

This homework is able to recognize a person's face by comparing facial images to that of a known person.

The experimental dataset is uploaded at “Modules” week 10. There are 40 subjects in this dataset and each subject has ten images. The size of image is 112 x 92 pixels. (You can use the code from HW2 and add the new Step 3 implementation.)

Tasks:

1. 1NN: Do classification using KNN (1NN in this homework). You need implement 1NN, not use the existing function directly.
2. Implement 5-fold cross validation. During every iteration, four-fold data are used as training data, and one-fold data are used as testing data.
3. 1NN + PCA: In each cross validation, using PCA to reduce the dimensionality of images (need to center the images before calculating PCA) to 60.
You can use `numpy.linalg.eig` for eigen decomposition. Don't directly use PCA or SVD functions.
4. Report the average prediction accuracy.
5. Submit Jupyter notebook at ELMS