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REMOVAL OF EYE GLASSES USING PCA

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ABSTRACT:

The purpose of this system to remove eyeglasses from an input face image and produces good quality of that face image. It basically consists of three segments that are eyeglasses identification, eye glasses localization and eye glasses removal. By the outcome of face detection and eyes localization wasto regularize a face image. It alsoused a markov chain Monte Carlo method for eyeglasses localization. For images with eyeglasses it was used PCA reconstruction error and edge feature to determine the occluded area andproduced the area through image in painting.Here PCA is used by many techniques to detecttheeyeglasses in anface images.PCA is used to classify between two classes that are face images with eyeglasses and face images without eyeglasses.For each class the results will be obtained by considering different traininginput images.The Investigationaloutcomesdisplaythatitcan identify the presence of eyeglasses exactly and attaincommonly natural looking images without eyeglasses.

Keywords- Reconstruction, face image, Eye glasses.

I.Introduction:

The investigationareasin computer vision and pattern recognition are face analysis and synthesis and theirstatistical learning based methods are successfully used.

Deformable models such as Active Shape Model are demonstrated to localize faces. These methods were needed to drag the facial features such as eyes and eyebrows of human faces with a non-glasses assumption.Suppose a person iswearing eyeglasses and itwas likely to be missed by a face detector training on faces without glasses.To analyze theglasses for face detection, recognition and synthesis it was a great importance.

Generally why people avoid eyeglasses there is some reasons. Firstly they can appear the eye glasses frames is so diverse such as metal and plastic. Furthermore the reflections on the eye glasses to the brightest part on face.

By using principal component analysis is to remove eye glasses on face images. The eye

glassless patterns are determined through the PCAin an eigen-space was to recollect their principal variance. The glasses pattern in an eigen-space it can project andto acquire the resultant non-glasses one. The input image that can spontaneouslyrecognize, locate and eliminate the eyeglasses from an input image. It is essential to put up the first two modules so that it can remove the eye glasses.

BLOCK DIAGRAM:

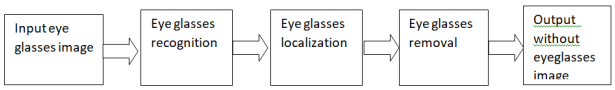

Figure: Block diagram of removal eye glasses.

It performs the operation according to the reconstruction errors in their eigen-spaces through the glasses recognition. They are learnt through the principal component analysis .It describes two sections that are feature extraction and principal component analysis.

For localization it can use an Active Shape Model. ASM is to explain the geometric information such as shape, size and position of the glasses. The points of eye glasses frame is indicated by W= {(xi,yi)i=1,….n}

Where W is along vector dimensionality of 2n.

To locate the position is created by using Bayesian rule and to identify an optimal W* .W* is the product of prior learning and like hood learning.

W*=arg max p(w/Ig) =arg max p(Ig/w)p(w). Priorlearning and the likelihood learning in a nonparametric way. Earlierknowledge is the earlier distribution of Wand it has twoautonomousquantities that are Inner parameters andouter parameters.

The glasses are defined through the like hood learning they are divergent in edge and orientation on the frame.

MCMC techniques are used to find solution to Bayesian inference problems. Theyselect the Gibbs samplingin optimization because they arethe closest to the input. It was certainly the outcomeon the non-glasses part and waslogicallyattached on the glasses region. It was confined the global assets of glasses such as proportion, contours and brightness was determined. For glasses identification it can use the feature extraction and classifier designing. The mcmc technique used to get the optimum value of the posteriori. The glasses localization segment is to find the position of the glasses that can easily remove the eyeglasses.

II. Literature survey:

Principal Component Analysis:

PCA was invented in 1901 by Karl Pearson. It is a flexible reduction procedure. It is useful for reduction of large variables into smaller number of variables. There is some redundancy in those variables. Redundancy defines some of the variables whichare correlated from one variable to another variable. Because they are measuring the same construct.

In recognitionthe problems will arise inhigh-dimensionalspace.To reduce thedimensionality data which are retaining as much as variation is possible in our original data set is the goal of pca. They reduce the dimensionality is implies information loss. The low-dimensional space can be determined by principalcomponents. The major advantage of PCA was using eigen-face approach which helps to reduce the size of the database for recognition of a test images. The images which are stored as its feature vectors in the database. They are projecting each and every trained image to the set of Eigen faces was obtained. For more purposes PCA technique are also used in voice recognition, and medical imaging analysis.

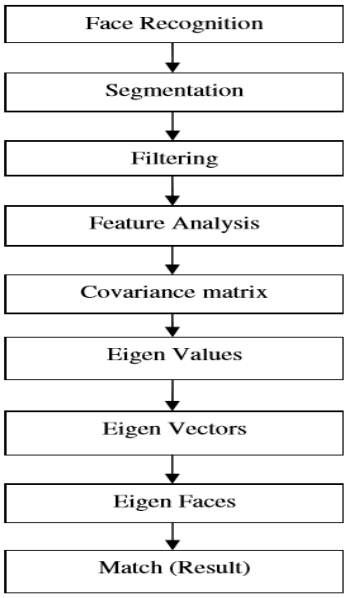

Figure : Flow chart of PCA algorithm

The image can be represented exactly in terms of linear combination .A N x N pixel image of a space represented as a vector occupies a single point N2 dimensional image space. By PCA its projects the data along these directions.These directions are obtained by eigen vectors of the covariance matrix matching to the major eigen values. The magnitude of the Eigenvalues finds the variance of the data along the eigen vector directions.

Steps for principle component analysis:

- Step1: obtain face images I1, I2,..., IM .
- Step2: convert every image Ii as a vector Γi
- Step3: compute the average face vector

$$\Psi=1/ M \Sigma\Gamma i$$

- Step4: subtract the mean face

$\Phi i =\Gamma i-\Psi$

- Step5: compute the covariance matrix C

$$C =AAT$$

where A = [Φ1 Φ2 ...ΦM]

- Step6: compute the eigenvectors ui of AAT

Step6.1: consider the matrix AT A

step6.2:compute the eigenvectors vi of AT A

There is a relation i.e., AT A vi =μ I vi

AAT A vi =μ i A vi

C Avi =μ i A vi or Cui =μ I ui

whereui = A vi

- Step 6.3: calculate the M best eigenvectors of AAT: ui = A vi
- step7: keep only K eigenvectors

III. Experimental results:

The aim is to classify a given face image such as face with eyeglasses and face without eyeglasses. They can use two sets of images was obtained from two di□erent datasets.That is SoFdataset and FERET dataset.SOF dataset contains face images of persons wear eyeglasses.FERET dataset contains high quality frontal face images without eyeglasses. It have two sets the first set contains faces with eyeglasses and the second set contains faces without eyeglasses.

Figure : samples with eyeglasses images.

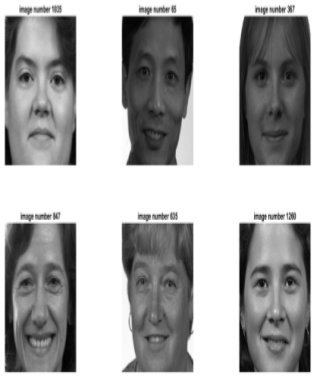

Figure: samples with out eyeglasses images

The figure shows eye glasses and non eye glasses images. After calculate the mean and eigen values. The first 202 principle components i.e.,c = 202 can be used by explain at least 95% of variance of the data. They obvious in the fraction of variance plot as shown in figure . It can see that r(c) approaches to 0.95 at c = 202.

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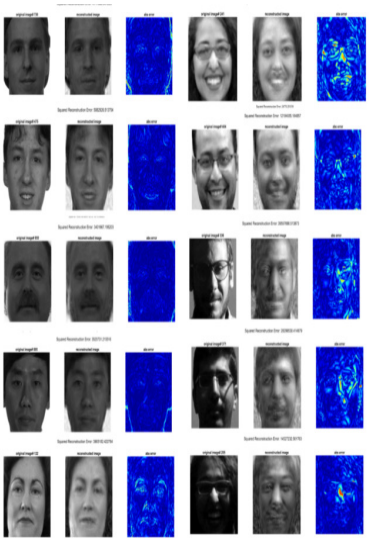

Figure: reconstructed images using 202 basis vectors

The Figure shows the original and reconstructed images and absolute

difference image was using c = 202 for 5 randomly selected non-eyeglasses images from the training set . It has reconstructed the eyeglasses images using the basis vectors and was obtained from the non-eyeglasses images.

IV. Conclusion:

The eyeglasses in an face image was detected and removed by using principle component analysis.

V.REFERENCES:

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