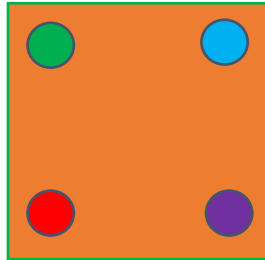


RBE 450X – Homework 4

In this homework, you will implement a visual servoing algorithm for a 2 DOF robot. For this, you will be using the robot from your previous HW.

Step 1 (3 pts): Spawn the object you have created in the previous HW on the ground within the robot's workspace.



Move the robot via the position controller so that the whole object is visible in the image (it might already be visible thanks to your initial placement of the object, which is totally OK). Take an image, get the coordinates of the 4 circle centers.

Deliverable: Present the image taken from the virtual camera, the detected circle centers, and a snapshot of the related part of the code in your report.

Step 3 (1 pts): Move the robot to a different location using the position controller. In the new location, the whole object should still be visible by the virtual camera. Take an image, get the coordinates of the 4 circle centers.

Deliverable: Present the image taken from the virtual camera, the detected circle centers, and a snapshot of the related part of the code in your report.

Step 4(6 pts): Implement a visual servoing algorithm that uses these four point features (the centers of the circles) and servos the robot from one image configuration to the other.

Couple important notes:

- You will need to switch the controller to the velocity mode in order to execute the velocity command
- In the image Jacobian you would need to use f and Z . Take both of them 1. Again, this is a 2D example, and all these parameters are multiplied with a gain (λ), and therefore does not have an effect.

Deliverable: Record the locations (x, y coordinates) of all the features over time during visual servoing. Plot them in the XY plane so that you visualize the trajectories of the features (you

can record them in a file and plot in Matlab if you like). Include that plot, a snapshot of your code in your report as well as the ROS package that includes your implementation.