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## SENTIMENTS BASED NOVEL METHOD FOR RECOGNIZING FACE & FACE EXPRESSIONS

PRIYANKA SINGH\*

RIMANPAL KAUR\*\*

\*M.Tech. Research Scholar, Department of Computer Science and Engineering CGC Technical Campus, Jhanjeri, Mohali, Punjab, India.

\*\* Lecturer, Department of Computer Science and Engineering CGC Technical Campus, Jhanjeri, Mohali, Punjab, India.

### ABSTRACT

*Face recognition & Face expression recognition has become a popular area of research in computer vision and one of the most successful applications of image analysis and understanding. We always have to extract optimal features from images to recognize an image as to achieve high accuracy as well as to be efficient. In this thesis an efficient and optimized face recognition & face expression recognition algorithm based on Extended Species Abundance Model of Biogeography is presented.*

*We have used Principal Component Analysis (PCA) for the face recognition technique to extract the most important features of the image as all the features. Initially we apply Gabor Kernel to smoothen the images so as to give as input to PCA. Gabor Kernel helps in proper alignment of images.*

*After this we extract important features present in the images through PCA. Than we apply extended BBO to train database, to collect most desirable features extracted from PCA, to make face recognition an efficient process. Performance analysis is performed on Cohan Kanade face database. Further investigation detail Helped LBP to concentrate most moment LBP highlight and in last the best Recognition execution is gotten by utilizing SVM classifier Supported LBP highlights to get face expression.*

## I. INTRODUCTION

There is a considerable measure of exploration work going ahead in the field of face recognition. Face recognition has turned into a famous range of examination in PC vision and a standout amongst the best uses of picture investigation and comprehension. The objective of face recognition application is to match a given information picture against an extensive database of pictures and figure out if it is there or not. Presently day face recognition is an essential piece of numerous applications for occasion check applications and distinguishing proof applications (one to numerous coordinating) [1]. There are a wide range of systems introduced for face acknowledgment [2]. These systems can be partitioned into two classes initial one is all encompassing coordinating system for instance Principal Component Analysis (PCA) and other one is neighborhood highlight coordinating technique. In this theory we will concentrate on a novel methodology called developed species model of Biogeography.

PCA is one of the basic systems for highlight extraction, because of its downside that crude pictures are not given as information. We utilize Gabor Kernel to first smooth the pictures and adjust them appropriately and after that we offer data to LBP. PCA prompted concentrate most attractive highlights for picture acknowledgment. Than we apply BBO in view of amplified species model of

Biogeography on highlights extricated to prepare database. This outcomes in a profoundly prepared database which was superior to prepared database with unique BBO.

After this in acknowledgment stage we enter a picture to remember, we apply BBO taking into account stretched out species model of Biogeography to perceive a picture.

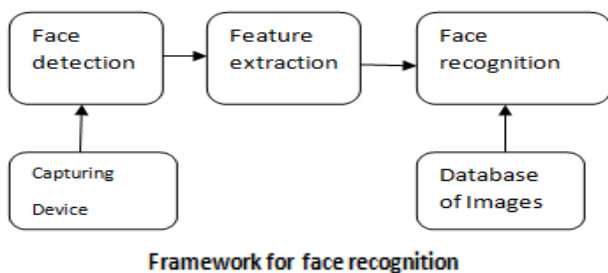
Facial expression recognition is one of the hot research points lately; it applies in the enthusiastic examination, design recognition feeling and picture transforming. In this we exactly concentrate on facial representation based on Local Binary Pattern highlights for individual autonomous face expression recognition. LBP highlights were proposed initially for composition investigation, and as of late have been acquainted with speak to faces in facial pictures examination. The most imperative properties of LBP highlights are their resistance against light changes and their computational effortlessness. When contrasted with Gabor wavelets, LBP highlights can be inferred quickly in a solitary sweep through the crude picture.

In this we exactly examine facial representation taking into account Local Binary Pattern (LBP) highlights for individual autonomous outward appearance recognition. LBP highlights were proposed initially for surface investigation and as of

late have been acquainted with speak to faces in facial pictures examination [17-18]. The most essential properties of LBP highlights are their resistance against enlightenment changes and their computational straightforwardness. When contrasted with Gabor wavelets LBP highlights can be determined quick in a solitary output through the crude picture.

**FACE RECOGNITION: FRAMEWORK**

Face Recognition, It is a big task that involves many sub problems. In it, info is constantly given as a picture or feature stream. Yield of face acknowledgment framework is either ID or check of the subject that was given as data in the feature or picture. Some methodologies characterize face acknowledgment as a process that embodies three stages: recognition of face, extraction of highlights and Recognition of face.



**FACIAL EXPRESSION RECOGNITION USING LOCAL BINARY PATTERNS**

The operator marks the pixels of a picture by thresholding the 3x3-area of every pixel with the inside worth and considering the outcome as a parallel number [32]. At that point the histogram of

the marks can be utilized as a composition descriptor. See Figure for an outline of the essential LBP administrator [35]. Later the administrator was reached out to utilize neighborhoods of diverse sizes. Utilizing roundabout neighborhoods and bilinearly introducing the pixel qualities permit any range and number of pixels in the area [30]. For neighborhoods we will utilize the documentation (P, R) which implies P inspecting focuses on a circle of sweep of R. See Figure underneath for a case of the roundabout (8, 2) area. Another expansion to the first administrator utilizes purported uniform examples. A Nearby Paired Example is called uniform in the event that it contains at most two bitwise moves from 0 to 1 or the other way around when the double string is viewed as round.

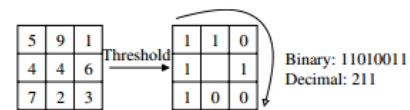
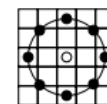


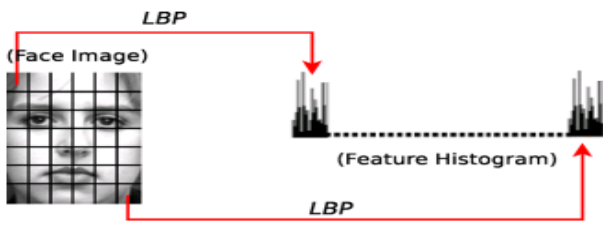
Fig. 1. The basic LBP operator.



**Fig.** The circular (8, 2) neighbourhood. The pixel values are bilinearly interpolated whenever the sampling point is not in the center of a pixel.

For example, 00000000, 00011110 and 10000011 are uniform patterns. Ojala et al. noticed that in their experiments with texture images, uniform patterns account for a bit less than 90 % of all patterns when

using the (8,1) neighborhood and for around 70 % in the (16,2) neighborhood. We use the following notation for the LBP operator: LBP<sub>u2</sub> P, R [30]. The subscript represents using the operator in a (P, R) neighborhood. Superscript u2 stands for using only uniform patterns and labeling all remaining patterns with a single label [33].



**Fig.** A face image is divided into small regions from which LBP histograms are extracted and concatenated into a single, spatially enhanced feature histogram.

**SUPPORT VECTOR MACHINE (SVM)**

A past fruitful procedure to facial expression classification is Support Vector Machine (SVM)[19,22,25,33], so we received SVM as option classifiers for interpretation distinguishment. As an intense machine learning procedure for information order, SVM [26] performs an understood mapping of information into a higher (perhaps boundless) dimensional highlight space, and afterward discovers a direct dividing hyperplane with the maximal edge to independent information in this higher dimensional space. SVM permits space particular determination of the bit capacity. In spite of the fact that new bits are being proposed, the most oftentimes

utilized part capacities are the straight, polynomial, and Radial Basis Function (RBF) kernels.

**Table.** Confusion matrix of 6-class facial expression recognition using SVM (RBF)

Confusion matrix of 6-class facial expression recognition using SVM (RBF)

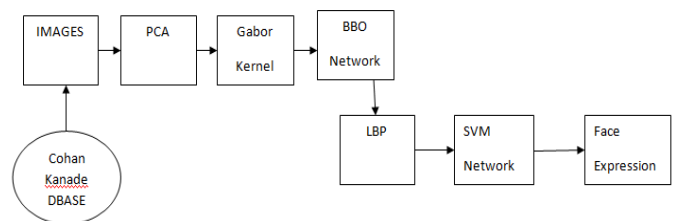
	Anger (%)	Disgust (%)	Fear (%)	Joy (%)	Sadness (%)	Surprise (%)
Anger	89.7	2.7	0	0	7.6	0
Disgust	0	97.5	2.5	0	0	0
Fear	0	2.0	73.0	22.0	3.0	0
Joy	0	0.4	0.7	97.9	1.0	0
Sadness	10.3	0	0.8	0.8	83.5	4.6
Surprise	0	0	1.3	0	0	98.7

**Table.** Confusion matrix of 7-class facial expression recognition using SVM (RBF)

	Anger (%)	Disgust (%)	Fear (%)	Joy (%)	Sadness (%)	Surprise (%)	Neutral (%)
Anger	85.0	2.7	0	0	4.8	0	7.5
Disgust	0	97.5	2.5	0	0	0	0
Fear	0	2.0	68.0	22.0	1.0	0	7.0
Joy	0	0	0.7	94.7	1.1	0	3.5
Sadness	8.6	0	0	0	69.5	2.3	19.6
Surprise	0	0	1.3	0	0	98.2	0.5
Neutral	1.6	0.4	0	1.6	6.0	0.4	90.0

**FACE RECOGNITION MODEL**

In our face recognition model we have utilized different systems like principal component analysis, Gabor kernel, extended species abundance model of biogeography, LBP, SVM and their combination to solve of face recognition problem efficiently[40].



**Fig.** Models of Face Recognition & Face Expression Recognition.

Images are gathered from Cohan kannade database and pass to PCA for optimization. After optimization extract all essential features by Gabor filter to create network i.e. BBO network for recognition of face. When face is recognize then apply local binary pattern over it for extracting low resolution features and then use technique support vector machine to create network for recognizing expression for face.

## CONCLUSIONS

As we have developed training database, so now we have to recognize an image. Generally an image is input and is compared to remaining all other image in database and an image is output which is closest to that image, but this procedure takes lot amount of time, so we have proposed a new approach based on extended species model of Biogeography. In it we input an image and apply algorithm to result a best match without comparing with all the images in training database. This led to reduction in time and makes it an efficient process. The critical property of the LBP administrator in certifiable applications is its resilience against light changes. Due its computational straightforwardness, it is conceivable to investigate pictures in difficult constant setting.

Inferring a powerful facial representation from unique face pictures is a key venture for effective facial expression recognition. We observationally assess LBP highlights to depict

appearance changes of statement pictures. LBP offers on low-determination pictures, and watches that LBP highlights perform.

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