Hands-on Exercise 1: Experimenting with Deep Multilayer Networks

In this hands-on exercise you use the interactive graphical deep learning tensorflow tool .

- Open the Tensorflow tool and examine the controls. On top of the page you see from left to right a start button, an epoch counter, a learning rate option, an activation function option, a regularization option, and a regularization rate (which corresponds to lambda). Under Data you find four datasets. As inputs, select x1 and x2 only. In all experiments set the ratio of training to test data to 50%, Noise to 0 and batch size to 1. A successful network shows a declining loss for both the training and test sets. With the + and - buttons you can add hidden layers and add hidden units.
- Start with the linearly separable dataset and train a perceptron. Change the options and examine the effects.
- Now select one of the other three datasets. Try to guess what minimal network configuration will result in a successful training performance. Configure the network accordingly and examine what happens.
- For all three other datasets, try to find a successful network and answer the following questions.
- What is the effect of the learning rate?
- What is the effect of the type of activation function?
- What is the effect of regularization (L1 and L2)?
- What is your diagnosis if the test loss goes up and the training loss goes down?
- What is your diagnosis if both the test and training loss go up?