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A NOVEL HYBRID FEATURE EXTRACTION TECHNIQUE FOR FACE RECOGNITION

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***Abstract*—Face recognition is a computer for identifying and retrieving desired images from a large collection on the basis of features(color, texture, shape..).CBIR system is generally used in security, medicine, entertainment…etc. Interesting method for dimensionality reduction is subspace analysis. Images are portioned into sub images by using sub band decomposition or orthogonal transform to detect local features. Shape feature of an image can be represented using various moments. Image representation using moments has desirable properties of rotation invariance, robust to noise, expression efficiency, effective ness, and multi level representation for describing various shapes of patterns. Further in this work different distance measure like Minkowski distance, Manhatten distance, Euclidean distance etc. will be used to test the performance of the proposed methods**

***KeywordS*-- PCA, LDA,ICA and distance techniques**

1. INTRODUCTION

For any one, from the start of the day involves in plenty of emotions till the end, hence the emotions play a key role in decision making [1]. The emotion is recognized by only with the help of expressions. The person can recognize the expressions by seeing directly them because every emotion has its own expression but person to person a little bit of variation may exist. The system which implements the recognition of the human facial expressions is called facial recognition system. The facial emotion recognition system involves in the following steps are Face Detection, Face Recognition, Face Emotion Recognition system.

It determines the locations and sizes of the faces in an input Image. Face detection can be regarded as specific case of object-class detection. In an object class detection, the task is to find the locations the sizes of all objects in an image that belong to a given Class. Face detection can be regarded as a more general case of face localization. In face localization, the task is to find the locations and sizes of a known number of faces (usually one). In face detection, one does not have this additional information. Early face-detection algorithms focused on the detection of frontal human faces, whereas newer algorithms attempt to solve the more general and difficult problem of multi-view face detection [3]. That is, the detection of faces that are either rotated along the axis from the face to the observer (in-plan rotation), or rotated along the vertical or left-right axis (out-of-plane rotation), or both. The newer algorithms take into account variations in the image or video by factors such as face appearance, lighting, and pose. Face detection is used in biometrics, often as a part of a facial recognition system. It is also used in HCI and image database management. Face detection is gaining the interest of marketers. Face detection is also being researched in the area of energy conservation [13].

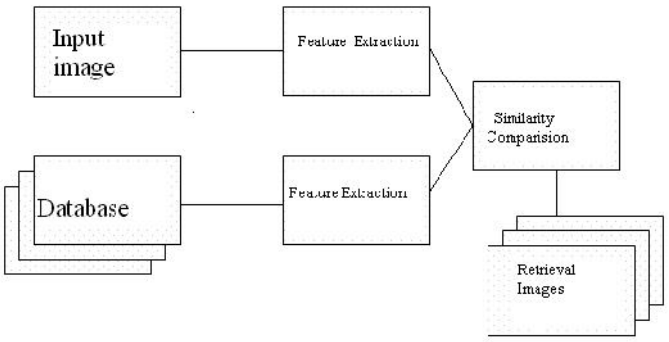


Fig: 1 Face recognition block diagram

A recognition system is computer application that automatically identifying or verifying a person from a digital image. One of the ways to do this is by comparing

selected facial features from the image and a facial database. Face recognition accuracy depends heavily on how well the input images have been compensated for pose, illumination and facial expression.The variations of facial appearances caused by illumination, the appearances are classified into four main components: diffuse reflection, specular reflection, attached shadow and cast shadow [4].Variations among images of the same face due to illumination and viewing direction are almost always larger than image variations due to change in face identity.

For instance, illumination changes caused by light sources at arbitrary positions and intensities contribute to a significant amount of variability. The image often includes a human face together with a background. Thus, the face has to be extracted from the background under variety of light sources called illumination. Some facial recognition algorithms identify facial features by extracting landmarks [9], or features, from an image of the subject's face. These features are then used to search for other images with matching features in this recognition system.

It is a computer system that attempt to automatically analyze and recognize facial emotions. For example, although facial expressions can convey emotions, they can also express

2. Existed and proposed system

Local Binary Pattern **(LBP)** is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighborhood of each pixel and considers the result as a binary number. Due to its discriminative power and computational simplicity, LBP texture operator [6] has become a popular approach in various applications. It can be seen as a unifying approach to the traditionally divergent statistical and structural models of texture analysis. Perhaps the most important property of the LBP operator in real-world applications is its robustness to monotonic gray-scale changes caused, for example, by illumination variations. Another important property is its computational simplicity [11], which makes it possible to analyze images in challenging real-time settings.The drawbacks in this system are it is highly sensitive to glasses and it is time consuming process. To overcome the drawbacks of existing system, a new method is proposed i.e. 2D-PCA (Principal Component Analysis).A kernel **principal component analysis** (PCA)[7] was previously proposed as a nonlinear extension of a PCA. The basic idea is to first map the input space into a feature space via nonlinear mapping and then compute the principal components in that feature space. This article adopts the kernel PCA as a mechanism for extracting facial features.Through adopting a polynomial kernel, the principal components can be computed within the space spanned by high-order correlations of input pixels making up a facial image, thereby producing a good performance. It is a way of identifying patterns in data, and expressing the data in such a way as to highlight their similarities and differences. The other main advantage of PCA is that once you have found these patterns in the data, and you compress the data, i.e. by reducing the number of dimensions [13], without much loss of information.

3. Experimental Results

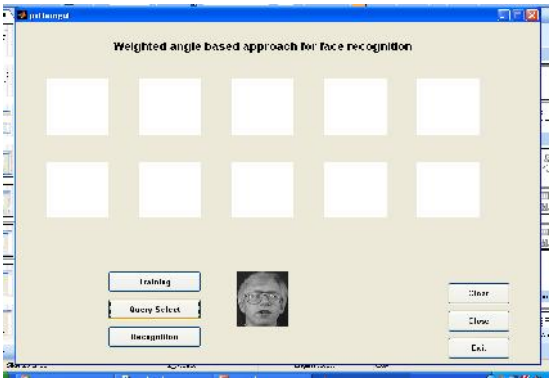
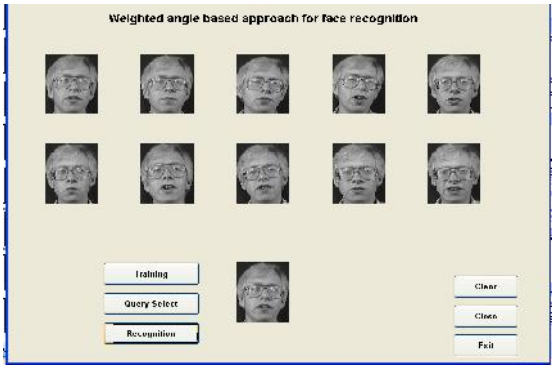


Fig 5 Input Images

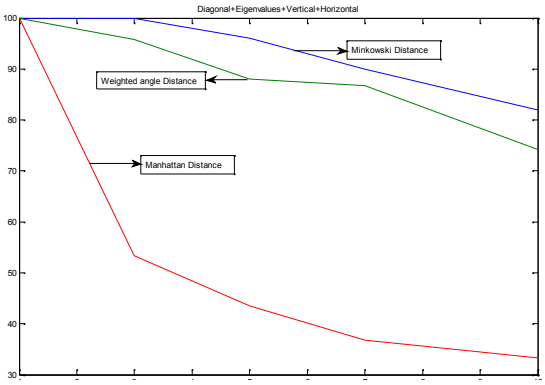


Query image a1

Fig:6 Comparison of images

ature Technique	Distance Measure	1	3	5	10
Hybrid feature extraction (PROPOSED)	Manhattan Distance	100	53	43	33
	Weighted angle Distance	100	95	88	74
	Minkowski Distance	**100**	**97**	**90**	**78**

Table: 1 Resultant Values



4. Conclusion and Future Scope

In this project i have taken my own database images from a1 to a10.Among those images a1 is taken as query image and the a1 is compared with remaining other images. Here we have applied 3 techniques on these images are Original LBP,ExtendedLBP, Principal Component Analysis.The image a4 is very nearer to query image a1 in pca As per the experimental results if we observe a4 image has glasses whereas a1 image does not have glasses. In case of glasses, the image quality does not change.PCA improves the accuracy of the emotion recognition even in case of experimental results as per the experimental result. The proposed method i.e.Principal Component Analysis also has some limitations like it is time consuming and some important features are missing in this method. To overcome this limitation we are using Color Filter Array Interpolation Techniques. Here we propose orientation-free edge strength filter and apply it to the image. Edge strength filter output is utilized both to improve the channel interpolation and to improve the quality of image.

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