ROBOTICS - CMP3103

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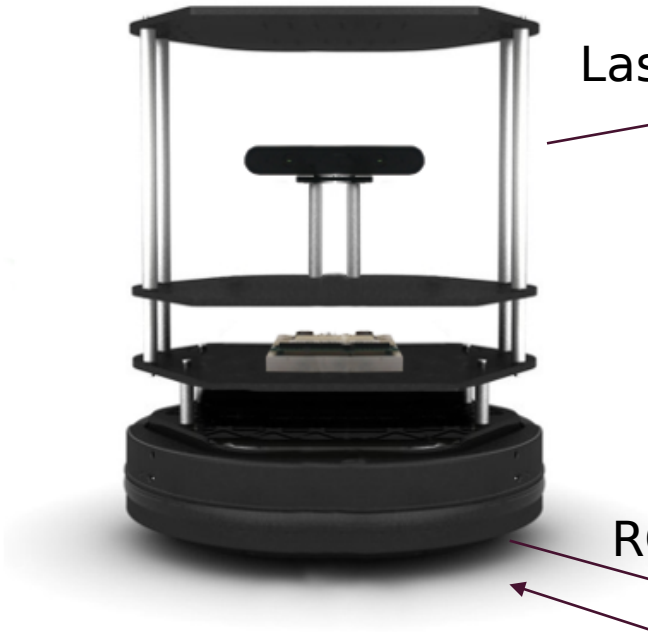
SYSTEM DESIGN

The code subscribes to both to /camera/rgb/image_raw and /scan and assigns them to the callbacks cb and image_callback respectively.

The cb callback tells the image_callback when it can and cannot move forward due to obstacles. The image_callback callback then finds where the colours are by moving forward and rotating. It sends all of this twist data back to the robot.



LaserScan

Def cb -
This callback uses the laser scanner to detect how far away objects are infront of the camera

Obstacle detecti data

RGB, image raw

cmd_vel_pub

Def image_callback -
This callback uses the rbg camera, and then puts the mask infront of it to find where the colours are in view

RESULTS

- Overall I think I created a good application for the robot. The code was good at avoiding obstacles, rarely getting stuck, and it also was very good and accurate when it found the colours. However, there are a few things I would have changed.
- Firstly, I made it so that the robot saw what was in front of it, if that object was too close, it would stop and turn till the space in front of it was clear. If I was to complete this task again I would have made the robot create a map of its world. Therefore it could have more easily known where the objects in the world were, making performance better and require less adjustments from the robot.

- Another thing I would change is how I coded the colour finding. Every time the code was run, it would take every mask and run it through different pieces of code. The code was identical, other than the mask it was using. If I was to do this again, I would have made it so that the colour masks were in arrays, and then I would have used a for loops to go through every mask, thus I wouldn't have repeated code for movement of the robot, and circling the target object.

- My robot would often get itself in a loop stuck around the map, and with its random choice to rotate left or right, it sometimes was left in this loop for a while. Through testing, my robot is able to find all 4 colours in time, but it can also get stuck and miss 1 or 2.