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An efficient Facial Features extraction Technique for Face Recognition system Using Local Binary Patterns

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Abstract- Imaging in life and materials sciences has become completely digital and this transformation of visual imagery in to mathematical constructs has made it common place for researchers to utilize computers for their day to day image analysis tasks. The main objective of the paper is extracting the facial features of an image. In this paper presents a survey on the recent use of Local Binary Patterns (LBPs) for face recognition. It is becoming a popular technique for face representation. In the existed system we are using LBP. It is a non-parametric kernel which summarizes the local special structure of an image and it is invariant to monotonic gray-scale transformations. Here, we describe the LBP technique and different approaches proposed in the literature to represent and to recognize faces but it is having some limitations like it is not suitable for shadow images and low contrasted images. To overcome those problems in this project we are proposing 2D principles of component analysis (2D-pca) to extract the facial features of an image. Here we are using our own data bases to extract the facial features.

Keywords: LBP, Extended LBP, PCA kerne

I. 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.

II. FACE DETECTION

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.

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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].

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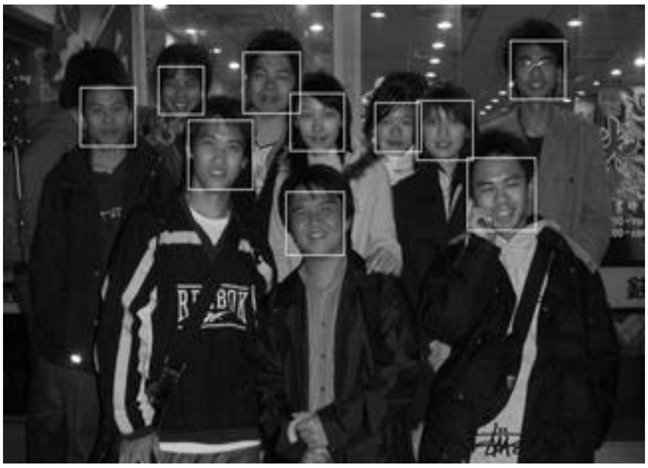


Fig: 1 **face detection to determine size & location**

III. FACE RECOGNITION

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.

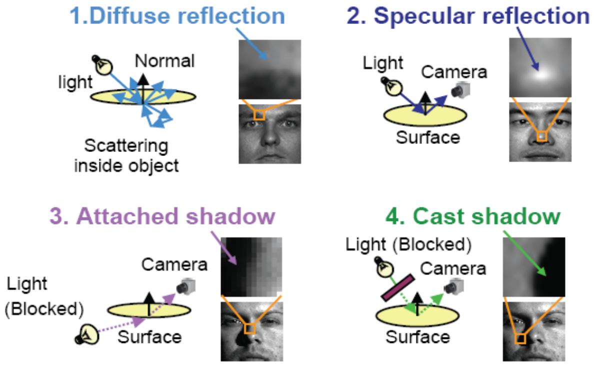
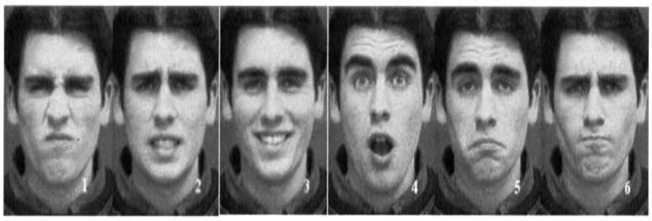


Fig: 2 Face recognition

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.

IV. FACIAL EMOTION 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 intention, cognitive processes, physical effort, or other intra or interpersonal meanings [5]. Some examples of feelings that can be expressed are



1. Disgust 2.fear 3. Joy 4.Surprise 5.Sadness 6.Anger

Fig: 3 Facial Emotions

V. 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.

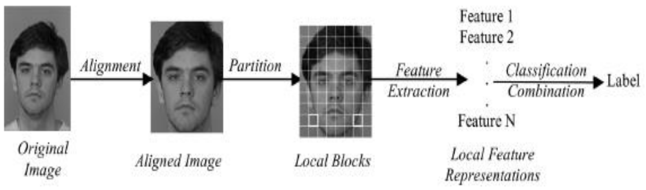
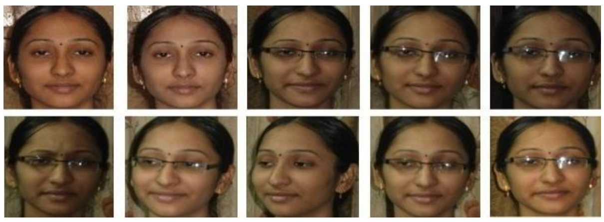


Fig:4 Proposed Methodology

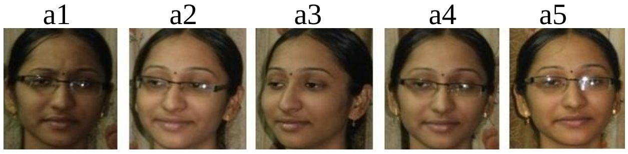
VI. EXPERIMENTAL RESULTS



Input Images

Query image a1

a1 a2 a3 a4 a5



a6 a7 a8 a9 a10

Table1

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Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP)

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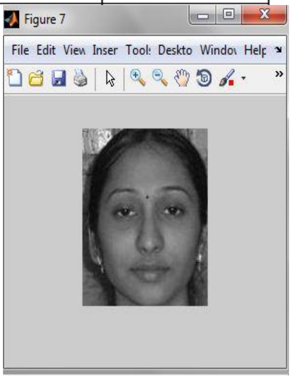
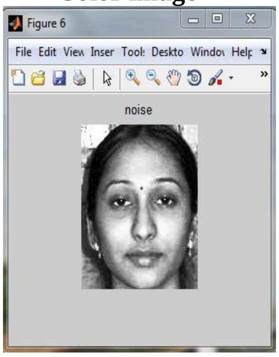
Image	Original LBP	Extended	Proposed
a1	0	0	0
a2	21.4865	45.323	138
a3	23.0337	48.8148	141
a4	18.485	39.7348	99
a5	28.2539	39.2969	95
a6	23.1191	39.1076	109
a7	24.7858	46.9914	146
a8	31.6637	46.9684	136
a9	20.5938	44.7536	135
a10	20.4857	44.6444	119

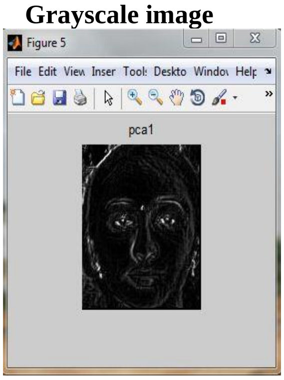
Color image



Grayscale image



Noiseless image



final PCA image

VII. CONCLUSION AND FUTURE SCOPE

In this project we have taken 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.

REFERENCES

1. A.S.Georghiades, P. N. Belhumeur, and D. J. Kriegman, “From few to many: Illumination cone models for face recognition under variable lighting and pose,” IEEE Trans. Pattern Anal. Mach. Intell., vol. 23, no. 6, pp. 643–660, Jun. 2001.
2. R.Basri and D. Jacobs, Lambertian Reflectance and Linear Subspaces, NEC Research Inst. Tech. Rep. 2000-172R, 2000, Tech. Rep.
3. R.Basri and D.W. Jacobs,“Lambertian reflectance and linear sub-spaces,” IEEE Trans. Pattern Anal. Mach. Intell., vol. 25, no. 2, pp. 218–233, Feb. 2003.
4. Bhabatosh Chanda and Dwijest Dutta Majumder, 2002, Digital Image Processing and Analysis.
5. R.W.Jr. Weeks,(1996). Fundamental of Electronic ImageProcessing Bellingham SPIE Press
6. A.K.Jain, Fundamentals of Digital Image Processing.Englewood Cliffs, NJ: Prentice Hall, 1989.
7. R.M. Haralick, and L.G. Shapiro, Computer and RobotVision, Vol-1, Addison Wesley, Reading, MA, 1992.
8. R. Jain, R. Kasturi and B.G. Schunck, Machine Vision, McGraw-Hill International Edition, 1995.
9. W. K. Pratt, Digital image processing, Prentice Hall, 1989.
10. A.C. Bovik, Digital Image Processing Course Notes, Dept. ofElectrical Engineering, U. of Texas at Austin, 1995.
11. D. W. Jacobs, P. N. Belhumeur, and R. Basri, “Comparing images under variable illumination,” in Proc. IEEE Conf. Computer Vision and Pattern Recognition, 1998, pp. 610–617.
12. J. Tumblin and G. Turk, “LCIS: A boundary hierarchy for detail-pre-serving contrast reduction, in *ACM* SIGGraph, 1999, pp. 83–90.
13. A. S. Georghiades, P. N. Belhumeur, and D. J. Kriegman, “From few to many: Generative models for recognition under variable pose and illumination,” in Proc. 4th IEEE Int. Conf. Automatic Face and Gesture Recognition, 2000, pp. 277–284.

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