Signal Classification with the k-NN Algorithm

Laboratory XX, DEDP

Objective

Implement and use the k-NN algorithm for classification of various signals

Theoretical aspects

Explain the k-NN algorithm

Data sets:

- training set
- test set
- (crossvalidation) set for choosing k

Exercises

1. Load the data file 'face_dataset.mat'. Explore the dataset:
   - display 5 images from the dataset
   - print the image sizes
2. Split the dataset as follows:
   - 80% of images of each class as the `training set`
   - 20% of images of each class as the `test set`
   - save the datasets as different files `trainset.mat` and `testset.mat`
3. Implement a function `[class] = myKNN(image, k)` for performing k-NN classification of an image:
   - the function takes as input an image `image`
   - the function loads the training set from `trainset.mat`

- the function computes the Euclidean distance between `image` and each image from the training set
- the output `class` is defined by the majority of the k nearest neighbours of the image
4. Call the function `myKNN` for each image from the dataset and compare the classification results against the ground truth.
   Print the confusion matrix.

Final questions

1. TBD