1 Objective

The objective of this exercise is to program the robot such that it will follow some visual cue. Specifically, the robot must be able to follow blob of a given color.

2 Task 1

From the course website, you will be able to download two sets of images. One set of images contain an orange cube while the second set contains a yellow cylinder. These images were obtained using the SRV-1’s color camera. Using these images, develop an algorithm that will allow you to consistently segment out sections of the image that is either orange or yellow. Therefore, for this task, you must first determine the range of Y, U, V values correspond to the orange (or yellow) color of interest. Based on this color calibration, you will then use your Connected-Component Labeling Algorithm that you developed in a previous assignment to segment out the portions of the image that correspond to the color of interest.

For your report: Describe in 2 pages or less your color calibration procedure. Include any tables, pseudocode, etc.

3 Task 2

Using a PID controller, program the robot to follow the color blob of interest. Specifically, task the robot to keep the blob centered in the image as well as maintain the size of the blob in the image. You’ll have to use the results you obtained in the previous task to do this.

Due to potential network latency, I suggest you work with robot images at the smallest resolution supported. Lastly, you must demo your working code in class on Thursday, Feb. 21. In other words, I will test everyone’s code by getting your robots to follow color blobs I provide.

For your report: Describe in 1 page or less your code. Include any tables, pseudocode, etc.

Grading: Your grade for this assignment will depend on how well your robot is at accomplishing the given task. Each robot will be asked to follow the color blob down a straight path (approximately 1 meter) and around a circular path (diameter of approximate 1 meter). You will be judged based on a robot’s ability to pick out the given color, robot’s responsiveness, and how well it is able to regulate its distance to the given color blob. Credit will not be given if your robot is unable to finish these tasks within a reasonable time.