PC –Z Security using Eigenface

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Abstract- *Nowadays all the people are using the internet. So the Cybercrime or hacking are increases on the internet day by day. For giving security to pc is very much important so we are developing this system pc-z security. We are used as SMTP, MIME, POP technologies. In our project we are developing a System such that we capture the image of the authorized as well as unauthorized person by using the web-cam. Then image matching of that image is done with admin stored image from the database. Image matches admin image, admin can access the system and if image does not match then the person will be unauthorized, so for security we send a message on the admin mail on a email-id with hacker's image and some notification. In the reverse we are changing the password by random string generation and then Shut-Down the computer. Image matching is not visible to new user so he is unaware from this software so this will definitely be helpful to make them fool.*

Keywords- Image processing, Spontaneous facial expression, Eigen face.

I. INTRODUCTION

To make able various organizations to provide satisfactory & secure working to their employees & make sure for complete security to data in organization it should be necessary to maintain application providing security.Face recognition gives several benefits over other biometric technique, a few of which are outlined here: Almost all technologies require some action by the user, i.e., the user needs to place his hand on hand-rest for fingerprinting or hand detection and for iris or retina identification person has to stand in a front of a camera.

Biometric is particularly beneficial for security. Iris and retina detection need costly equipment and are much too sensitive to any body motion. Voice recognition is affected by background noises in public places. Voice Signatures can be modified or forgot. Facial images can be easily captured with cameras. Face recognition is totally non-intrusive and does not carry any such health risks. When the biometric devices recognize some part of human part the laser beam which omit by devices its harmful for health. Now a day's people are aware of capacity and power of Computers. They often use Computers for storing confidential information or huge Servers are maintained to store large Database of any organization. With increase in use of these servers, frauds or abused actions are also getting increased, which is hazardous to such huge Servers. So Security of such system is so important.

We are basically working in Security domain. We are developing a system that makes use of Image processing concept for intrusion detection and that named as PCZ Security. It detects the intrusion by matching user's image with administrator's image. But if image does not match, then it informs it to administrator so that quick actions can be takes place. With intrusion detection, our proposed system also gives information (Image) of Novice User who tried to access administrators system, so that he can be tracked easily. In Proposed system also send a e-mail on administrator accounts using SMTP, MIME, POP protocol.

We are creating such applications which will help us to stop the cybercrime. It is not visible to novice user which means he is unaware of this software so this will definitely helpful to make them fool. So PCZ Security will be such a powerful intrusion detection system which provides image based detection. There are two general categories of attacks which intrusion detection technologies attempt to identify Anomaly detection and Misuse detection. So our System covers both Detections.

II. MATERIALS AND METHODS

➢ Eigen Face Algorithm:

• Steps of Eigen face Algorithm

1. The first step is to obtain a set S with M face images. In our example M = 25 as shown at the beginning of the tutorial. Each image is transformed into a vector of size N and placed into the set.

$$S = \{ \Gamma_1, \Gamma_2, \Gamma_3, \ldots\ldots , \Gamma_M \}$$

2. After you have obtained your set, you will obtain the mean image Ψ

$$\Psi = \frac{1}{M} \sum_{n=1}^{M} \Gamma_n$$

3. Then you will find the difference **Φ** between the input image and the mean image

$$\Phi_i = \Gamma_i - \Psi$$

4. Next we seek a set of M orthonormal vectors, **u_n,** which best describes the distribution of the data. The kth vector, **u_k,** is chosen such that

$$\lambda_k = \frac{1}{M} \sum_{n=1}^{M} \left(u_k^T \Phi_n \right)^2$$

is a maximum, subject to

$$u_l^T u_k = \delta_{lk} = \begin{cases} 1 & \text{if } l = k \\ 0 & \text{otherwise} \end{cases}$$

Note: **u_k** and λ_k are the eigenvectors and eigenvalues of the covariance matrix **C**

5. We obtain the covariance matrix **C** in the following manner

$$C = \frac{1}{M} \sum_{n=1}^{M} \Phi_n \Phi_n^T$$

$$= AA^T$$

$$A = \{ \Phi_1, \Phi_2, \Phi_3, \dots\dots , \Phi_n \}$$

6. A^T

$$L_{mn} = \Phi_m^T \Phi_n$$

7. Once we have found the eigenvectors, v_l, u_l

$$u_l = \sum_{k=1}^{M} v_{lk} \Phi_k \qquad l = 1,\dots\dots , M$$

Figure 4: These are the Eigen faces of our set of original images [15]

- **Recognition Procedure**

1. A new face is transformed into its Eigen face components. First we compare our input image with our mean image and multiply their difference with each eigenvector of the L matrix. Each value would represent a weight and would be saved on a vector Ω.

$$\omega_k = u_k^T (\Gamma - \Psi)$$

$$\Omega^T = [\omega_1, \omega_2, \dots\dots, \omega_M]$$

2. We now determine which face class provides the best description for the input image. This is done by minimizing the Euclidean distance

$$\varepsilon_k = \left\| \Omega - \Omega_k \right\|^2$$

3. The input face is considered to belong to a class if ε_k is bellowing an established threshold θ_ε. Then the face image is considered to be a known face. If the difference is above the given threshold, but bellow a second threshold, the image can be determined as a unknown face. If the input image is above these two thresholds, the image is determined NOT to be a face.

4. If the image is found to be an unknown face, you could decide whether or not you want to add the image to your

training set for future recognitions. You would have to repeat steps 1 through 7 to incorporate this new face image [1].

III. RESULTS

In this System when recognize the face of particular person its match it with the stored admin images then its ok, if it doesn't match it sends unauthorized person image on the administrator email id.

If someone will be disconnect the admin computer from the network then administrator computer will be automatically shut down.
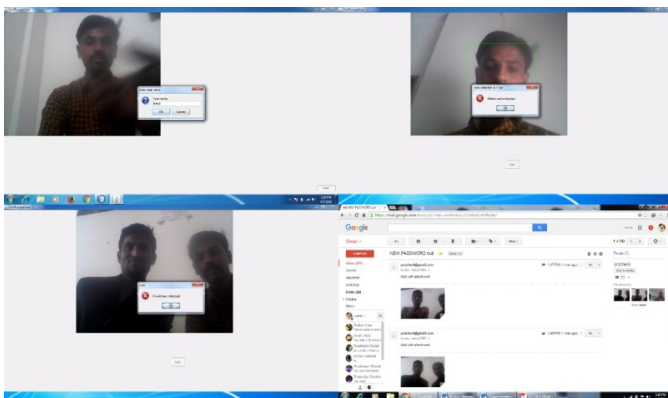

Fig. Result of proposed system

IV. CONCLUSIONS

In this paper we have proposed better security of Eigen Face algorithm is used. It is having extra features like automatically shut down computer when unauthorized user accesses our computer. This paper provides security like capturing face of unauthorized person and sends it to the owners email.
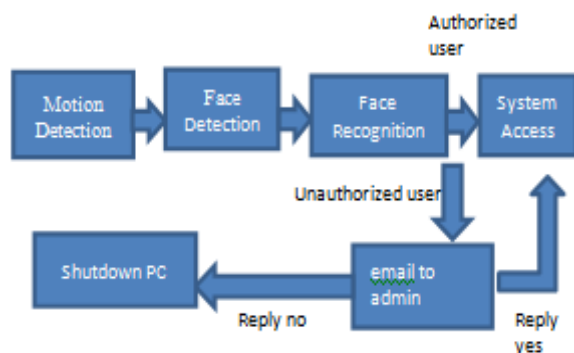
V. SYSTEM ARCHITECTURE

Figure 5: System Architecture

The input of a face detection system is an image or video stream. The output is an identification or verification of subjects that present in the image or video stream. Face recognition system contain the face detection, feature extraction, face recognition.

Face detection is the process in which it extracts the faces from scenes. Then the system can identifies a certain image region as a face. Feature extraction means obtaining related facial features from the data. These features may be certain face regions like eyes, nose, chick, mouth. And finally it recognizes the face. For this different algorithms are use.

If the Person is authorized then take System access to that authorized Person, if it unauthorized person then Sms or email send on admin mobile number or email id through the sms if admin want to give permission for the unauthorized person to access the PC then it sent yes reply to system through the sms gateway then system will be accessed by unauthorized person and if admin send reply no then pc can be shutdown remotely. Also the unauthorized person image store on admin email id.

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