Non–Uniform Motion on Blur, Illumination, and Pose in Face Recognition

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Abstract— Convolution model is existing method for performing face recognition in uniform-blurring. It can't handle non-uniform blurring situation that frequently arise rotations in hand held camera. Then developing a system that can recognition faces across non-uniform blur and varying illumination and pose. Using non-uniform blur-robust algorithm based on transformation spread function (TFS).

Key words: Non–Uniform Motion, Face Recognition

I. INTRODUCTION

Dealing with camera shake is very relevant problem because affect the quality of images. Then developing a system that can recognize faces across non-uniform blur, and varying illumination and pose. Face recognition system that work with focused images have difficulty when presented with blurred data. Approaches to face recognition from blurred images can be classified in to four categories .(i) De blurring based: In which the probe image is first deblurred and then used for recognition.(ii)Joint deblurring and recognition (iii)De blurring blur-invariant features :Effective only for mild blurs.(iv)Direct recognition .In this paper propose face recognition algorithm that is robust to non-uniform motion blur arising from relative motion between the camera and the subject.

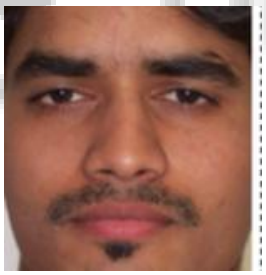

Fig. 1: focused image

II. CONVOLUTION MODEL

In this model existing method for face recognition. It cannot handle non-uniform blurring situation, only handle for uniform situation. it only focused on face recognition in blurred situation not including illumination ,pose. In this model the motion of the camera is limited to in-plan translations. It cannot including space-varying motion.

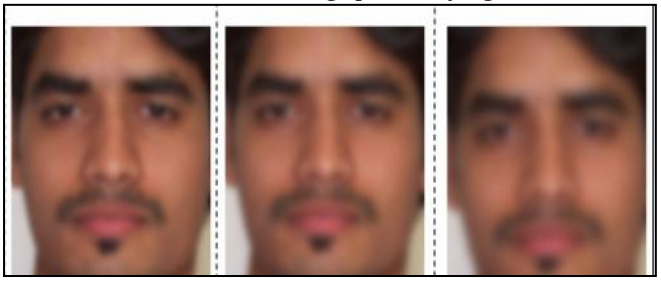

Fig. 2: Applying convolution model

A. Handling illumination variation

A configuration of nine light source direction. The subspace formed by the image taken nine source. It is effective for recognition face under a wide range of lighting condition. Set of all images under varying illumination and non-uniform motion blur also forms a bi-convex set. PIE data base which consist of images of 68 individual different illumination conditions.

B. Handling Pose Variation

This method focused cluttered images, detect the face and return a quantized estimate of the pose. Always return an estimate which is within +or – 15 degree and of true pose. Using PIE data base, selecting four-near frontal pose.

C. Algorithms

1) Non-Uniform Blur-Robust

1) Define blurred probe image and a set of gallery images(input)
2) Identity of the probe images (output)
3) For each gallery images find optimal transformation spread function(TSF)
4) Each gallery images with its corresponding TSF and exact LBP (local binary pattern)features
5) Compare the LBP features of probe images with those of the transformed gallery images
6) Find the closest match

Camera transformations can range from in-plane translation and rotation to out-of-plane translation ,out-of-plane rotation and even general 6D motion. Each focused gallery images apply all the possible transformation that exist in the 6D space and stack the resulting transformed images as columns of the corresponding matrix.

2) Motion Blur and Illumination-Robust Face Recognition

1) Define blurred and differently illuminated probe images and a set of gallery images
2) identity of the probe images(output)
3) Each gallery images obtain the nine basis images
4) Find the optimal TFS and illumination coefficient
5) Transform the gallery images and using the computed TFS and coefficient illumination and extract LBP features
6) Compare the LBP features of the probe image with those of the transformed gallery images
7) Find the closest math

This algorithm on illum subset of the PIE database. It contains of images of 68 individuals under different illumination conditions

In multi-scale implementation increasing the speed of an algorithm.

III. MOTION BLUR, ILLUMINATION AND POSE-ROBUST FACE RECOGNITION

1) Define blurred and different illuminated probe image under a different pose and set of gallery images(input)
2) Identify of the probe image (output)
3) Obtained an estimate of the blurred probe image
4) Each gallery image synthesize the new pose
5) Each synthesize gallery image ,obtained the nine basis images
6) Each synthesize gallery image find the optimal TSF and illumination coefficients
7) Transform the synthesize gallery images
8) Compare the LBP features of the probe images with those of the transformed gallery images
9) Find the closest match

This algorithm use PIE database. It contain selecting four near-frontal pose.

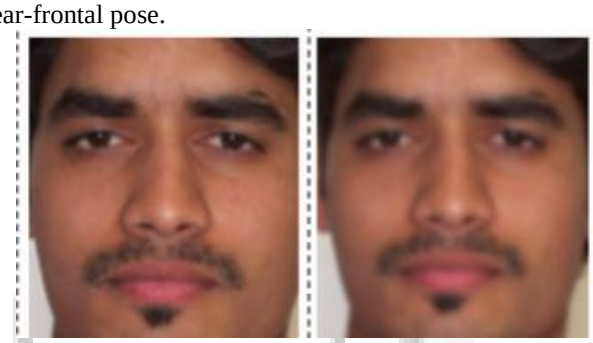

Fig. 3: Applying space variant model

A. Space Variant Model

Each gallery images apply all the possible transformation exist in the 6D space and the result is stored in column of the matrix. Set of all images obtained by blurring a particular gallery images is a convex set given by the convex hull. Recognize a blurred probe image, minimize the distance between the probe and convex combination. The camera motion space allows to optimization function on TFS weights. Each gallery images blurred, optimal TFS is compared with the probe in LBP.

IV. CONCLUSION

This is the first attempt to systematically address face recognition under non-uniform motion blur and the combined effects of blur, illumination and pose. Extend the method to non-frontal situation by transforming the gallery to a new pose. Multi-scale implementation that is efficient both in terms of computation as well as memory storage. Including standard face database (FERET,PIE)in the presence of blur, illumination and pose variations .Using non-uniform robust algorithm based on TFS model.

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