

recognition strategy to tackle the face recognition problem. An ORL face database, which consists of 400 images of 40 individuals, is used to evaluate performance of new method. They also present an experiment for recognition on a large face database. Then they compare the SVM-based recognition with the standard eigenface approaches using the nearest center classification (NCC) criterion[5].

Kim *et al.*(2002) they have presented a Kernel PCA based face feature extraction method, they used polynomial kernel principal components to compute the product space of input pixels which making up a facial pattern. To show the effectiveness of the proposed method an SVM method have used as the recognition and an ORL database used[6].

Ganet *al.*(2005)in In their research, is presented with the advantages of PCA, and an improved method 83 Jun-ying Gan, Dang-Pei Zhou, Chun-Zhi Li based on the normalization of within-class average face image. Then they have compared with traditional PCA method, which their result has shown more acceptable to process samples with different class and same class. Therefore, this experimental shows which, a higher correct recognition rate can be acquired, then a better efficiency can be achieved[7].

Timotius *et al.*(2010)In their paper a face recognition method based on the combined KPCA analysis kernel principal component and support vector machine SVM methods have presented, that KPCA method is utilized to extract features from the input images, then SVM method is applied to classify the input images. They compare the performance of this face recognition method to other commonly-used methods which their experiments show that the combination of KPCA and SVM achieves a higher performance compared SVM, and the combination of kernel principal component analysis[8].

Ebied, Rala M. *et al.* (2012) In their studies have shows use of linear and nonlinear methods for feature extraction in the face recognition system. Widely The linear PCA used in the face recognition is used to construct the feature space and extract features. A KPCA is extended from PCA to a nonlinear mappings in a higher dimensional feature space. In Kernel function several parameters has investigated and expected to affect the recognition performance. Thus the k-nearest neighbor classifier with Euclidean distance is used in the classification step. In their experiments used a ORL face database which contains variability in expression, pose, and facial details then, results show that KPCA with Gaussian function can give a correct recognition rate similar to PCA and higher than Kernel-PCA with polynomial function[9].

Upadhayay, Ritu, and Rakesh Kumar Yadav(2013) in Their surveys presents nitty gritty of KPCA and an up to date review of techniques KPCA. They notify benefits of KPCA over PCA. Finally, they find that it is a good appropriate technique for face recognition systems. Therefore, they shows with reviewing existing face recognition system a KPCA for face recognition system can have a highest recognition[10].

3. PCA Method

The principal component analysis classifier is linear method to classification which transform a number of possible variable which are correlated into a smaller number of variable which are uncorrelated called principle component, that is mathematically defined as an linear transform that transform the data to a new coordinate system. A principal component analysis computes means, covariance, variances and correlations of large data sets. PCA computes and ranks principal components and their variances.

These as benefits of a principal component analysis method are, reduce the dimension of the data, complexity of the images can be reduced. This year the number of extension of pca is used such as, 1. Improved PCA, 2. Fuzzy PCA, 3. Incremental PCA, 4. Kernel PCA.

3.1 Improved PCA

Usually in PCA face image matrix must be converted into a high dimensional vector matrix, these directly is very difficult to process and recognize the face image matrix but improved PCA, Original face image can be represented as a two dimensional matrix.

3.2 Fuzzy PCA

A Fuzzy PCA has used to resolve problem of a PCA which a PCA method does not always show the real similarities structure on the data in the higher dimensional space. So a fuzzy PCA used to get data into more feasible form.

3.3 Incremental PCA

In existing PCA based face recognition systems because of the cost and memory requirement burden are hard to scale up. An incremental approach is usually adopted for resolve this limitation.

3.4 Kernel PCA

A KPCA method allows a linear PCA method to nonlinear dimensionality reduction. PCA method only allows linear dimensionality reduction thus, data that are complex, and cannot be simplified in a linear subspace a PCA method will become invalid and because of this limitation a kernel PCA method has developed. Although a KPCA is a development form of the PCA method.

4. PCA Process

