

KUKA Cricket Star

Project Weekly Report 02

EN.503.707 Robot System Programming

Spring 2020

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1 Ball Throwing

progress:

1. Add a node to get the real position of the ball in Gazebo and transform it to a format compatible with Rviz, as shown in Figure 1. This function later can be used to visualize how well our trajectory prediction performs.

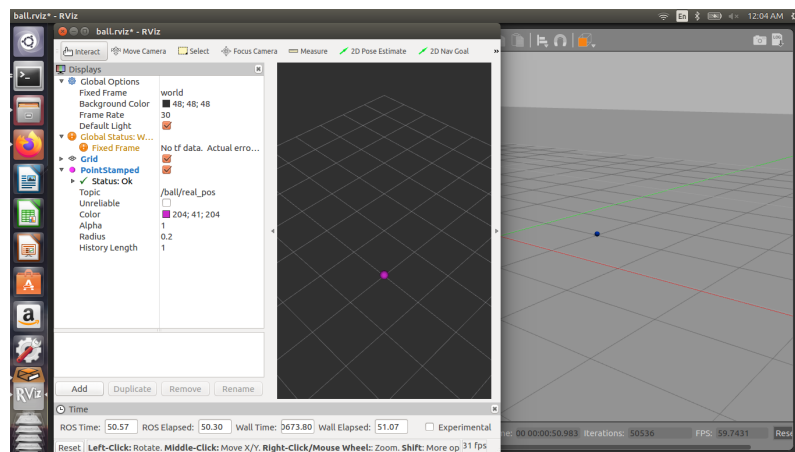


Figure 1: Real position of the ball in Gazebo is accessible to Rviz.

2 Multi-View System

progress:

1. Complete the setting of multi-view system by urdf.
2. Partly complete the ball_tracker plugin. It currently can track the ball in 2D image by segmenting color in HSV colorspace and get its 2D position by computing the centroid of blob.
3. Convert the images to proper message format so that we can use image_view to inspect the images (to compare the raw image with the binary image after color segmentation).

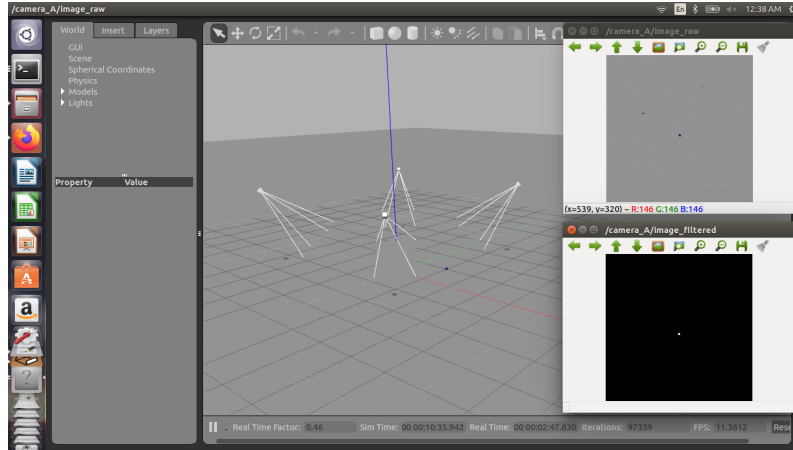


Figure 2: Multi-view system setting and the visualization of image message.

future work:

1. Might will add a denoising part to make sure the blob centroid computation robust to noise in binary image. (might not need to do this)
2. Need to consider synchronizing the multiple cameras.
3. Complete the triangulation part for 3D tracking.

3 Trajectory Prediction

progress:

1. Start to implement the trajectory prediction algorithm (with Kalman filter).
2. Still working on improvement with Kalman filter.

future work:

1. Plan to complete the trajectory prediction and correction part during next week.

4 Robot Arm Control

progress:

1. Implement and test inverse kinematics package for kuka lwr based on KDL Library.
2. Clean and integrate existing kuka arm packages.
3. Find and build existing ROS packages of Reflexxes Motion Libraries.

future work:

1. Add velocity control to the robot arm.
2. Synchronize the robot arm with the trajectory prediction node.

5 Summary

The implementation of KUKA robot control part goes well as planned. However, the progress of the camera (multi-view) part is a little slower than planned (the work is a litter harder than what we expect), so we need to speed up our implementation and plan to complete all the camera part (from tracking to trajectory prediction) during next week.