ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization) Vol.2, Special Issue 1, March 2014

Proceedings of International Conference On Global Innovations In Computing Technology (ICGICT'14)

Organized by

Department of CSE, JayShriram Group of Institutions, Tirupur, Tamilnadu, India on 6th & 7th March 2014

Computer Vision Approach for Retrieving Unconstrained Blurred Images

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Abstract: Face Recognition has been of great importance in different fields of technology. But when blurring come to picture face recognition becomes difficult. There has many approaches proposed in this context like blind image deconvolution, image statistics etc. But all these approaches concentrate mainly on the blurring part alone. The problem of unconstrained face recognition from remotely acquired images. The main factors that make this problem challenging are image degradation due to blur and appearance variations due to illumination and pose. Here in this approach the illumination defects are together considered with the blur problems. Based on this set theoretic characterization proposed a blur-robust algorithm whose main step involves solving simple convex optimization problems. To overcome this problem, the proposed technique is based on computer vision. And the violo- jones method is the fast face detection in skin color detector. By using this method avoid the problem in existing system and get good performance. It concerned with the theory for building artificial systems that obtain information from images. Based on this characterization proposed a blur and illumination robust algorithm

Index Terms: Direct recognition of blurred and illuminated faces, unconstrained face recognition

I. INTRODUCTION

Face Recognition is one of the most research fields of computer vision over the past few years. Though significant strides have been made in tackling the problem in controlled domains (as in recognition of passport photographs) [1], significant challenges remain in solving it in the unconstrained domain. The main factors that make this a challenging problem are image degradations due to blur and noise, and variations in appearance due to illumination and pose. One such scenario occurs while recognizing faces acquired from distant cameras. The main factors that make this a challenging problem are image degradations due to blur and noise, and variations in appearance due to illumination and pose [2].we specifically address the problem of recognizing faces across blur and illumination. Thus each gallery image can be associated with a corresponding convex set. The distance of a given probe image (which we want to recognize) from each of the convex sets is computed, and assign it the identity of the closest gallery image.

The distance-computation steps are formulated as convex optimization problems over the space of blur kernels. To overcome this problem, the proposed technique is based on computer vision. By using this method avoid the problem in existing system and get good performance. It concerned with the theory for building artificial systems that obtain information from images. The image data can take many forms, such as a video sequence, depth images, views from multiple cameras, or multi-dimensional data from a medical scanner. Any parametric or symmetric form for the blur kernels is not considered; however, if this information is available, it can be easily incorporated into the algorithm, resulting in improved recognition performance.

The main challenges in recognizing such faces are variations due to blur, pose and illumination. we specifically address the problems of blur and illumination by replacing the Euclidean distance by weighted L1-norm distance and comparing the

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images in the LBP (local binary pattern) [6] space. It has been shown in [7] and [8] that all the images of a Lambertian convex object, under all possible illumination conditions, lie on a low dimensional (approximately nine-dimensional) linear subspace. Though faces are not exactly convex or Lambertian, they can be closely approximated by one. Thus each face can be characterized by a low dimensional subspace, and this characterization has been used for designing illumination robust face recognition algorithms [7,9].

II. DIRECT RECOGNITION OF BLURRED FACES

In the existing approach it can be seen that both blur and illumination are taken together. At first the blur portion alone is considered. It can be resolved with the help of direct recognition of blurred faces algorithm. Later on it is checked with the illumination correction algorithm. Basically a blurred image consists of sharp image and a blur kernel. The main issue here is to resolve the blur kernel or PSF i.e. point spread function. Many methods have been proposed like blind image deconvolution etc. but none proved that futile. Each and every method has got some drawback or the other. Blind image deconvolution finds the unknown blur kernel in a probabilistic manner and retrieves the image. Though this method returns correct results it is much time consuming. The blurs has got a number of characteristics like out of focus blur has circular symmetry etc. All these features can be incorporated for getting the bur kernel sooner. In the direct recognition of the blur it has got a database set preferably a ferret database. In the database each and every possible image is stored. It can be done in the following way.

A. Implementing Direct Recognition of Blurred Images

In this step we first review the convolution model for blur. Next, we show that the set of all images obtained by blurring a given image is convex and finally we present our algorithm for recognizing blurred faces. Blurred image can be called as a combination of the sharp image and a blur kernel. So once the blur kernel is estimated it becomes easy for recognition. As a first stage the blur kernel is estimated giving the sufficient constraints to make it perform better.

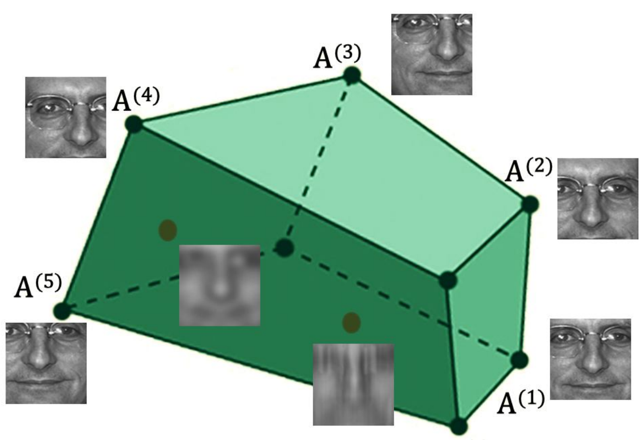

Fig 2.1 The set of all images obtained by blurring an image I is a Convex set.

B. Recognition of blurred faces

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Face recognition is also sensitive to small pixel misalignments and, hence, the general consensus in face recognition literature is to extract alignment insensitive features, such as Linear Binary Patterns (LBP), and then perform recognition based on these features. We then blur each of the gallery images with the corresponding optimal blur kernels hj and extract LBP features from the blurred gallery images. And finally, we compare the LBP features of the probe image with those of the gallery images to find the closest match. To make our algorithm robust to outliers, who could arise due to variations in expression, we propose to replace the L2 norm by the L1 norm.

C. Incorporating the Illumination Model

As a next step, the facial images of a person under different illumination conditions [3] can look very different, and hence for any recognition algorithm to work in practice, it must account for these variations. First, we discuss the low-dimensional subspace model for handling appearance variations due to illumination. Next, we use this model along with the convolution model to define the set of images of a face under all possible lighting conditions and blur. We then propose a recognition algorithm based on minimizing the distance of the probe image from such sets.

D. Illumination-Robust Recognition of Blurred Faces (IRBF)

Corresponding to each sharp well-lit gallery image, we obtain the nine basis images. . The major computational step of the algorithm is the optimization problem. The complexity of the overall alternation algorithm is O(T (N + K3)) where T is the number of iterations in the alternation step, and O(N) is the complexity in the estimation of the illumination coefficients. For example, all points on the bottom-most plane are obtained by fixing the blur kernel at h(0) (the impulse function centered at 0, i.e. the no-blur case) and varying the illumination conditions. On this plane two data-points (faces), corresponding to illumination conditions 0 and 00, are explicitly marked. Both these data points are associated with their corresponding blur convex hulls.

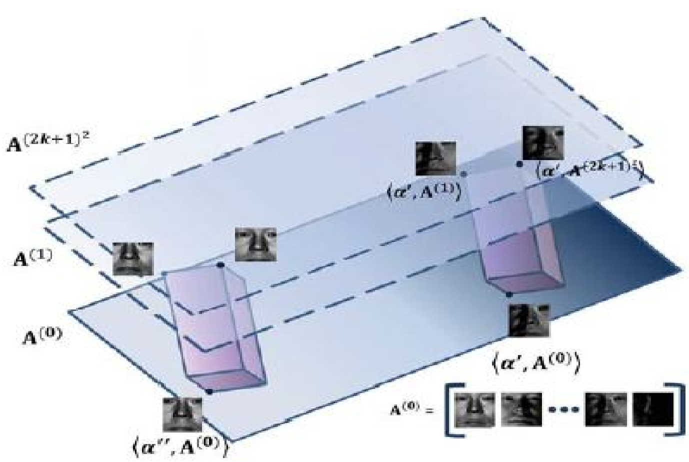

Fig 2.2 The set of all images under varying lighting and blur for a single face image.

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F. Concentration on face

When the image as such is taken from the database there can be problem from with the image retrieval. That is the exact image may not be retrieved. Hence as an addition the basic features of the image are taken. Hence when retrieval come to picture only essential features are compared and get the image more accurately.

III. PROPOSED SYSTEM

In proposed system, Computer vision is the science and technology of machines. It concerned with the theory for building artificial systems that obtain information from images. The image data can take many forms, such as a video sequence, depth images, views from multiple cameras, or multi-dimensional data from a medical scanner and make computers understand images and videos.

A. Generic representation of a face recognition system

ACE recognition has become a very active area of research in recent years mainly due to increasing security demands and its potential commercial and law enforcement applications. In the first stage, the 2D-DCT for each face image is computed, and feature vectors are formed from the discrete cosine transform (DCT) coefficients. The second stage uses a self-organizing map (SOM) with an unsupervised learning technique to classify vectors into groups to recognize if the subject in the input image is "present" or "not present" in the image database. If the subject is classified as present, the best match image found in the training database is displayed as the result, else the result displays that the subject is not found in the image database.

B. Approaches to face detection

It's not easy to give taxonomy of face detection methods. There isn't a globally accepted grouping criterion. They usually mix and overlap. In this section, two classification criteria will be presented. One of them differentiates between distinct scenarios. Depending on these scenarios different approaches' may be needed. The other criteria divide the detection algorithms into four categories. Controlled environment. It's the most straightforward case. Pho-to graphs are taken under controlled light, background, etc. Simple edge detection techniques can be used to detect face. Color images. The typical skin colors can be used to find faces. They can be weak if light conditions change. Nowadays, most commercial systems must locate faces in videos. There is a continuing challenge to achieve the best detecting results with the best possible performance. The Viola–Jones object detection framework is the first object detection framework to provide competitive object detection rates in real-time proposed method. Although it can be trained to detect a variety of object classes, it was motivated primarily by the problem of face detection.

IV. EXPERIMENTAL RESULTS

In the existing method it can be seen that different blur removal techniques were used. But the time consumed was much more and does not return accurate results. But in the proposed approach it can be seen that it much faster and returns more accurate results when compared with the previous approaches. For some video surveillance application, non-collaborative face detection and tracking is a critical task. High resolution, high quality frontal images of the face are needed in order to effectively recognize a person. Face logs are collections of time-stamped face images for video surveillance purposes.In many video surveillance applications, a face log system provides input to a face recognizer, that is capable to state if that face is present in the face database and provides the id of the matching face, if any.The quality of collected face images must be evaluated in order to filter out low quality images and keep only the best ones. Construction of complete and concise face logs requires dealing with intrusion detection and identity matching.

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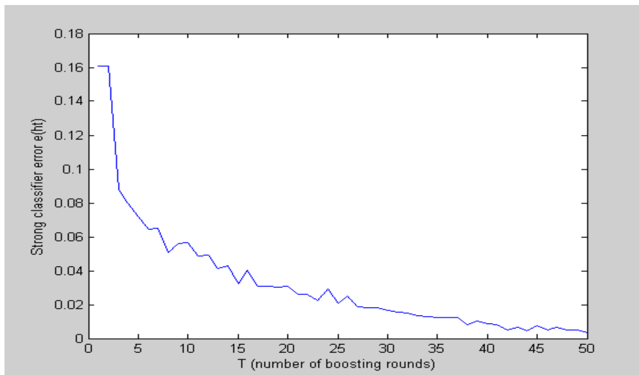

Fig 4.4 Reduction in Error as Boosting adds Classifiers

V. CONCLUSION

Motivated by the problem of remote face recognition, the problem of recognizing blurred and poorly illuminated faces has been addressed. By eliminating the blur and illumination effects the figure can be restored and can easily be recognised. The challenging problem of face recognition in uncontrolled settings can alleviated to a greater extent using the blur and illumination robust face recognition method. By incorporating the features of different types of blur and by giving weights to different pixels, much better results are obtained compared to the other contemporary methods. Violo jones face detection method using computer vision tackling the challenging problem of face recognition in uncontrolled settings and improve the performance.

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