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Modern Robot Programming Problem Set #6

CODE LINK: https://github.com/art81/EECS373/tree/master/problem_set_6
Navigate to: src/ps6.cpp

Theory Of Operation:

The theory of operation of my program is to first start the competition, then start the conveyer, detect when there is a box underneath Logical Camera 2, detect when that box is within a certain tolerance of being centered beneath the camera, pausing for 5 seconds, starting the conveyor again, and then continually calling the drone until it succeeds (ie. when a box is in the shipping area ready to be picked up). To do all of the following things I used the start competition service, the conveyor control service, the drone control service, and the logical_camera_2 publisher/subscriber relationship.

Something that surprised me when running my program was that when I had "ros::Duration(5.0).sleep()" for a 5 seconds delay after the box was centered underneath the camera, this actually resulted in a significantly larger delay and I had to set it to 1.2 seconds for that to correspond to approximately 5 seconds in the simulation.

Observations of Behavior and Limits

Originally, when I wrote my program I had the tolerance of being centered underneath the camera to be 0.01m but, through testing, have found that this is too small as the current z-value didn't update fast enough to catch the boxes midpoint 100% of the time. Sometimes the observed z-value would skip over a value within the tolerance of 0.01m and would never stop the box. I now have it set to 0.02m and from what I can tell, it will always be able to detect the midpoint of the box and stop the conveyor. This means that when the box stops it will always have a z-coordinate between 0.02 and -0.02 in reference to the frame of the camera.

In the video I submitted, you can see that the box was stopped at a z-value of ***0.008m***