BRSU

Neural Networks
Assignment 3

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1 Read chapter 2 from Haykin's book (2nd edition), till the section 2.6 inclusive and then start from 2.10 till 2.12 inclusive. Summarise or sketch your insights in mind-map or an outline or a summary.

See figure 1.1.

2 From the Chapter 2 Haykin's book solve 2.1

The *delta rule* is a supervised learning method. It uses a teacher to compute the error of the network output and uses this error to adjust the neuron's weights.

The *Hebb's rule* is a form of unsupervised learning. The weights of synchronously active neurons get strengthened, the weights of asynchronously active neurons get weakened or eliminated.

3 From the Chapter 2 Haykin's book solve 2.10

$y_i = \phi(v_i)$
$v_i = \sum_j^N x_j w_{ij} - \sum_{k \neq i}^M y_k z^{-1} c_{ki}$
with N the number of input neurons and M the number of output neurons.

The neuron with the largest value for v is considered active and its output equals 1, all the other outputs are set to 0.

4 From the Chapter 2 Haykin's book solve 2.21

5 A simple network is given below (from lecture slides). You have to update the weights once using Boltzmann learning for this network. Please do calculations by hand or by using MATLAB or Python.

Figure 1.1: Mindmap