Assignment 1

Assigned: Tue Jan 16, 2001
Due: Tue Jan 23, 2001

Before we dive into the technical details of machine learning, I would like us to get a better appreciation for the sorts of applications where machine learning techniques are useful. To introduce you to the field, your first assignment is to report on a problem that has been solved using machine learning techniques. I want you to focus on the problem; the techniques used to solve the problem and the details of the solution are not too important for the time being. You should address the following points:

• **What is the task?** (You can characterize the task in terms of the input-output behavior of the system. For example, the speech recognizer I demonstrated in class takes as input features extracted from an acoustic signal, and produces as output a probability distribution over a set of predefined alternative classifications of the signal.)

• **What is the training data?** (How much data is used to train the system? Where does the data come from?)

• **How was the system's performance evaluated?** (Was the system tested in the real world? Are there quantitative reports of accuracy of the system?)

• **What do you think about the work?** (Do you see this as a sensible application? Does it have practical implications? Can you think of ways in which the work could be extended—to other domains, to bigger problems, to related problems? What are its limitations?)

• **What is your information source?** (Give the complete paper citation.)

You may not be able to answer all of these questions, depending on how detailed your source of information is. I would like you to hand in a brief report on your findings, no more than one page in length. One or two paragraphs should suffice. As with all assignments for this course, I expect the report to be typed and spell checked.

The assignments are due **at the start of class** on January 23. The reason for this is that we will spend a significant part of the class period on oral reports. You are expected to come to class prepared to give a short summary (no more than 5 minutes) on your findings. Beyond the sharing of information, the goal of these oral presentations is to allow me to get to know you, to allow you to get to know one another, and as a stimulus for class discussion. I will bring a transparency projector to class in case you wish to make overheads for your presentation.

To select an application, I would like you to go to the library and look through journals and conference proceedings that publish research on machine learning. Some promising journals are: *Machine Learning*, *Neural Computation*, *Neural Networks*, *AI Magazine*, *IEEE Transactions on Neural Networks*, *Adaptive Behavior*, *IEEE Expert*, and *IEEE Intelligent Systems*. Interesting applications are often described at conferences as well; try looking in the published proceedings of *Neural Information Processing Systems* (NIPS), the *International Conference on Machine Learning* (ICML), the *American Association for Artificial Intelligence* (AAA), and the *International Joint Conference on Artificial Intelligence* (IJCAI). If you select an article from another source, please check with me, because I want to ensure that the source is reputable.

Although it is easy to troll the web for information, I would like you to actually walk around in the library and handle the physical journals and proceedings. Just by browsing tables of contents and picking up other materials nearby on the shelves, you will learn a lot about the field. Perhaps the most challenging part of the project is selecting an interesting article. However, you should feel free to supplement the article you read with sources from the web. I have links to many different resources on the class home page. You may be able to find a cool java demo of the work, or other papers by the author.