Advances in Computational Sciences and Technology
ISSN 0973-6107 Volume 10, Number 11 (2017) pp. 3141-3150

http://www.ripublication.com

Automatic Countenance Recognition Using DCT-PCA Technique of Facial Patches with High Detection Rate

Maloth Sudheer Sagar [1] and Y. Shekar [2]

[1] PG Scholar, Department of ECE, S R Engineering College, Warangal, Ananthasagar, Telangana, India.

[2] Assistant Professor, Department of ECE, S R Engineering College, Ananthasagar, Warangal, Telangana, India.

Abstract

Facial expression, being a basic mode of communicating human emotions, finds its applications inhuman-computer interaction (HCI), health-care, surveillance, driver safety, deceit detection etc. Tremendous success being achieved within the fields of face detection and face recognition, emotional computing has received substantial attention among the researchers within the domain of computer vision.

Extraction of discriminative features from salient facial patches plays an important role in effective facial features recognition. The accurate detection of facial landmarks improves the localization of the salient patches on face images. This paper proposes a novel framework for expression recognition by using appearance features of chosen facial patches. many distinguished facial patches, depending on the position of facial landmarks, are extracted that are active throughout feeling elicitation. These active patches are further processed to get the salient patches that contain discriminative features for classification of every pair of expressions, thereby choosing totally different facial patches as salient for various pair of expression categories. One-against-one classification technique is adopted using these features. additionally, an automatic learning-free facial landmark detection technique has been proposed, which achieves similar performances as that of other state-of-art landmark detection ways, nevertheless needs considerably less execution time.

Keywords: facial features analysis, facial landmark detection, feature selection, salient facial patches, low resolution image

2 findings will give helpful performance analysis criteria for best design and testing of face recognition systems. Classification that classifies the facial expressions based on extracted relevant features. There are completely different ways of features extraction such as look based technique, geometric based technique, texture based technique, etc. and within the current analysis largely used ways are geometric {based mostly primarily based mostly} technique and appearance based technique. Geometric based feature extraction technique, extract feature info exploitation form, distance and position of facial elements and appearance based mostly feature extraction technique uses appearance info like pixel intensity of face image. Once obtaining the features, classification ways are applied to acknowledge facial expression.

I. LITERATURE SURVEY

Recently Dhall et al. reported higher performance of Local phase quantisation (LPQ) in facial expression recognition. In local Directional Pattern Variance (LDPV) is proposed that encodes contrast info using local variance of directional responses. However, Shan et al. found LBP features to be robust for analysis of low resolution images. Therefore, we tend to use the LBP histograms appearance features.

PCA and LDA are used as a tool for spatial property reduction similarly as classification inexpression recognition. In authors reported the higherMajumder, A.; Behera, L.; Subramanian, V.K. et al. have given an appearance feature based facial expression recognition system using Kohonen Self-organizing Map (KSOM). Appearance features are extracted using uniform local binary patterns (LBPs) from equally sub-divided blocks applied over face image. The spatial property of the LBP feature vector was reduced using principal component analysis (PCA) to get rid of the redundant information that ends up in inessential

Myunghoon Suk; Prabhakaran, B. et al. have developed system uses a collection of Support Vector Machines(SVMS) for In general for PCA based face recognition, the rise within the range of signatures can increase the recognition rate, however, the recognition rate saturates after a certain amount of increase. Therefore, in our observation it is better to use robust image pre-processing systems, like geometric alignment of vital facial feature points (eyes, mouth, and nose) and intensity normalization that will increase the recognition rate and at the same time decreases the amount of signature representing images within the PCA space. Increase within the range and style of samples within the variance matrix will increase the recognition rate. In general, the image size isn't necessary for a PCA based face recognition system as long because the range of signatures before PCA-projection is more than the overall range of sample images. These findings will give In general for PCA based face recognition, the rise within the range of signatures can increase the recognition rate, however, the recognition rate saturates after a certain amount of increase. Therefore, in our observation it is better to use robust image pre-processing systems, like geometric alignment of vital facial feature points (eyes, mouth, and nose) and intensity normalization that will increase the recognition rate and at the same time decreases the amount of signature representing images within the PCA space. Increase within the

range and style of samples within the variance matrix will increase the recognition rate. In general, the image size isn't necessary for a PCA based face recognition system as long because the range of signatures before PCA-projection is more than the overall range of sample images. These findings will give helpful performance analysis criteria for best design and testing of face recognition systems. Facial features for emotion recognition were extracted by Active Shape Model (ASM) fitting landmarks on a face and then dynamic features were generated by the displacement between neutral and expression features.

II. PROBLEM OUTLINE

EXISTING SYSTEM

The existing methodology is found to perform well systematically in several resolutions, hence, providing an answer for expression recognition in low resolution pictures.

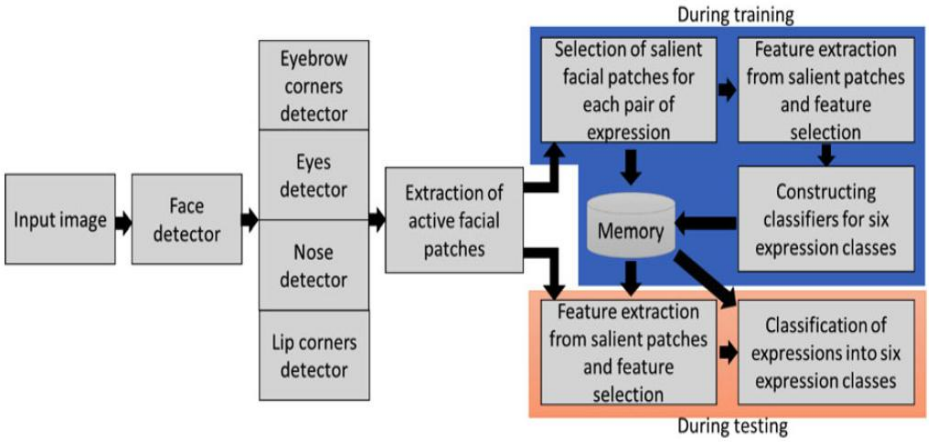

Fig 1: proposed methodology

A low pass filtering was performed employing a 3x3 Gaussian mask to get rid of noise from the facial images followed by face detection for face localization. Each the eyes were detected one by one using Haar classifiers trained for every eye. The Haar classifier returns the vertices of the oblong space of detected eyes. The ROIS for lips and eyebrows were selected as a function of face breadth positioned with relation to the facial organs. To observe the lip corners, we are going to follow the subsequent algorithmic rule.

1: choose coarse lips ROI using face breadth and nose position.

2: apply the Gaussian blur to the lips ROI

3: apply horizontal sobel operator for edge detection.

4: apply Otsu-threshold.

5: apply morphological dilation operation.

6: find the connected elements.

7: take away the spurious connected elements using threshold technique to the amount of pixels

8: scan the image from the highest and choose the primary connected component as upper lip position

9: find the left and right most positions of connected component as lip corners.

PROPOSED SYSTEM

In the proposed system we are using PCA-DCT technique, by that we will increase the detection rate of the facial expression. Discrete cosine Transform (DCT) may be a powerful transform to extract correct features for face recognition. Once applying DCT to the whole face images, a number of the coefficients are chosen to construct feature vectors. A new modification of PCA and LDA is proposed particularly, DPA–PCA and DPA–LDA. In these modifications DCs that are chosen by DPA are used as the input of those transforms. Simulation results of DPA–PCA and DPA–LDA on the database verify the development of the results by using these modifications.

III. METHODOLOGY

Changes in facial expressions involve contraction and expansion of facial muscles that alters the position of facial landmarks. Together with the facial muscles, the texture of the realm conjointly changes. This paper tries to understand the contribution of various facial areas toward automatic expression recognition. In alternative words, the paper explores the facial patches that generates discriminative features to separate 2 expressions effectively.

Observations from recommending that accurate facial landmark detection and extraction of appearance features from active face regions improve the performance of expression recognition. Therefore, the primary step is to localize the face followed by detection of the landmarks. A learning-free approach is proposed during which the eyes and nose are detected within the face image and a coarse region of interest(ROI) is marked around each. The lip and brow corners are detected from individual ROIs. Locations of active patches are defined with regard to the placement of landmarks.

In training stage, all the active facial patches are evaluated and the ones having features of most variation between pairs of expressions are chosen. These chosen features are further. Projected into lower dimensional subspace and classified into totally different expressions employing a multi-class classifier.

The training section includes pre-processing, selection of facial patches, extraction of appearance features and learning of the multi-class classifiers. In an unseen image, the process 1st detects the facial landmarks, then extracts the features from the chosen

salient patches, and finally classifies the expressions.

FACE RECOGNITION

Face recognition technique could be a analysis hotspot within the fields of computer vision and pattern recognition, that is wide utilized in human-computer interaction, security validation and etc. Up to now, most the techniques ar supported multi-sample. However in some special situations, like passport verification and ID card verification, only 1 image may be obtained for one person, and these techniques might unsuccessful. Principal Component Analysis (PCA), proposed by Turk is one among the foremost vital single sample face recognition ways, which may specifically express each face image via linear operation of eigenvector.

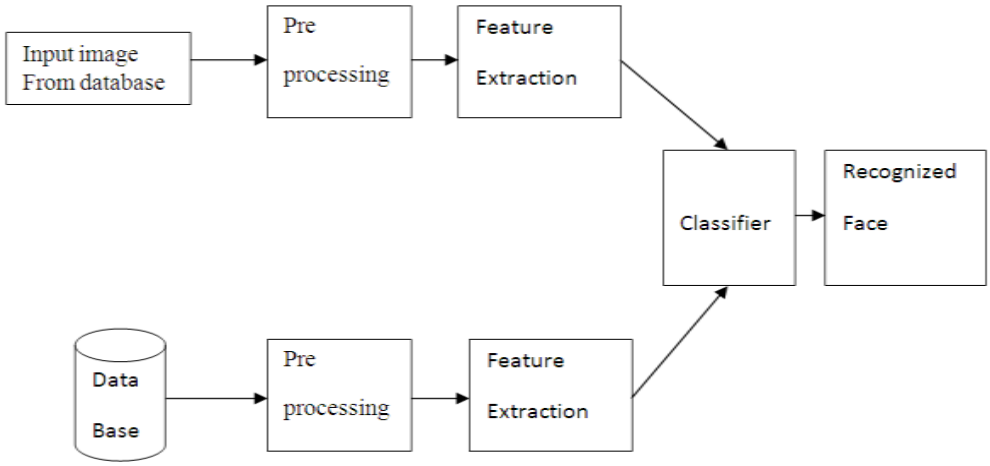

Fig. 2: Face recognition system

Face Recognition problems.

During the past decades, face recognition has received substantial attention from researchers. The challenges of face recognition are the fast and correct identification or classification of a question image. Rapid will be associated to speed and accuracy refers to recognition rate. Most techniques emphasize on the potency in obtaining positive results, however once it comes to implementation, speed is important. The performance of a face recognition technique ought to be able to provide the results inside an affordable time. For instance, for video watching and artificial vision, real time face recognition includes a vital that means. It's terribly helpful that the system will discover, acknowledge and track subjecting real time. In human-robot interaction, real-time reaction time is crucial. Besides, it additionally permits computer systems to acknowledge facial expressions and infer emotions from them in real time.

Feature Extraction

Feature extraction is a very important methodology within the fields of pattern recognition and data processing technology. It extracts the substantive feature subset from original dates by some rules, to reduce the time of machine training and therefore the quality of space, so as to attain the goal of spatial property reduction. Feature extraction transforms the information input file computer file into the set of features whereas the new reduced illustration contains most of the relevant info from the original data. Feature extraction may be a key step of any face recognition system. Feature extraction may be a method that transfers the information from primary spaces into feature space, representing them in a very lower dimensional space with fewer effective characters. Feature extraction may be a method that transfers the information from primary spaces into feature space, representing them in a very lower dimensional space with fewer effective characters. Among them, the algorithmic rule of Eigen face, the foremost widely used method of linear map supported PCA (Principle Component Analysis), has become the mainstream criterion to test the performance of varied face recognition system.

Principal component Analysis (PCA)

Principal component Analysis (PCA) may be a spatial property reduction technique which will be used to solve compression and recognition issues. PCA is additionally called Hotelling,or Eigen space Projection or Karhunen and Leove (KL) transformation. PCA transforms the original data space or image into subspace set of Principal Components (PCs) specified the primary orthogonal dimension of this subspace captures the best quantity of variance among the images. The last dimension of this subspace captures {the least the smallest quantity} amount of variance among the images, based on the applied mathematics characteristics of the targets. The output elements from this transformation are orthogonal or unrelated, and therefore the mean sq. error will Hans Be the smallest once describing the original vector with these output elements.PCA is a widespread transform technique that result's not directly associated with a sole feature element of the original sample. PCA has the potential to perform feature extraction, that ready to capture the foremost variable data elements of samples, and choose variety of vital people from all the feature elements. PCA has been with success applied on face recognition, image denoising, data compression, data processing, and machine learning. The majority of the applications of PCA are to use PCA to transform samples into a new space and to use lower dimensional representation from the new space to denote the sample. Implementation of the PCA methodology in face recognition is named Eigen faces technique. The Turk and Peatland given the Eigen faces method for face recognition in 1991. Face images were protrusive onto a face space defined by the Eigen faces, and the eigenvectors of the set of faces not necessary corresponded to isolated features like eyes, ears and noses. The Eigen faces algorithmic program uses PCA for spatiality reduction in order to search out the most effective account of vectors for the distribution of face images among the whole image spaces. PCA has been widely investigated. It has become one of the most productive

approaches in face recognition and the most absolutely characterised samples. The procedures of Principal component Analysis consist of 2 phases, training step and recognition step.

Training Step: This step is a method to get Eigen space from training image that antecedently has been changed into information matrix. Samples of information, on that the system must acknowledge, are used to produce an Eigen Matrix that transforms the samples within the image space into the points in Eigen space.

Recognition Step: This step is a method to get Eigen space from test image that antecedently has been changed into information matrix. These results were then compared with results from training section to induce minimum distinction.

IV. RESULTS

Fig 3: The trained database image

Fig 4: The test database image

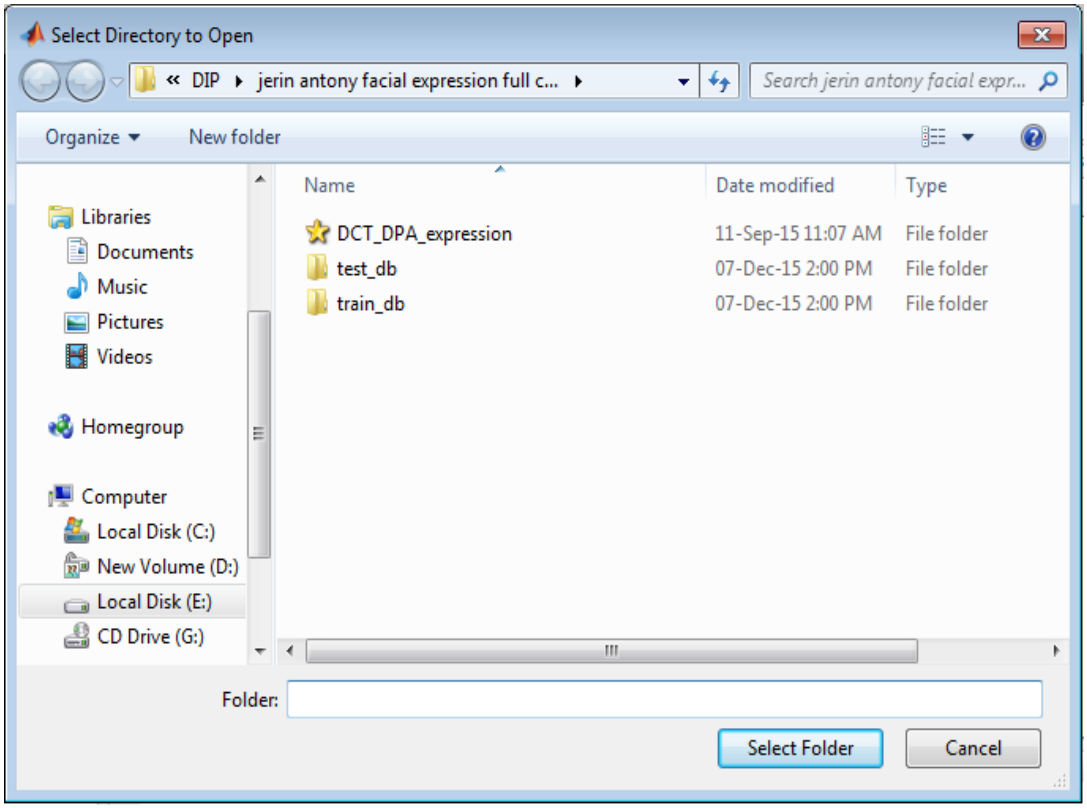

Fig 5: The selection of the test database image

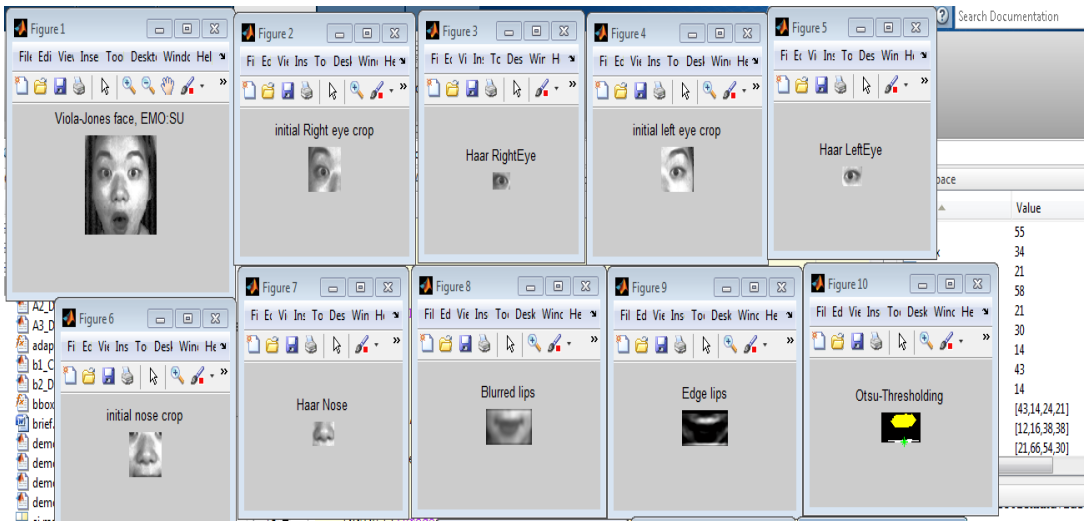

Fig 6: The facial expression results

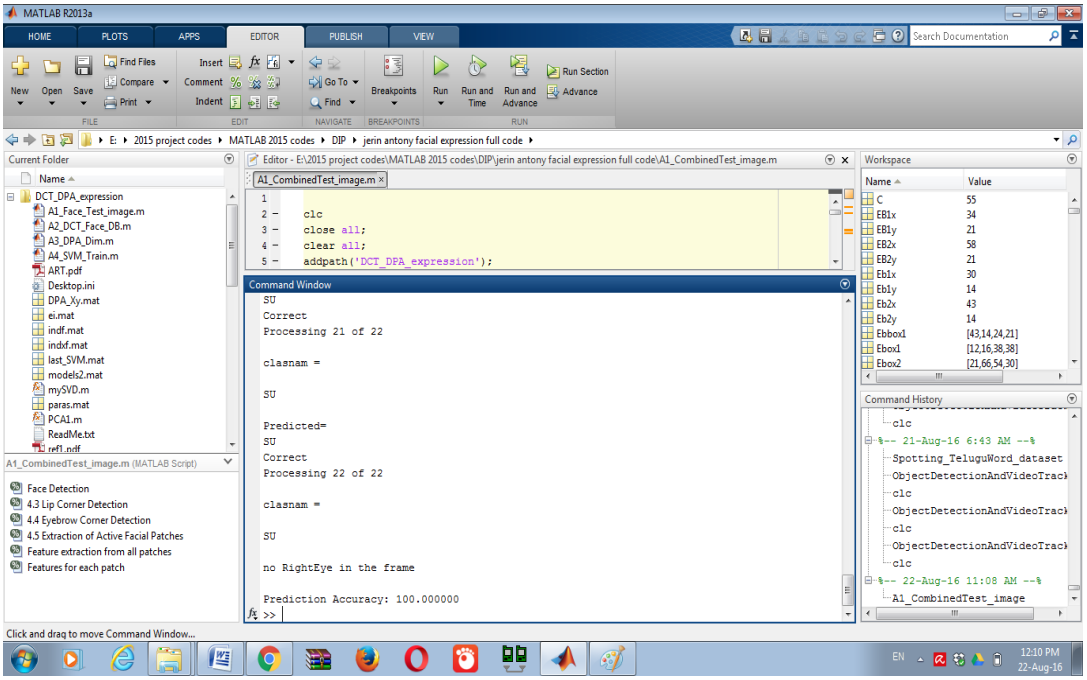

Fig 7: The DCT-DPA facial expression results proves that the detection of facial expression in less time but the prediction accuracy is little bit degrades

VI. CONCLUSION

In general for PCA based face recognition, the rise within the range of signatures can increase the recognition rate, however, the recognition rate saturates after a certain amount of increase. Therefore, in our observation it is better to use robust image pre-processing systems, like geometric alignment of vital facial feature points (eyes, mouth, and nose) and intensity normalization that will increase the recognition rate and at the same time decreases the amount of signature representing images within the PCA space. Increase within the range and style of samples within the variance matrix will increase the recognition rate. In general, the image size isn't necessary for a PCA based face recognition system as long because the range of signatures before PCA-projection is more than the overall range of sample images. These findings will give helpful performance analysis criteria for best design and testing of face recognition systems.

VII. REFERENCES

[1] DashunQue, Bi Chen, Jin Hu "A Novel Single training sample face recognition algorithm based on Modular Weighted (2d)2 PCA" School of Information Technology, Wuhan University of Technology, Wuhan 430063, P. R. China.

[2] Turk M, Pentland A. Eigenfaces for recognition. Journal of Cognitive Neuroscience, 1991.3(1): 71-86

[3] Du C, Su G D, Lin X. Face Recognition across Different Poses Using a Single

2D Model View. IEEE InternationalConference on Robotics, Intelligent Systems and SignalProcessing, 2003.2: 721-725

[4] K.E. Gates, "Fast and Accurate Face Recognition Using Support Vector Machines," Proceedings of the 2005 IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 2005, pp.163-163.