CSE 460 Mobile Robotics - Lab 8

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***Abstract*— Lab 8 report for CSE 460 Mobile Robotic with Professor David Saldaña.**

I. Github Code

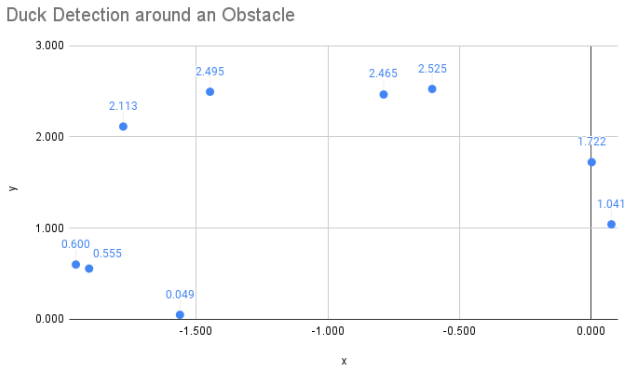
The code I developed for lab 8 can be found here: https://github.com/amandabaran/robotics/tree/main/lab8/lab8.py

II. Detector Accuracy

After placing the duck in front of the robot in 10 different locations, I was able to determine the average error of calculating the duck's distance from the robot. The average distance error is -0.14056 centimeters with a standard deviation of 3.3466. The average angle error is 0.02387 radians with a standard deviation of 0.03887.

III. Detecting Ducks Around an Obstacle

The plot below shows the locations of the detected ducks in the world frame as the robot drives in a circle around the obstacle. The points that are close to eachother represent the same duck detected at different points in time by the robot.



IV. Questions

A. How noisy is the information of the duck?

The information of the duck is pretty noisy. Without the duck moving, the detected location of the duck changes with noticeable variability.

B. Would the information be reliable in a search a rescue scenario?

As the plot shows, the information isn't perfectly reliable in detecting the exact location of the duck, so adjustments would be needed to use the information of the detected ducks to pinpoint exactly where the duck itself is.

C. How can you improve the detection method?

In order to better improve the detection method, a clustering mechanism of detecting the ducks location and then calculating a middle-ground estimate might prove to work better than just using the calculated point since the detector is not completely accurate. Using the average error as an offset might help this.

D. Can you make the robot move to describe a spiral trajectory?

In order for the robot to move in a spiral trajectory, you would still use the a circle trajectory, but you would need to change the radius with each circle completion that so that it spirals outward or inward depending on the change in radius.

References

[1] Amanda Baran, Github, https://github.com/amandabaran/robotics/tree/main/lab8