CS663 Assignment-4

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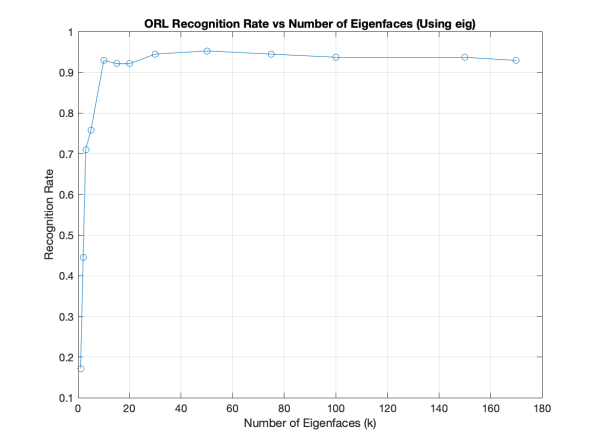
Question 4

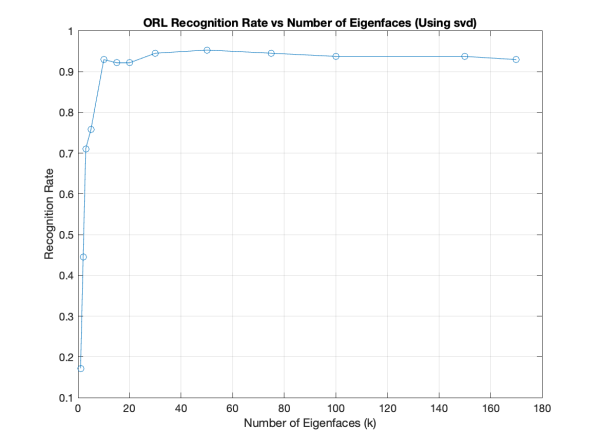
Solution

Note: All values of Recognition Rate in the plots are in fractions.

- **ORL Database:**
  Code is in `myMainScript_ORL.m`.
  Plots for Recognition Rate vs k for the following methods are given below:-
  - Using `eig` function



  - Using `svd` function

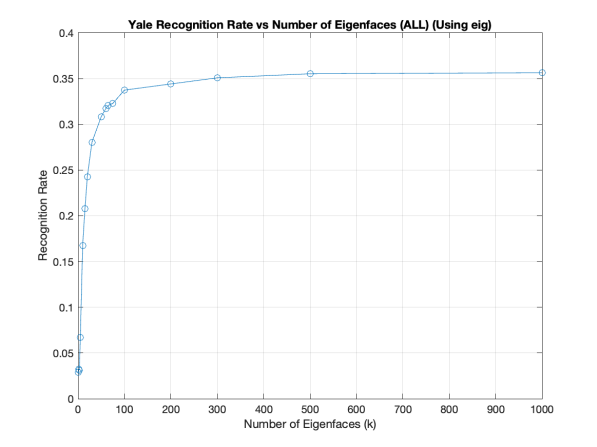


  We can see that both are looking same. Maximum Recognition Rate is around 0.953 for $k = 50$ (in both cases).

- **Yale Database:**
  Code is in `myMainScript_Yale.m`. As asked by the question, `eig` function has been used.

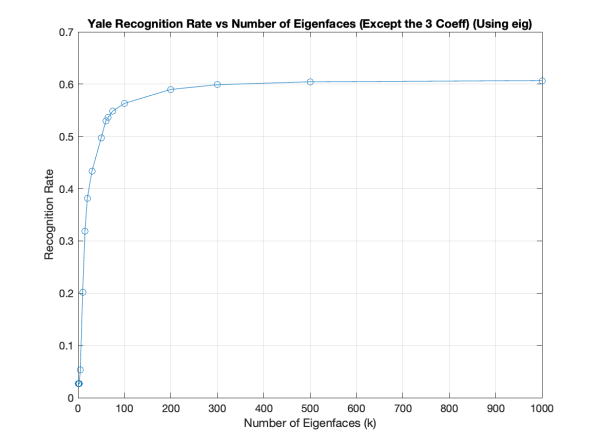
Plots for Recognition Rate vs k for the following parts are given below:-

- Part (a)



Maximum Recognition Rate is around 0.356 for $k = 1000$.

- Part (b)

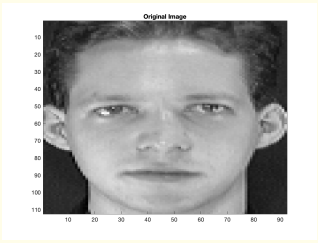


Maximum Recognition Rate is around 0.606 for $k = 1000$.

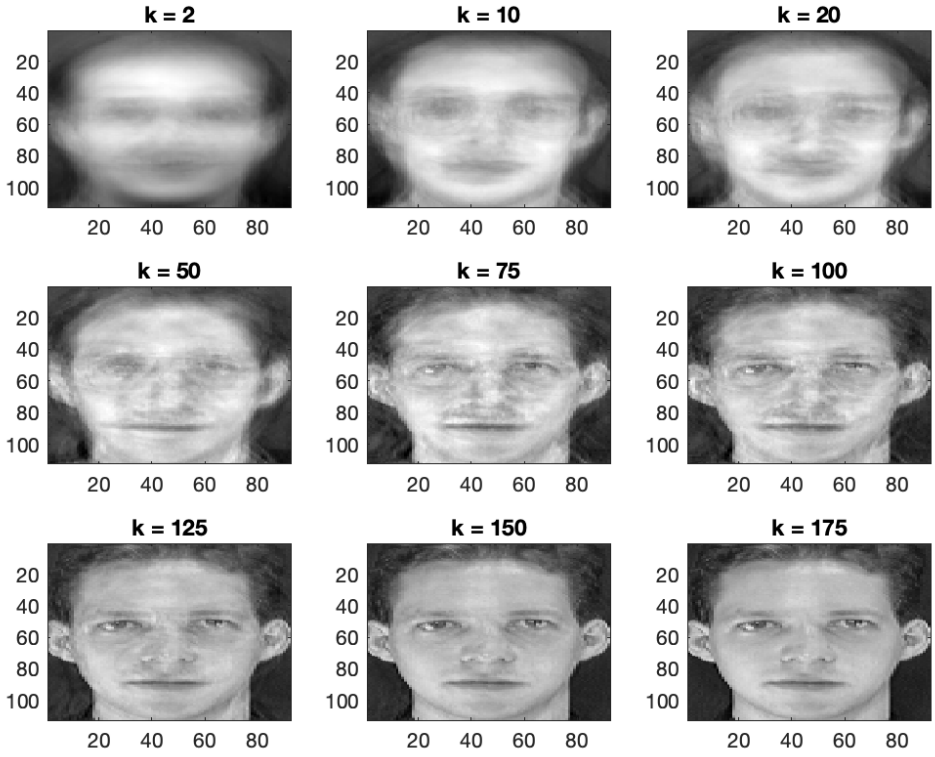
It seems that the results were better once the eigen-coefficients related to the three largest eigenvalues were dropped.

- **Reconstruction:**

  Code is in `myMainScript_reconstruction.m`. We used the `svd` function for reconstruction of the image. For example here, we chose the very first image of the first person.



Reconstructed images for different values of k are:-



The 25 eigenvectors (eigenfaces) corresponding to the 25 largest eigenvalues are:-

The top leftmost corresponds to the largest eigenvalue, the one to its right is second largest and so on.