ASSIGNMENT 4

Question 6

If we test on images that were not part of dataset, the eigen coefficients obtained by $a_p = V_k^T \overline{z}_p$ might not lead to minimization of total squared difference between data points and their respective projections along eigen vector directions. To find matching identity, I can obtain all eigen coefficients for all training images and then for a test image (160 here), I find its eigen coefficient using single eigen space of all persons (32) images (32x6). This is then compared using L2 norm (sum of squared difference) to every eigen coefficient vector of train set. If the difference is larger than a threshold, the image is not of known person. Else, we have a matching identity!

Following are the definitions of false positive and false negative here:

***False positive*:** Difference $<$ threshold and if the probe image subject is not used in training (subject $>$ 32). This means the method says subject identity is known in database nut in reality it is not.

***False negative*:** Difference $\geq$ threshold and if probe image subject was one of the training subjects (subject $\leq$ 32). This means image didn't match to any subject but it reality it should have.

Following are the tuned parameters:

- K = 90
- Threshold = 6e6

Tuning of threshold is done manually after choosing K small enough. On decreasing threshold, false positive decrease and false negatives increase and on increasing threshold, false positives and false negatives decrease. So, an optimum parameter which minimizes both is tuned. Info of providing path is given in myMainScipt file. Following is the result:

Time Taken: 63 seconds

False Positives: 3 out of 32 possible

False negatives: 25 out of 128 possible