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REVIEW ARTICLE

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TO IMPROVE THE ACCURACY IN FACE RECOGNITION SYSTEM

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ABSTRACT

The feature selection and recognition is an optimization challenge to improve the accuracy in face recognition system. It is a challenging problem and widely studied in the field of computer vision and pattern recognition to provide better result. The human face recognition and detection is an important issue in the real life for detecting various faces. Face recognition has many applications that are used in biometric authentication and video surveillance etc., for the security purpose. In the past decade, there are several methods were proposed to detection and recognition face. There occur many invariant changes due to the illumination and pose variations in presence of light. In this paper we proposed a novel method of face recognition to improve the accuracy performance and minimize the error. This paper consist proposed method Linear Discriminate Analysis for reducing feature of face change in live faces. The Hausdroff distance classifier is used to find the similarity to the live faces from the datasets. The proposed method will shows the better result as compare to the previous result.

Keywords— Image processing, Feature Extraction, Detection, Hausdroff distance classifier, Accuracy

I. INTRODUCTION

Nowadays, various applications are used by the army or police forces and civilians need to effective face recognition in different ways. The main significant purpose of face recognition system is to identification, verification and physical access control. When an access point gets an image of anyone's face and compares it with the pre-stored database of faces. If the image is matched, access is granted and result action is performed. The areas where are red alert or have a high level security, there should be different security checks such as face and checking cards etc. This kind of face recognition system works in sensitive areas like air ports for facilitation of staff and other people to pass through different security levels without showing their identification. Applications where face verification can be used efficiently including secure transactions in e-commerce, m-commerce and banking. Face recognition can also be used in government security issues like national ID cards, passports, license, UID Aadhar Card etc.

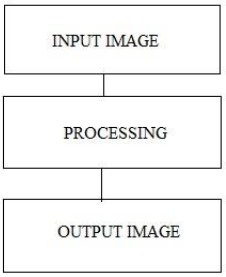

Fig.1 Basic model

2. EXISTING WORK

Face recognition is used for both verification and identification. A detailed survey of illumination and pose invariant face recognition techniques can found for feature extraction and feature selection. Variations in face due to illuminating, pose and lighting conditions should not hamper its efficiency. Aneesh M U et al. [1] proposed an algorithm for the application to select the feature subset from the database is commonly known as feature selection. Particle swarm optimization (PSO) algorithm is used as bird flocking and fish-schooling. Mahhhew A. Turk et al. [2] identify an approach to the detection and identification of human faces which tracks human faces of the individuals to face recognition as 2D-recognition. The face images are projected on to the feature space (Eigen faces) images that encodes the variation among the images of face. The face space framework provides and supports the ability to learn to recognize new faces as unsupervised manner. Priya Sisodia et al. [3] worked the useful property of gabor with robustness against slight object distortion, rotation and variation in illumination of due to light. In this they used a number of parameter use to represent gabor feature and space complexity reduction with help of SVM classifier on facial data. Gabor filter removes variability in images that occurs due to changes in the lighting and noises. Zhenhua Chai et al. [4] proposed a new method that allows for obtain more robust histograms of local patterns by using a more discriminative spatial division strategy is use the face measures. Spatial histograms are more suitable to obtain from regions clustered according to the semantics pixel relations by making better use of spatial information. PCA and whitening process are applied on the face image for the final vector dimension reduction to face recognition. Jun Wang et al. [5] applied modifications of Hausdroff distance measurements by using k-nearest neighbors and use the average distance from each point in the model image with the test image. KNNHD's various degree. The average of the distances to the k-nearest points is more robust than the distance to one single point. Chandrappa D N et al. [6] used two techniques gabor wavelets and morphological shared weighted neural network based automatic face recognition. These techniques used as transform images as independent of gray-level shifts. Face detection is performed under the MSWNN that recognize all the human faces in constrained environments and multi-view recognition. Muhammad Sharif et al. [7] proposed an Elastic Bunch Graph Map (EBGM) algorithm to implement face recognition system using Gabor filters and calculate maximum intensity points in each filter image at different angles and orientation. Dong Hui et al. [8] applied SURF algorithm to detect the points and match points through high time efficient KD-tree nearest neighbor searching methods and find the results better as compare to SIFT matching algorithm. These points measure with using of Haar wavelet to provide best feature. SURF algorithm is used as the image's scale rotation at different position. Shih-wei Lin et al. [9] worked on linear discriminant analysis which is commonly used classification method. LDA shows high correlation between features and noise. The Particle swarm optimization provides the better solution using LDA to determine beneficial feature subset [15]. The PCA based features are reused to increase the accuracy in face system. Data without feature selection may be redundant or noisy and may degrade classification accuracy rate [17]. Gheorghita Ghinea et al. [10] worked reduce the error rate using the various methodologies by the PCA method with schur decomposition.

3. FACE RECOGNITION METHOD

This section describes detailed overview of the standard face recognition methodologies namely Fisher faces, Eigen faces, Laplacian faces, Fisher discriminate with Schur decomposition and LDA faces.

Eignfaces for face recognition

The face recognition method uses commonly in computer vision Eigenfaces through dimension reduction. It creates a linear subspace projection by reduce the original image dimension [10]. In this method compute the eigenvectors and eignvalues through covariance. The drawback of this method is only between-class-scatter in subspace projection not within-class-scatter [16].

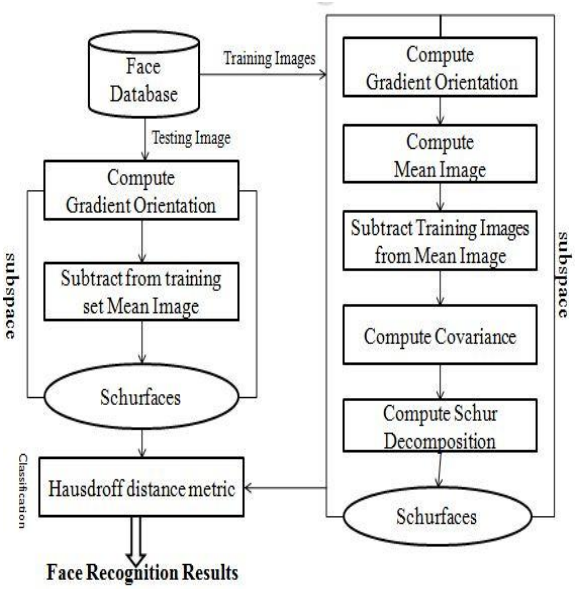

Fig.2 Block diagram of existing model

Laplacianfaces for face recognition

The Laplacianfaces is originally derived from the locality preserving projection. Laplacianfaces uses the Laplacian of a graph through compute the transformation matrix to build the subspace of dataset. Locality preserving projection provides the map values that are known as the Laplacian Eigen map values. The locality defines the radius of local neighborhood.

The Laplacian matrix is L = D – W. where W is weights of sparse matrix m × m and D is the diagonal matrix.

Fisherfaces for face recognition

Fisherfaces derived from the Fisher Linear Discriminant (FLD). As we discuss in Eigenfaces, similarly Fisherfaces considers both with-in-class and between-class scatter matrix for subspace projection of the original images. FLD method uses the PCA to reduce the dimension of the feature space.

The problem in FLD approach is that the number of training samples per subject should be more than one due to this it takes very time and uses large memory space than Eigenfaces.

Fisher Discriminant with Schur Decomposition (FDS) for face recognition

FDS produces a novel eigenanalysis which is very effective when used with Fisher Discriminant Analysis for face recognition applications. Fisher Discriminant with Schur decomposition has all the characteristics of Fisher Discriminant Analysis except the eigenanlysis using the Schur decomposition. The Schur decomposition method is originally suitable, reliable, and efficient. The square matrix A is more suitable for Schur decomposition and it can be represented as

$A = Q\,U\,Q^T$

Where, Q is unitary matrix, U is an upper-triangular matrix and its diagonals represent Schurvalues such as diagonals values (λ_1……λ_n). It can be evaluate as the following formula

$$A = U\,\mathrm{diag}(\sqrt{\lambda_i})U^T.$$

The computation cost is $10n^3$. FDS has some drawbacks such as it support complex computations for subspace creation, more processing time and more memory utilization.

4. CONCLUSION

The face recognition system is used widely in verification and identification from unauthorized organization. Various image processing technique and methods are used to improve the face data to identify from the datasets. The digital image processing techniques is working currently in the research area to optimize the results. There are various issues, presents related to minimize the error and accuracy of the human faces. Te purpose of face recognition system will support to the security.

REFERENCES

[1] G. Aneesh M U, Abhishek A K Masand, K Manikantana, “Optimal Feature Selection based on Image Pre-processing using Accelerated Binary Particle Swarm Optimization for Enhanced Face Recognition”, ELSEVIER , 750-758 , 2011.

[2] Matthew A. Turk and Alex P.Pentland, “Face Recognition Using Eigenfaces ”, IEEE, 586-591, 1991

[3] Priya Sisodia, Akhilesh Verma , Sachin Kansal “Human Facial Expression Recognition using Gabor Filter Bank with Minimum Number of

Feature Vectors ", International Journal of Applied Information Systems (IJAIS), 9-13, July 2013.

[4] Zhenhua Chai, Heydi Mendez-Vazquez, Ran He, Zhenan and Tienie Tan, "Explore semantic pixel sets based local patterns with information entropy for face recognition", Springer, 2014.

[5] J. Wang and Y. Tan, ``Hausdorff distance with k-nearest neighbors,'' in Advances in Swarm Intelligence. Berlin, Germany: Springer-Verlag, pp. 272281, 2012.

[6] Chandrappa D N and Ravishankar M " Gabor Wavelets And Morphological Shared Weighted Neural Network Based Automatic Face Recognition", Signal & Image Processing : An International Journal (SIPIJ) , Vol.4, No.4, 61-70, August 2013.

[7] Muhammad SHARIF, Adeeel KHALID, Mudassar RAZA, Sajjad MOHSIN, "Face Recognition using Gabor Filters", Journal of Applied Computer Science & Mathematics, 53-55 , 2011.

[8] Dong Hui and Han Dian Yuan, "Reasearch of image Matching Algorithm Based on SURF features", International Conference on Computer Science and Information Processing, 2012

[9] Shih-Wei Lin and Shih-Chieh Chen "PSOLDA : A particle swarm optimization approach for enhancing classification accuracy rate of linear discriminated analysis",Elsevier, 1008-1015, 2009.

[10] Gheorghita Ghinea, Rajkumar, Kannan, And Suresh Kannaiyan "Gradient-Orientation-Based PCA Subspace for Novel Face Recognition", IEEE, 914-920, August 2014.

[11] Ms. B. Saranya Bargavi, Ms C. Santhi "Global and Local Facial Feature Extraction using Gabor Filters", International Journal of Science, Engineering and Technology Research (IJSETR), Volume 3, Issue 4, 1020-1023, April 2014 .

[12] Kennedy, J. a Dong Hui and Han Dian Yuan "Research of Image Matching Algorithm Based on SURF Features", International Conference on Computer Science and Information Processing (CSIP), 1140 – 1143, 2012.

[13] F. Bashar, A. Khan, F. Ahmed, and H. Kabir, "Face recognition using similarity pattern of image directional edge response,'' Adv. Elect. Comput.Eng., vol. 14, no. 1, pp. 6976, 2014.

[14] G. Anbarjafari "Face recognition using color local binary pattern from mutually independent color channels,'' EURASIP J. Image Video Process, vol. 2013, no. 1, pp. 111, 2013.

[15] Lu, J, Plataniotis, K. N, and Venetsanopoulos, A. N, "Face recognition using LDA-based algorithms," IEEE Trans. on Neural Networks, 195-200, JANUARY 2003.

[16] M. A. Turk and A. P. Pentland, "Face recognition using eigenfaces,'' in Proc. IEEE Comput. Soc. Conf. Comput. Vis. Pattern Recognit. (CVPR), pp. 586591, Jun. 1991

[17] Rabab M. Ramadan and Rehab F. Abdel Kader; "Face Recognition Using Particle Swarm Optimization-Based Selected Features", International Journal of Signal Processing, Image Processing and Pattern Recognition Vol. 2, No. 2, June 2009.