Literature Survey on Contour Point based Recognition

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Abstract-**Contour is a main role for object recognition. In this paper, a new contour related feature to detect and depict local contour point information images. There are two features. The first one is contour patch detector used for detecting images into patches exotic information of object contour which is called as Maximal/Minimal Torque Patch (MTP) detector. The second one is contour patch descriptor describes Multiscale Torque (MST) descriptor. It models the torque values in the region of the patch in a multi-scale manner. Observation for object recognition on the Caltech-101 datasets are should in proposed contour features of this paper also explained contour point features and included in other types of features.**

Keywords: Contour point, face recognition,

I.Introduction

Nowadays many object recognition concepts based on interesting one of the point detectors and descriptors ([1], [6]) are texture based features, some other powerful keys have not been adequately explored yet, and one of them is the key of contour.

Contour point consists of edge fragments or curve, which represent some meaningful information about geometric concepts. Contour features can be effectively represents object that can be identified by shape. Clearly, humans do recognizes a wide range of objects based on 2D. The contour point should be an important role in object recognition.

The contour point approach is not most popular one compared to texture based approach. Because of more complexity of the extending contour point in the object recognition.

An alternative approach contour patches. Contour patches can be classified as three approaches. The patch detector describes to find useful information about the contour patches. The Local descriptor describes that the spatial distribution of edges one the chunks, into local features, and contour representation of the overall contour point or shape based on the spatial distribution of the local features.

Some approaches to detect simple elements like circles [8], whose power is weak or representing shapes by spatial distribution of local features and as a result, becomes very complex [3]. It can be used in limited applications. This shows us to develop a new contour based detector with a trade-off between repeatability and discrimination and a feature descriptor, which provides distinct information of contours yet has a simple vector from to be object can be easily recognized.

In this paper, we introduced a contour point features concept is torque. Torque is also is called as moment of force is a physical concept that measures the tendency of an object to rotate around axis. The proposed contour feature was used for object recognition and tested on the Caltech-101 dataset. The experiments showed, using the contour cue as the only feature, our proposed method noticeably outperformed other contour- related features, and performed on a par with many exist-ing methods using other types of cues [2]. Combining it with SIFT; the resulting contour feature noticeably improved the classification performance of the SIFT-based approach.

1. Problem Definition

Contour point face recognition problem can be formulated as: The user given input face image and a database images are known individuals, how user can verify or find right person of the given input images?

2. Why use object recognition for face

In recent years biometric techniques are emerged as most of recognition. To identify the authenticating people can be used for passwords tokens, keys, PIN (Personal Identity Number), smartcard and so on. These methods are used to identify his/her behavioral

character. Passwords and PPIN's are hard to remember the authenticating people. Smart card, keys

and tokens are may be displaced, duplicated, or stolen from authenticating people. To avoid this problem biometric traits are not misplaced, forgotten, stolen, because it is an individual behavior of the authenting person.

Biometric techniques based on identification of anatomical characteristics such as face, fingerprint, hand geometry, voice, speech recognition, Iris, retina and so on, and behavioral traits such as gait, signature and keystroke dynamics[4].

Face recognition shows several advantages over biometric traits. However, all technologies need some other spontaneous action by the user. I.e. The user needs to place the correct position of the hand-rest for fingerprinting and the user need to stand for iris or retina in a fixed position in front of the camera. Even though, facial images can be easily obtained with a couple of economical fixed cameras. A good face recognition algorithms and correct preprocessing of the images cam compensate for noise and slight variations in orientation scale and illumination.

Finally, technologies that require multiple individuals to use the same equipment to capture their biological characteristics potentially expose the user to the transmission of germs and impurities from other users. However, face recognition is totally non-intrusive and does not carry any such health risks.

3. Difficulties in face recognition

Face recognition is distinct and hard case of object recognition. Then difficulty of the problem is stems from the face that in their mostly it appears to be roughly alike and the differences between are quite subtle. Consequently, front face images are very dense cluster in a image space makes it virtually impossible for conventional pattern recognition techniques to accurately differentiate among with a high degree of success.

Moreover, the human face is not a unique, rigorous object. Absolutely, there are number of factors that cause the appearance of the face to vary. The facial appearance can be categorized into two approaches: An intrinsic factors of the face and are independent of the observer. These factors can be classified into two: Intrapersonal factors are responsible for facial expression of the same person. Some examples are facial expression and facial paraphernalia (facial hair, specs, surface, etc.). Interpersonal factors are responsible for the differences in the facial appearance of different people. Some examples are ethnicity and gender. Extrinsic factors cause the appearance of the face to alter via the interaction of light with the face and the observer. These factors include illumination, pose, scale and imaging parameters (e.g. resolution, focus, imaging noise, etc.).

4. Face Recognition Techniques

The technique for acquiring image depends upon the primary application. For example, observation applications may finest be served by capturing face images by resources of a video camera while image database investigations may have need of fixed strength images taken by a average camera. Some other applications, such as right to use to top security domains, may even require the forgoing of the non-intrusive feature of face recognition by requiring the user to place in front of a 3D scanner or an infra-red sensor. Therefore, depending on the face data achievement methodology, face recognition techniques can be generally divided into three categories: methods that operate on concentration images, those that deal with video sequences, and those that have need of other sensory data such as 3D information or infra-red imagery.

4.1 Featured-based

Feature-based approaches first process the input image to recognize and take out (and measure) unique facial features such as the eyes, mouth, Iris, nose, etc., as well as other fiducially marks, and then calculate the geometric relationships among those facial point, thus falling the input facial image to a vector of geometric features. Standard numerical pattern recognition techniques are then employed to match faces using these dimensions [5].

More sophisticated characteristic taking out techniques involve deformable templates. Though, all of these techniques rely greatly on heuristics such as restricting the explore subspace with geometrical restriction. Moreover, certain patience must be given to the models since they can never completely fit the structures in the image. However, the use of a large tolerance assessment tends to tear down the accuracy required to distinguish individuals on the basis of the model's ultimate best-fit parameters and makes these techniques insensate to the minute variations desired for recognition. More newly, reported a recognition performance of 95% on a database of 685 images using a 30-dimensional characteristic vector derivative from 35 facial features. However, the facial features were physically extracted, so it is reasonable to assume that the recognition performance would have been a great deal lower if an

automatic, and hence a smaller amount accurate, feature extraction method had been adopt. In general, present algorithms for automatic feature extraction do not provide a high degree of (Fig.1) accurateness and necessitate considerable computational capacity.

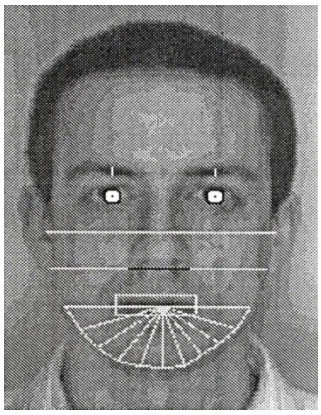

Fig. 1. Geometrical facial appearance (white) used in the face recognition experiments. . (©1993 IEEE)

4.1.1 Advantages and Disadvantages

The main advantage presented by the featured-based techniques is that because the taking out of the feature points herald the analysis done for matching the image to that of a known individual, such methods are relatively vigorous to location variations in the input image. In principle, feature-based method can be made invariant to size, orientation and/or lighting [7]. Other benefits of these schemes include the firmness of representation of the face images and high speed matching.

The major disadvantage of these approaches is the complexity of automatic feature recognition (as discussed above) and the information that the implementer of any of these techniques has to make random decision about which features are important. After all, if the feature set lacks prejudice ability, no amount of succeeding processing can pay compensation for that intrinsic deficiency.

4.2 Holistic

Holistic approaches challenge to identify faces using inclusive representations, i.e., images based on the entire image rather than on local facial appearance of the face. These schemes can be classified into two groups: statistical and AI approaches. An overview of some of the methods in these categories follows.

4.2.1 Statistical

In the simplest version of the holistic approaches, the image is symbolize as a 2D array of absorption values and recognition is performed by direct association comparisons between the input face and all the other faces in the database. The major obstruction to the direct-matching methods' recognition performance is that they try to carry out classification in a space of very high dimensionality. To oppose this curse of dimensionality, more than a few other schemes have been proposed that employ statistical dimensionality reduction methods to attain and retain the most meaningful feature dimensions before performing recognition.

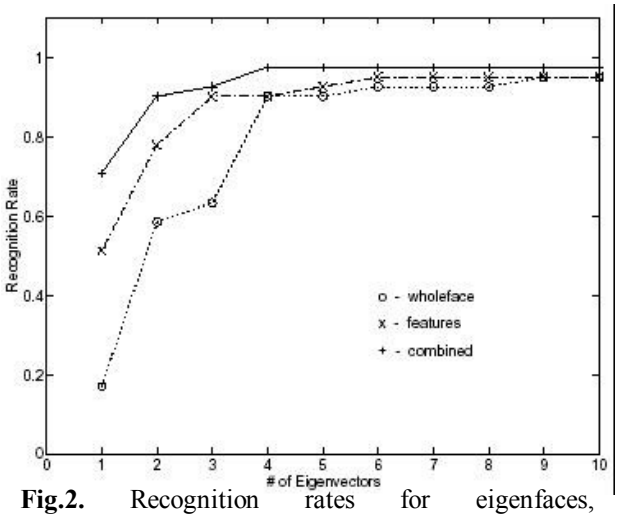

Fig.2. Recognition rates for eigenfaces, eigenfeatures, and the combined modular representation. (©1994 IEEE)

This scheme is reported to have produced to some extent better results than the fundamental eigenfaces approach (Figs. 2). Though no implementation has been reported, it has however been optional in that difference in scale be dealt with by employing multi-scale eigenfaces or by rescaling the input image to many sizes and using the scale that results in the smallest expanse measure to the face space.

4.2.2 AI

AI approaches make use of tools such as neural networks and machine learning method to recognize faces. Some examples of technique feel right to this

category are given below.

In, 50 principal mechanisms were extracted and an auto-associative neural network was used to decrease those components to five dimensions. An average multi-layer perception was demoralized to classify the resulting representation. Though approving results were conventional, the database used for training and testing was somewhat simple: the pictures were physically allied, there was no lighting variation, slanting, or revolution, and there were only 20 people in the database

4.3 Face Recognition from Video Sequences

Since one of the most significant applications of face recognition is scrutiny for security principle, which necessitate real-time recognition of faces from an image sequence captured by a video camera, a important quantity of do research has been directed towards this region in recent years.

A video-based face recognition scheme normally consists of three modules: one for detecting the face; a second one for tracking it; and a third one for recognizing it. Most of these methods choose a few good frames and then is appropriate one of the recognition performance for strength images to those frames in order to identify the individual.

2. Conclusions

Face recognition is a difficult problem in the field of image analysis and computer mental picture that has conventional a great deal of interest over the last few years because of its many applications in various domain. Research has been carry out enthusiastically in this vicinity for the past four decades or so, and although enormous progress has been made, encourage results have been attain and current face recognition scheme have reached a assured degree of mellowness when operating under inhibited conditions; however, they are far from accomplishing the ultimate of being able to perform effectively in all the various situations that are commonly stumble upon by applications make the most of these techniques in practical life. The decisive goal of researchers in this area is to make possible computers to imitate the human vision method and, as has been appropriately pointed out by Torres “Strong and coordinated effort between the computer vision, signal processing, and psychophysics and neurosciences community is needed” to achieve this objective.

References

[1] A. K. Jain, R. Bolle, and S. Pankanti, "Biometrics: Personal Identification in Networked Security," A. K. Jain, R. Bolle, and S. Pankanti, Eds.: Kluwer Academic Publishers, 1999.

[2] K. Kim, "Intelligent Immigration Control System by Using Passport Recognition and Face Verification," in *International Symposium on Neural Networks*.
Chongqing, China, 2005, pp.147-156.

[3] J. N. K. Liu, M. Wang, and B. Feng, "iBotGuard: an Internet-based intelligent robot security system using invariant face recognition against intruder," *IEEE Transactions on Systems Man And Cybernetics Part C-Applications And Reviews*, Vol.35, pp.97-105, 2005.

[4] H. Moon, "Biometrics Person Authentication Using Projection-Based Face Recognition System in Verification Scenario," in *International Conference on Bioinformatics and its Applications*. Hong Kong, China, 2004, pp.207-213.

[5] D. McCullagh, "Call It Super Bowl Face Scan 1," in
Wired Magazine, 2001.

[6] CNN, "Education School face scanner to search for sex offenders." Phoenix, Arizona: The Associated Press, 2003.

[7] P. J. Phillips, H. Moon, P. J. Rauss, and S. A. Rizvi, "The FERET Evaluation Methodology for Face Recognition Algorithms," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Vol.22, pp.1090-1104, 2000.

[8] T. Choudhry, B. Clarkson, T. Jebara, and A. Pentland, "Multimodal person recognition using unconstrained audio and video," in *Proceedings, International Conference on Audio and Video-Based Person Authentication*, 1999, pp.176-181.

