



## Faces Recognition Based on Features

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**Abstract**— Now a day, Face recognition system is becoming very essential in different areas. There are different methods available for recognizing faces. The most common method used for it is a feature-based approach of face recognition. A feature-based approach to face recognition is biological method which extracts the salient facial features such as nose, eyes, cheeks, forehead, chin etc. In this approach different visual feature extraction techniques are also used such as color, shape, layout, texture etc. This paper takes a view of feature-based approach used in face recognition. Furthermore this paper also consist the discussion about the accuracy and effectiveness of the feature-based face recognition.

**Keywords**— Biometrics, Face recognition, Feature extraction, Histogram

### I. INTRODUCTION

Now a day digital images are used in variety of areas. The face recognition is becoming challenging task in these areas. Face recognition has wide applications in verification and identification of a person. The verification is one-to-one matching means as given the input image of a person compare it with previously available image of that person. For example verification is generally used in exams for verifying whether right candidate is appearing for exam or not. On another hand, the identification is one-to-many matching as given the input image comparing it with the images available in database and finding out the similar image among all for determining the person's identity. For example suppose for accessing some account details; face image password is given. In such case the input face image is compared with the images available in database and thus it can be used to identify the authenticate person. We know that verification and identification is essential in lots of areas. In such areas face recognition is getting arisen. The face recognition system is which has a large image database. This system takes the input as a face image and verifies or identifies it.

Recently for recognizing or identifying individuals the biometric-based techniques are emerged which authenticates the people and grants permission for accessing the virtual and physical domains based upon the keys, passwords, PIN etc. The biometric –based technique consist of identification based on the characteristics such as fingerprints, voice, face, eyes retina etc. Face recognition system is very advantageous as compared to the biometric-based approach. The biometric-based approach is active approach in which the users need to do actions; whereas the face recognition method is passive in which users do not need to do actions. Face recognition is specially used for security purpose. It performs the verification or identification. There are different methods which are available for recognizing faces. The most common method used for it is a feature-based approach of face recognition.

### II. FEATURE BASED APPROCH

A feature-based approach to face recognition is biological method which extracts the salient facial features such as nose, eyes, cheeks, forehead, chin etc. In this approach different visual feature extraction techniques are also used such as color, shape, layout, texture etc. The feature extraction model is biological method. The feature often belongs to salient facial features such as the nose, eyes, cheeks, chin, forehead etc. These features are generally used to recognize similar faces from a database. The large database of images is kept for retrieving the matching image. The image retrieval system retrieves the image with matching features as given in input. Comparisons between two faces are made based on their relationship in the feature space. Depth and curvature features have many advantages. It has the potential of higher accuracy in to describe properties of the face in areas such as the cheeks, forehead, and chin etc.

This approach firstly processes the input image for extracting the unique facial features such as nose, eyes, chin, forehead etc. And then compares the geometrical relationship among these facial points as shown in Fig 1 and Fig 2.

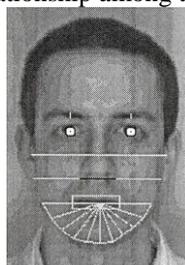


Fig. 1 Geometrical features (white) used in the Face recognition experiments

These extracted features from input face images are used for comparing with the images available in database in face recognition system. Then the 80% to 100% matching images are retrieved and by doing further analysis the accurately matching image is generated as a result of face recognition system.

The general features of faces are nose, eyes, chin, forehead etc. these features are identified with the help of visual features such as color, shape, texture, layout etc.

#### **Color-**

Color is one of the most widely used features among all the visual features used in face recognition system. The color histogram is most widely used for color representation. A histogram is a graphical representation of the number of pixels in an image. A color histogram of an image represents the distribution of colors in the image. The distributed colors in image are represented by color histogram. It represents number of pixels in each color range. The RGB (Red, Green, and Blue) and HSV (Hue, Saturation, and Value) are three-dimensional color spaces. The color histogram can be built in any of these color space.

#### **Shape:-**

The shape is another important feature used in face recognition. Generally shape can be represented in two ways: boundary-based and region-based. The boundary-based method only uses outer boundary of the shape while the region-based method uses entire shape region. The representatives used for these two methods are Fourier descriptor and moment invariants. Fourier descriptor is used for finding out boundary-based shapes. Moment invariant is used to find out the region-based shapes. In some cases the Fourier descriptor and Moment invariants both are used in combination to achieve the best result. These methods are generally used for 2D shape representation. Many other methods are also developed for 3D shape representation. Recently the FEM (Finite Element Method) has its application in shape representation.

#### **Texture:-**

The texture is also essential feature in facial recognition. Texture generally refers to the homogeneous visual patterns in digital image. Texture generally provides information about the structural organization of surfaces and their relationship with surroundings. It has application in image retrieval for pattern recognition. Previously the matrix method is used for representing texture feature. Later the wavelet transform was developed for representing texture. There are different wavelet transform techniques available such as orthogonal, bi-orthogonal, tree-structured etc. The wavelet transform approach provides above 80% accuracy. This approach can be combined with other techniques to achieve better accuracy.

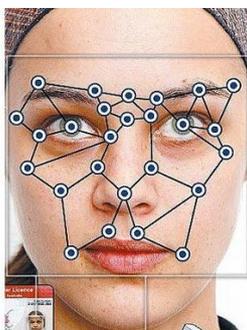


Fig.2 Geometrical features used in face recognition

### **III. CONCLUSION**

This paper is taking review of feature-based facial recognition method. In this type of face recognition the feature extracted from input image is used widely in verification and identification. The different features such as color, texture, shape are used mainly used for recognizing faces. This method provides accuracy above 80%. But there are still some chances of problems in some cases to recognize the correct faces. The images may vary due to makeup, or some accessories. In such cases finding the accurate face becomes challenging task. So for eliminating such risk new techniques are also evolving.

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