

KARLSRUHER INSTITUT FÜR TECHNOLOGIE

DESIGN DOCUMENT

Numerical Linear Algebra meets Machine Learning

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1.3.1 Class Configuration File

The configuration file is a text file. It is used to specify all necessary information the class neural network needs to train the neural network. If the user does not change anything in the configuration file, default options will be used. The configuration file is organized in four main categories.

1. loading path of the set of matrices
2. saving path for the neural network
3. loading path for the neural network
4. model definition and hyperparameters abc

The loading path of the set of matrices is the path in which the matrices that are used for the training and testing are stored. The training module only supports one hd5 file. If the path is any other file, the labling module will print an error (would crashing make sense if the user has to change the config file anyway?). For the training and testing making sense there should be at least 500 matrices in the hd5 file. Otherwise the accuracy of the neural network will be so low that i can not be used for classification. If there is no path specified, the training module will use a default path. In the default path will be the latest matrices that the labling module has produced.

The saving path for the neural network is the path where the trained and tested neural network will be safed. It will be safed as a Keras model. If there is no path specified, the neural network will be safed at a default destination. If there is no path for the neural network specified in the module Classifier the module will use this default path to load its neural network.

The loading path for the neural network is strictly optional. If this path is specified the

training module will use the neural network in the path for training and testing. This option enables the user to use a pre-trained neural network for training. This could be the case if the user interrupts the training process at a certain time and wants to repeat the training later. Other use cases are of course possible too. The neural network has to be a model of the Keras framework. If the path is any other file the training module will print an error(crash?). If this path is not specified the training module will create a new neural network(with the model definition and hyperparameters of the next category) and train with it.

The model definition and hyperparameters are used to determine which neural network will be trained and tested. The model definition determines the following:

- the amount of layers
- the amount of nodes in every layer
- the kind of neural network(e.g. Convolutional)
- the activation function
- the regularization

The hyperparameters determine the following:

- the dropout
- the batch size
- how much of the data should be training and how much should be testing data

1.3.2 Class Neural Network

1.4 Classifier

1.5 Command line interface

1.6 Classes needed in more than one module

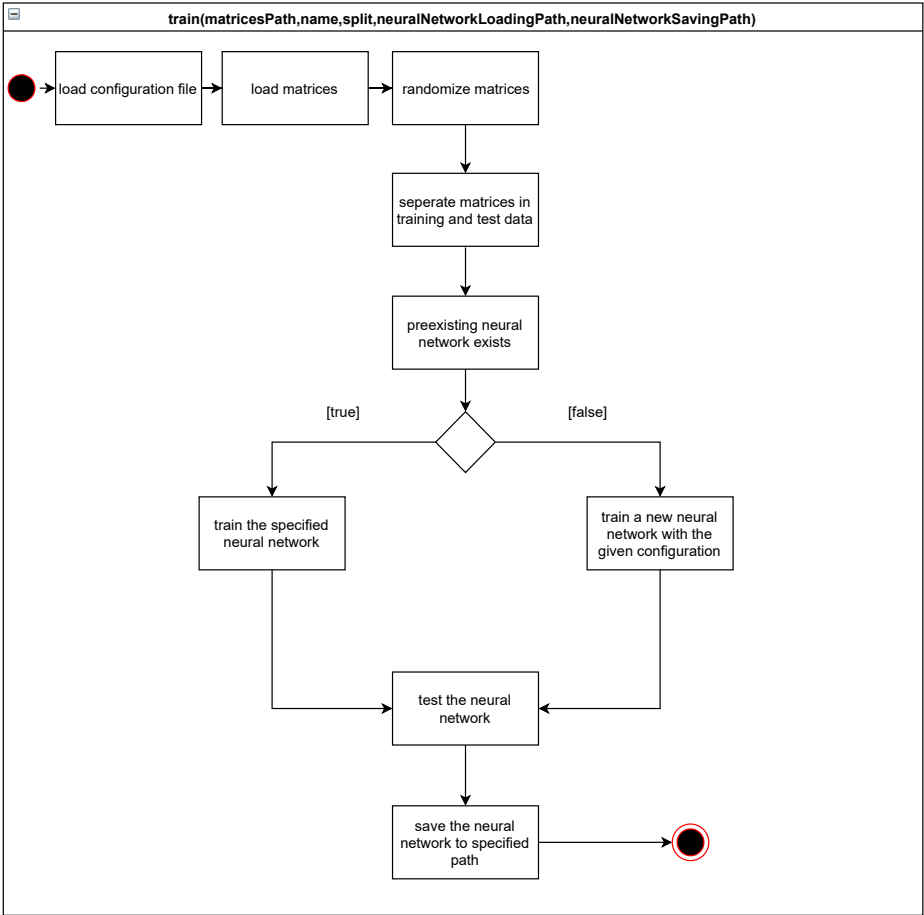
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2.1 Collector

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2.3 Training Moulde



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3 Class diagrams

4 Sequence diagrams

5 Glossary