

# FACE RECOGNITION BASED ON IMAGE REGISTRATION FOR WEBINAR AUTHENTICATION

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**Abstract:** The Biometric is the most important feature technique utilize for Human Recognition. It is a time of Computer Technology which deals with Digital Information Technology, every person has some special characteristics which can be utilized for detection and identification. The human detection and recognition is a credential task to recognize person for their activity in social area as well as private secure area. Many researchers have been dealing with different algorithms for Recognition. Specially, Face, Fingerprint, and Retina Scan are processed in the form of Image Information. In computer engineering Images are processed as signal and signal processing is nothing but dealing of pixel values in the form of frequency values.

The PCA (Principle Component based Analysis) is very popular. This dissertation work is based on Face Recognition utilizing PCA. Images play an important role to extract the information about the object in every field. But if the image is not clear specially movement of object, the extracted information will not prove the originality and also not able to provide meaningful information sometimes. Image Registration process is an alignment process of two images, which is called 'Reference images' and 'Input images' that images can be taken of same scene but from different viewpoints, different sensors or from different times. Surface and Point based image registration techniques are very popular. This research work includes a method for best image registration for face identification. The research is done to judge applicability in terms of Peak Signal to Noise Ratio (PSNR) and Correlation Coefficient (CC). The calculated results are compare for the different possibility and dramatic conditions. The comparison is targeted to get the best quality Image which proves that Image Registration actually improves the performance of Face Recognition by avoiding failure and false results.

**Keywords:** Face Recognition, PCA, Image Registration, PSNR, SNR, Correlation Coefficient, Webinar System.

## I. INTRODUCTION

The most important application of image processing, face recognition has recently approach a significant attention. This is the evidence that of face recognition conferences are organizing. There are some key factors: the first is availability of large range of commercial and law enforcement applications and the second is the available resource today. There is an immediate requirement of a system to secure person's assets and protect the privacy without sacrificing identity. In the current scenario,

people require a PIN to get cash from an ATM, a password for a computer and internet services. Although very reliable functions of biometric authentication are available for example fingerprint and retinal recognition, these operations require full cooperation of the applicant, whereas the authentication based on face recognition does not require applicant cooperation.

The Face Recognition is a recent involvement of digital technology with print media. The mechanism of Face Recognition is almost similar to other Recognition based on image processing. The Face Image has different characteristics and features. The Face Recognition Methods available today are application based which work under the internet on Mobiles. Mobile phones today are available with good configuration added Camera, which makes it possible to capture and process Face Image to recent advancements in imaging technology. It combines both hardware modeling as well as image processing techniques. [1]

TABLE 1.1

Common Types of Biometric Applications [1]

S. No.	Forensic	Civilian	Commercial
1.	Criminal Investigation	National ID	ATM
2.	Corpse Identification	Driver's License	Credit Card
3.	Parenthood Determination	Welfare Disbursement	Cellular Phone
4.	Activity Tracing	Border Crossing	Access Control

## II. PREVIOUSWORK

TahiaFahrin Karim, Molla Shahadat, Md. Lushanur, and Faria: The research article titled- "Face Recognition using PCA-based Method" aim to develop the image processing and recognize the faces using PCA-based face recognition. The article is published in Advanced Management Science (ICAMS), 2010 IEEE International Conference. The MATLAB is used for implementation.

Finally, the performance of PCA-based face recognition system is quite satisfactory instead of having some shortcomings of the system. Dakui Wang, Dongwei Li, and Yi Lin: Their article titled- "A new method of face recognition with data field and PCA" published in Granular Computing, IEEE International Conference, 2013. They had worked for integrating data field and PCA. The faces are first recognized using individual PCA, it shows that PCA has low recognition rate with few pictures. Then, they proposed method by integrating PCA and data field which results high rate of recognition. So, the overall improves recognition effect of PCA.

Vo Dinh Minh Nhat and Sungyong Lee: They had published their article titled- "An Improvement on PCA Algorithm for Face Recognition" in Lecture Notes in Computer Science (LNCS), International Symposium on Neural Network, Springer, Berlin. The Principle Component Analysis (PCA) technique is used to analyze strengths and weakness. At some point of discuss the PCA based technique stands fail. They introduce some modification in PCA based scheme, and their experimental results presents the efficient outcomes.

Step -I: It perform the Projection of images into available face space. The important point in the step is to represent the face using subset of eigenvectors.

Step -II: The nearest-neighbor classifier is used here for identification of faces (Eculidian Distance). Basically, the classifier prioritize the database images by some similarity constraints.



Fig. 2 Selected Faces for Experiment

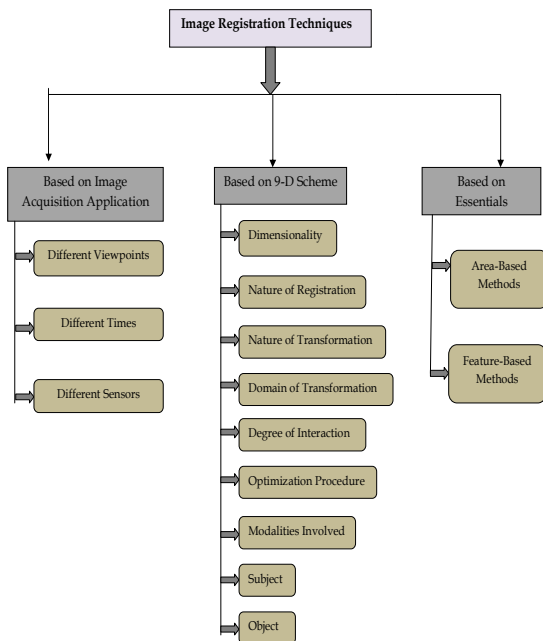


Fig.1. Image Registration Techniques

**III. RESULT OBTAINED BY MULTIPLICATIVE ALGORITHM**

PCA decomposition on the test database, which gives the eigenvectors and eigenvalues. All the practical are done on the same test database. The third class used for identification the unique face, as it find face from normalized image. Basically, it compose of two steps:

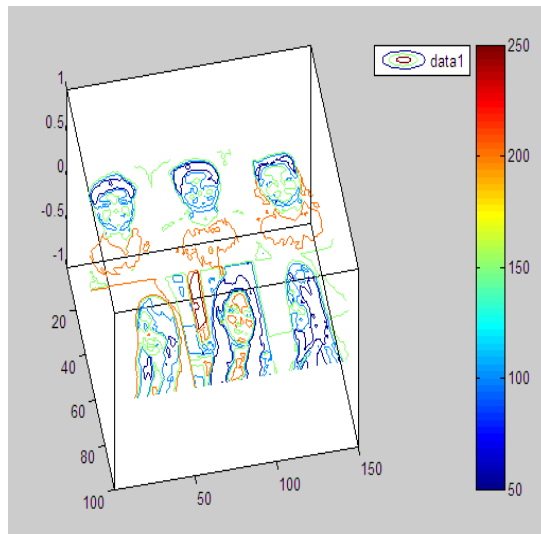


Fig. 3 Contour Analysis of Face Pattern

Basic approach of matching the faces includes the set of initialization operations: First is the acquisition of face images, then calculation of Eigenface (from the train database) occur which keeps only selected images that correspond to the largest eigenvalues. These selected images present the face space, if new face occurs then the database require to update. The calculation of the distribution in dimensional weight space for individual face by simple projection of the face onto the "face space" perform in the step.



Basically, the values of eigenvectors accepted as a set of features extracted from the face images. The location of individual images relates values of each eigenvector, which actually represent the horror face image known as Eigenface. The linear combination of the eigenfaces are used to represent the individual face. The individual selected face can also approximate from best eigenfaces (face with the largest eigenvalues, result account of most variance among the set of faces).

Fig. 4 Calculated Eigen Faces

TABLE 1.1  
OBTAINED SNR AND PSNR FOR ORIGINAL & MOVED IMAGES

Sr. No.	Original Image	Moved Image	SNR Value			PSNR Value		
			(:,:,1)	(:,:,2)	(:,:,3)	(:,:,1)	(:,:,2)	(:,:,3)
1.	vikas.jpg	M_vikas.jpg	25.86	25.65	26.00	33.65	33.98	34.66
2.	narendra.jpg	M_narendra.jpg	25.66	25.17	25.34	33.13	33.26	33.78
3.	shakti.jpg	M_shakti.jpg	26.89	26.26	26.74	33.56	33.51	34.37
4.	neha.jpg	M_neha.jpg	26.83	26.57	26.86	33.78	34.19	34.34
5.	kirti.jpg	M_kirti.jpg	19.07	18.26	17.18	28.79	28.87	28.90
6.	eitti.jpg	M_eitti.jpg	23.36	22.73	21.05	33.36	33.39	33.54

TABLE 1.2  
OBTAINED SNR AND PSNR FOR ORIGINAL & REGISTERED IMAGES

Sr. No.	Original Image	Registered Image	SNR Value			PSNR Value		
			(:,:,1)	(:,:,2)	(:,:,3)	(:,:,1)	(:,:,2)	(:,:,3)
1.	vikas.jpg	R_vikas.jpg	29.04	28.99	28.81	36.83	37.31	37.47
2.	narendra.jpg	R_narendra.jpg	28.66	27.91	27.74	36.13	36.00	36.17
3.	shakti.jpg	R_shakti.jpg	30.60	29.95	29.74	37.26	37.21	37.37
4.	neha.jpg	R_neha.jpg	30.37	30.04	29.72	37.33	37.67	37.19
5.	kirti.jpg	R_kirti.jpg	21.56	20.60	20.11	31.27	31.21	31.21
6.	eitti.jpg	R_eitti.jpg	26.65	25.99	24.09	36.66	36.65	36.57

Typically, PSNR values which lies between 30 to 50 represents good quality of image. In which higher PSNR value is better. For the quality measurement and performance evolution of face recognition system PSNR and SNR are calculated which represents direct comparison of images. This dissertation work based on selected some set of images those are first compared with their Noise Ratio in which a sample image kirti.jpg with their moving version presents most noise variation (28.79), it means images highly effected by Noise. So, it may affect the performance of algorithm. The second table presents similarity measurement between two images, in which the values are calculated and compared. Registration method is use to improve the quality of the moving image for the same SNR, PSNR, Correlation Coefficient, and BCR are calculated. The analysis of these values are based on comparison between the values for the moving image and image after registration. The most specific and highly affected sample image kirti.jpg produced tremendously improved values for PSNR (31.27). Because the PSNR values after registration is 31.27 which comes under standard as require to fall within 30 to 50.

#### IV Conclusion

This research work introduced and suggests an authentication system based on face recognition. Face recognition can be improved by using image registration method which is proved in this dissertation work. The conceptual model for face based authentication for webinar system is also presented. The calculation and comparison of result for the certain parameters (SNR, PSNR, CC, and BCR) for selected variable images proves that image quality after registration method defiantly improves the performance of face recognition system. The overall conclusion of this dissertation work is that the face authentication over webinar system is possible and performance of authentication can be improved by image registration method.

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