1. Classifiers in sklearn

The aim of this exercise is to familiarize yourself with some of the classifiers implemented in sklearn by applying them to a 2D classification task.

On Canvas under “Files/Jupiter Notebooks/Ex4”, you find classifier dataset.ipynb which allows you to generate point-clouds with labels ±1.

a) Using such datasets, build classifiers with svm.svc, DecisionTreeClassifier, RandomForestClassifier, AdaBoostClassifier.
b) Using default parameters, check their performance on your pointcloud by checking their score and visualizing their classification boundaries.
c) Comment on how your results for the DecisionTreeClassifier change when varying the maxdepth.

2. XOR in Keras

In the last exercise, we have seen that a single layer Perceptron cannot accommodate the XOR function. Show that by utilizing a single hidden layer with sigmoid activation functions, XOR can be realized.

a) Implement this network utilizing Keras.
b) What is the minimum number of hidden units needed in this network?
c) What are the network parameters after training?
d) (Optional) Could there be significantly different results depending on the weight initialization?