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A Survey on
Face Recognition System - A Challenge

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Abstract: Face recognition presents a challenging problem in the field of image analysis and computer vision, and as such has received a great deal of attention over the last few years because of its many applications in various domains. This paper focuses on the meaning of face recognition system, human face features that use to identify the face, face recognition types including two- dimensional system (2D) and three-dimensional system(3D)& the explanation of three-dimensional recognition procedures We also explained our new idea for recognizing the human face. This paper is an attempt to give an idea of the state of the art of face recognition technology.

Keywords: Face Recognition, Person Identification, Biometrics, 2D, 3D Technology.

FACE RECOGNITION TECHNOLOGY DEFINITION

As we all know that almost the security system in the airports, huge hotel and especially in the police led depend on the use of advanced protection system that based on the computer programs. Theses program verifying people present and also thieves. This system is based database for pictures of people criminals, thieves and others with picture captured by a surveillance camera. So a facial recognition system is a computer application for automatically identifying a person digital image that its source is already sorted in the database. Actually, it is works by comparing the selected facial features from the image and a facial database.

FACE MEASURE

Every human face has many distinctive features are in a various meandering on the face. The program is based on these parameters nodal points. Each face has approximately 80 nodal points. Almost facial recognition programs analyze the relative position, size, and/or shape of the eyes, nose, cheek boons and jaw. The most famous features of the face measured by a program are:
1. The distance between the eyes.
2. The depth of the eye.
3. Nasal breadth.
4. The form of the cheek boon.
5. Along the jaw line.

The parameters measured by the program and then translated into digital codes called the fingerprint and face print used to represent the face in the database with time , such as eye hole, the distance between the eyes, nose shape and others mentioned above. These features are a source of information for a facial recognition system as the changes in

the lighting or surrounding environmental conditions do not affect these measurements, for example: can operate these systems in any lighting conditions even if the place was dark and even if the person is not in the face of camera.

2.4 3D Face Recognition

How 3D Procedure Work: The use of depth and focus of the face that does not affect the change in lighting is known as three-dimensional face recognition system. The software system that relay on three-dimensional technique with a series of steps to eventually be able to perform a face recognition procedure. We can divide the whole process by the following steps. Steps involve in the face recognition system are: (fig 1)

Fig. 1 the steps of 3D face recognition system.
1) Detection: Capture a digital image by a two dimensional digital camera or even using a video camera.

2) Alignment: After capturing the image, the system will determine a head position, size and its direction.

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Fig. 2 Feature Extraction Process.


2.3 Face Recognition Types

2D System In the past, facial recognition programs depended on two dimension (2D) picture to compare it with the image sorted in the data base, but these programs did not succeed only if the person is looking just to the camera. Of course anyone suspect will be warned that he/she will see a camera in place, and here lies the problem where this fails by depending on the 2D system. Beside, the additional changes in the environment surrounding the person, such as light will produce images the computer cannot have in the corresponding memory; also the changes in the same person can cause a system failure in face recognition.

3D System Modern system for face recognition based on the pattern of three-dimensional (3D) [8], where the special cameras will captured images of three-dimensional views of the suspected person, and using the special main features of each face that are not changed significantly

3) Measurement: The software (specific program) will calculate the curves and meanders on the face to an accuracy of part OS the millimeter. Then the program ready to convert that information to establish a face model or pattern.
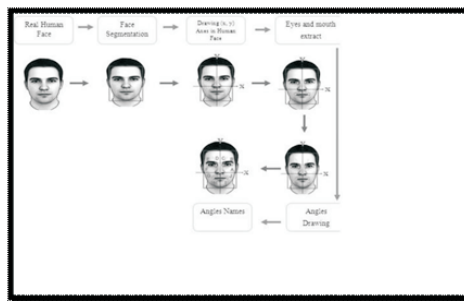

4) Representation: In this step, the system will translate the model and form a specific code. The code for each model is unique and consists of a set of numbers.
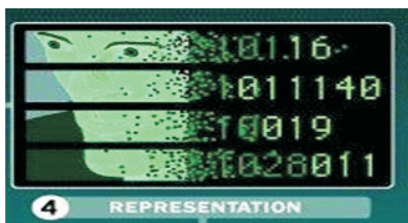
face area from a given facial scan. The segmented face area starts from the forehead until the chin as shown in figure 2. The subsequent feature point extraction is conducted within the segmented face area.

5) Matching: In the case that the picture is three-dimensional and corresponding to the three- dimensional images that stored in the database, the comparisons between the images are immediately. But the challenge facing these systems is that most of the images stored in database are in two-dimensional.

The development of a new technology support the use of three different points to get to know any face sorted in database. Some of these points are outside of the eyes, inside the eyes and the tip of the nose. The conduct of the system will carry out these measurements on the dimensions between these points of three-dimensional picture and begin to be converted to two-dimensional images through the application of complex mathematical algorithms. After the conversion process, of this part, the system begins to work of comparison.

6) Verification or Identification: In the step of recognition, the program will compared the images and match them with pictures of the database sorted by the system in the previous step. But if the goal is verify the result of the previous step, the system compares the image with all images in the database and then matching results are displayed in percentages.
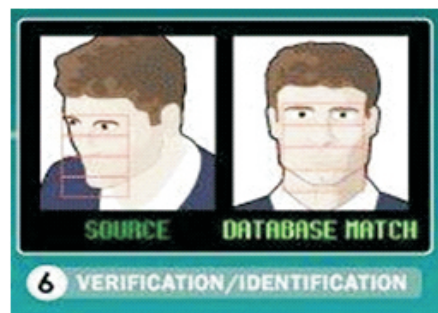
CONCLUSION

As you can see, face recognition system is very important in our daily life. It is possesses a really great advantage. Among the whole types of biometric, face recognition system is the most accurate. Research has been conducted vigorously in this area for the past four decades or so, and though huge progress has been made, encouraging results have been obtained and current face recognition systems have reached a certain degree of maturity when operating under constrained conditions; however, they are far from achieving the ideal of being able to perform adequately in all the various situations that are commonly encountered by applications utilizing these techniques in practical life. The ultimate goal of researchers in this area is to enable computers to emulate the human vision system. To attain this objective, "Strong and coordinated effort between the computer vision, signal processing, and psychophysics and neurosciences communities is needed".

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