

**Homework 5**  
**Posted Feb 19, 2008**  
**Due Feb 26, 2008**

**Problem 1. (50 points)**

Modify the BP network that you implemented in HW-4, in the following way:

- a) Include a momentum term.
- b) Make the BP learning into a function (say BPlearn), with all the variables that you change from one application (case) to another (such as # of input, output, hidden PEs, learn rate(s), epoch size, stopping criteria, momentum, ..., data arrays) parameters of this function. (Hint: you can put the more frequently changing parameters into an array and have that array as one parameter to BPlearn.)
- c) Write a separate routine (say BPrecall), for testing the network, i.e., to run training and test data through the network with frozen weights, for the purpose of verification of performance. (This will require to pass the trained weights of your network from the BPlearn function to the BPrecall function (so make the weight matrices outputs or parameters of the BPlearn and parameters of the BPrecall function! You can also capture the errors or the generated outputs at each recall in an array inside BPlearn and pass it back to the main program for post-processing (forming various error quantities) and evaluation (plotting)).
- d) Write a main program that performs data I/O, pre- and post-processing (including plots), and calls the BPlearn and BPrecall functions as needed.
- e) Comment your functions and main program so the reader can readily see what the variables mean, etc.

Train this network to classify the 'iris' data set. Use the version of the iris data that is already split into a training and test data set (iris-train.txt and iris-test.txt). Document your best results according to what was requested in HW-4, and in addition briefly report your experiments (e.g., what network configuration did you start with, did you need to change it in order to achieve satisfactory training results and test results, if so, what changes did you make, and how did the network's performance change as a result of that).

The iris data are in /home/erzsebet/ANNclass502 on hoss.ece.rice.edu. If you cannot access it let me know.

Document your training process and the results the same way as was required in HW4.

Any question, problem, please see me!