Assignment 1: "Hello, World!"
CS 393R: Robotics
8-26-2009

Assignment due: Thursday, September 10, 2009

The purpose of this assignment is for you to get the fairly complex hardware and software system that is your robot to "turn over" (to use automotive terms).

You will learn how to connect to the Aibo, read its sensors (joints, camera, and others), send motor commands to the head and legs, and write simple control programs to close the loop. For this assignment, the control programs should be very simple, so you can concentrate on getting all the pieces to work together.

You will do much of your work using Tekkotsu Version 4.0 (http://www.tekkotsu.org/), an open source development toolkit for the Aibo. You will be programming in C++ using many of the features already incorporated into Tekkotsu, including the preprogrammed walks and color segmentation features. You can find a comprehensive set of documentation for Tekkotsu at http://www.tekkotsu.org/development.html. The tutorial found at http://www-2.cs.cmu.edu/~dst/Tekkotsu/Tutorial/ contains examples of how to use many of the features of Tekkotsu that this and future assignments require. The tutorial also describes how to form your own color table.

Your Tasks:

* Establish contact between your workstation and your Aibo. Demonstrate that you can read the sensors and make the Aibo move its head and walk.

* Get started using a colored-blob-tracker on the camera image.

* Write a couple of simple control programs to control the Aibo's gaze and walk.

Checklist

This assignment is worth 10 points. Here's how you earn them. Partial credit is possible.

[_____] (1 point) Demonstrate the ability to read the changing values from the Aibo's sensors as useful data in your program, and then display them on your workstation.

[_____] (1 point) Same for the camera image.

[_____] (1 point) Demonstrate the ability to detect and locate a pink blob in the camera image with the head held still.

[_____] (1 point) Demonstrate that you can control sitting, standing, and head-turning.

[_____] (1 point) Demonstrate that you can control walking: forward and turning.

[_____] (1 point) Demonstrate that your Aibo can walk in a curve: forward and turning at the same time.

[_____] (2 points) Demonstrate that your Aibo can move its head to keep the visible blob from a pink ball near the center of the image, if the ball isn't moving too fast.

[_____] (2 points) Demonstrate that your Aibo can spot a blue colored patch in the distance, and walk toward that patch until it fills more than half of its camera image, and then stop.

Extra Credit

[_____] (1 point) Identify the orange ball in the distance, walk up to it, and use a pre-packaged routine to kick the ball. Don't worry about accuracy (yet).