# Hands-on Machine Learning Training

Session 6 – Backpropagation

## Preparation

Based on your knowledge from the last session as well as from the supplementary material, you will implement the backpropagation algorithm on your own in this session. In the end, you will write all necessary code to train a complete neural network from scratch.
By now, you should already be familiar with the basic building blocks of a neural network, as well as with Python and NumPy

In order to prepare for the session you should:

- Work trough and understand the following book chapter (including the optional sections):
  Michael Nielsen: "Neural Networks and Deep Learning", Chapter 2 [1].
- Understand the source code in this chapter
- Look at the exercises in this book chapter on your own or with your teammates

We will not control if you have worked through the exercises. However, understanding and solving these exercises could help you get a better understanding of the complicated backpropagation equations. This will definitely be of use during the quicktest and the following session, as you will need to implement the equations in the bookchapter.
After working through the material and exercises you should know about:

- The basic concept of backpropagation
- The hadamard product
- The four fundamental equations of backpropagation
- How to measure the error of a neural network
- The backpropagation algorithm in detail
- How to update a neural network based on gradient descent

[1] `http://neuralnetworksanddeeplearning.com/chap2.html`