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AN EFFECTIVE FACIAL EXPRESSION LOCATOR APPLYING WLD AND DCT WITH SINGLE SAMPLE PER CLASS

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Abstract: Topical appearance-based methods havebeen successfully employed to automatic face recognition and achieved state-of-the-art performance. The aim of this paper is to extract the facial features applying the topical appearance based method for the exact facerecognition with single sample per class. The topical appearance based method finds facial features suchas eyes, nose, mouth and chin and also finds attributes of and relations (e.g. areas, distances, angles) between the characteristics are applied as descriptors for face recognition. In this paper we proposed single sample per class applying Weber's Local Descriptor (WLD) and Discrete Cosine Transform (DCT).Discrete Cosine Transform is used to extract the facial features from the image .It helps to extract the facial features efficiently. The WLD descriptor acts an image as a histogram of differential excitements and clarification changes, formal detection of edges and powerful image representation.This proposed approach reduces the computation time, space complexity and increases the efficiency.

Key words: Weber's Local Descriptor, Discrete Cosine Transform, Histogram.

INTRODUCTION

Biometrics technology is used to describe or verify a human basedon physiological traitsor behavioral traits. The physiological traits of a human are fingerprint, palm print, face, iris etc. and the behavioral traits of a human are keystroke, signature, gait etc. Biometric system can be either an 'identification' system or a 'verification' system, which are defined below.

Identification – Biometrics can be implemented to describe a human identity even without the human's knowingness. For example, surveillance photographiccamera usage in a crowd and applying facerecognition technology can identify matches versus the database made and predefined.

Verification – Biometrics can be applied to check a human identity. Forinstance, one can please some physical approach to a secure field by using finger scans. Automatic face recognition is usedto describe or verify human physiological parameters.Facerecognition is successfully applied today inlaw enforcement, surveillance, entertainment etc. In practice thereis some difficulty in dealing with different illumination, pose, facialexpressions, ageing. Another important problem is single sample problem, where weare using only one single sample per class for training. In the case of passport, adhar card, driving license, voters id etc. only one image is available for training. Processing of an image includes advance in its visual aspect and effective representation. So the area comprises of not only feature extraction, analysis and identification of images, but also coding, filtering, enhancement and restoration. The entire process of image processing and analysis beginning from the capturing the visual data output and ends in givingaway description of the setting. The important components of the processing system are digitizer, image sensor, storage unit and display unit.

LITERATURE SURVEY:

Recognition [1]-[7] is a computerbased diligences for automatically identifying or cross checking a person from a digitalimage or a videoframe from a video source. One of the ways to do this is by comparing selected facialfeatures from the image and a facial database. It is generally implemented in securitybasedsystems and can be compared to other biometrics such as eye iris generation or fingerprint systems [5]. Recognition or diagnosing technology is used to reducedata from facial images with the help of a face recognition device, without any human interaction [3]. Unlike face detection or recognizing technology, face recognition technology uses image processing algorithms to recognize and then compare human facial images with the ones that are stored in the database of face recognition device. It is enabled device examines the characteristics of complete human face [2]. One of the manners to do this is by equating selected facialcharacteristics from the image and the database. It is generally used in secrecysystems or secret data communication and can be compared to other biometrics such as fingerprint or eye irisrecognition systems [5]. For instance, an algorithm may analyze the proportional position. These characteristics are then applied to search for other images with feature extraction [7] and matching. Other algorithms normalize a template of images and then compress the images, only securing the data in the signal that is applied for face recognition [4]. An earliest

successful scheme is dependent on matching techniques applied to facial characteristics, furnishing a compressed face representation.

PROPOSED SYSTEM

The proposed system mainly using two techniques: They are local texture based face recognition using Gabor filter and adaptive local binary pattern. First the facial features are extracted by using discrete cosine transformation and then we proceed with Gabor filter and adaptive LBP. Second the face finder called WLD (Weber's Local Descriptor).By implementing WLD features the face can be detected and recognized. Although only one classifier is trained, and using that frontal, occluded and face images are identified.

A. Creation of face template using Gabor filter

Here first we perform convolution process of face image with Gabor filter and provides Gabor representation of face image. Let I(x,y) be the intensity coordinate (x,y) in a grey-scale image. Convolution of Gabor filter $\Psi_{f,\theta}(x,y)$ is defined by

$$g_{f,\theta}(X,Y)=I(X,Y)O\ \Psi_{f,\theta}(X,Y)$$

where Θ denotes the convolution operator
The Gabor kernel filter representation is a complex function with real part $\Im\{g_{f,\theta}(x,y)\}$
And imaginary part is given by $\hat{J}\{g_{f,\theta}(x,y)\}$
The magnitude response is expressed as $\|g_{f,\theta}(x,y)\}\|=\sqrt{R^2\{g_{f,\theta}(x,y)\}+F^2\{g_{f,\theta}(x,y)\}}$

And finally we generate Binary Face Template from the real part of complex information

BFT(X,Y)=1 if complex information>0
BFT(X,Y)=0 if complex information<=0

B. Local binary pattern

Normal Local Binary Pattern (LBP) [38] is used to extract representative features from each facial image. LBP approach generates LBP for each pixel, which describes the face image. In this method it is only essential to generate LBP for particular pixel of face image. For this purpose we are using Gabor filter first and then we are going for adaptive LBP. Gabor filter extracts the local image features efficiently. On basis of these features binary face template is produced. This binary face template explains the variation of local texture, which is robust against facial variation. Only for this reason we have used Gabor filter prior to the local binary pattern.This approach generates adaptive LBP only for pixel I(X,Y),which has a value correspond to BFT(X,Y).Due to this we reduce the number of patterns.

C. Granular Computing & Dog

The input image is preprocessed to eliminate the noise and also to determine the edges. After that the hybrid features are extracted from the face image. The hybrid features includes both the local features and global features. Subsequently the face granulation is done to generate the Difference of Gaussian (DoG) .pyramids to recognize the face by using the Euclidean distance.It is an orthogonal transformation. DoG parameters are employed here to rebuild original image.

D. Face Recognition

Recognition is the process that assigns a mark to an object depends on the information provided by its descriptors. Having extracted the hybrid features in the feature extraction step, the Face granulation is done to produce out the Difference of Gaussian (DoG) pyramids formation. The DoG pyramids are produces to analyze the Euclidean distance to discern the face images valiantly. Feature extraction is a common term for algorithms of constructing similarities of the variables to obtain these issues while still depicting the data with enough accuracy. Somehow, if no such proficient knowledge is available general dimensionality reduction techniques may help.

EXPERIMENTAL RESULTS

In this section the performance of selective local feature extraction based on Gabor filter and Adaptive LBP on single sample per class is evaluated. The image is cropped and made into 64X64 from middle of location of eyes .Here the local features such as contrast, brightness; length, breadth etc. are considered. Here 1 sample per person is considered.

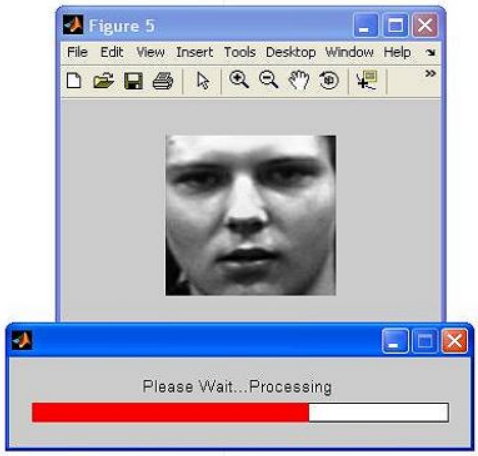

Fig.1 Processing the image.

Thus they save some low frequency elements of discrete cosine transform and cut down lots of high frequency components. It implements inverse transformation to get a continued image which is similar to exact input image.

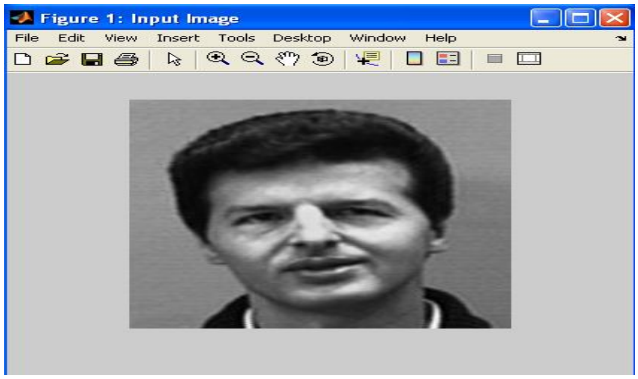

Fig 2 *,Acquired Input Image*

The original image is invisible due to some distortion. It is because, it contains most important information. Feature extraction imparts altering the amount of resources needed to describe a set of data accurately. It analyses of complex data one of the important issues from the number of variables included.

fig 3: Vector Identification of face images

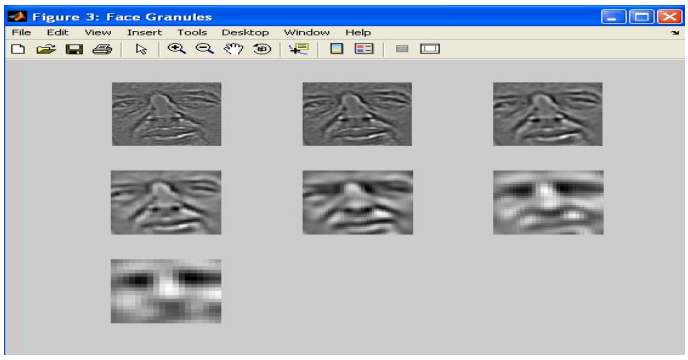

fig 4: Granular Computed values

Thus the face image vectors have been diagnosed and thus the comparison is done accordingly. The face granules values (as mentioned in *fig 4*) are brought outwit the use of pixel classification among the single input image. *Fig 3* and *fig 4* gives us the clear idea of getting out the output values based upon the identification of face vector values along with the different usage of granules computed and taken as successive outcomes. The performance is to be measured based on the comparison with the normal input image and the classified granules computed image. Each granule node distributes and describes about the successive granule nodal values spontaneously.

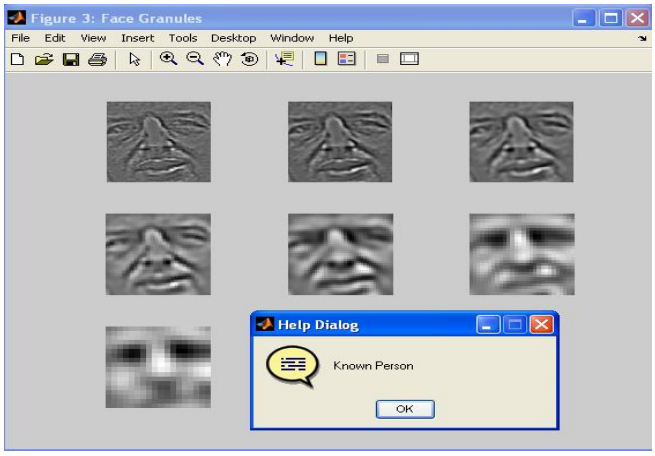

fig 5: Authentication of face images

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