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Computational Robotics
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Warmup Project

Drive Square

In this script, we had the neato move forward and rotate 90 degrees four times. We defined two functions:
moveStraight(), which directs the neato to move forward at .2 meters/second for 3 seconds
rotate(), which takes pi/2 seconds to rotate counterclockwise 90 degrees

This implementation was a good initial challenge because we were getting used to the node's publishing capabilities. We also got to explore how the rospy timer can dictate the robot's behavior.

Teleop

The teleop.py script takes a dictionary of different keys and assigns them a tuple of four different values of 1,0, or -1. The four values correspond to the velocities in the x,y,z and angular directions. The function get key takes in the keyboard character and saves it under self.key. The run function updates the self.key variable for each input and moves the robot in the respective linear and angular directions. If a key not defined in the dictionary is pressed, the robot will stop moving.

Wall-Following

For the wall-following script, we defined two different behaviors: moving forward and orient to wall. For the wall-following portion, we had the robot move forward until it detects an object within a threshold that we define upon initializing the node. When the robot decides that an object or wall is nearby, it will orient itself until it is parallel to the wall by equalizing d_3 and d_4 or d_5 or d_6.
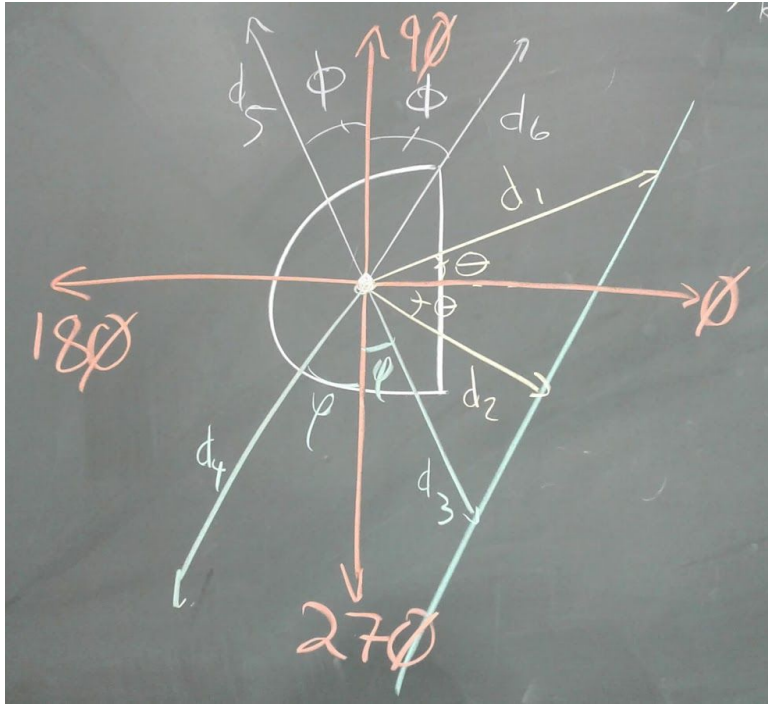
After rotating enough to achieve equality in one of those pairs, we get a position like this:

if $d_1 = d_2$, then x // wall
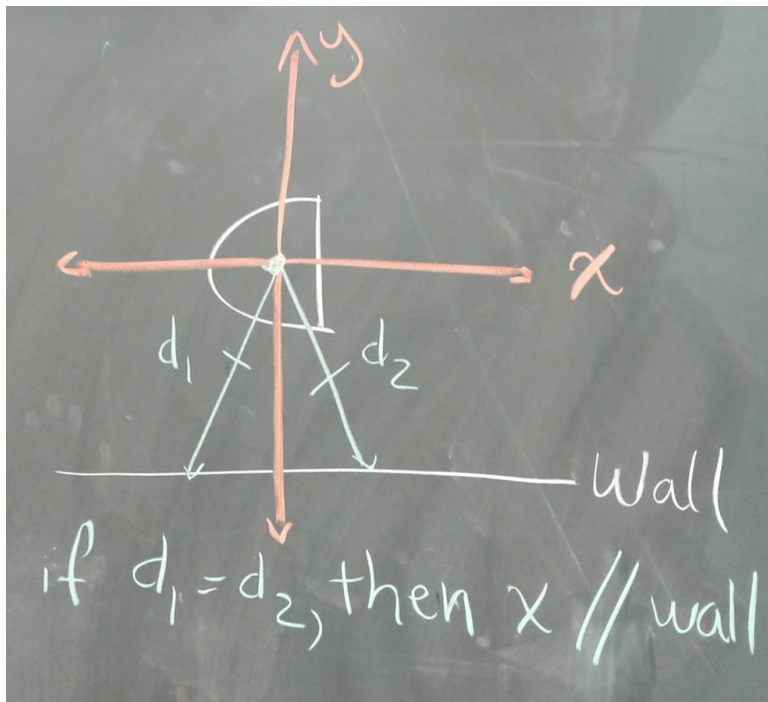
Person Following

Obstacle Avoidance

Finite State Controller