditions such as, the position and the strength of the light source can be modified like the ones.

B) PROJECT OBJECTIVE:

There is few objectives design face detection system. The objectives of face detection are:
1. To design real time face detection system.
2. To utilize the face detection system based on Haar classifier.
3. To develop face detection system using open CV.
4. Users could operate on a touch screen to select entering the house by the house by recognizing face or entering password. For face recognition, an image will be captured by camera and preprocessed and converting, resizing and cropping, then face detection and recognition are performed.

2. BLOCK DIAGRAM

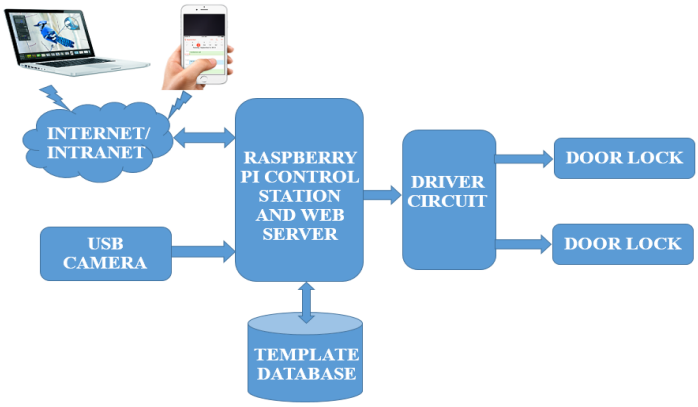

Fig -1: block diagram of IOT based door lock or unlock system using face recognition.

The system will works in two different parts. The first part is for capturing and creating a database by storing the image. And the second one is to compare the image with the stored images in the database .For feature extraction we will use Eigen faces methodology and Euclidian distances will used for recognition of the face.

CAMERA MODULE: Camera module is pi camera interfacing to the raspberry pi module. It is used to capture images and send the clicked images to the raspberry pi module. Camera contains LEDs and flashes to handle that light condition that is not explicitly supplied by the environment and these light conditions are known as ambient light conditions.

RASPBERRY PI MODULE: raspberry pi 3 module is a small computer board. When an image is taken by raspberry pi it is compared with database image. For the first time when we capture an image to Create a database raspberry pi module captures many images to create a database in the system and this database is compared with the live captured images. After comparing the two images, based on whether the output is positive or negative it gives commands to GSM module.

GSM MODULE: GSM module is used to send a message to the authorized people based on the output. If the output is positive "Information matched Access granted" message will be sent to the authorized people, otherwise in case of unauthorized access it will send an "Access denied. Some unknown person is trying to unlock the door". Message to the certified users of the system. As with any system, the initial stage is to visualize the core modules, inputs, outputs and interrelations among them; this can be effectively done using a flow chart, above is a graphical representation of the proposed system.

3. CONCLUSIONS

The arrangement of a facial recognition system using raspberry pi can make the system littler, lighter and work successfully utilizing lower control use, so it is more convenient than the pc- based face recognition system. It is open source software on Linux. Also, send a security alert message to the authorized person utilities. We are also providing power backup for the smooth and continuous functioning of the system in case of power failure. The power bank is used to charge the Raspberry Pi so there is less chance to slow down the system.

This development scheme is cheap, fast, and highly reliable and Raspberry pi takes less power and provides enough flexibility to suit the requirement of different people.

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REFERENCES

[1] Çarıkçı M. Özen F. 2012 A Face Recognition System Based on Eigen faces Method.

[2] Jogdand S. Karanjkar M. 2015Implementation of Automated Door Accessing System with Face Design and Recognition.

[3] Sowmiya, U. shafiq mansoor J. 2015 Raspberry pi based home door security through 3g dongle.

[4] Kartik J. Srimadhavan V. 2013 SMS Alert and Embedded Network Video Monitoring Terminal.

[5] Sahani M. Nanda C. Sahu A. Pattnaik B. 2015Web Based Online Embedded Door Access Control and Home Security System Based on Face Recognition.