Hands-on Machine Learning Training

Session 1 – Basic Principles

Theoretical Preparation

In the first session, focus is on understanding principles of pattern recognition. Your will get introduced to basic classification problems and how to translate raw (e.g. image) data into a representation which is appropriate for classification. You will find out how "training" data can be utilized to categorize new samples. You will also find out the differences between supervised and unsupervised learning which is an important categorization considering the requirement for annotated training data. Finally, you will get an understanding of over/underfitting which also has high impact for real-world application scenarios, especially in case of few available training data.

Preparation consists of a theoretical and a practical preparation:

- Read and understand the following literature:
  - Storck & Duda: "Pattern Classification", Chapter 1 (enclosed as pdf: PatternClassification1.pdf)
- Based on this literature you should have an understanding of
  - the concept of features
  - the impact of complex and basic decision boundaries
  - the principle of overfitting/underfitting
  - the difference between supervised, unsupervised and reinforcement learning

Practical Preparation

- Get introduced to Python
  - `https://www.stavros.io/tutorials/python/` or enclosed as pdf (pythonTutorial.pdf)
- Get introduced to SciPy
  - `https://docs.scipy.org/doc/numpy-dev/user/quickstart.html` or enclosed as pdf (scipyTutorial.pdf) (You do not need to know all functions in detail.)