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# GENERATION OF FACIAL EXPRESSION USING BLOCK BASED LOCAL BINARY PATTERNS OF SALIENT PATCHES FOR FACE RECOGNITION

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Abstract- ***Different features for facial patches plays an important role in facial expression recognition. During emotion elicitation effective facial landmark that depends upon facial patches. In this paper we evaluate facial expression recognition using salient facial patches. Here SVM classifier algorithm can be used for face detection. An automated Learning Free Landmark Detection, feature classification discriminative features can also be analysed for various methods of facial expression. The existing systems are based on motion-based, model-based and also based on geometric and appearance based feature. This advanced algorithm tested with CK+ and JAFFE database.***

***Keywords: Facial Patches, Facial landmark, automated learning free landmark detection.***

## I.INTRODUCTION

Facial Expression is an important part of communication. Enormous success achieved for face detection and face recognition. Facial expressions are the resulting changes in facial appearance .Facial expressions are the form of non-verbal communication. Facial features that are used for motion-based, model-based, and geometric based and appearance based. Facial expressions are varying different persons. The models that based on geometric features find the shape and size of the face and facial components such as eyes, lip corners, eyebrows etc., and generalize the expressions based on accurate position of the facial components.

Facial Expressions can classified in different ways-in terms of non-prototyping and prototyping expressions based on Facial Action Coding System (FACS) [3] that represents in terms of Action Unit (AUs) that accomplice with facial expression. In most powerful situations finding facial landmark are very challenging to achieve. Moreover, the stretch between facial landmarks differ from person to person. There are six kinds of universally known facial expressions [1] - : happiness, sadness, fear, anger, disgust and surprise. SVM is used for classification purpose that is used for low resolution images. Facial expression mainly based on appearance based and geometric based method. Here appearance based [9] method the active patches are chosen to be the pixel concentration values in an image of the object. These pixel intensities that directly to the effulgence of light emitted from an object along certain radiation in space. In geometric based method [4] the recognition of expression by tracing the shape and size of facial landmarks using multiclass support vector machines. In appearance based method represented in lower dimensional subspace by applying dimensionality reduction techniques, such as principal component analysis (PCA), linear discriminant analysis (LDA) etc. Then, the classification is performed in learned subspace. The main problem of this method is it requires exact detection of facial landmarks, any errors occurs during the detection of face will affect the overall performance of the system. In this method using facial patches [5], the facial patches are depending on the position of facial landmarks, are extracted during the emotion. The facial patches are eyes, eyebrow corner, nose, lip corner. In existing systems extraction of features from facial regions determine the facial regions that are based on certain data. Thus the location and content of active facial patches differ in instruction data. In this paper we evaluate facial landmark technique as well as salient facial patch are to be used for this data. The purposed method contain face as well as facial landmark point in an image thereby obtain some salient facial patches that are likely during training stage. The development of the facial patches are recognized using a multi-class classifier to classify the image into six basic expressions. In this

method is similar to the state-of-the art method. In facial expression method have good quality, and providing good result for expression recognition in low decision of images and fewer execution time. The expression features with reduced number of histogram generate are used to execute computing. Figure 1 shows the basic facial expression generation. Automatic facial expression is a difficult task. The future enhancement of this paper is that the extracted facial patches are generated using still image. Here we are using a motion detection algorithm and it can be used to generate original image and then we can generalize expression generation such as smile, fear etc. This application can be used in ATM machines for face alarm detection.

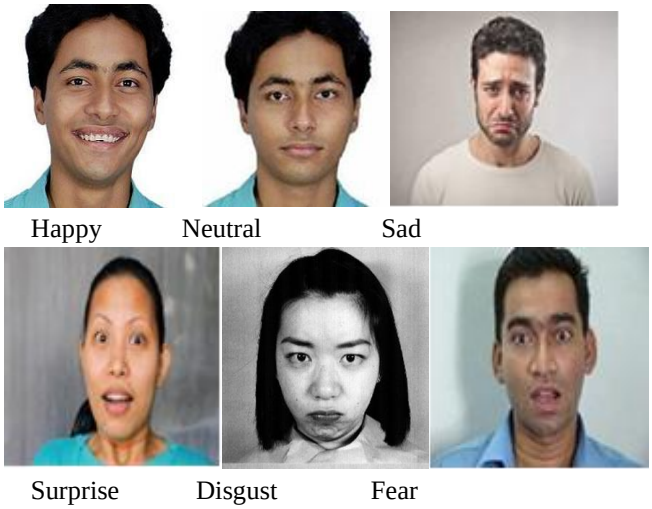


Fig 1: Basic Facial Expression

## II.RELATED WORK

Face alignment is the first step and is usually drifting out by detection and horizontal positioning of eyes. Feature selection is also used in classification accuracy. A self-organizing feature map can be used for feature expression and extraction, Face detection and classification [2]. Here the recognition rate is 90%. The SOM algorithm is a well-known unsupervised learning algorithm in the field of neural networks [6]. A conventional optical flow algorithm is used. A relative geometrical distance based approach is used computationally expensive Gabor filters for landmark detection and tracking [7]. Here SVM and HMM models as classifier. Active appearance models (AAM) [8] combines both shape and texture models to represent the object, hence providing better result to ASM. AAM is widely used for detection and tracking of non-rigid facial landmarks [10] [11].

Marryam Murtaza determines different techniques, such as motion, model and muscles approaches have been used in order to handle the facial expression and recognition of the image [12].

Sun et al. analyze PCA and LDA classifier algorithms are used [13]. It is used to highlights the lack of control points, it focus on 4 D data and it is time consuming. Its accuracy is 97.4%. Its feature extraction is to locate ROI (Region of Interest) and apply PCA to ROI to locate nose tip. In Jiequan Li Haar transform and adaptive Adaboost algorithm for face identification and Principal Component Analysis (PCA) in conjunction with smallest area classifier for face recognition [14]. PCA & K-nearest Neighbor (KNN) classification algorithm and used for the Negative matrix factorization (NMF) & KNN algorithm tested with Taiwanese & Indian face database for facial recognition. Cristinace et al. propose the Constrained Local Model (CLM) framework for proving the better tools for the person independent of facial landmark detection [15]. Gabor features of different scales from the face image and experienced using Adaboost to select the salient patches for each expression [16]. When extracting patches are examined with different database then the size and position of the salient patches are different. Thus, the recognition of expressions in unknown images, unique criteria cannot be established. Here identified the salient facial patches which are having generalized discriminative features for expression generation [1].

## III.PROPOSED METHODOLOGY

Changes in facial expressions involve shrinkage and expansion of facial muscles which alters the position of facial landmarks. Along with this, the texture area also changes. This project try to understand the addition of different areas towards automatic facial expression.

The overview of purposed method is shown in figure 2. The correct facial landmark detection and extraction of appearance features from active face regions develop the performance of expression recognition. Here a learning free method is used in which eye and nose are detected in the face region. The lip and eyebrow corners are distinguished from various ROIs. Location of facial patches are defined with location of landmark.

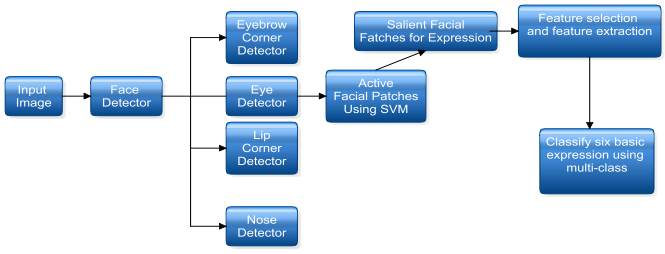


Fig 2: Overview of proposed System

A.Detection of Facial Landmark

The active patches are located down the eyes, between the eyebrows, around the nose and mouth corners. To modify these patches from face image, we need to identify the facial components that followed corresponding facial patches. Haar-like features are used to detect facial landmark detection.

Fig 3: Landmark detection

B.Pre-processing

Gaussian mask is used to remove noise from the facial images accessed by face detection for face localization. Viola-Jones algorithm of Haar-like features using face detection is used. It is focused on frontal and upright facial images. It is scaled using a common resolution. This made the algorithm insensitive to the location on image.

C.Eye and Nose Localization

The Region of Interest (ROI) for eye and nose localized using geometrical position. Both eyes are detected using Haar-like Classifier .Here eye and nose are detected using anthropometric statistics of face.

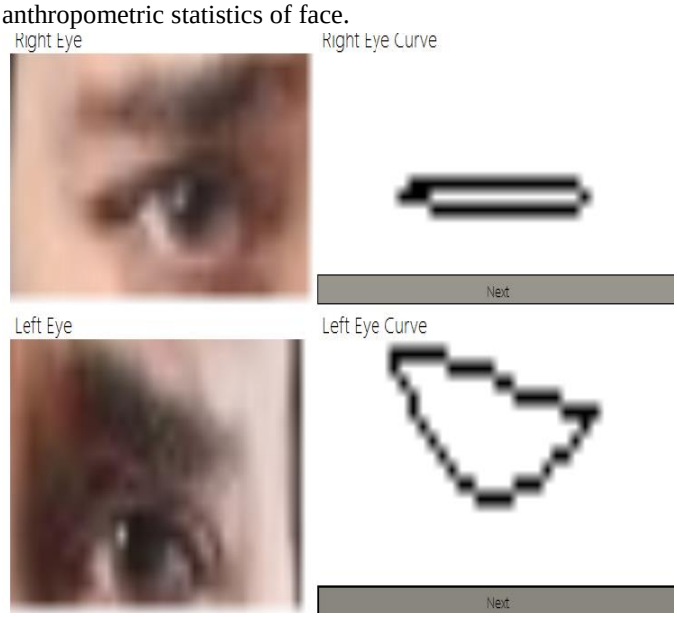


Fig 4: Left and Right eye detection

D.Lip Corner Detection

Here sobel edge algorithm is used for lip corner detection. Here binary images are using for connected regions. Using false component having less threshold that was removed.

E.Eyebrow Corner Detection

To detect eyebrow corner Region of Interest was selected. The same step in the upper lip corner can be used to detect eyebrow. A horizontal edge detection algorithm can be used for eyebrow detection.

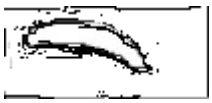

Fig 5: Eyebrow corner detectio

F.Extraction of active facial patches

Local patches from the image are used to obtain face images that depend on the position of face muscles. A binary number can be used for the neighboring pixel values and center pixel value [17].

In this paper LBP [1] was used for future descriptor.

$$LBP(x,y)=\sum_{n=0}^{7} s(i_n-i_e)2^n \quad [1]$$

$i_e$ is the pixel value of (x,y),$i_n$ pixel value in the neighborhood (x,y).

$$S(x)=\begin{cases}1, & x\geq 0\\ 0, & x<0\end{cases} \quad [1]$$

G.Learning and Training of expression

Support Vector Machine (SVM) is used for training process. We implemented one-against-one technique for multi class classifier.

## IV.EXPERIMENTS AND DISCUSSION

The proposed method works on CK+ and JAFFE database. It shows the effectiveness of the proposed system. This show that when number of facial patches increase, accuracy of facial expression also increases. A SVM classifier is used in the training stage, and is coupled with LBP histogram [1].

## V.CONCULSION

An efficient method to identify facial expression is presented in this paper. Face detection can be used by Viola Jones algorithm. Training is implemented using SVM. An efficient facial expression system that classify six basic

expressions. During expression generation all the active facial patches are extracted. The system analyze active patches and find their respective areas on face which are used for different expressions. The recently proposed CLM model based on DRMF method. In two cases accuracy is almost similar.

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