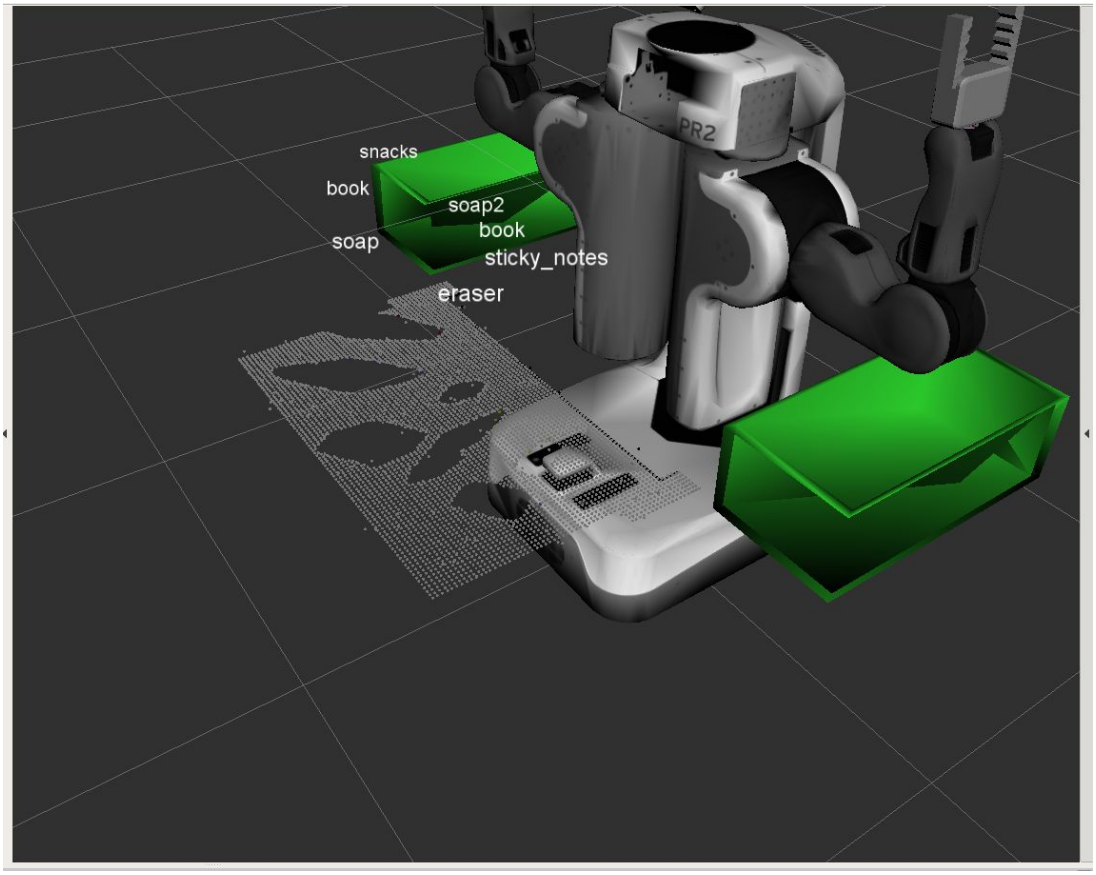
Project Perception Writeup

A. Exercise 1, 2 and 3 Pipeline Implemented

1. Pipeline for filtering and RANSAC Plane fitting.

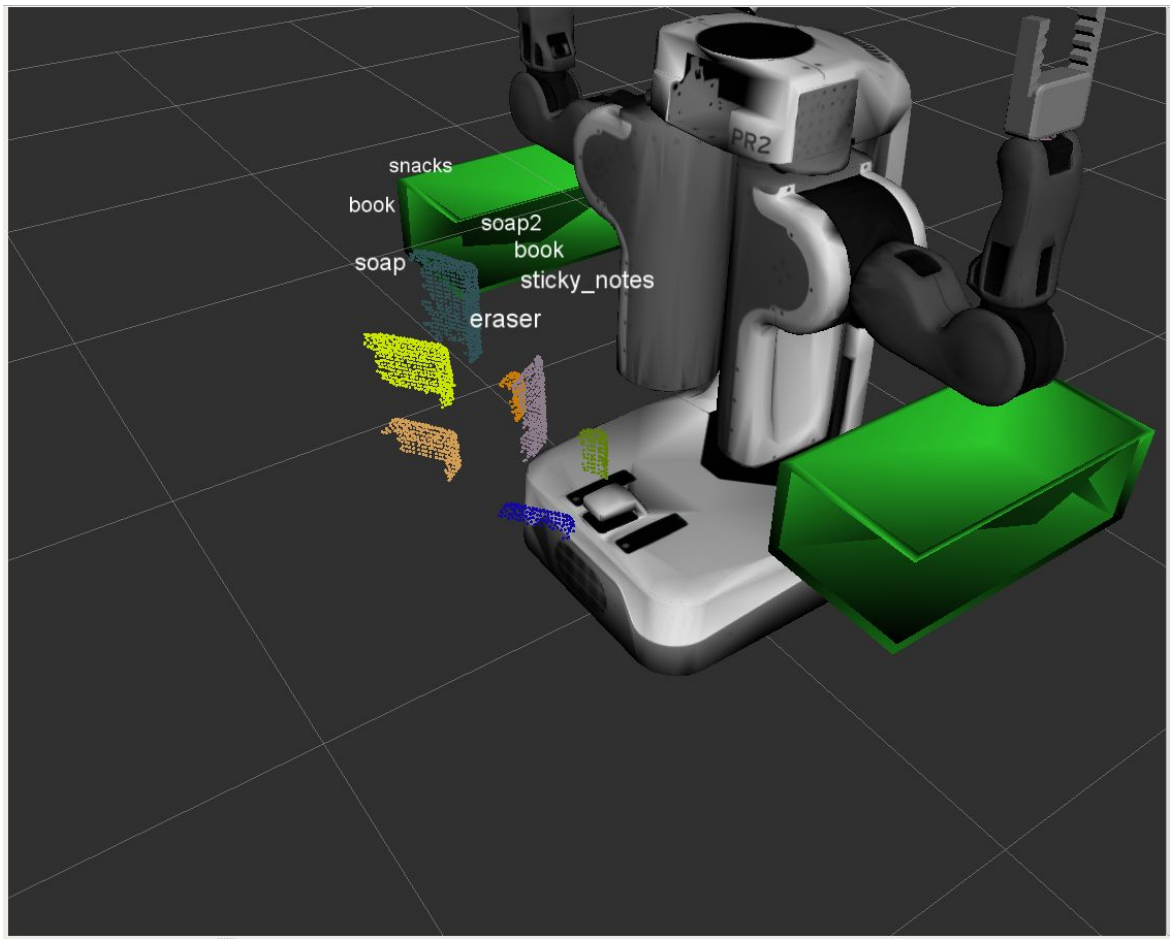
- Follow the instruction from the Exercise 1 guidance and add extra filter called Statistical Outlier Filter in order to remove noise from depth camera image.
- Also, experiment with different values for pass through filter in Z direction in order to filter out the tabletop (figure below).

2. Pipeline including clustering for segmentation implemented



- Experiment with different Euclidean Distance Parameters in order to have the appropriate value to cluster new objects from pick list.

3. Features extracted and SVM trained. Object recognition implemented.

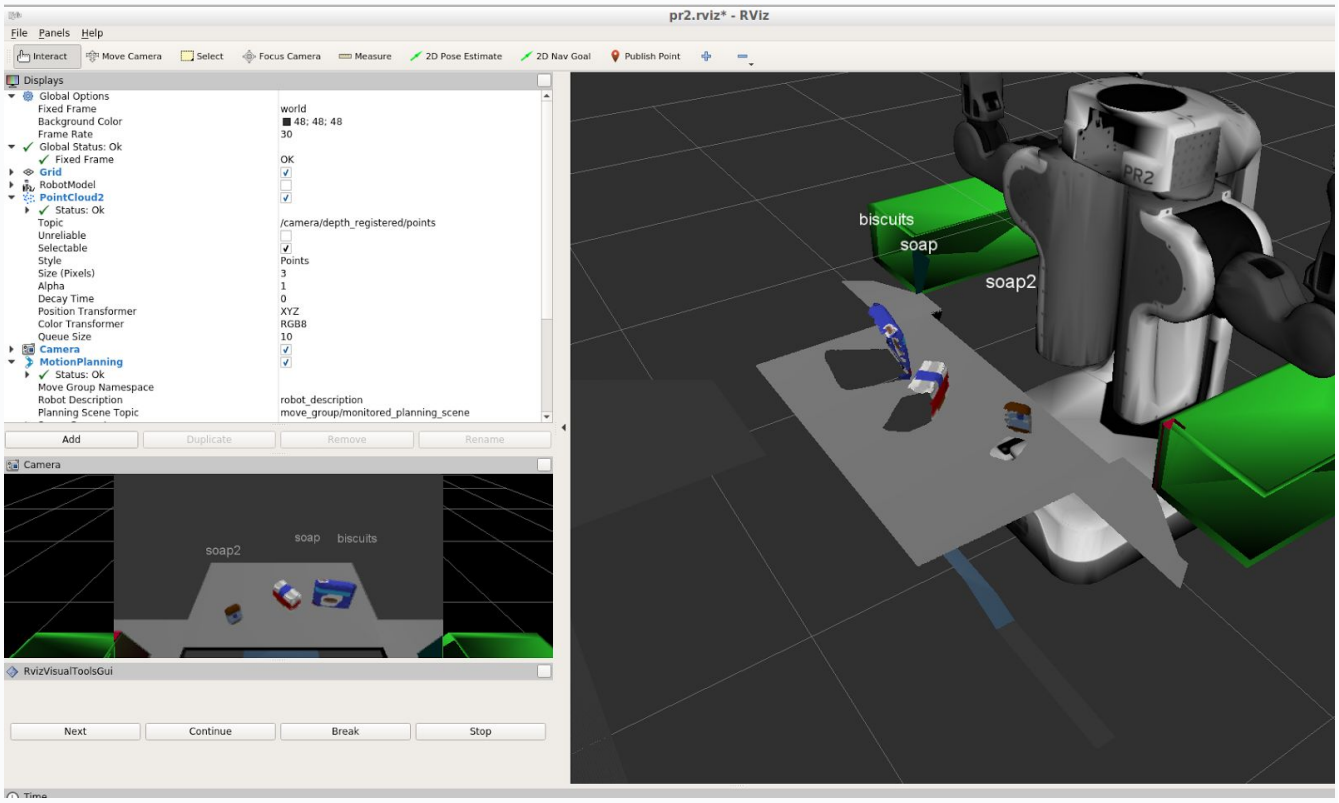


- Run the capture_features.py in order to generate new training models.
- Run train_svm.py to train the new recognition scheme.

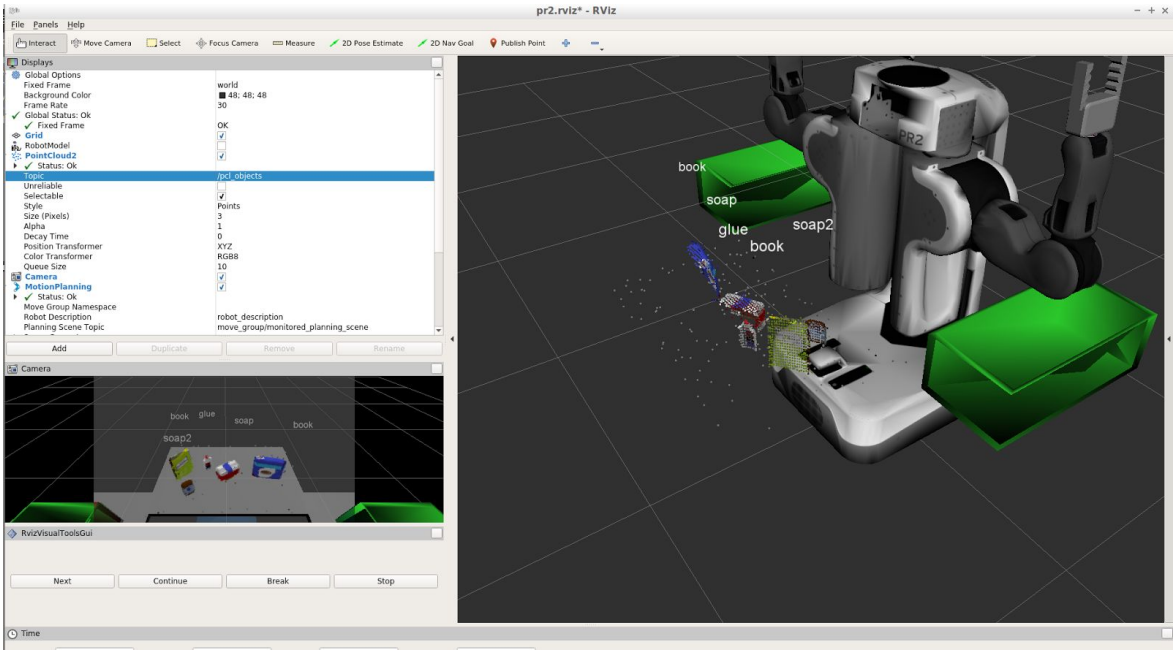
B. Pick and Place Setup

- Follow the guidance from the lecture to generate pick and place request for all the recognizable objects and output them to the corresponding .yaml files.
- Disable the code to call and wait for pick and place service and just simple output the request to the .yaml file as soon as all the request messages are generated.
- Add some enhancements to the recognition model to use HSV color scheme to compute histograms color feature.
- Below is the Rviz screenshot with labels marker for each of the required scenarios:

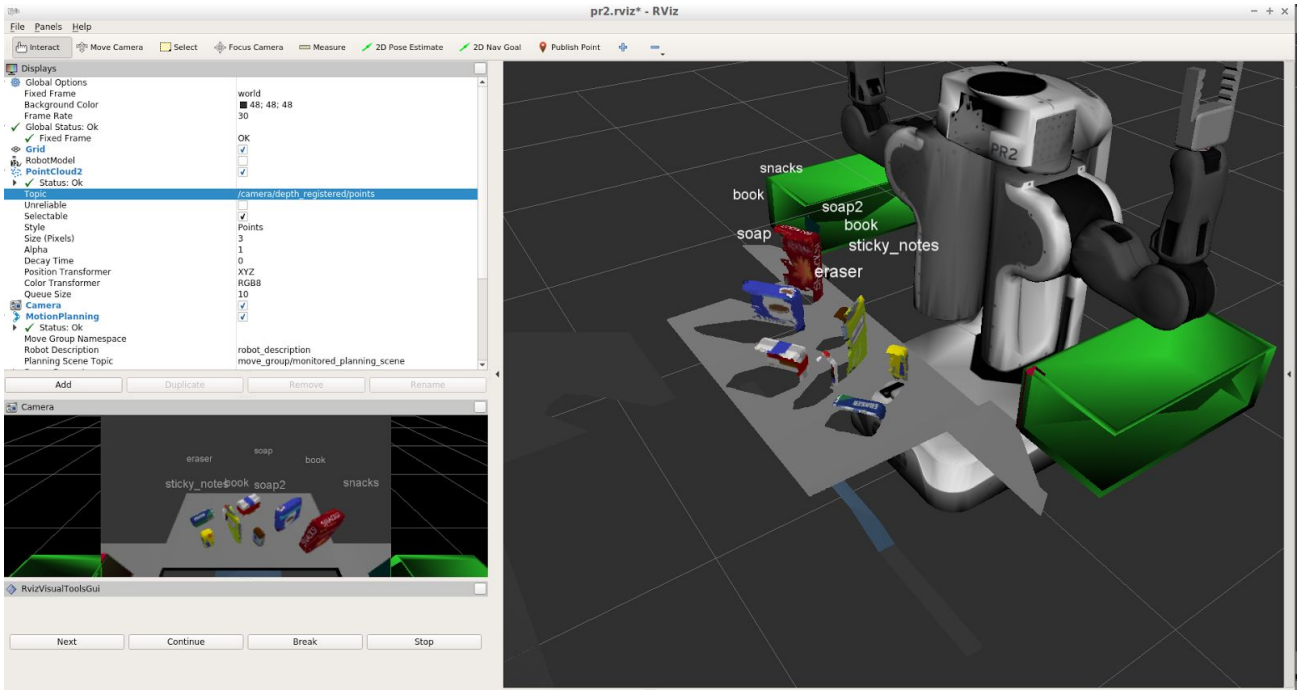
- **Test World 1**



- **Test World 2**



- **Test World 3**


pr2.rviz* - RViz
File Panels Help
Interact
Move Camera
Select
Focus Camera
Measure
2D Pose Estimate
2D Nav Goal
Publish Point
Displays
Global Options
Fixed Frame world
Background Color 48; 48; 48
Frame Rate 30
Global Status: Ok
Fixed Frame OK
Grid
RobotModel
PointCloud2
Status: Ok
Topic /camera/depth_registered/points
Unreliable
Selectable
Style Points
Size (Pixels) 3
Alpha 1
Decay Time 0
Position Transformer XYZ
Color Transformer RGB8
Queue Size 10
Camera
MotionPlanning
Status: Ok
Move Group Namespace
Robot Description robot_description
Planning Scene Topic move_group/monitored_planning_scene
Add
Duplicate
Remove
Rename
Camera
eraser
soap
book
sticky_notes
book
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RvizVisualToolsGui
Next
Continue
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