Computer Vision

Exercises of Lab 8

Exercise 8.1: Linear and nonlinear classification

The goal of this exercise is to get some experience with linear and nonlinear (kernel-based) classification models. In this Exercise, we will use three facial expression datasets, the BU, Jaffe and Kanade datasets. Other face datasets can be found here. Pre-processed versions of these datasets in a vectorized form are included in the files of the exercise.

In this Exercise, we will use four classifiers:

1. Linear regression-based classification
2. kernel regression-based classification
3. Linear Support Vector Machine (One-Versus-Rest)
4. Kernel-based Support Vector Machine (One-Versus-Rest).

Open Exercise8_1.m and fill the missing lines of code. Compare the performance of the various classifiers.

Exercise 8.2: Nonlinear regression-based classification on large datasets

The goal of this exercise is to experiment with the various regression-based classifiers based on Randomization and on Clustering-based references.

In this Exercise, we will use the PubFig+LFW face dataset. HOG-based facial image representations and dataset splits are provided here.

Open Exercise8_2.m and look through the code. Here, you will apply linear regression-based classification and two variants of nonlinear regression-based classification, i.e. using Random Feature Regression and Radial Basis Function network.

Fill the missing lines of code and compare the performance of the various classifiers. Moreover, if time allows, transform the RBF network classifier to ELM and RVFL networks and compare their performance.