



Ms. Apeksha N. Gaikwad.  
Computer Engineering  
KJ College of Engineering and  
Management Research  
Pune, Maharashtra, India.

Ms. Sharayu D. Dhamale  
Computer Engineering  
KJ College of Engineering and  
Management Research  
Pune, Maharashtra, India.

Ms. Priyanka A. Ghevade  
Computer Engineering  
KJ College of Engineering and  
Management Research  
Pune, Maharashtra, India.

Mr. Kunal B. Patil  
Computer Engineering  
KJ College of Engineering and  
Management Research  
Pune, Maharashtra, India.

Prof. Mr. Vikas B. Maral  
Computer Engineering  
KJ College of Engineering and  
Management Research  
Pune, Maharashtra, India.

## Survey Paper on Multimodal Spontaneous Face Detection using PCZ Security

### Abstract

Today's world is computerized world. The cybercrime is also on an increase the web of www is increased day by day. So protection of software is the important part. For this purpose we are developing the PC-Z Security System With the help of some technologies such as SMTP, and MIME, SMLIB. 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 webcam. 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 mobile phone with help of any gateway and a mail on admin email-id with hackers' image and some notification. In the reverse we are changing the password by random string generation and then Shut-Down the computer remotely. 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, Principal Component Analysis (PCA).*

## 1. INTRODUCTION

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 fixed position in 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.

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.

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.

## 2. RELATED WORK

Face recognition is one of the applications of image analysis. In 2009, a simple search on "Face Recognition" in the IEEE Digital Library throws 9422 results 1332 articles. Examples are Video surveillance, human-machine interaction, photo cameras, and virtual reality. Face recognition is a relevant term in pattern recognition, neural networks, computer graphics,

image processing and psychology. In the 1950's in psychology the work on this subject has been made. They belong to other issues like face expressions, emotions and perception.

The research on this subject was Woodrow W. Bledsoe. During 1964 and 1965, Bledsoe, along with Helen Chanand Charles Bisson, worked on to recognize faces using computers.

He continued later his researches at Stanford Research Institute. Bledsoe designed and implemented a semi-automatic system. Some face coordinates were selected by a human operator, and then computers used this information for recognition. Face recognition allows variation in illumination, head rotation and aging. Researches trying to measure subjective face features as ear size or between-eye distance. In 1973, Fischler and Elschanger tried to measure similar features automatically.

Algorithm used local template matching to measure facial features. There were approaches back on the 1970's. A face as a set of geometric parameters and based on those parameters performs some pattern recognition. In 1973 Kenade was developed a fully automated face recognition system. Kenade compares this automated extraction to a human or manual extraction, showing only a small difference. He got a correct identification rate of 45-75%.

In 1986, the Eigen Faces in image processing technique was made by L. Sirovich and Kirby. This methods were based on the Principal Component Analysis. The goal was to represent an image in a lower dimension without losing information, and then reconstructing it.

In 1990's, the recognition of the mentioned Eigen face approach was the first industrial applications. In 1992, Mathew Turk and Alex Pentland of the MIT presented a work which used Eigen faces for recognition. Many approaches which has led to different algorithms like PCA, ICA, LDA and their derivatives. That algorithm was able to locate, track the subject's head.

### **3. WHAT IS PC-Z SECURITY SYSTEM?**

In our project we are developing a System such that we can get the image of the unauthorized person and authorized user using the web cam. Then Image matching is performed with the stored admin image if result fails then we send a message on the owner's mobile phone and mail on admin email-id. In the reverse we are changing the password by random string generation and then Shut-Down the computer remotely. We can create such applications which will help us to stop the cybercrime. It is not visible to new user so that he is unaware from this software so this will definitely helpful to overcome unauthorized access.

### **4. FACE RECOGNITION**

The input of a face recognition 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.

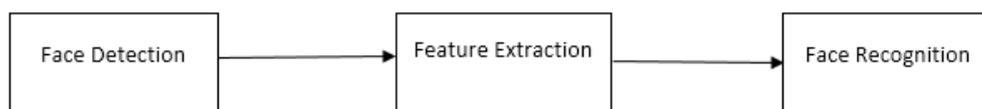


Fig. 1.1: A generic face recognition system [4]

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.

#### 4.1 Face Recognition methods

##### ➤ *Featured-based*

In Feature-based method the input image to identify and extract (and measure) facial features such as the eyes, mouth, and nose then calculate the geometric relationships among those facial points, thus reducing the input facial image to a vector of geometric features.

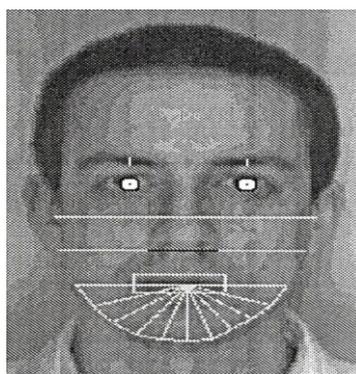
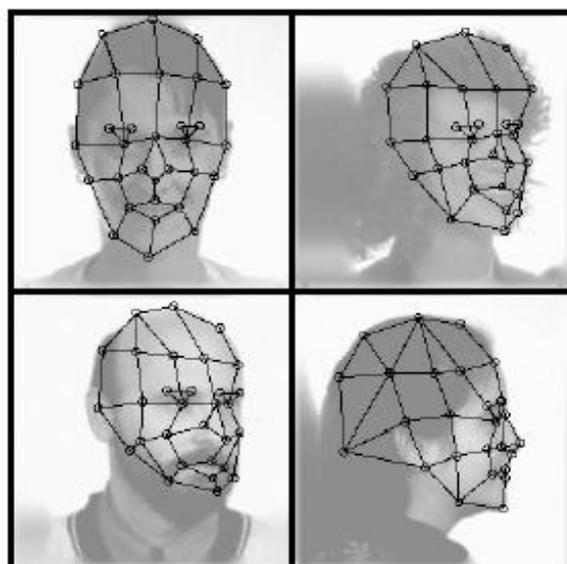


Fig 1.2: Geometrical features (white) used in the face recognition experiments [3]

Simple image processing methods to extract a vector of 16 facial parameters - which were ratios of distances, areas and angles and used a simple Euclidean distance measure for matching to achieve a good performance. It require 2 images per person one for reference and one for testing.

#### 4.2 Elastic bunch graph matching method

The elastic bunch graph matching method is a feature based approach proposed by Wiskott. It is based on Dynamic Link Structures. A graph for an individual face is generated as following steps: a set of points on the human face are chosen. A full connected graph having node as point on human face. A representative set of such graphs is combined into a stack structure. This graph is called a *face bunch graph*. By Elastic Bunch Graph Matching Recognition the graphs for new input face images can then be generated automatically.



*Fig 1.3. Grids for face recognition*

## **5. EIGEN FACE ALGORITHM**

Face recognition done by using Eigen face algorithm. Eigen faces are a set of eigenvectors. This is first successful example of facial recognition. The eigenvectors are derived from the covariance matrix. A set of Eigen faces can be generated by performing a mathematical process principal component analysis (PCA) on a large set of images. This algorithm does not take many Eigen faces combined together to generate a fair approximation most of the human faces.

### **5.1 PCA**

For more than 15 years, research in biometric systems has been increasing significantly due to international insecurity environment. Research groups around the world are developing algorithm and systems based on face, iris, fingerprint, palm print or voice. In our research laboratory, recognition with iris and face, and their implementations on embedded platforms are studying. Face recognition algorithm is mainly based on Principal Component Analysis (PCA). PCA can be time-consuming and this article will give quantitative data for choosing the best platform for implementing this algorithm .PCA is the most efficient method used for face detection. Principal Component Analysis is one of the most known face recognition algorithm. The main idea is to focus on differences and similarities by finding the eigenvectors of the covariance matrix of a multidimensional data.

Principal component analysis (PCA), also known as Karhunen-Loeve expansion, is a classical feature extraction and data representation technique widely used in pattern recognition Sirovich and Kirby first used PCA to easily represent pictures of human faces. They say that any face image could be reconstructed approximately as a weighted sum of a small collection of images that define Eigen images, and a mean image of the face. In 1991 Turk and Pentland presented the well-known Eigen faces method for face recognition. Two

other methods for PCA is developed that are independent component analysis (ICA) and kernel principal component analysis (Kernel PCA). But these methods are more expensive than PCA. PCA scheme can straightforwardly take into consideration data labeling, which makes the performance of recognition system better.

## **6. SMS GATEWAY**

Short message service (SMS) will play a very vital role in the future business areas whose are popularly known as mobile banking, organizational marketing system etc. For this future, SMS could make a mobile device in a business tool as it has the availability and the effectiveness. This thesis is about software development that is based on short messaging service (SMS) system for delivering messages through SMS gateway. Main goal of proposed system is to provide multilevel local authentication to the SMS gateway service. This service can be implemented in any multi departmental organization where SMS service is used for notification system and marketing purpose. Proposed system has web interface and the encryption method for providing service. SMS gateway is use to transform the message from sender to receiver or vice-versa. SMS gateway providers can be classified into aggregator's providers. The aggregator model is based on multiple agreements with mobile carriers to exchange 2-way SMS traffic into and out of the operator's SMS-C, also known as 'local termination model. SMS messages are delivered in the operator's SMS-C, not the subscriber's handset.

OZEKI NG – SMS Gateway is a high capacity SMS server that is very popular among ISV/OEM, Enterprise, and Community Users. It is recognized for its superior ease of use, performance and reliability. The software can be used to send and receive SMS text messages and various other message types, such as WAP push messages, operator logos and ring tones. The sending is done through IP SMS connections or GSM Modem connections.

OZEKI NG – SMS Gateway makes it possible to connect any application implementing business logic directly to the Short Message Service Center (SMSC) of a GSM service provider. This connection is possible through the Internet or through a leased line. Software developers and system integrators prefer OZEKI NG – SMS Gateway, because it provides easy to use connectivity options and application programming interfaces (APIs) for both sending and receiving. Concerning performance, the software has an outstanding capacity. It can serve 300 SMS /second on several SMSC connections simultaneously on a standard Intel P4D, 3GHz 1GB RAM computer. The server can handle large number of concurrent applications and user connections. The software is reliable. It was designed to operate 24 hours a day /7 days a week under heavy duty. It manages network link failures, network service provider failures, tolerates hardware reboots.

## **7. E-MAIL**

SMTP and MIME protocol is used for sending notification to user. For electronic mail (e-mail) transmission across Internet Protocol (IP) networks Simple Mail Transfer Protocol (SMTP) is used. In OSI reference model\_it is an Application Layer protocol. SMTP uses the 25 TCP port.

Email is submitted by a mail client (MUA) to a mail server (MSA, mail submission agent) using SMTP. The MSA delivers the mail to its mail transfer agent (MTA, mail transfer agent).

SMTP protocol is connection-oriented, text-based protocols in which a mail sender can communicate with a mail receiver by sending command and provide necessary data over a reliable ordered data stream channel. An SMTP session consists of commands send by an SMTP client (the initiating agent, sender, or transmitter) and responses from the SMTP server (the listening agent, or receiver) so that the session is opened, and session data are exchanged. A session may include zero or more SMTP transactions. MIME defines for sending other kinds of information in email. These include text in other languages like English using character encodings and files containing images, sounds, movies. Mapping messages into and out of MIME format is typically done automatically by an email client or by mail servers when sending or receiving Internet (SMTP/MIME) email.

## **8. CONCLUSION**

This work has presented a survey about **MULTIMODEL SPONTANEOUS FACE DETECTION USING PCZ SECURITY**. It isn't a trivial task, and today remains unresolved. These are the current lines of research

We are developing PCZ-SECURITY system which can control unauthorized access from any location. Quick action against illegal access can be taken New or extended feature extraction methods. There is much literature about extending or improving well known algorithms. For example, including weighting procedures to PCA. Developing new kernel based methods or turning methods like LDA into semi-supervised algorithms.

Feature extraction method combination. Many algorithms are being built around this idea. As many strong feature extraction techniques have been developed, the challenge is to combine them. For example, LDA can be combined with SVD to overcome problems derived from small sample sizes. Classifier and feature extraction method combinations. It's a common approach to face recognition. For instance, there are recent works that combine different extraction methods with adaptive local hyper plane (ALH) classification methods.

Face recognition is also resulting in other dares, like expression recognition or body motion recognition. Overall, face recognition techniques and the emerging methods can see use in other areas. Therefore, it isn't just an unresolved problem but also the source of new applications and challenges. Administrator can get complete idea of who is trying to access the system with help of image capturing of unauthorized person and then sending image via SMS and E-Mail alert. Enhance security should be provide with the help of face recognition technique.

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