

91.549 Mobile Robotics
Fall 2004, Prof. Yanco

Lab 4: Neural Networks

Out: Tuesday, 19 October 2004

Due: Thursday, 28 October 2004

Overview: In this lab, you'll explore neural networks as a way to develop control algorithms for the robot.

Read the sections of the neural network module that are linked from the course web page (Intro, Building Neural Networks using Conx, and Robot Learning using Neural Networks) and complete the exercises.

Run the programs in Robot Learning using Neural Networks in simulation. Then write a program that will (hopefully) learn to follow a wall. Try online learning in simulation. See if the learning improves if the program is left running overnight or longer. If you're feeling brave, save your network and load it on a real robot to see what happens. (Be sure to be close to your robot if you do this.)

Read the section on associating images with labels. How realistic would it be to use a neural network for your vision system? Find at least one robot system that uses neural network based vision. Write a few paragraphs on how it works (with references, if appropriate).

Turn in your programs and description of a robot system using a neural network for vision processing. There's nothing to demonstrate for this lab, unless you want to show me your neural network for wall following, either in simulation or on the real robot.