

PROBLEM --- Detection

Facial expression emotion recognition: We have a face dataset contains 213 images of six facial expressions (Happy, Fear, Angry, Disgust, Surprise, and Sad) .We want build a system to classify images with respect to the facial emotions.

- a. Plot the singular values from PCA and explain how to find an appropriate point for truncation.
- b. Indicate the first 4 and the last 4 eigenvectors (called Eigen-faces¹ when converted to the matrix format) in your report. What are these images representing?
- c. After applying PCA, use k-NN classifier with $k=1, 2$ and report the classification rate. (Use sklearn² for this part)
- d. Repeat part c without PCA. According to the context, explain why dimension reduction changes the results.