DECEMBER 6, 2018

RoboND-Perception-Project

GOALS OF THE PROJECT:

- The goal of this project is to apply learned perception techniques to pr2 pick & place robot.
- Pr2 robot is mounted with RGB-D camera that gives us required data to form 3D point cloud.
- By applying filters we reduce noise from camera data.
- By applying segmentation techniques we get inliers & outliers
- Finally every object is detected by object recognition techniques

PROJECT STEPS:

1- Set up your ROS Workspace
2- Complete Perception Exercises 1, 2 and 3, which comprise the project perception pipeline
3- Downloaded the project repository into the src directory of your ROS Workspace
4- assimilate your work from previous exercises to successfully complete a tabletop pick and place operation using PR2
5- implement a perception pipeline
6- output yaml files that has the data of objects in each scenarios
7- extra challenges

RUBRIC POINTS:

APPLYING TECHNIQUES FROM EXERCISE 1

1ST Outlier Removal Filter is applied to decrease noise and distortion in the image obtained from camera

2nd Voxel Grid Downsampling is applied to make the data more practical for processing

3rd x-axis and z-axis is filtered with Segmentation Filter to remove the parts we don't need from the cloud

4th RANSAC Plane Filter is applied to separate the table and the objects each in cloud

APPLYING TECHNIQUES FROM EXERCISE 2

Euclidean Clustering is applied to detect each object cloud and separate them

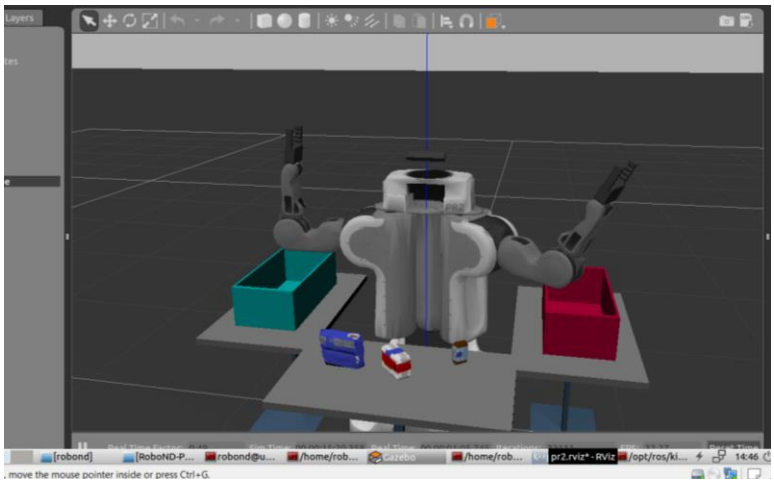
APPLYING TECHNIQUES FROM EXERCISE 3

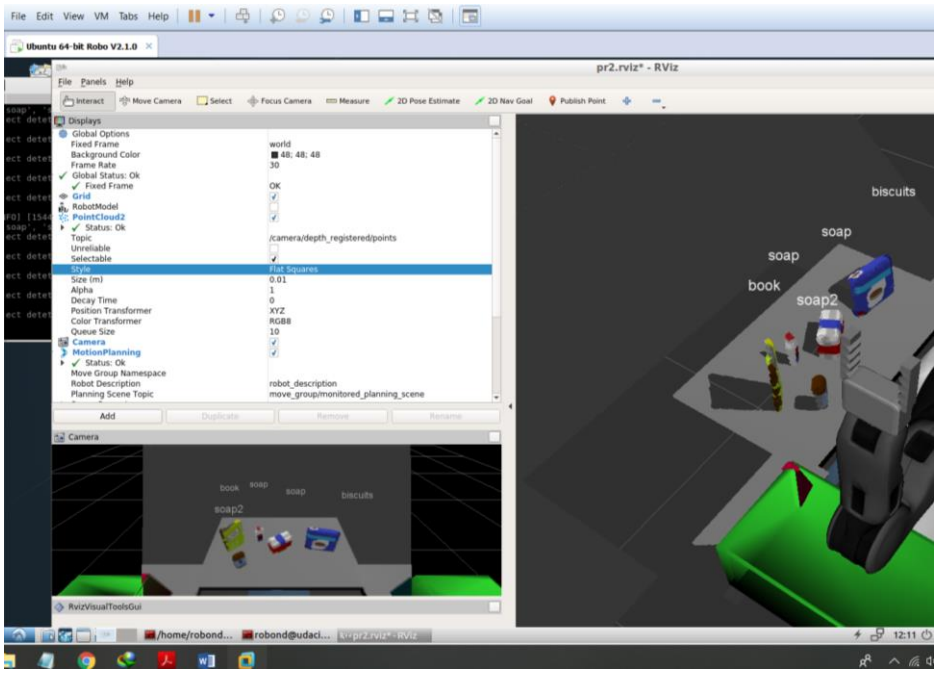
- Object recognition is done by first calculating color histogram of each object and surface normal
- After that by using SVM we create a pattern for each object and train it

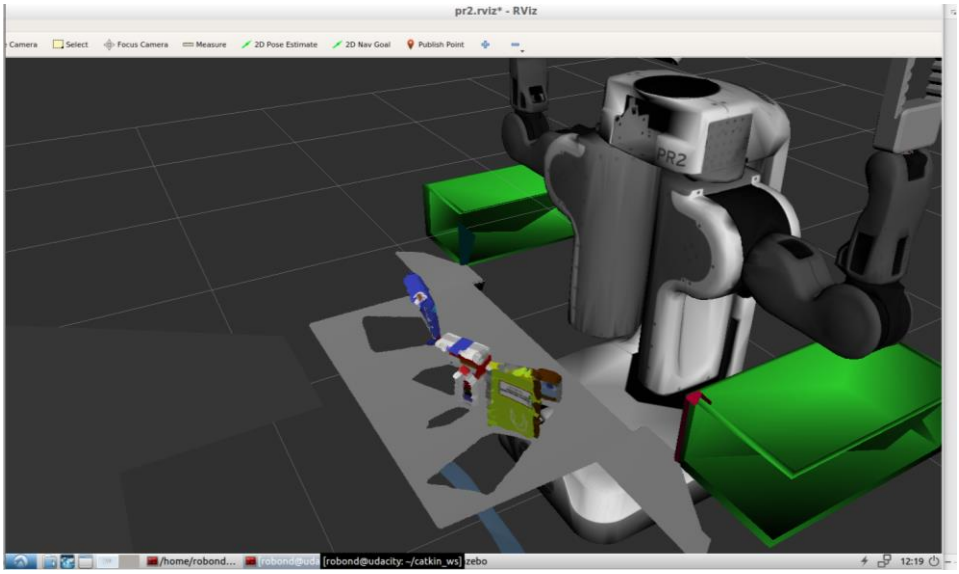
PUBLISHING MESSAGES NEEDED & OUTPUT DATA

- After finishing Object recognition steps ,required messages are created and published
- Output data is send to yaml file contains detected objects and its position

PROJECT IMPLEMENTATION



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PR2
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