

HOMEWORK ASSIGNMENT # 1 DUE: January 25, 2010

Use the NeuralWorks Professional II simulator and carry out the following exercises using the BackPropagation method.

1. Set up a network like the one shown in Figure 4, pg. 332 of the reading material available on the course Web page (Rumhart & McClelland re. XOR problem). You will be able to construct this required NN via the "Instanet" capability within NeuralWorks. However, after you do so, I suggest you experiment with deleting elements, connections, etc., and with putting them back in, and/or forming different structures, just to give you practice with and exposure to various aspects of the simulator.

Create a data file xxxxx.nna corresponding to data given in Table 1, pg. 319 of the text (see pages RF 229, et seq, in *Reference.pdf* in your NeuralWorks directory for information on file formats).

Experiment with the network, e.g., with different starting weights, different values of training rate, momentum term, epoch sizes, etc. Study the description of experimental results given in the attached text material to obtain hints for your own experimentation and learning.

Your experiments may generate a lot of data, however I want you to write a **summary** report containing a concise (and informative) description of the problem you worked on, and a summary of solutions obtained for at least 5 different parameter combination (see above enumeration).

Include in your report:

A statement of the problem, the experimental process, and your conclusions.

In describing the experiments, include the net's initial conditions, and use the scheme shown in Figure 5 to show your final nets' weights and threshold values.

Indicate how many iterations it took for the net to learn the task.

2. Repeat the above process for the "encoding problem" discussed on pages 335, et seq, of the attached material. Use a 4-2-4 configuration (modified versions of Figure 7 and Table 4, respectively).

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PS: School is closed next Monday (January 18th -- MLK observance), so make sure you have done sufficient work on this assignment to bring up questions you may generate at our next class meeting on Wednesday, January 20th -- the only class meeting before assignment is due.