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Individual Re-Identification in Blurred Image using SVM/PCA Technique

K. Karthika[1], R. Sulochana[2], M. Gunasundari[3], J. Durgadevi[4]

Assistant Professor, Computer Science and Engineering[1]

Student, Computer Science and Engineering[2,3,4]

Anjalai Ammal Mahalingam Engineering College, Thiruvarur, India

Abstract: *Individual re-identification (Re-ID) is the task of matching a target person across different cameras, which has drawn extensive attention in computer vision and has become an essential component in the video surveillance system. Pre-id can be considered as a problem of image retrieval. Existing person re-identification methods depend mostly on single-scale appearance information. In this work, to address issues, we demonstrate the benefits of a techniques using Support vector machine or Principal component analysis proposed for pre-id in this study. However, great challenges are being faced in the pre-id task. First, in different scenarios, appearance of the same pedestrian changes dramatically by reason of the body misalignment frequently, various background clutters, large variations of camera views and occlusion. Second, in a public space, different pedestrians wear the same or similar clothes. Therefore, the distinctions between different pedestrian images are subtle. These make the topic of pre-id a huge challenge. The proposed methods are only performed in the training phase and discarded in the testing phase, thus, enhancing the effectiveness of the model. Our model achieves the state-of-theart on the popular benchmark datasets including Market-1501, duke mtmc -re-id and CUHK03. Besides, we conduct a set of ablation experiments to verify the effectiveness of the proposed methods.*

Keywords: Re-ID; Blur identification; SVM; Individual Re-identification and PCA**.**

I. INTRODUCTION

It is well-known that the accuracy of face recognition systems deteriorates quite rapidly in unconstrained settings. This can be attributed to degradations arising from blur, changes in illumination, pose and expression, partial occlusions etc. Motion blur, in particular, deserves special attention owing to the ubiquity of mobile phones and hand-held imaging devices. Dealing with camera shake is a very relevant problem because, while tripods hinder mobility, reducing the exposure time affects image quality. Moreover, in-built sensors such as gyros and accelerometers have their own limitations in sensing the camera motion.

In an uncontrolled environment, illumination and pose could also vary, further compounding the problem. The focus of this paper is on developing a system that can recognize faces across non-uniform (i.e., space-variant) blur, and varying illumination and pose. Traditionally, blurring due to camera shake has been modeled as a convolution with a single blur kernel, and the blur is assumed to be uniform across the image. However, it is space-variant blur that is encountered frequently in hand-held cameras. While techniques have been proposed that address the restoration of non-uniform blurs by local space-invariance approximation recent methods for image restoration have modeled the motion-blurred image as an average of protectively transformed images. Face recognition systems that work with focused images have difficulty when presented with blurred data. Approaches to face recognition from blurred images can be broadly classified into four categories.

i. De-blurring-based in which the probe image is first de-blurred and then used for recognition. However, deburring artifacts are a major source of error especially for moderate to heavy blurs.
ii. Joint de-blurring and recognition, the flipside of which is computational complexity.
iii. Deriving blur-invariant features for recognition. But these are effective only for mild blurs.
iv. The direct recognition approach of in which re-blurred versions from the gallery are compared with the blurred probe image.

II. OVERVIEW

In this proposed face recognition DBT that is robust to non-uniform i.e., space varying motion blur arising from relative motion between the camera and the subject. We will assume that only a single gallery image is available. 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. Observe that the blur on the faces can be significantly non-uniform. The simple yet restrictive convolution model fails to explain this blur and a space-varying formulation becomes necessary the area of face recognition is well developed using

- Support Vector Machine (SVM)
- Principle Component Analysis (PCA)

III. METHODOLOGY

Unless otherwise specified, person Re-ID in this survey refers to the pedestrian retrieval problem across multiple surveillance cameras, from a computer vision perspective. Generally, building a person Re-ID system for a specific scenario requires five main steps:

1. Face Image Uploader
2. Face Blur Prober
3. Face Edge Detection Using Bi-Convex Set
4. Face Matching Prediction Using Dynamic Blur Transition.

3.1 Face Image Uploader

The face image up loader module has used to store the image in the database. It will help full to find the image in the future. This image has only uploaded by the admin only. He has only the full authority to use the system so he can only upload the image for the certain persons in the data base. Once if we enter the image, we can predict the image with the higher performance in the future. Those images are store in the database server so it will be in very secure format and as well the binary encrypted format so that the intruder should not change or modify the image in our system.

3.2 Face Blur Prober

This phase we have to load the image which of the image we have to predict in our data base. So, we have to upload the image and we find the image how it should be blurred value has occurred in the image. It will easy and reduce the probability our method to reduce the high complexity and other dimension to predict the possible images in our database images so it will give the flexibility to predict the image in our system.

3.3 Face Edge Detection Using Bi-Convex Set

This module has found out the edge in the blur corrected image. Here uploads the temporary save the image and predict the edge of the image it will be helpful to predict the image in the very clear and accuracy. It will reduce the conjunction of our system it will make a very fast to predict the image in our system. Edge finding is the important phase to predict the image. We are using the bi-convex set it is very clearly predicting the nearest value of the image edge and it make the outlier of the particular image.

3.4 Face Matching Prediction Using Dynamic Blur Transition

In this phase going to predict the image from the database according to the value of the blur value and edge of the image. This will calculate the same or nearby value in the database image and it will get and shown to the admin in a possible solution manner. It will nearly predict the high accuracy and high security and less time to retrieve the image here we are using the Dynamic Blur transition method it will predict every image blur in the data base and which of the image has possibly related and it will predict and suggest to the admin.

IV. ALGORITHM

4.1 Support Vector Machines

SVM map data from an original space into a higher dimensional feature space using non-linear mapping. An original algorithm from the original space is used in the feature although the high-dimensional space increases the difficulty of the problem (curse of dimensionality), a trick for computing the scalar products in the feature space exists. Computation of the scalar product between two feature space vectors can be done using kernel functions. Using kernel functions, the feature space need not be computed explicitly. The SVM method was originally developed as a linear classifier. Later it was modified utilizing kernel methods so that it allows also non-linear mapping of data to the feature space.

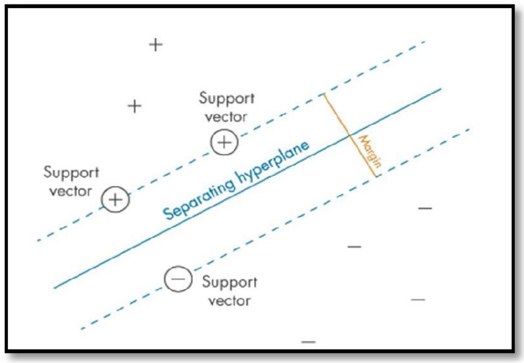

Figure 1: Defining the Margin Between Classes

4.2 Principle Component Analysis

Principal Component Analysis (PCA) is a dimensionality reduction technique which is used for compression and recognition problems. It is also known as Eigen space Projection or Karhunen-Loeve Transformation.

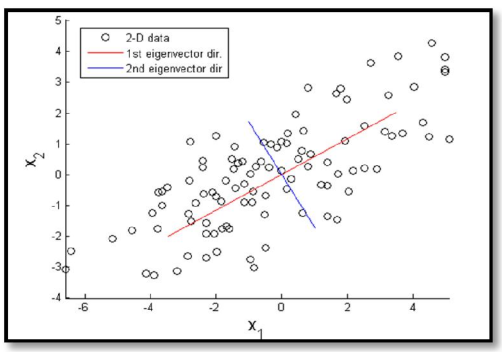

Figure 2: Raw 2D Data Distribution

PCA projects images into a subspace such that the first orthogonal dimension of this subspace captures the greatest amount of variance among the images and the last dimension of this subspace captures the least amount of variance among the images.

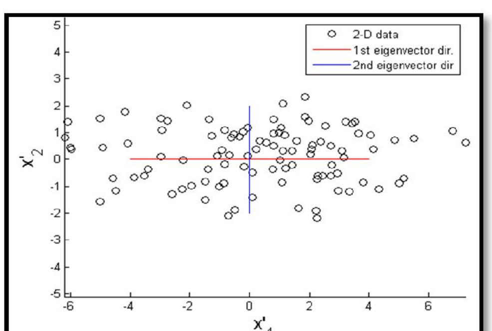

Figure 3: Rotated 2D Data Distribution

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The main goal of PCA is the dimensionality reduction, therefore the eigenvectors of the covariance matrix should be found in order to reach the solution. The Eigen vectors correspond to the directions of the principal components of the original data, the statistical significance is given by their corresponding Eigen values. To determine eigenvalues and eigenvectors a characteristic equation $D(\lambda)=det(A-\lambda I)$

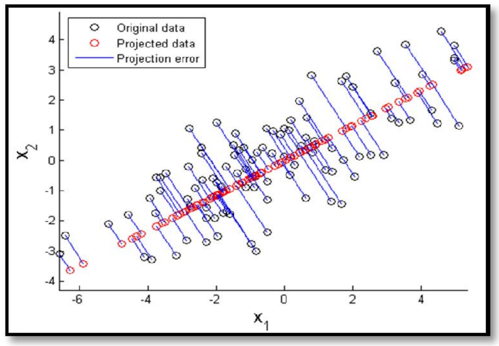

Figure 4: Projection on the Primary Eigenvector Direction

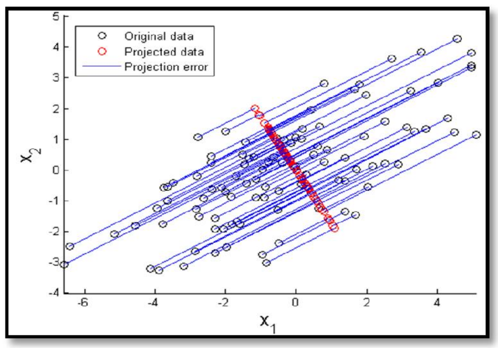

Figure 5: Projection on the Secondary Eigenvector Direction

V. CASES

The face image up loader module has used to store the image in the database. It will help full to find the image in the future. This image has only uploaded by the admin only. Those images are store in the database server so it will be in very secure format and as well the binary encrypted format.

```
clc;
clear all;
i=imread('C:\blur.png');
subplot(2,2,1);
imshow(i);
title('input');
```

Figure 6: Image Upload

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In this Edge Detection, we use three methods like canny, sobel and pewit filter methods it can be classified under two operations that is Gradient and Gaussian.

```
clc;
clear all;
i=imread('C:\blur.png');
subplot(2,2,1);
imshow(i);
title('input');
subplot(2,2,2);
imshow(edge(i,'sobel'));
title('sobel filter');
subplot(2,2,3);
imshow(edge(i,'prewitt'));
title('prewitt filter');
subplot(2,2,4);
imshow(edge(i,'canny'));
title('canny filter');
figure;
edge_detection=edge(i,'sobel');
imshow(edge_detection);
title('edge detected image using sobel filter');
figure;
```

Figure 7: Edge Detection Using Filters

To upload the image and we find the image how it should be blurred value has occurred in the image. It will easy and reduce the probability our method to reduce the high complexity and other dimension to predict the possible images in our database images so it will give the flexibility to predict the image in our system.

```
i=imread('C:\d.jpg');
subplot(1,3,1),imshow(i);
title('original image');
%%use motion blur
len=20;
theta=10;
psf=fspecial('motion',len,theta);
blurred=imfilter(i,psf,'conv');
subplot(1,3,2),imshow(blurred);
title('blurred image');
%%remove blur
recovered=deconvwnr(blurred,psf,0.1);
subplot(1,3,3),imshow(recovered);
title('recovered image');
```

Figure 8: Blur Identification

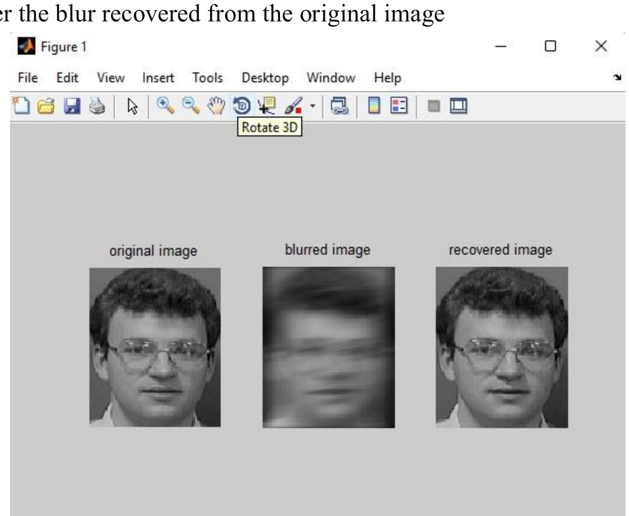
To load the images for matching purpose .so, we can load the images belong to different poses of a particular person.

```
function output_value=load_database()

persistent loaded;
persistent numeric_Image;

if(isempty(loaded))
    all_Images=zeros(10304,3);
    for i=1:3
        cd(strcat('C:\database\s',num2str(i)));
        for j=1:10
            image_Container=imread(strcat(num2str(j),'.bmp'));
            all_Images(:,(i-1)*10+j)=reshape(image_Container,size(image_Container,1)*size(image_Container,2),1);
        end
        display('loading database');
        cd ..
    end
    numeric_Image=all_Images;
end
loaded=1;
output_value=numeric_Image;
```

Figure 9: Load Database for Re-establishment

VI. RESULT AND DISCUSSION

The final result obtained after the blur recovered from the original image



VII. CONCLUSION

Face recognition is a challenging problem in the field of image analysis and computer vision that has received a great deal of attention over the last few years because of its many applications in various domains. Research has been conducted vigorously in this area for the past four decades so, and though huge progress has been made, encouraging results have been obtained and current face recognition systems have reached a certain degree of maturity when operating under constrained conditions; however, they are far from achieving the ideal of being able to perform adequately in all the various situations that are commonly encountered by applications utilizing these techniques in practical life.

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