Computer Science and Engineering 87

Neural Networks as Models of the Mind

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Office Hours: Tuesday and Thursday 1-2PM or by appointment.

NOTE:
CLASS MEETS FOUR WEEKS ONLY!!: 01/08, 01/15, 01/22, and 01/29

Course Description

This is a one credit course that will meet for 4 weeks, two hours per session. This course will explore connectionist (or Parallel Distributed Processing, or artificial Neural network) models and their relation to cognitive processes. We will cover what neural networks are, their use and current learning methods for them. We will also look at the application of the models to several problems in cognitive modeling. Use of demonstration programs will be an integral part of this course. Each week I will try to limit myself to talking for one hour, and then we will "play" on the computer for an hour.

Week 1 will motivate why we are interested in neural networks as models of cognition. We will also try out a simple model or two on the computer, using the **cs** program. Week 2 will cover more models, especially so-called "attractor networks" as model of memory, using the Jets & the Sharks example (**iac** program). Week 3 will introduce learning using perceptrons and back propagation, using the **bp** program. Week 4 will look at learning in recurrent networks (Elman and Jordan networks and others). This week we will also go over to my lab in AP&M prime and see a couple of demonstrations.

Required Work

The *only* required work consists of attending class each week. I will actually take attendance. If you miss a class, you will receive an NP (or a U or whatever it is). The only way to make this up is to write a five page paper covering some aspect of neural networks of interest to you. This may be a "thought piece", suggesting how neural nets may explain some aspect of human cognition, or a simple regurgitation of some of the things you learned in the course, or a write-up of a (very small!) project using the PDP simulation software (see the "Explorations" book below).

Slides

Some of the slides I present are available at the class web page, linked off my home page (which can be reached by typing in "Gary Cottrell" into the location bar of your web browser).

Recommended Text

Explorations in Parallel Distributed Processing, McClelland & Rumelhart, MIT Press, 1988. ($52.95 on Amazon.com) This spiral-bound volume comes with two floppies for a PC with several programs for simulating neural networks. There is also a Mac version.

Also recommended is *Parallel Distributed Processing, Vols 1 and 2*, edited by Rumelhart and McClelland. MIT Press, 1986 ($27.50 for one volume on amazon.com) These books are ones you will want to have if you plan on eventually doing research in Cognitive Science.

Check for these books both under the class in the bookstore and in the general book section. Let me know if you can't find them.