



Eigenfaces

Exercise 28 Programming Task: For this exercise, we will take a look at the implementation of Eigenfaces using Python. You can download the file `faces.zip` which contains a set of photographs. Feel free to use an image of yourself as a test image for this exercise but keep in mind that it's size has to be 64x64 pixel.

Several steps need to be implemented:

- (a) Images for training need to be loaded into a matrix. Store every photo as a column vector in a data matrix containing all images.
- (b) Generate the average face from all photos.
- (c) Subtract the average face from every training image.
- (d) Use the Singular Value Decomposition (SVD) to compute the Eigenfaces.
- (e) Reconstruct an image by summing up a certain number of Eigenfaces. The higher the number of Eigenfaces, the better the result. How many Eigenfaces do you have to sum to get a satisfying result?