Human Face Detection and Recognition using Genetic Algorithm

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Abstract - *Face detection is one of the challenging problems in the image processing. This project, introduce a face detection and recognition system to detect (finds) faces in images from galleries of known people. Human skin color is an effective feature used to detect faces, although different people have different skin color, several studies have shown that the basic difference based on their intensity rather than their chrominance. Textures of human faces have a special texture that can be used to separate them from different objects. An important task to be carried out in the Systems of Recognition of Faces is to detect the presence of a face in a determined region of the image. To detect the face before trying to recognize it saves a lot of work, as only a restricted region of the image is analysed, opposite to many algorithms which work considering the whole image. This system is caped with three steps. The first step is to classify each pixel in the given image as a skin pixel or a non-skin pixel. The second step is to identify different skin regions in the skin detected image. The last step is to decide whether each of the skin regions identified is a face or not. Finally recognition is done by using Genetic Algorithm. As the genetic algorithm is computationally intensive, the searching space is reduced and the required timing is greatly reduced.*

1. INTRODUCTION

Face detection is the essential front end of any face recognition system, which locates the face regions from images. It also has numerous applications in areas like surveillance and security control systems, content-based image retrieval, video conferencing and intelligent human-computer interfaces. Most of the current face recognition systems presume that faces are readily available for processing. However, in reality, we do not get images with just faces. We need a system, which will detect the face in image, so that this detected face can be given as input to face recognition systems. Given an image, the goal of a face detection algorithm is to identify the location and scale of all the faces in the image. The task of face detection is so trivial for the human brain, yet it still remains a challenging and difficult problem to enable a computer to do face detection. This is because the human face changes with respect to internal factors like facial expression, beard and mustache, glasses etc and it is also affected by external factors like scale, lightning conditions, contrast between face and background and orientation of the face. Face recognition is the process of automatically determining whether two faces are the same person. A number of factors make this a challenging problem for computers. Faces in images and video can be captured at various resolutions, quality, and lighting conditions. Different cameras have different imaging properties. Moreover, people's facial expressions as well as their pose with respect to the camera can vary widely, and facial characteristics can change dramatically as people age over time. Digital images and video are becoming more and more important in the multimedia information era. The human face is one of the most important objects in an image or video. Detecting the location of human faces and then extracting the facial features in an image is an important ability with a wide range of applications, such as human face recognition, surveillance systems, human computer interfacing, video-conferencing, etc.

2. LITERATURE REVIEW & RELATED WORK

Recently, human face detection algorithms based on color information have been reported [3-5]. The face regions are initially segmented based on the characteristic of skin tone colors. The color signal is usually separated into its luminance and chrominance components in an image or video. Experimental results show that the skin-like regions can be segmented by considering the chrominance components only. Although skin Colors differ from person to person, they are distributed over a very small area on the chrominance plane. However, human face detection and facial feature extraction in gray-level images may be more difficult because the characteristics of skin tone color are not available. K.K.Sung proposed an example-based learning approach for locating vertical frontal views of human faces in complex scenes. A decision-making procedure is trained based on a sequence office and non-face examples. Six face clusters and six non-

face clusters are obtained according to 4150 normalized frontal face patterns. The face regions are located by matching the window patterns at different image locations and scales against the distribution-base face model.T.S.Huang proposed a hierarchical knowledge-based method consisting of three levels for detecting the face region and then locating facial component in an unknown picture. Images of different resolutions are used in the two higher levels. Two sets of rules based on the characteristics of a human face region are applied to the images. At third level, the edge of facial components is extracted for the verification of face candidates. However, the computational requirements of these methods may be too high for some applications, which may be unable to detect and locate a tilted human face reliably. Extraction of facial features by evaluating the topographic gray-level relief has been introduced [3, 8, 9]. Since the intensity is low for the facial components, the position of the facial features can be determined by checking the mean gray-level in each row and then in each column. In [9-11] facial feature detection based on the geometrical face model was proposed. The model is constructed based on the relationships among facial organs such as nose, eyes, and mouth. However, these methods can work properly only under well-lit conditions. Therefore, the pre-processing step for reducing the lighting effect is very important for the methods. In previous work [12,13], possible face candidates in a gray-level image with a complex background were identified by means of valley features on the human eyes.

3. ANALYSYS OF PROBLEM

Problems of face detection and facial feature extraction In fact, detecting human faces and extracting the facial features in an image is a challenging process. It is very difficult to locate the positions of faces in an image accurately. There are several variables that alert the detection performance, including wearing of glasses, deferent skin coloring, gender, facial hair, and facial expressions.

Furthermore, the human face is a three-dimensional (3-D) object, and might be under a distorted perspective and uneven illumination. As a result, a true face may not be detected. Moreover, facial feature extraction is a time-consuming process due to the lack of constraint on the number, location, size, and orientation of faces in an image or a video scene.

4. PROPOSED WORK AND OBJECTIVE

Objectives:

1. To enhance the image quality.
2. To detect the face from the input image with accuracy.
3. To recognize the face with precision.

Proposed Work:

The entire propose work has divided into two modules

1. Face Detection
2. Face Recognition

1) Face Detection

a. First we consider a color image as an input for a system. Here we are concentrating on color image because; we require a color skin region of a human face.

b. .After receiving a color image there is a need to detect a skin region by following color patterns.

c.If the skin region of a human face is detected and accepted properly, then first we will load the features images which are available in database and then secondly, locate various features in skin area.

d. At last, we present the output in the form of "Face regions with features".

e.If skin region is not present in the image, then we discard this image and no further processing is done.

2) Face Recognition

a.Load detected image as input to the face recognition system.

b.Train artificial neural network using Genetic algorithm.

c.Load trained file.

d.Test Input image using Artificial Neural Network .

Fig.1 represents the method for face detection .

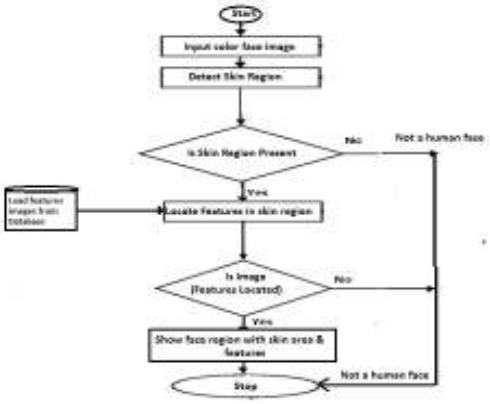

Figure1 :-Proposed Method for Face Detection

5. CONCLUSSION

This system is very useful for security such as access control, comparing surveillance images to know terrorists, legislature i.e. identify of voter prior to vote, Banking minimize fraud by verifying identity of person.

6. REFERENCES

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