Small Exercises 7

Neural networks

These exercises are meant as preparation for the inverted classroom lecture. Keep your answers short: two or three sentences, sometimes even less, should suffice.

Problem 1: Why do we use basis functions in neural networks? What purpose do they serve?

Without basis functions the system would remain linear, and adding layers doesn't change anything.

Problem 2: What is "deep" about deep neural networks?

It only means that the neural network has more than one hidden layer.

Problem 3: When do we use a Bernoulli likelihood assumption in a neural network?

If we use the neural network for classification .

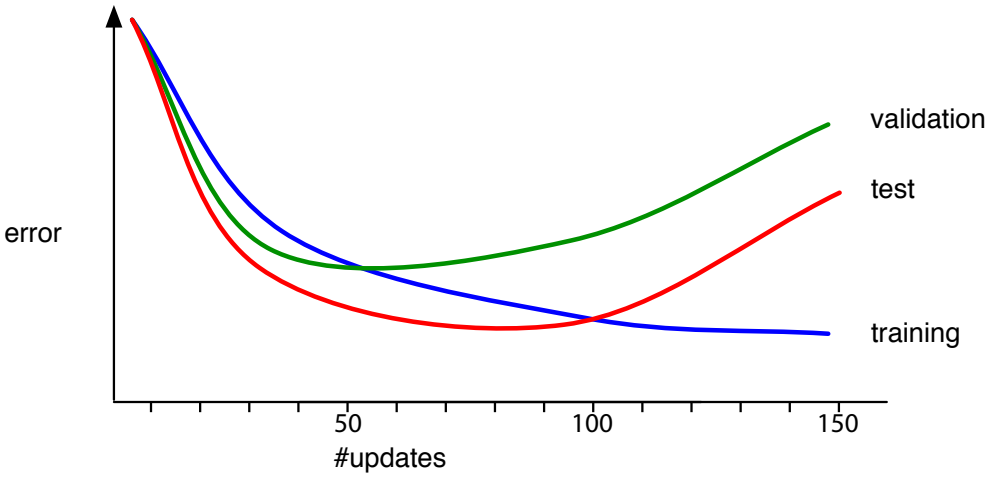
Problem 4: How can you compute the gradient of the weights in a neural network?

That's what back-propagation does.

Problem 5: Give one advantage and disadvantage each for stochastic vs. batch learning.

Stochastic: can be done online, and can be used to prevent "getting stuck", but it doesn't really optimise what you want. Batch: too expensive when the data set is too large.

Problem 6: Of which update (give the approximate number) do you use the corresponding neural network weights (i.e., when do you "stop training")? Explain your answer. Relate your answer to the below figure, in which the data is separated in a training set, a validation set, and a test set.


error
validation
test
training
50
100
150
#updates