CS 663 Homework 4
Question 3 Report

We defined a threshold based on the metric of least value of the square of difference of eigencoefficients. This is the same metric used in Q1 for evaluating the recognition rate.

For any test image, if this metric was greater than or equal to this threshold, we classified it as not belonging to the training dataset (negative) and for metric value less than this threshold, we defined it as belonging to the dataset (positive).

Calculating the threshold: The threshold was calculated based on training dataset. The square of difference of eigencoefficients with the least value for every train images was stored and the threshold was defined as the mean of these values + standard deviation of these values.

Results

(These values were obtained for k = 20)

Threshold for Classification = 40.723664

Total Number of Positive Images = 128

True Positives (Correctly classified) = 104

False Positives = 24

Total Number of Negative Images = 32

True Negatives (Correctly classified) = 31

False Negatives = 1

Analysis

This method does a good job in correctly classifying the negatives. The number of false negatives are quite low and we believe that this metric is more important than others as for face recognition based security systems for a company, we are more tolerable towards a company employee not being recognised (False Positive) than an outsider being allowed access (False Negative).

This method can be further refined and fine tuned for better accuracy on True Positives but as False Positive is a more important metric we reported these values in the final report.