Che-Yen Lu

Team E: PLAID

Teammates: Michael Beck, Akshay Bhagat,
Matt Lauer, Jin Zhu

ILR03

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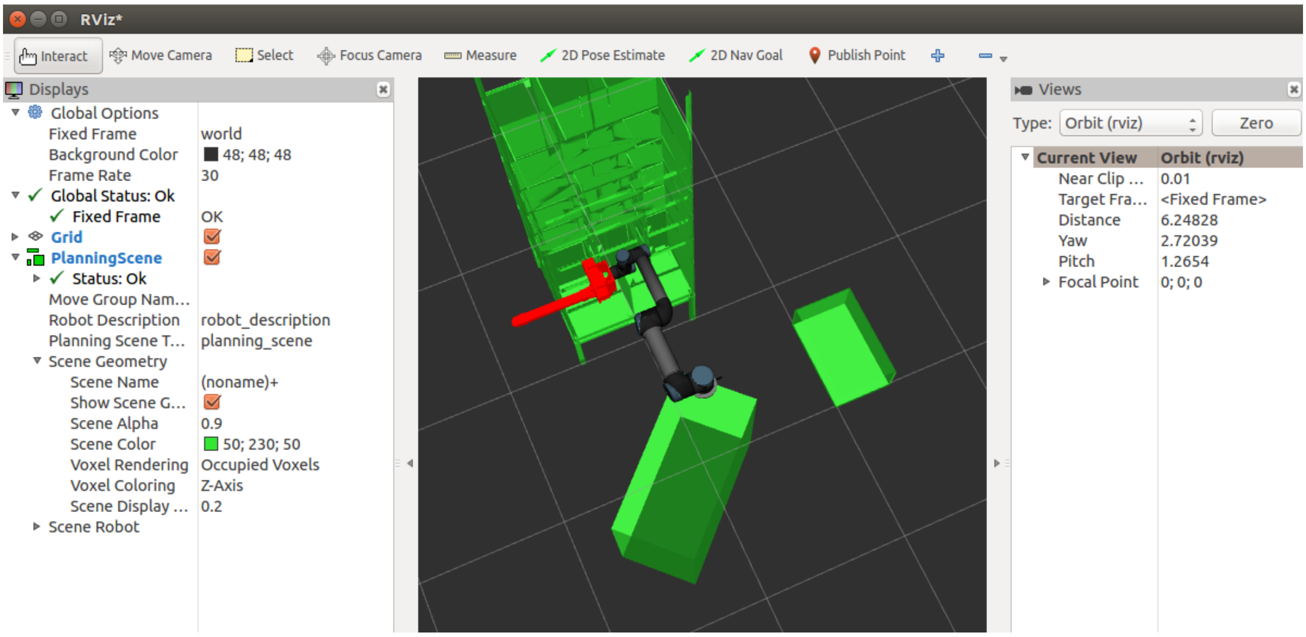
1. Individual progress

I create code template which is based on the legacy codebase this week. I took the planning code from harp codebase as part of our planning module. For perception, grasping and state machine, I create package and class prototype for these sub-systems. Since we will choose either UR5 or UR10 which is the same with last year's, it is reasonable to reuse path planning module. As for other sub-systems, we should build it from scratch because underlying hardware is different or the performance is low.

Also, I migrate the code Matt is working on. There are some changes didn't push to master branch, and I merge the changes to new repository. Moreover, Matt and I work together to get new base model working on simulation. The ROS packages I create so far is listed below.

- harp_arm – Move arm server. Move arm based on the request.
- harp_common – Common utility package which could be used in compile time.
- harp_msgs – Message package. Define all type of messages.
- plaid_grasping – Turn suction on/off. Grasping strategies.
- plaid_perception – Shelf/item localization and item classification.
- plaid_system – Central state machine. Issue command to other sub-systems.
- plaid_test – Test package. All test related code.



Global Options	
Fixed Frame	world
Background Color	■ 48; 48; 48
Frame Rate	30
✓ Global Status: Ok	
✓ Fixed Frame	OK
Grid	☑
PlanningScene	☑
✓ Status: Ok	
Move Group Nam...	
Robot Description	robot_description
Planning Scene T...	planning_scene
Scene Geometry	
Scene Name	(noname)+
Show Scene G...	☑
Scene Alpha	0.9
Scene Color	🟩 50; 230; 50
Voxel Rendering	Occupied Voxels
Voxel Coloring	Z-Axis
Scene Display ...	0.2
Scene Robot	

Type: Orbit (rviz)

Current View	Orbit (rviz)
Near Clip ...	0.01
Target Fra...	<Fixed Frame>
Distance	6.24828
Yaw	2.72039
Pitch	1.2654
Focal Point	0; 0; 0

Figure 1. simulation on new code base.

2. Challenges

Currently, one of the biggest challenge is the version control and code synchronization issue.

Software we are working on depends on many other planning packages, such as sbpl_geometry_utils, sbpl_manipulation and moveit_planner_sbpl. However, our codebase can only work with old planning codebase. One solution to mitigate this issue is to create different branch for our project, but it is possible we can’t get latest changes if modifications are not pushed back to the branch we need. Other solution is to monitor the changes and solve build errors for other planning package, but communications and clarifications are needed since we don’t understand those changes at all. We may need to discuss with SPBL for this issue.

Secondly, when I got ROS issues, all I know is to check log and nothing else. I should talk with seniors and search on the Internet to check if there are other debug technologies I can take advantages on. Usually, engineers spend more time on debugging than developing. If we can solve issues in a more efficient way, we could be more productive.

3. Teamwork

For this project, we focus on different domains and break down the tasks as follows:

- Michael Beck – Gripper. Survey existent facilities for vacuum and gripper and develop prototype/CAD model of end effector. Create co-axial plate for last year’s gripper.
- Akshay Bhagat – Perception. Manipulate with point cloud to remove redundant or NaN point clouds. Localize the shelf by using ICP.
- Matt Lauer – Arm Planning. Integrate with me to get planning up and running on new refactoring repository. Create STL file for new base.
- Che-Yen Lu – Software Architecture and Perception. Create code template for sub-systems and migrate move arm rosnode from legacy codebase. Also Integrate with Matt to make sure new base works without any issues on new codebase.
- Jin Zu – Perception. Get real sense up and running. Use “save_image” service in turntable package to save PCD and RGB files.

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4. Future plans

After talking with Alex, I decide to implement state machine for taking shelf pictures as my top priority. In the meantime, I will try to define the protocol between each sub-systems this week, so that group members will have a rough idea how to implement sub-system based on the request required by other modules.