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Study of Open Challenges in Face Recognition and Expected Result

KEYWORDS

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ABSTRACT *Face, the most attractive biometric, in view of the tremendous industrial and technological growth in the last decade, the need of facial recognition increased for security and identification purpose. In this paper we study challenges for face recognition system. We show expected result obtain by using MATLAB software and also discuss various application of face recognition ,so now our key goal is to create automated enhance face recognition systems that can provide better graphical user interface .Government agencies are investing a considerable amount of resources into improving security systems as result of recent terrorist events that dangerously exposed flaws and weaknesses in today's system safety mechanisms. Face logon provides identification of a user by biometric verification. Passwords and fingerprints are past now, Forget typing your password every time you login to your PC , face recognition is the future login.*

INTRODUCTION

Person identification is one of the most interesting image processing problems. As we know one picture is worth more than ten thousand words, present environment need best biometric authentication as other method cannot authenticate correctly the need of facial recognition is rapidly increasing in identity verification. A digital image is an image f(x, y) that has been discretized in both spatial coordinates and brightness(intensity). The image is divided into small regions called picture elements, or pixels, Image digitization includes image sampling [i.e., digitization of spatial coordinates (x, y)] and gray-level quantization (i.e., digitization of brightness amplitude). An image is represented by a rectangular array of integers Images are produced by a variety of physical devices, including still and video cameras, scanners, electron microscopes. They can be used for a variety of purposes, including entertainment, medical imaging, business and industry, military, civil, security, and scientific analyses. This ever-widening interest in digital image processing systems from the improvement in the quality of pictorial information available for human interpretation .We are trying to find best face recognition obtain from the latest software available. Finally, several challenges and prominent development directions for the future are identified.

CHALLENGES FOR FACE RECOGNITION

The face is a dynamic structure that changes its shape non-rigidly since muscles deform soft tissue and move bones. Another key challenge for face recognition is the effect of facial expressions on the appearance of the face. Neurophysiologic studies have suggested that facial expression recognition happens in parallel to face identification (Bruce, 1988) However, the appearance of the face also changes due to aging and people's different lifestyles. For example, if grow skin becomes less elastic and get loose with age, the lip and hair-line often faint recedes, the skin color changes, people become fat may gain or lose weight, grow a beard on face , change their hairstyle etc. This can lead to dramatic changes in the appearance of faces in images. Challenge for face recognition is related to the problem of occlusions. Such occlusions can happen for a number of reasons, e.g. part of the face maybe occluded with cloth and not visible when images are taken from certain angles.

- The changes in illumination
- The changes in pose
- The occlusion
- The age

- **THE CHANGES IN ILLUMINATION**

Face recognition was found to be sensitive to the presence of cast shadows and to changes in illumination. Person face was slower and less accurate at matching and naming faces when there was a change in illumination direction. Ambient lighting changes greatly within and between days and among indoor and outdoor environments. As we know human face structure is 3D that's why , a direct lighting source can cast strong shadows that accentuate or diminish certain facial features. (RAMESHJAIN, (1989))

Change detection algorithms take two digitized images as input and return the locations in the field of view where differences between the images are identified. These differences may be caused by the motion of an object in the field of view, the addition or removal of an object from the scene, slight changes in illumination , or environmental noise from the digitization process. (RAMESHJAIN, (1989))The goal of such an algorithm is to locate only the changes that are due to structural changes in the scene, i.e., an object moving or the introduction or removal of an object in the scene. Many different types of techniques for change detection exist in the literature. Changes may be detected either at the iconic or pixel intensity level or after identifying features various entities such as fine lines , spots, corners, or some other interesting change . At the pixel level various diverse techniques exist for detecting changes. These range from simple differencing methods to complex modeling processes . In some technique individual pixels taken or in others technique look at blocks of adjacent pixels . But, besides the specific technique used for measuring changes, this change detection process is generally the same. (RAMESHJAIN, (1989)) The input images are first divided up into defined regions. A metric f, is then computed for a region in the field of view for both input images. By comparing the measurements computed for the two images, one determines a quantity corresponding to the difference (or similarity) between the two locations. A simple equation for this metric may appear as follows (E.Wood)

$$D(x,y)=f1(x,y)-f2(x,y)$$

In this equation D(x, y) is the calculated difference, and f, is the metric computed for the particular region in question in image i. , then compares this "difference metric" to a threshold to determine if a change is to be indicated at that location.

- **THE CHANGES IN POSE**

In many face recognition scenarios the pose of the probe

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and existing gallery face images is different. For example, the gallery image may be a frontal "mug-shot" and the probe image may be a 3/4 view captured from a camera in the corner of a room. Approaches addressing pose variation can be classified into two main categories depending on which type of gallery images they apply for testing. Multi-view face recognition is a direct extension of frontal face recognition in that the algorithms require all different pose gallery images. Linear subspaces have been extended in order to deal also with the problem of pose changes.

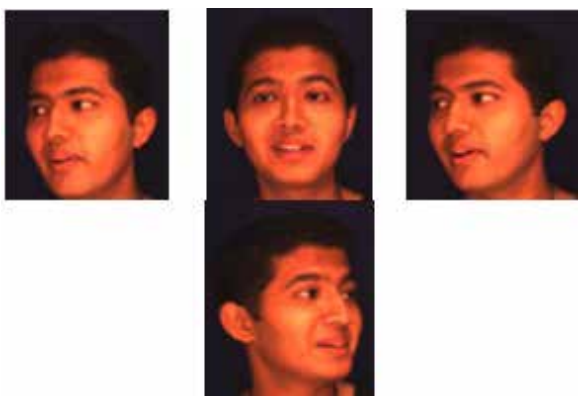

Fig1. Changes in pose

- **THE OCCLUSION**

Most probably if one grew a beard on their face or is wearing sun glasses or a hat on their head , rap cloth etc then it is difficult to recognize occluded region of face . A disguise can be anything which conceals or changes a person›s physical appearance, including a packing with wig, sun glasses, dark makeup, costume or some other ways. Various disguise for people, animals and objects. Different hats or cloth , sun glasses, change in hair style or apply wigs, color, plastic surgery, and make-up are also used. One of the main drawbacks of the appearance-based paradigm (e.g., PCA), is its failure to robustly recognize partially occluded objects. One way to deal with partially occluded objects (such as faces) is by using various local approaches. In general, face divide into various parts and then use a voting space to find the best match.

Fig2. Example images from the four categories image glasses , sunglass , hat, disguise

- **THE AGE**

As the face matures, it changes some of its most enduring properties (e.g., shape of cranium) and acquires new attributes (e.g., wrinkles,spot). These changes are the basis for information about the aging of the face. When the time lapse between the training and testing images is not negligible. Many of the considered techniques ignore in performances, This makes clear that all the introduced methods do not take into account for problems due to the age variations. Some strategies overcome this problem periodically upgrading the gallery or retraining the system. Nevertheless this not very suitable solution only applies to those systems granting services, which perform the person authentication, task frequently (Andrea F. Abate, 26 January 2007), while it is impractical in other situations, such as low enforcement. Alternatively the age of the subject could be simulated trying to make the system more robust with respect to this kind of variation.

Fig3. Dramatic changes in the face as it ages,

ADVANCES IN FACE IMAGE ANALYSIS

IMAGE ANALYSIS: It cover study of various aspect of recognition. Face image analysis, include collection of facial data, conduct survey, organization of face database, Creating sample database for processing & testing of face image.Tree diagram of various FRT techniques is shown .

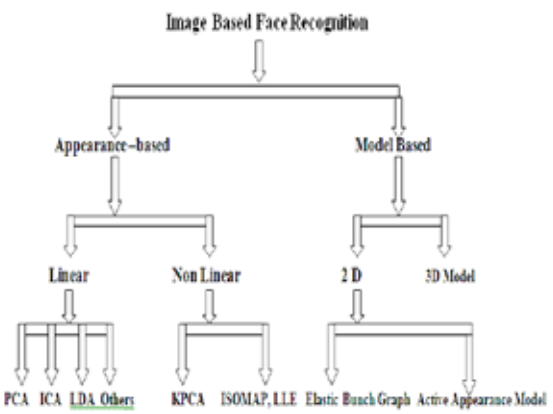

Fig4. Face recognition methods covered in this tree

EXPECTED RESULT

Research is a structured enquiry that utilizes acceptable scientific methodology to solve problems and create new knowledge that is generally applicable for that ,we show expected result obtain by MATLAB program . MATLAB Software provide platform for reading and writing Images ,We can read TIFF, JPEG, BMP standard image files using the imread function. The various type of data returned by imread depends on the type of image reading by imread command. We can write MATLAB data to a variety of standard image formats using the imwrite function. For example, h = findobj('Type',''); finds the handles of all patch objects. By using MATLAB software we are trying to enhance color face recognition. A face is digitized and matched against the face database to determine if the person is authorized to enter a facility or use a system.

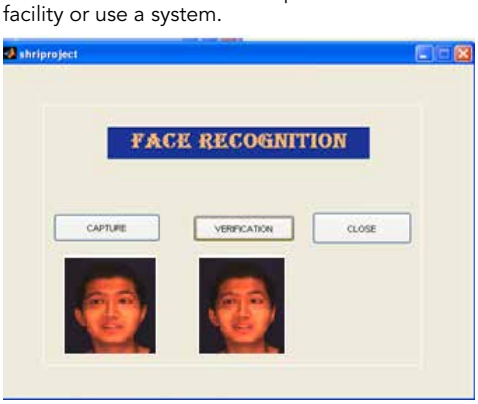

Fig5. Miniature System Model GUI Obtain by Using MATLAB software

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FACIAL DATA MANAGEMENT

Facial Data Management includes the creation, maintenance, and use of a facial database. As we Know from detail study that the two images of same size can be only compared with each other . So first we have to register Image before processing .Database contain all same size images.

Face Image registration: Image registration is the process of transforming one image into the coordinate system of another image.

APPLICATIONS

- Law Enforcement.
- Rapid progression through customs. (http://www.forensicmag.com/article/facial-recognition-valuable-tool-law-enforcement)
- Residential Security.
- Voter Verification.
- In Banking for person authentication.
- Checking for criminal records .

Thought the applications of FRT are more but the up till work is not satisfactory so to enhance FRT need further boost. FRT can only recognize a face if a specific individual's face has already been added to (enrolled in) the system in advance. FRT for daily attendance has yet not be achieved in practice. So we are trying to develop such system that can be able to recognize person by their facial image id. In this test, the system is trained on sample 20 people.

CONCLUSIONS

In this paper we discuss open challenges in today's face recognition system and their applications and also show steps involve in recognition process and show expected result obtain by using MATLAB software , We discusses several aspects of face recognition . We hope this application oriented paper can provide the readers a better understanding about face recognition and facial data management.

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