

ASSIGNMENT - 4

QUESTION - I

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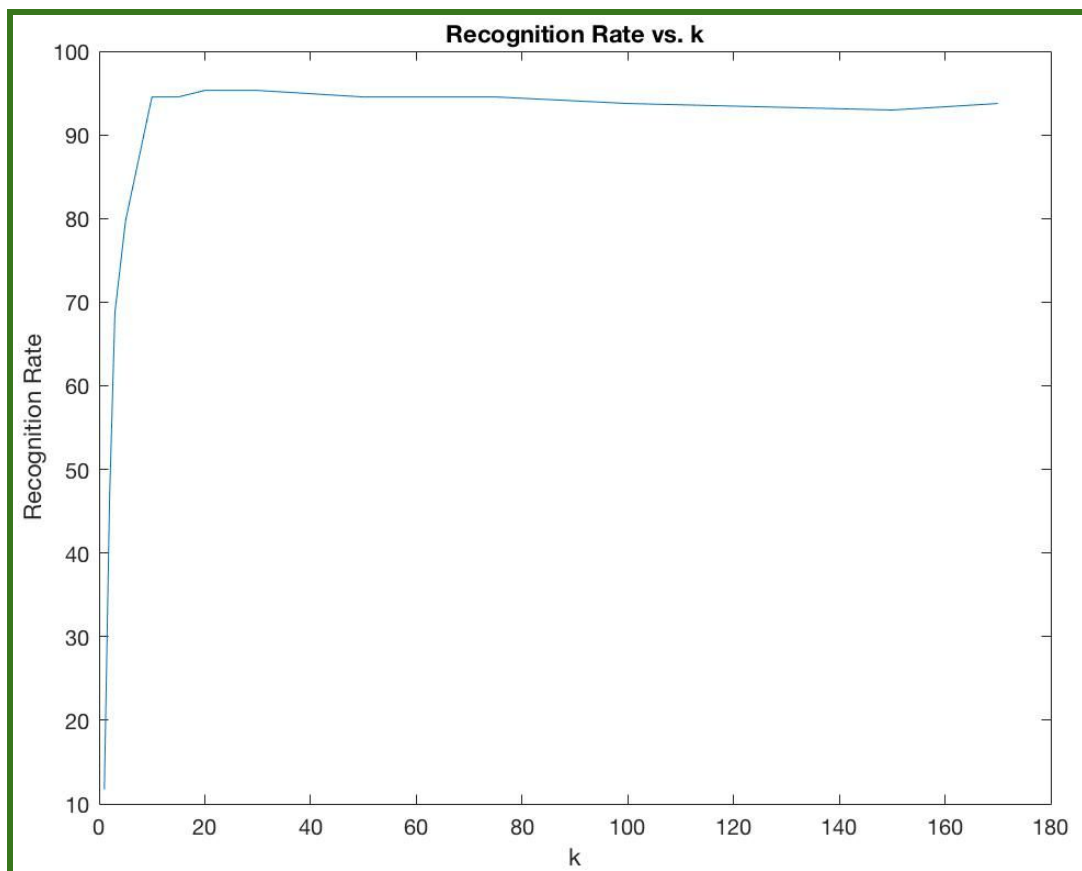
ORL database :

For the ORL database, the function **eigenspace.m** computes the eigenspace of the faces from ORL database by saving the following mat files in the same directory :

- Normalised eigenvectors - **eigenvectors.mat**
- Mean of **$\mathbf{x(i)}$** vectors which are basically the images unrolled into a column vector - **mean_X.mat**
- Eigen coefficients of all the training images - **eigencoefficients.mat**

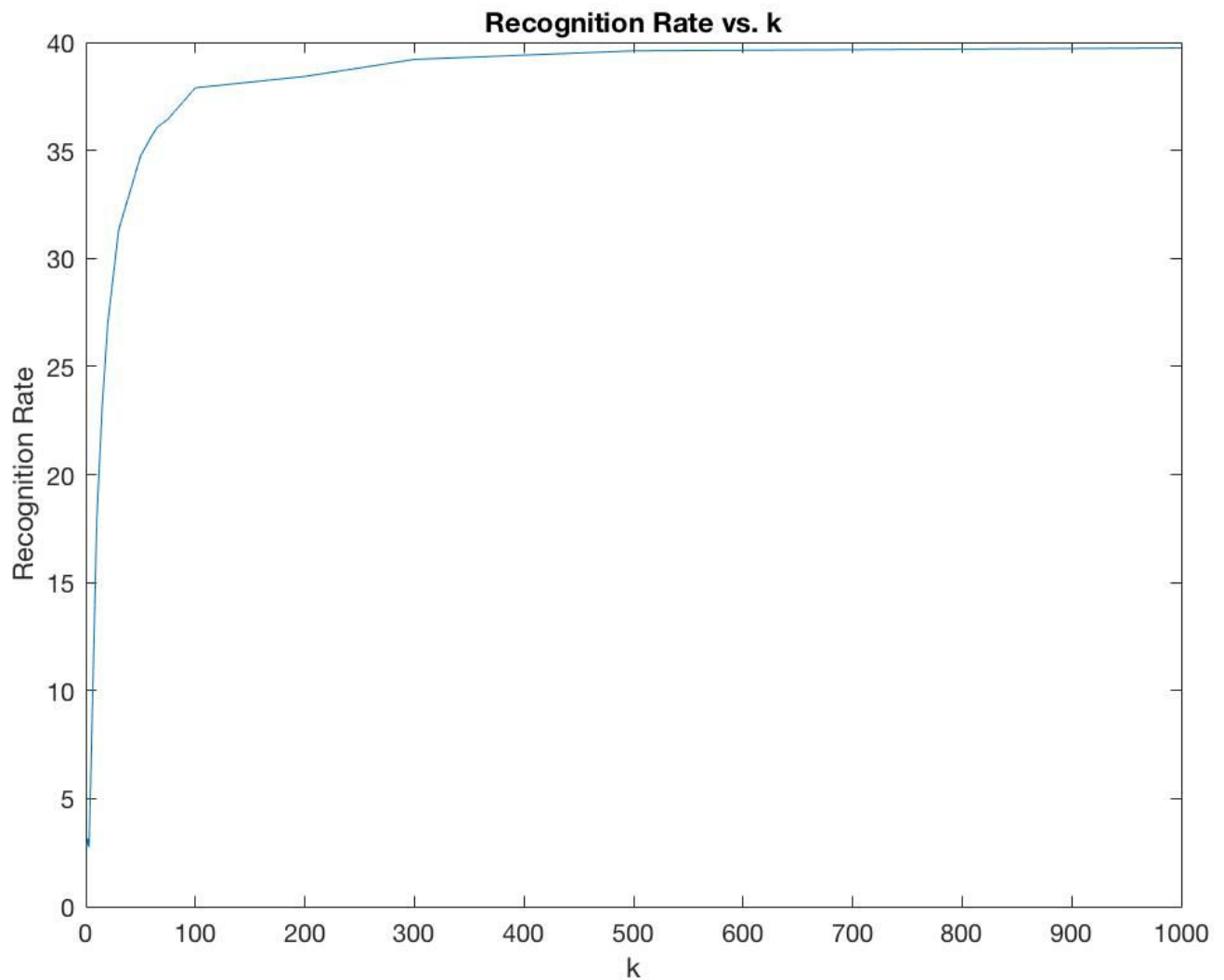
On plotting the recognition rate =

Number of recognized images/Total number of test images
versus k (The number of eigenvectors taken), the following plot was obtained :

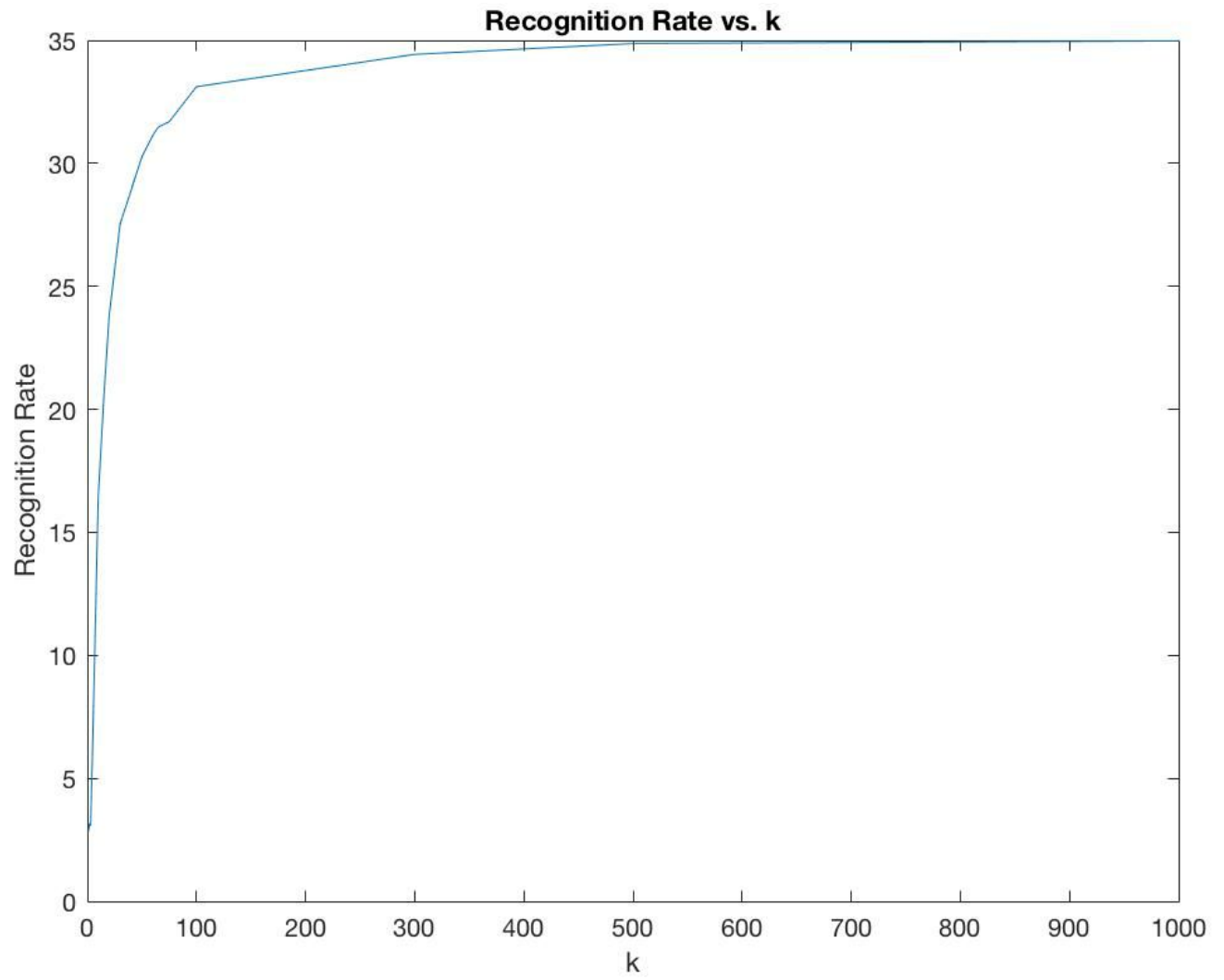


Yale database:

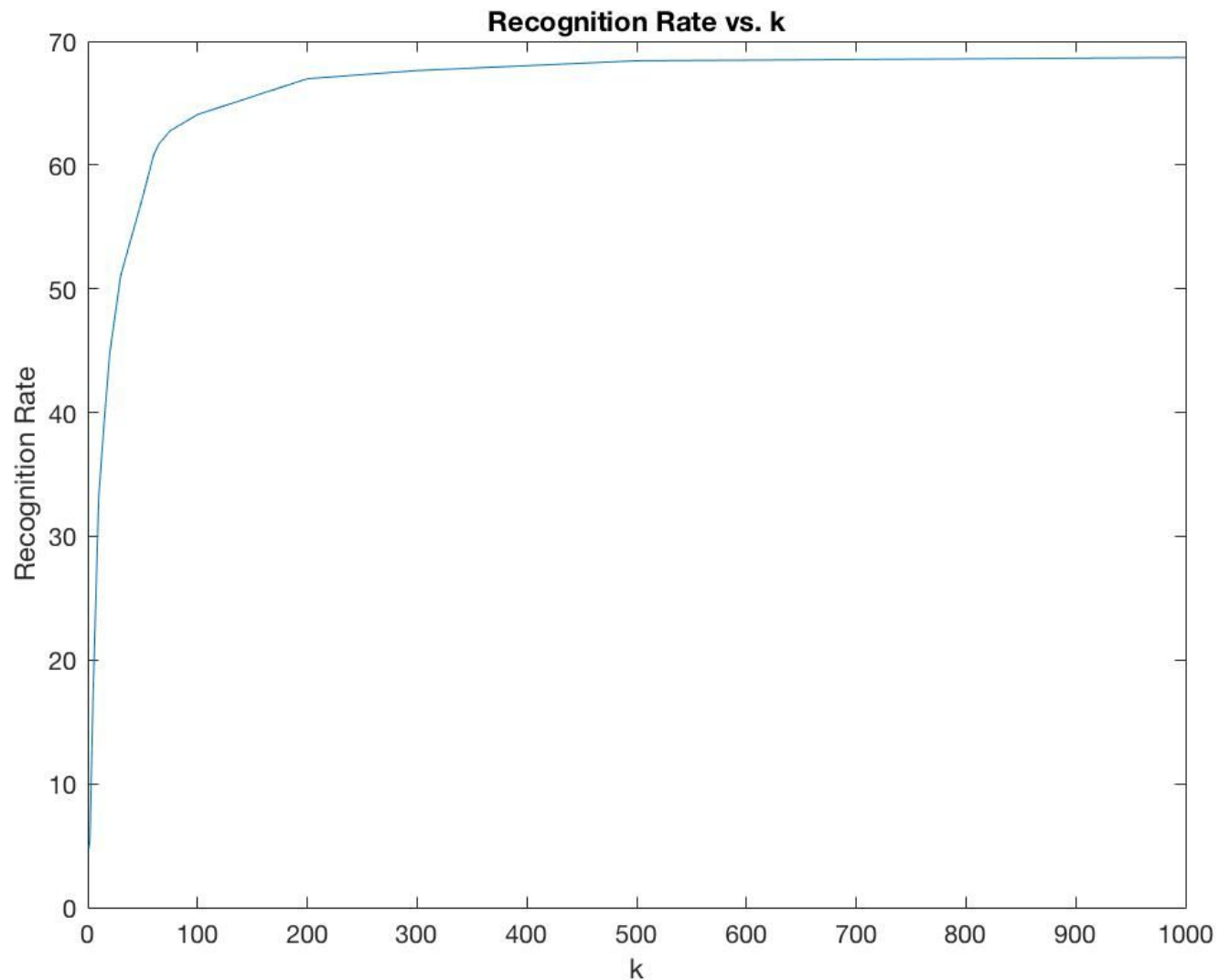
For the Yale database, **eig** function was replaced by the usage of **svd** function of MATLAB. The right side vector **V** was taken and it contains the eigenvectors of **L**. The **diagonal matrix S** contains the positive square root of the eigenvalues. So point-wise square of this matrix gives a diagonal matrix of eigenvalues. On plotting the recognition rate (as defined above) versus k values (number of eigenvectors taken) using (a) Sum of squared difference of the first k eigenvectors, the following plot was obtained (The test set was taken from 40 to 60 for each subject):



The test set was taken from 40 to the maximum images in that subject :



(b) Removing the top 3 eigenvectors and the rest being the same:
The test set going from 40 to 60 for each subject :



Instructions for running the codes:

Run the **myMainScript.m** and three plots will be generated. The first one being the recognition rate for the ORL database, the second one being the recognition rate for the Yale database by retaining the first 3 eigenvectors and the third one being the recognition rate for the Yale database by removing the top 3 eigenvectors.