

Question 4

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ORL Dataset

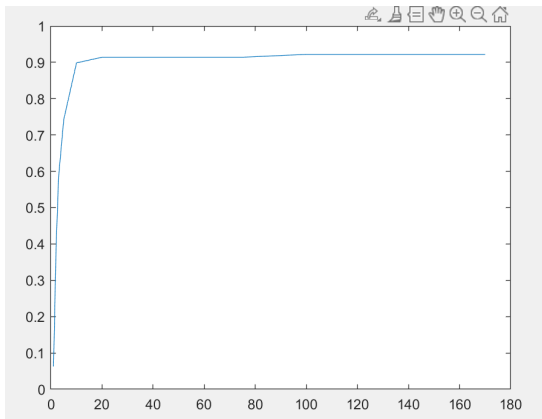


Figure 1: eig

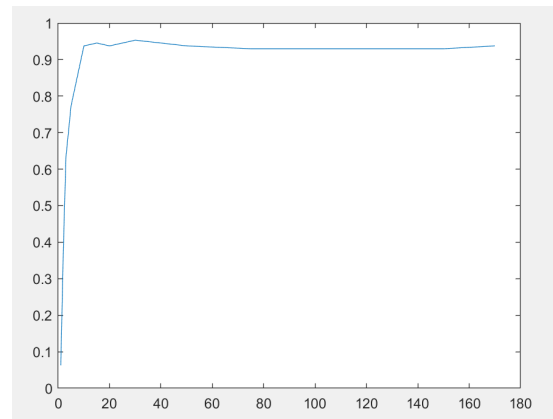


Figure 2: svd

What we see is that after $k=10$, the algorithm is able to recognize 90%+ of the images. SVD is slightly better than the simple eig function.

YaleCropped Dataset

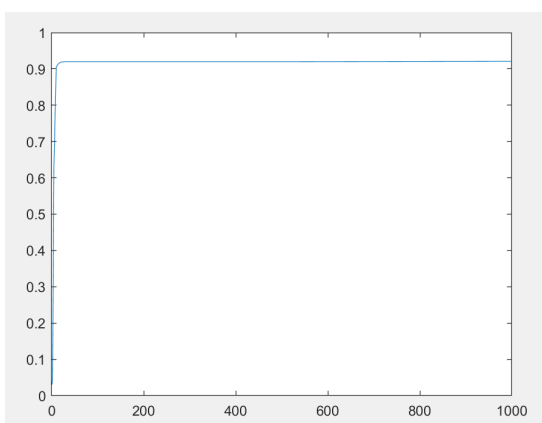


Figure 3: eig

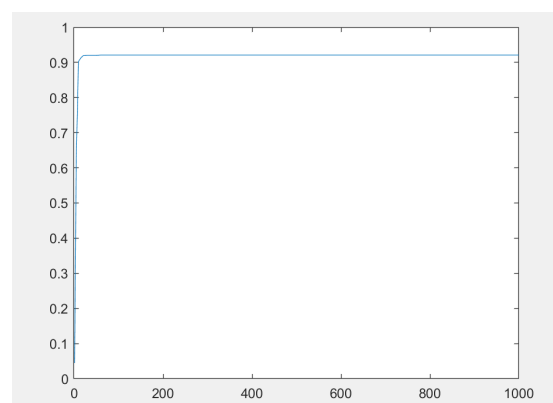


Figure 4: Top 3 eigenvalue corresponding eigenvectors excluded

What we see is that after $k=10$, the algorithm is able to recognize exactly 91% of the images. Excluding the eigenvectors corresponding to the 3 largest eigenvalues had barely no difference.

Reconstruction of Images



Figure 5: Reconstructed Images

Clearly, as k increases the reconstructed image looks more realistic and similar to the original.

Top 25 Eigen Faces

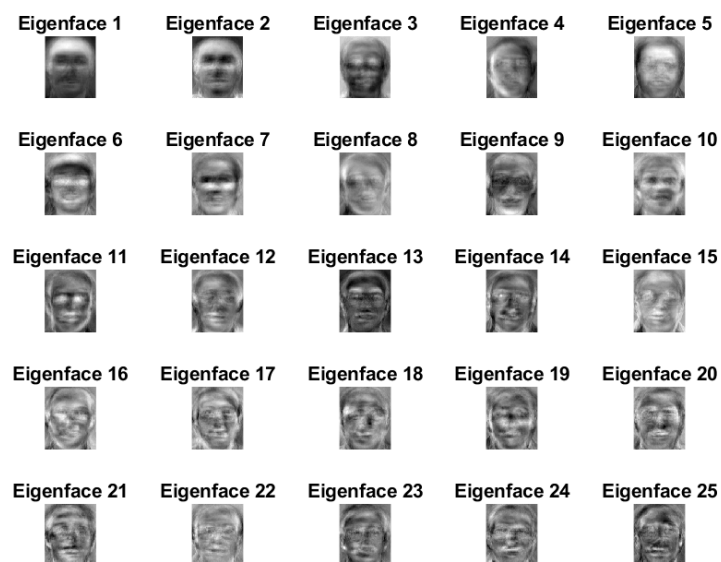


Figure 6: Top 25 Eigen Faces

Here are the top 25 eigenfaces.