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Analysis Report of Face Recognition Across Non-Uniform Motion Blur, Illumination, and Pose

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Abstract*— One essential challenge is to find pose invariant spatio-temporal volumetric features to analyze the video sequence efficiently. Traditionally, facial emotion recognition systems have been evaluated on laboratory controlled data, which is not representative of the environment faced in real-world applications. We first propose a non uniform blur-robust algorithmic program by creating use of the idea of a sparse camera trajectory within the camera motion space to make energy perform with l1-norm constriction on the camera movement. The frame is then extended to handle illumination variations by exploiting the information that the set of all images obtain from a face image by non-uniform blurring and ever-changing the illumination forms a bi-convex set. Finally, we tend to propose an elegant extension to also account for variations in pose.

Index Terms*—Face recognition, non-uniform blur, sparsity, Illumination, pose.

1. INTRODUCTION

Face recognition is an important research problem spanning numerous fields and disciplines. This because face recognition, in additional to having numerous practical applications such as bankcard identification, access control, Mug shots searching, security monitoring, and surveillance system, is a fundamental human behavior that is essential for effective communications and interactions among people. Due to its many potential applications, face recognition has become one of the most active topics in computer vision research [1]. However, despite the significant progress in the last decade, the design of recognition algorithms that are effective over a wide range of viewpoints, occlusions, aging of subjects and complex outdoor lighting is still a major area of research. While there is a significant number of works addressing these issues, problems caused by image degradations due to other factors such as blur, noise and sampling are mostly overlooked. This is particularly surprising as such image degradations also significantly affect the performance of face recognition systems and are often present in images and videos in real-world applications such as watch-list monitoring and video surveillance. Only recently has research community started to look at facial image.

A face recognition technique depend on sparse representation for knowing 3D face meshes under expressions using small level geometric features was projected matching pursuit filters for face characteristic detection and recognition. The filters were designed in the course of a simultaneous decomposition of a training set into a 2D wavelet growth designed to differentiate among faces. It was shown that the resultant algorithm was robust to facial appearance and the close environment. There is a number of difficulties that face detection systems based on sparse representation must overcome. One is the designing algorithms that robust to vary in illumination; and second is that algorithms need to competently scale as the number of people enrolled in the scheme increases. In some of the above advanced, the challenge mentioned above are met by collecting a set of images of each one person that spans the space of expected variations in illumination. The SRC approach recognizes faces by resolving an optimization difficulty over the set of images enrolled into the database. This clarification trades robustness and size of the database adjacent to computational efficiency.

With increasing emphasis on national and global security, there is a growing and urgent need for human identification. Biometrics is the science of identifying an individual based on the physiological and behavioral characteristics. It can be traced to 14th century China, where merchants used children's palm and footprints to distinguish them from one another. The physiological characteristics are related to the shape of the body including face, iris, retina, fingerprint, palm print, palm vein, hand geometry, DNA, earlobe, etc. The behavioral characteristics are related to the pattern of behavior of a person such as gait, signature, keystroke dynamics, voice, etc. Among these biometric traits, face is the most commonly seen and used one in our daily life.

Facial expression analyses are also affected by changes in view-point and inter subject variations in performing different expressions. Therefore, developing robust algorithms for expression recognition is of interest. Depending on the facial feature extraction methods as well as the types of input data (2D or 3D), the effects of these variations is different and they can

be eliminated using different approaches. For example, the effect of in-plane face rotation and different scales of the faces can be eliminated by face normalization before extracting features or by proper feature representation before attempting expression recognition.

2. Background

The subject of face recognition is as old as computer vision, both because of the practical importance of the topic and theoretical interest from cognitive scientists. Despite the fact that other methods of identification (such as fingerprints, or iris scans) can be more accurate, face recognition has always remains a major focus of research because of its noninvasive nature and because it is people's primary method of person identification.

As one of the most successful applications of image analysis and understanding, face recognition has recently received significant attention, especially during the past few years [8]. The accuracy and efficiency of the face recognition system is rapidly improving unconstrained settings. This is evidenced by the emergence of face recognition conferences such as the International Conference on Audio and Video-Based Authentication (AVBPA) since 1997 and the International Conference on Automatic Face and Gesture Recognition (AFGR) since 1995, systematic empirical evaluations of Face Recognition Techniques (FRT), and many commercially available systems. Wide range of commercial and law enforcement applications and the availability of feasible technologies after 30 years of research are the reasons for this trend.

Advantages

This proposed method of recognition allows us to circumvent the challenging and ill-posed problem of single image blind-deblurring. It efficiently deals with blurred images.

(i) The combined effects of blur, illumination and pose.

(ii) The first attempt to systematically address face recognition under non-uniform motion blurs.

(iii) The proposed system is useful to develop non-uniform motion blur and illumination-robust algorithm MOBIL.

In this prove that the set of all images obtained by non-uniformly blurring a given image forms a convex set. In this also show that the set of all images obtained from a face image by non-uniform blurring and change of illumination forms a bi-convex set. We extend our method to non-frontal situations by transforming the gallery to a new pose. In this propose a multi-scale implementation that is efficient both in terms of computation as well as memory usage.

3. Proposed Method

In this paper propose a face recognition algorithm that is robust to non-uniform (i.e., space-varying) motion blur arising from relative motion between the camera and the subject. The camera transformations can range from in-plane translations and rotations to out-of-plane translations, out-of-plane rotations, and even general 6D motion.

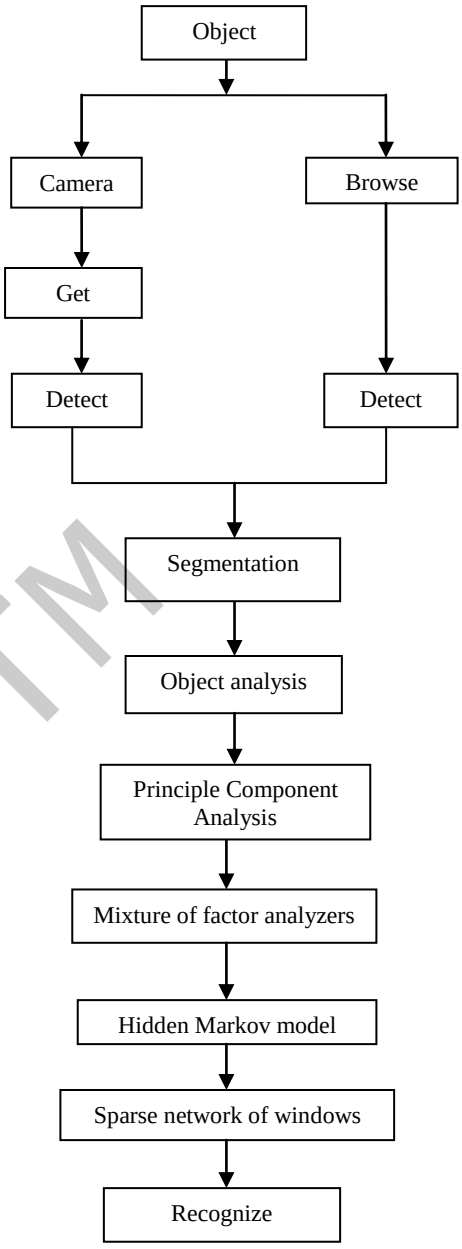

Fig.1 Flow Diagram of Proposed Method

In fig.1 shows the flow diagram of proposed method. In this figure 3 firstly take object that is take input image for recognize. There are two types of object detection process. First one is the process of clicking the picture from camera and get image after that image taken for the another stage which is name as get image in which data or image clicking by camera are successfully stored. Another technique for detection of image is

browse, in which image or pictures are taken from computer/laptop or any cloud server where data should be stored. Then detection of object should be taken place. After that segmentation process is performing. Segmentation is the process of dividing or partitioning image into multiple sets or pixels.

After segmentation of image then analysis of object process is performing for detection edges, lines; trace borders after that PCA process that is principal component analysis which is a statistical procedure which is an orthogonal transformation to convert set of observed values. After this process mixture factor analysis and then hidden markov model (HMM) is a statistical markov model in which the system being modeled is assumed to be a markov process with unobserved (hidden) states. At last recognition of the output image.

4. RESULTS

In this section shows the result of proposed algorithm. The results figures are shown in below:

Fig.2 input image

Fig.3 Segmentation image

Fig.4 PCA analysis image

Fig.5 obtained image after the mixture of factor analyzers

Fig.6 get image after markov model algorithm

Fig.7 Recognize output image

5. CONCLUSION

In this paper proposed a hidden markov model and PCA face recognition algorithm. The limitation of our approach is that

significant occlusions and large changes in facial expressions cannot be handled. The proposed approach has novelty in both the feature extraction and recognition. In this paper show that the set of all images obtain by non-uniformly blurring a known image by using the TSF model is a convex set given by the convex hull of distorted versions of the image.

6. REFERENCES

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