E2 212 : Matrix Theory - Assignment 2

Department of Electrical Engineering, IISc

Due :

Question 1

Download the AT&T Face dataset from the link provided here. This dataset contains gray scale images of 40 different persons. For each person, 10 images are available varying the lighting, facial expression etc. against a dark background.

Step-1: Divide the entire dataset into training and test samples. (You can take 80% of the total images as training samples and rests for testing).

Step-2: Compute the eigen faces using the training images.

Step-3: Take one random image from the training set. Compute K-coefficients of that image.

Step-4: Using the computed co-efficients, reconstruct back the image and display both the sample (original) image and the reconstructed one.

Step-5: Compute the K-coefficients and classify the test samples in the eigen space. (You can use the Nearest Neighbor of a particular test sample in the K-dim. eigen space for classification).

Step-6: Report the classification error over your test set.

Step-7: As in Step-3 and 4, take a random image from your test set and display both the original image and the reconstructed one. Note down your observation.

Step-8: Vary the value of K and observe the quality of the reconstructed image on both training and test set samples. Note down your observation.