UNIVERSITY
OF MANNHEIM
School of Business Informatics
and Mathematics

Data Mining

Exercise 6: Neural Networks

6.1. Learning a neural network with scikit-learn for the Adult dataset

In this task, you should create a neural network for the Adult dataset. Use the MLPClassifier provided by scikit-learn.

1. Load the Adults dataset and play around with the hidden layers and the activation function (both are architecture parameters)
2. Try out different hyperparameters of the neural network like learning rate and batch size

6.2. Neural networks with PyTorch Lightning

In the previous exercise only the MLPClassifier is used. To extend the possibilities, use PyTorch Lightning and create a similar neural network.

1. Implement the same model in PyTorch Lightning and find an optimal model using F1 as the scoring measure.

6.3. Multi class classification with PyTorch Lightning

Use the Connect 4 dataset to adjust the neural network for multi class classification

The target variable to predict is either ‘win’, ‘ loss’, or ‘ draw’.

1. Load the dataset and split it into training, validation and test.
2. Adapt the architecture (change the loss and adapt the output layer) and optimize for validation accuracy.