

INF3490 exercises - week 5 2014

Problem 1

Last week we used the activation function

$$g(h) = \begin{cases} 1, & h > 0 \\ 0, & \text{else} \end{cases}$$

Why is this not used with backpropagation?

Problem 2

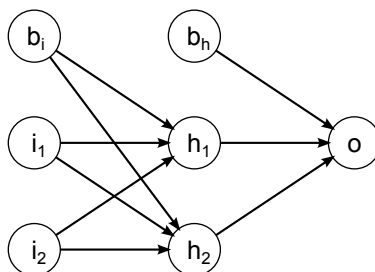
What is the minimum number of hidden neuron layers needed in order to approximate an arbitrary continuous function, and why?

Problem 3

Why do we use a validation set? Describe how do the three different cross-validation methods presented in the lecture slides work, and what their advantages and disadvantages are.

Problem 4

Implement the MLP shown below, and train it to correctly perform the XOR function



Problem 5

In the lecture slides the backpropagation deltas are first presented as

$$\delta_k = (y_k - t_k) y_k (1 - y_k)$$

What does this tell us about which activation function that is used?

Problem 6

You are to design an MLP that would learn to hyphenate words correctly. You would have a dictionary that shows correct hyphenation examples for lots of words. Think about the following:

- What should the input to the neural net be?
- How should this input be encoded to work well with the classifier?
- How is should the output be encoded?
- How many layers do you need?
- How many neurons should there be in each layer?