Automatic Facial Feature Extraction From Detected Face

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***Abstract*—**This paper proposes a method to extract the feature points from faces automatically. It provides a feasible way to locate the positions of two eyeballs, nose & lips. This approach would help to extract useful features on human face automatically and improve the accuracy of face recognition. The experiments show that the method presented in this paper could locate feature points from faces exactly and quickly.

Keywords-*Feature Extraction,* Feature Localization,Templates

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I. INTRODUCTION

Though people are good at face identification, recognizing human face automatically by computer is very difficult. Face recognition has been widely applied in security system, credit-card verification, and criminal identifications, teleconference and so on. Face recognition is influenced by many complications, such as the differences of facial expression, the light directions of imaging, and the variety of posture, size and angle. Even to the same people, the images taken in different surroundings may be unlike. The problem is so complicated that the achievement in the field of automatic face recognition by computer is not as satisfied as the finger prints. Facial feature extraction has become an important issue in automatic recognition of human faces. Detecting the basic feature as eyes, nose and mouth exactly is necessary for most face recognition methods. Facial feature de- tection techniques can be categorized in two major classes: In the first category, a **face detection** step has to be performed before facial feature detection, in order to provide the facial region where feature detection will be performed. The second class of approaches is looking for **facial features** over the entire image.

II. FACE DETECTION

Because of the increasing instances of identity theft and terrorism incidences in past few years, biometrics based security system has been an area of quality research. Modern day biometrics is a cutting edge technology which enables the automated system to distinguish between a genuine person and an imposter. Automated face recognition is one of the areas of biometrics which is widely used because of the uniqueness of a human face to other human face. Automated face recognition has basically two parts; one is face detection and other one is recognition. To detect a face from an online surveillance system or an offline image, the main component that should be detected is the skin area. This thesis proposes a skin based segmentation algorithm for face detection in color images with detection of multiple faces and skin regions. Skin color has proven to be a useful and robust cue for face detection, localization and tracking. In Face Detection, we check in given input image whether it contains human face or not, if so, then returning the location of the human face. Basically due to lots of research, wide variety of applications and difficulties in face detection has become interesting topics of research for the researchers in past decade. Face detection is used in many places nowadays especially the websites hosting images like Picasa, photo bucket and Face book. Actually Face Detection is first essential step in Face Recognition system for localizing and extracting the features of given image. Since faces have lot of variation in appearance based approach, face detection is not a simple or straightforward, it consists of a long list of these factors, such as pose variation, occlusion, image orientation, illuminating conditions, facial expression, structural components, facial size found in the image, the scene and complexity of images background and others.

We preferred HSV color model for human face detection because unlike RGB color model Hsv separates the image intensity component from the color component.e.g. if we want to do histogram equalization of a color image & we probably want to do that only on the intensity component & leave the color components alone.

Our hand has many parts like palm, back palm so different color variation in this areas but for all, these hue values don't vary much,so hue value can be useful in hand segmentation.

III. GENERAL FRAMEWORK

Regarding feature extraction, there is a general agreement that eyes are the most important facial features, thus a great research effort has been devoted to their detection and Localization. This is due to several reasons, among which:

• eyes are a crucial source of information about the state of human beings.

• the eye appearance is less variant to certain typical face changes. For instance they are unaffected by the presence of facial hair (like beard or mustaches), and are little altered by small in-depth rotations and by transparent spectacles.

• the knowledge of the eye positions allows to roughly identify the face scale (the intraocular distance is relatively constant from subject to subject) and its in-plane rotation.

• the accurate eye localization permits to identify all the other facial features of interest.

To our knowledge, eyes are the only facial features required for the initialization of *any* FRT; actually this is the only information needed by those methods that operate an *alignment* of the face region, for instance as done by [Zhang et al., 2005]. However some techniques may require more features than just the eyes. For instance all FRTs derived from subspace methods are initialized on four positions (the eyes, nose and mouth locations) to *warp* the face region before projection.2 Other techniques operate on larger sets of facial positions because they base the recognition on some kind of local processing: e.g. is based on the comparison of the image texture found in the neighborhood of several *fiducial points*. Due to these considerations, the performance evaluation of a feature extraction method is usually given in terms of error measures that take into account only the localized eye positions.

The nose is characterized by very simple and generic properties: the nose has a "base" the gray levels of which contrast significantly with the neighboring regions; moreover, the nose profile can be characterized as the set of points with the highest symmetry and high luminance values; therefore we can identify the nose tip as the point that lies on the nose profile, above the nose baseline, and that corresponds to the brightest gray level. These considerations allow to localize the nose tip robustly

Regarding the mouth, our goal is to locate its corners and its upper and lower mid-points. To this aim, we use a snake [Hamarneh, 2000] to determine the entire contour since we verified that they can robustly describe the very different shapes that mouths can assume.

IV. OUR PROPOSED METHOD

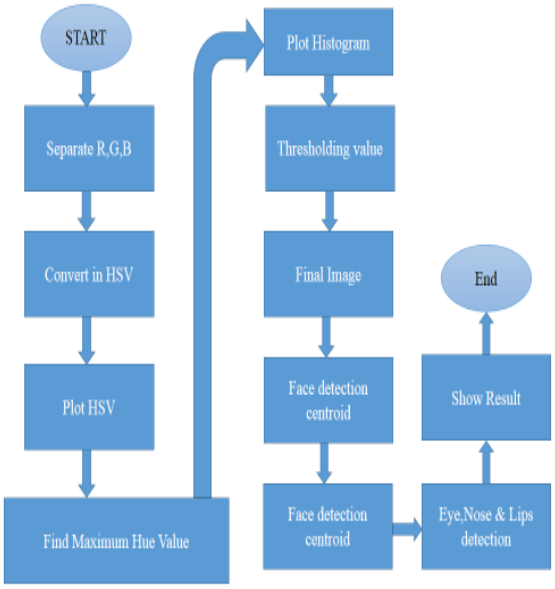

Fig:1 Basic Process Flow

Here in figure 1 basic process flow diagram is shown for face detection using the HSV color model & for feature extraction. Any image we take from the camara is nothing but the RGB image so first we have to convert it in the HSV form then find the hue value of the image & compare it with the thresholding value.After that the face is detected from the image & according to the skin color on the face its centroid is found. After that the feature from the face are extracted. HSV color model is used for face detection & another algorithm is used for feature extraction such as Eye,Nose & Lips.

V. RESULTS

Fig:2 Original Image

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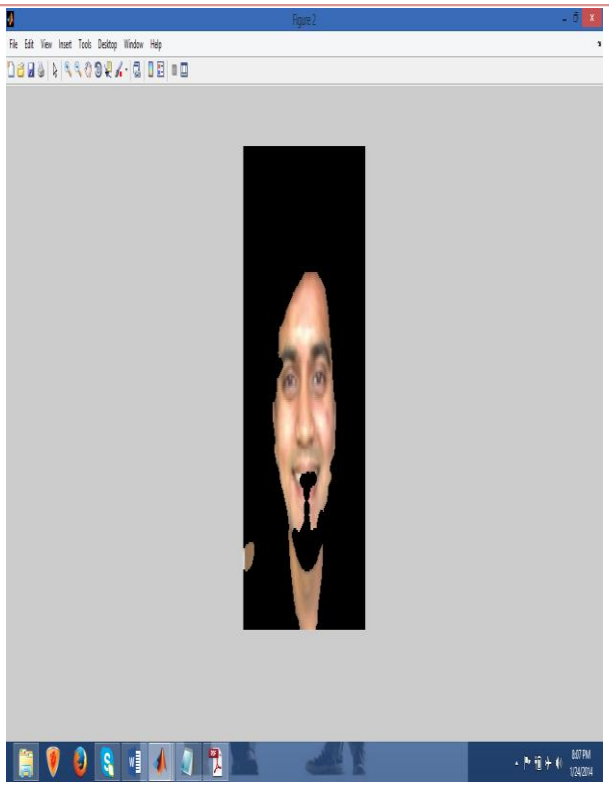

Fig:3 Detected Face

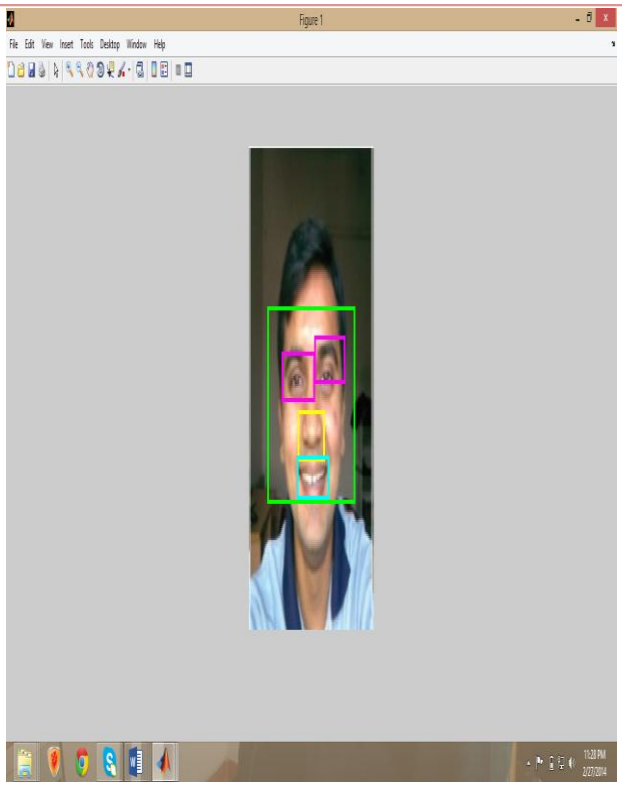

Fig:5 Original Image with feature extraction

Fig:4 Original Image with Centroid

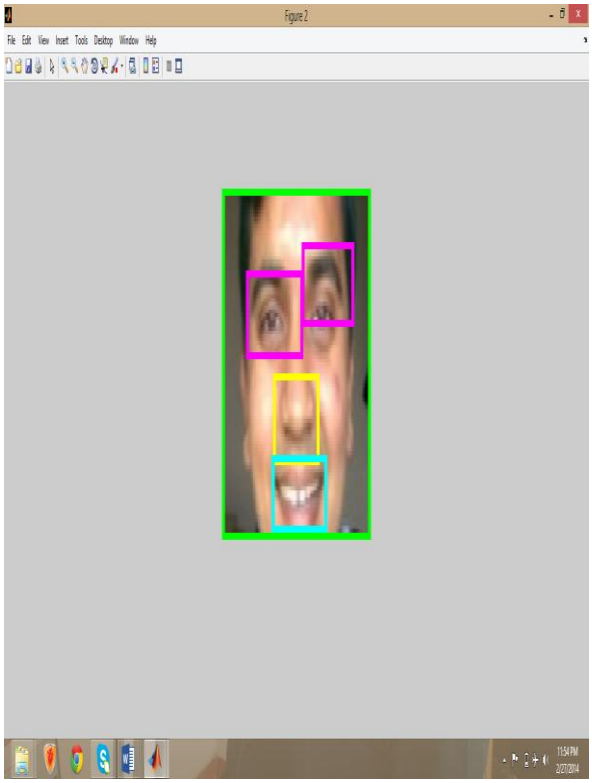

Fig:6 Detected Face With Extracted Features

VI. CONCLUSION & FUTURE WORK

In this paper the algorithm used for the detection of faces achieves a high rate of accuracy, because RGB color model is used for detection, then detect the features of the face. For that

another algorithm is used so two different approaches are used for detection & feature extraction. Both give the accurate results. The future work we can say that the different color model component can be used for face detection like from the RGB color model R component, from YCbCr color model Y component,& from HSV color model H component.

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