Ashutosh Sharma (190100027)
Kritti Sharma (180100060)
Shreyas Chandgothia (180260037)

Exercise 4

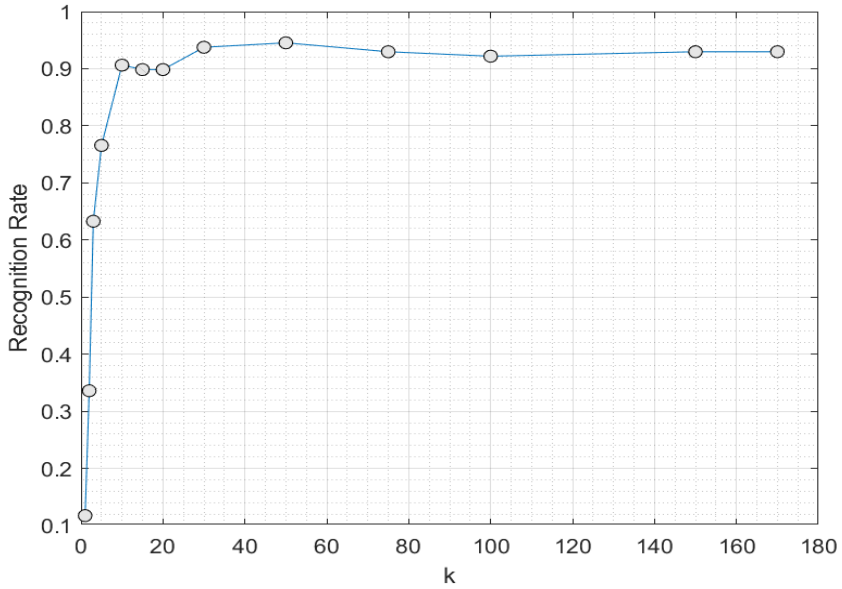

Figure 1: The recognition system implemented on the ORL dataset by using the svd function of MATLAB. The recognition rates using squared difference between all the eigencoefficients for all the test set and train set images, for $k \in \{1, 2, 3, 5, 10, 15, 20, 30, 50, 75, 100, 150, 170\}$ have been plotted. We can see that our simple face recognition system does an excellent job, as the recognition rate values saturate well above 0.9.

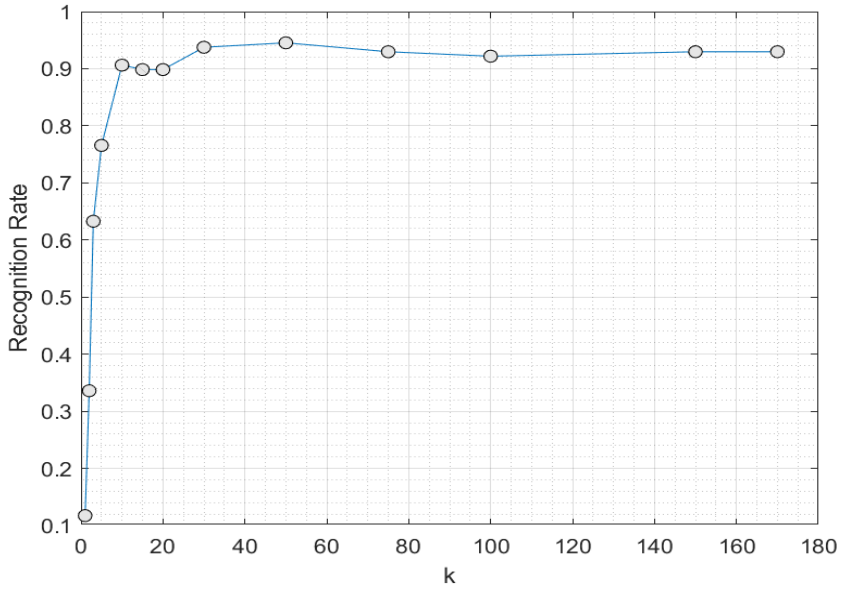

Figure 2: The recognition system implemented on the ORL dataset by using the eig function of MATLAB. The recognition rates using squared difference between all the eigencoefficients for all the test set and train set images, for $k \in \{1, 2, 3, 5, 10, 15, 20, 30, 50, 75, 100, 150, 170\}$ have been plotted. The obtained plot is exactly same as the previous one. The only difference is the slightly higher computational time for this part.

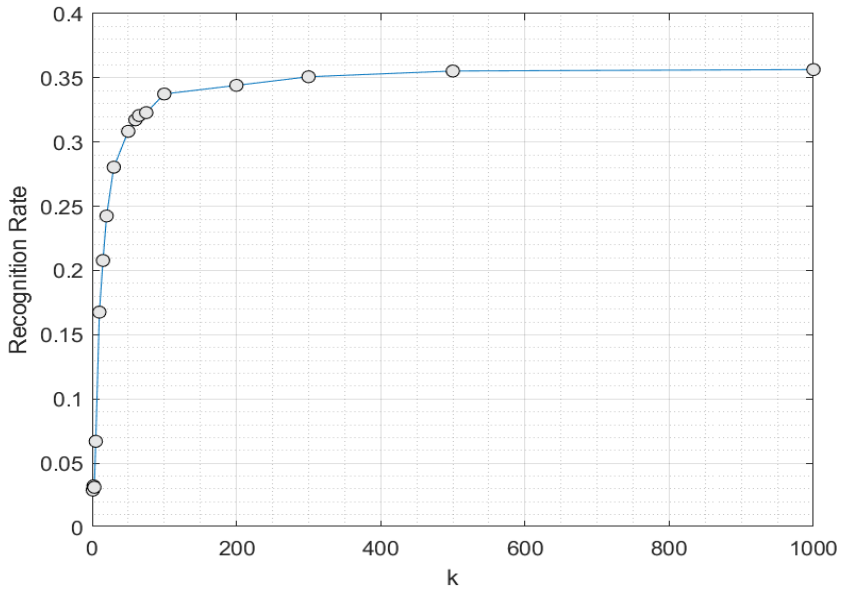

Figure 3: The recognition system implemented on the Yale dataset by using the svd function of MATLAB. The recognition rates using squared difference between all the eigencoefficients for all the test set and train set images, for $k \in \{1, 2, 3, 5, 10, 15, 20, 30, 50, 60, 65, 75, 100, 200, 300, 500, 1000\}$ have been plotted. We observe that the recognition rate values saturate to only about 0.35, indicating that our face recognition system is quite sub-optimal, with the major reason being the differences in lighting conditions across images.

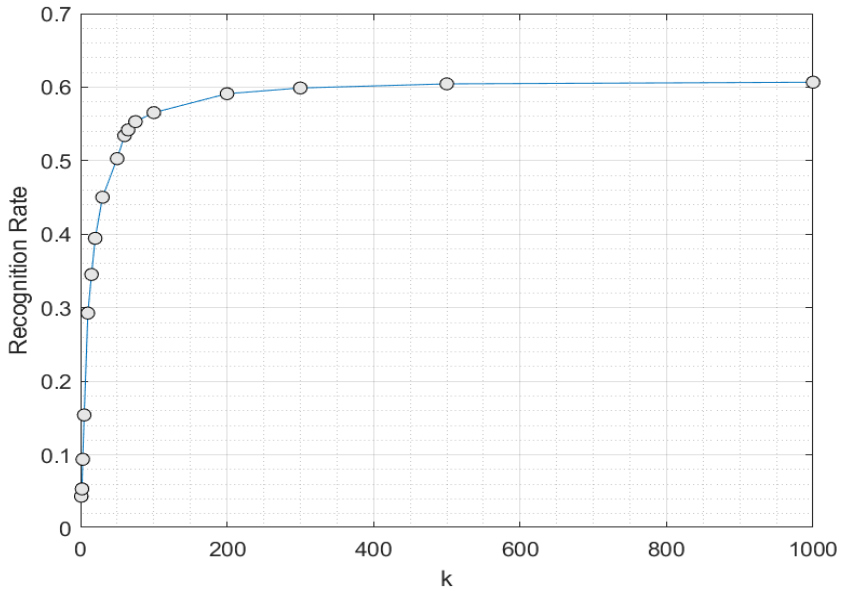

Figure 4: The recognition system implemented on the Yale dataset by using the svd function of MATLAB. The recognition rates using squared difference between all except the three eigencoefficients corresponding to the eigenvectors with the three largest eigenvalues, for all the test set and train set images, for $k \in \{1, 2, 3, 5, 10, 15, 20, 30, 50, 60, 65, 75, 100, 200, 300, 500, 1000\}$ have been plotted. This time, the performance is significantly better than the previous part, with the recognition rate values saturating at about 0.6. This indicates that excluding the eigencoefficients correpsonding to the top 3 eigenvalues does indeed make the face recognition system robust to changes in lighting conditions.