

Lab 3 – Reactive Paradigm Procedure

Overview

The purpose of this lab is to demonstrate the combination of reactive behaviors on the ER1 robot. It will help to familiarize the student with the reactive paradigm as well as the computer vision, object recognition, obstacle avoidance, and search features of the ER1 robot platform. This lab is meant to be performed in conjunction with the reactive paradigm portion of the course including Chapter 4 of the textbook and the associated lecture slides.

Part I: Setting up Behaviors

In this portion of the lab the robot will be setup to drive between its *home* and its friend's *home* while avoiding any obstacles placed in its path. The student may choose to create a new target to represent the homes or may use targets already built into the ER1 platform (e.g. the robot's box).

1. Turn on the ER1 and laptop and start the ER1 software.
2. If not already available, capture the template for the robot's *home* and that of their friend (see Lab 2 for detailed instructions for this step).
3. Set up one or more behaviors so that the robot will recognize the *homes* and drive towards them (see Lab 2 for detailed instructions on this step).
4. Create another behavior to control the robot's actions once it arrives at a home. The robot should visit for a set time period, then turn around and begin driving forward. Setup an appropriate sequence for this and the above behavior(s) to follow.
5. Enable obstacle avoidance for each of the behaviors you have created. Open 'Behavior Settings', select the 'Obstacle Avoidance' tab, and click the 'Avoid obstacles using IR sensors' checkbox as shown in Figure 1.
6. Test out the behaviors in the environment setup for this lab. If the robot does not avoid the obstacles, adjust the IR sensors positioning and the robots speed to allow the robot to sense the obstacles in time. Make adjustments until the behaviors appear to be functioning properly.

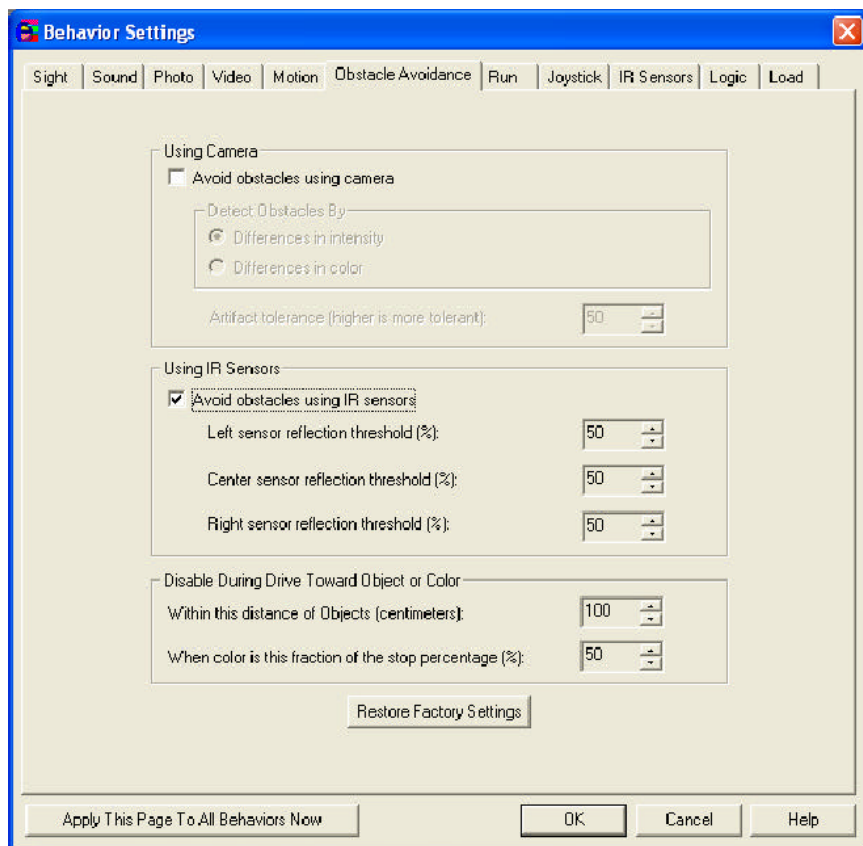


Figure 1: Setting up Obstacle Avoid.

Part II: Activities

1. Allow the robot to navigate between the two homes once, then pause the behaviors (hint: use the space bar), move the obstacles slightly closer, and restart the behaviors. Repeat until the robot can no longer navigate between the two homes. Note the position of the homes and obstacles and the behavior of the robot on this last iteration.
2. Experiment with moving the obstacles without pausing the robot. Note the responsiveness of the robot to such changes in its environment. Use this step to try to determine why the robot behaved as it did during the previous activity.