

Webpage for the lecture: <https://mathopt.de/TEACHING/2020MML/>

Optimization Methods for Machine Learning

WS 2020 – 7. exercise sheet

Exercise 7.1 Neural Network for wine classification

Goals: *Build a one hidden layer dense neural network and see how sessions work.*

1. Extend the computational graph from last week to build a one hidden layer fully connected neural network.
2. You can use `softmax` activation on the last layer to get predictions for the different categories.
3. Run your optimizer in a *TensorFlow* session to train your network.
4. Calculate the rate of succes for the test data.

Exercise 7.2 Convolutional Neural Network for image classification

Goals: *Build a convolutional neural network to classify the MNIST dataset.*

1. One common building block in a convolutional neural network consists of a convolutional (with a possible bias) and a pooling layer together with a ReLU activation. These are used to identify patterns.
2. To implement such a block have a look at the `conv2d`, `bias_add`, `max_pool` and `relu` functions in `tf.nn`.
3. After some of those convolutional blocks usually a fully connected layer is added to the computational graph to fit the recognized patterns to the different labels which are represented by the output layer.
4. Train your network on the MNIST image dataset and check your accuracy on the test set.