Task 7.3: Programming Familiarization Part 3 - ROS Libraries

Jiyoon Park (jiyoonp)

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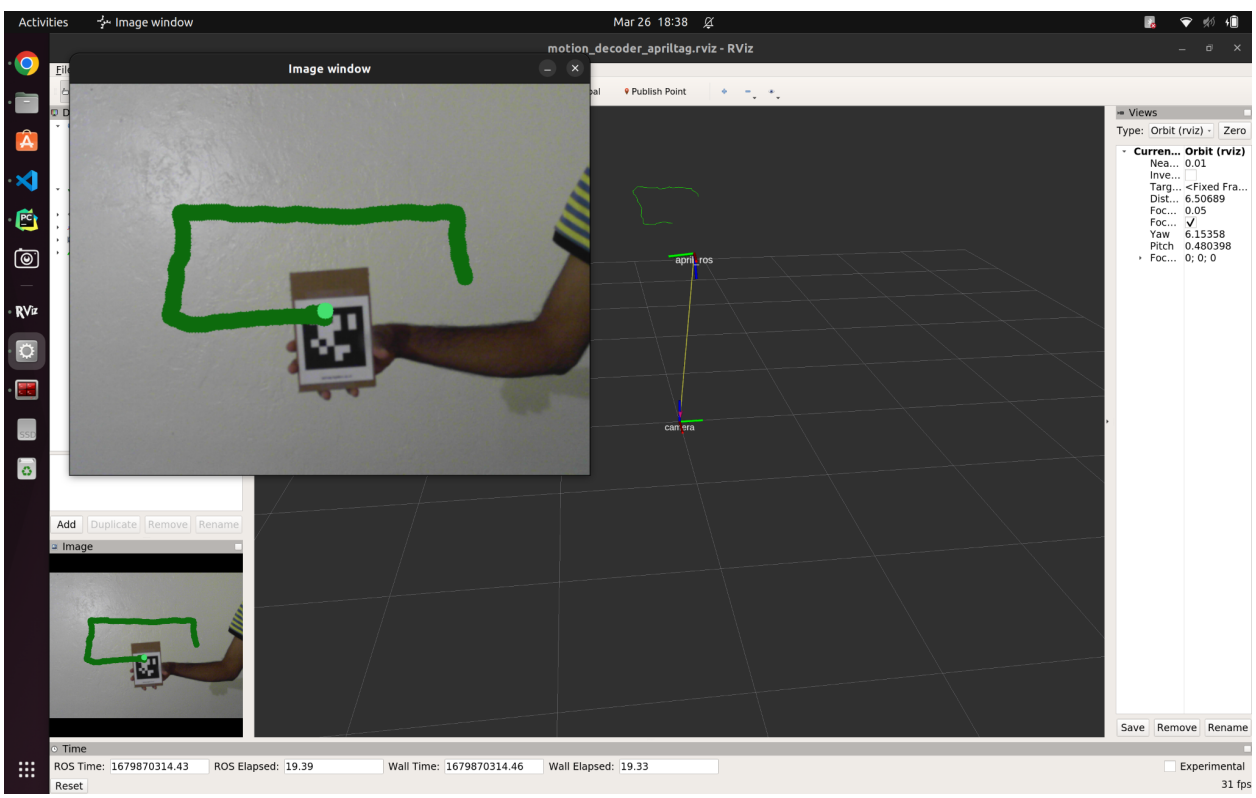
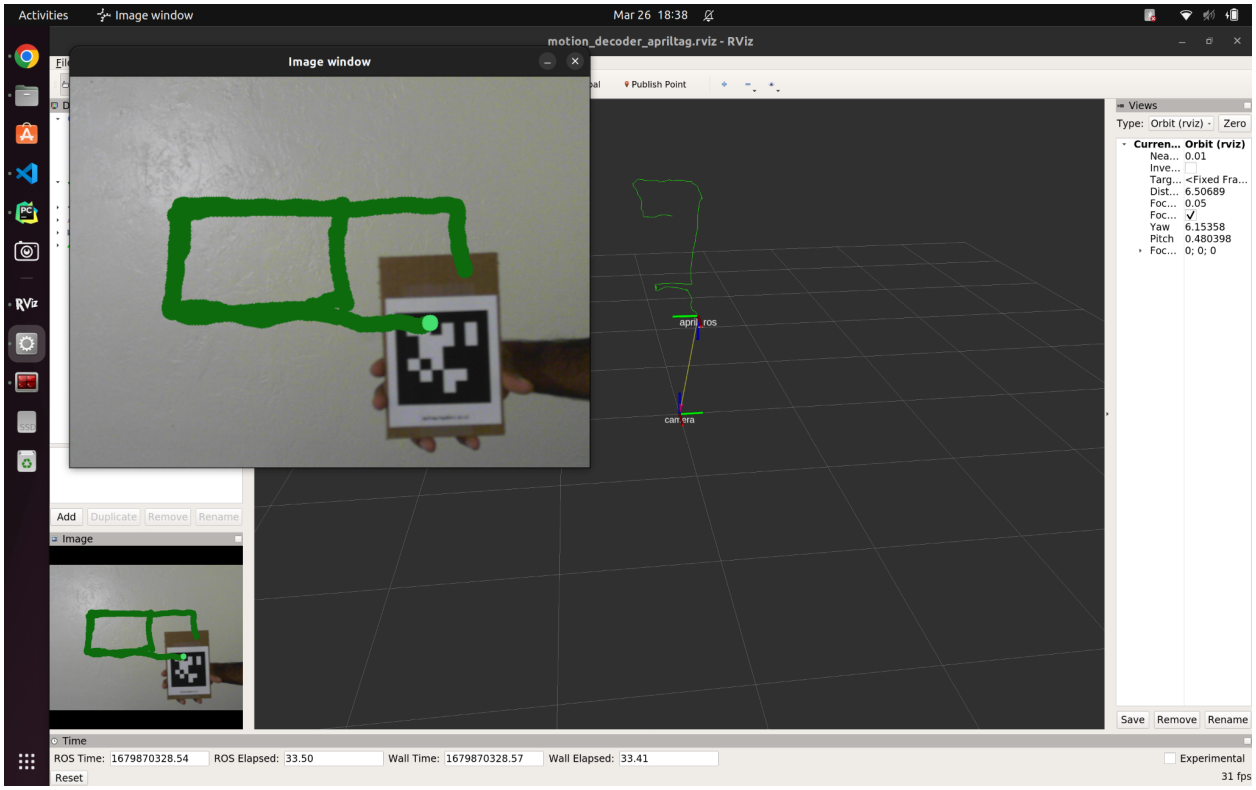
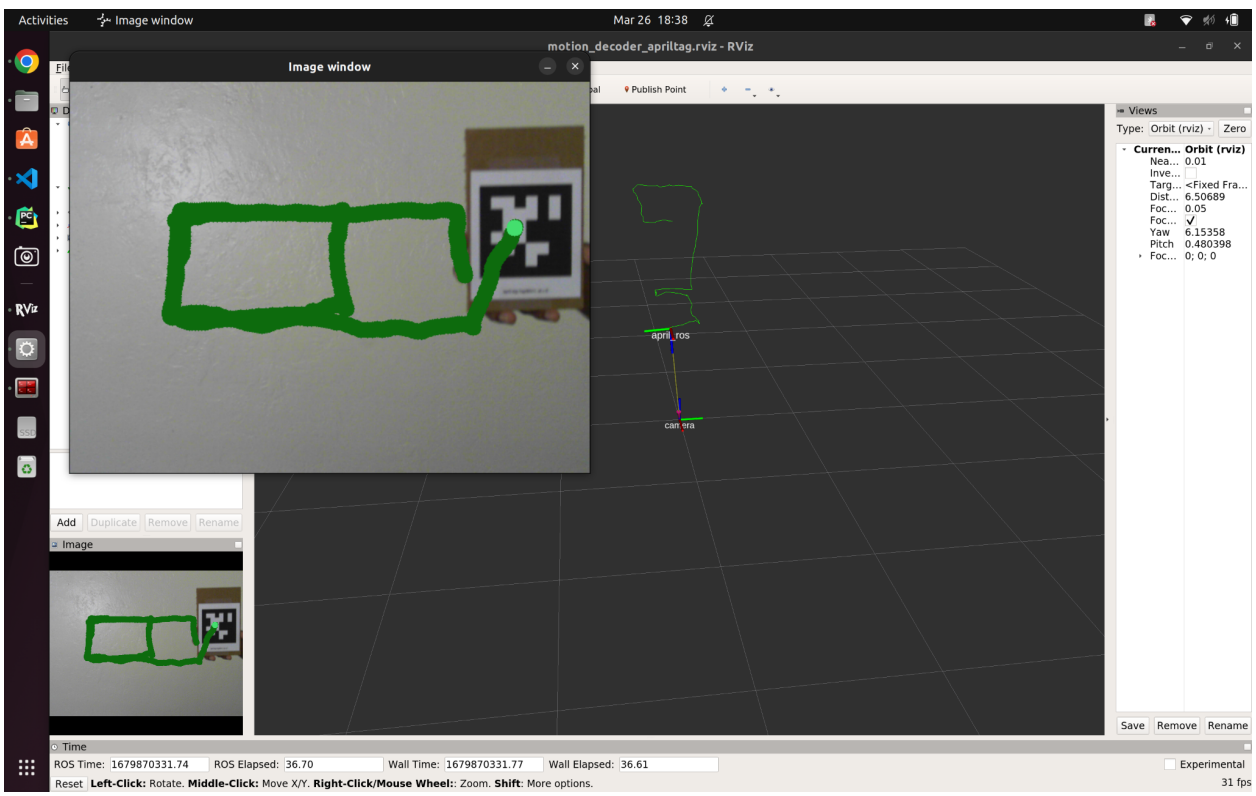
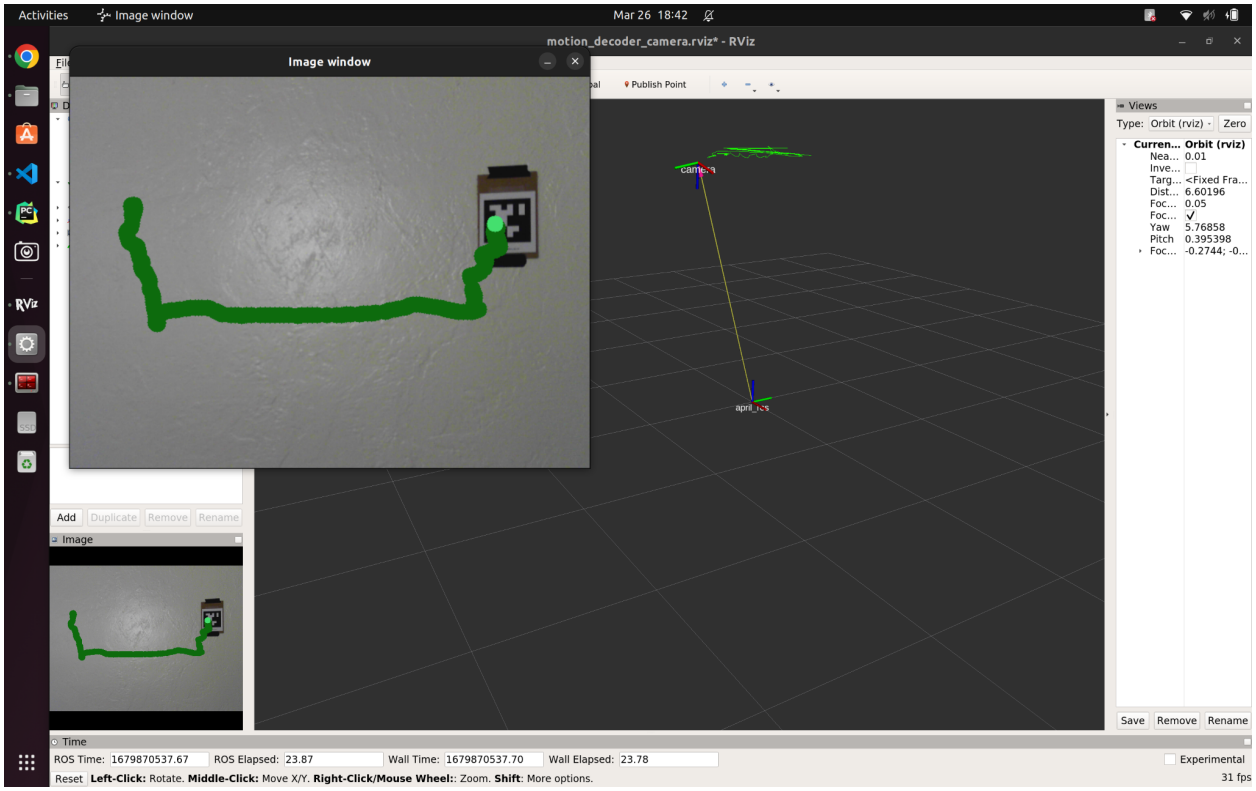
Apriltag moving green circles & rviz trajectory visualization: light green is the current circle and dark circles are the trajectories

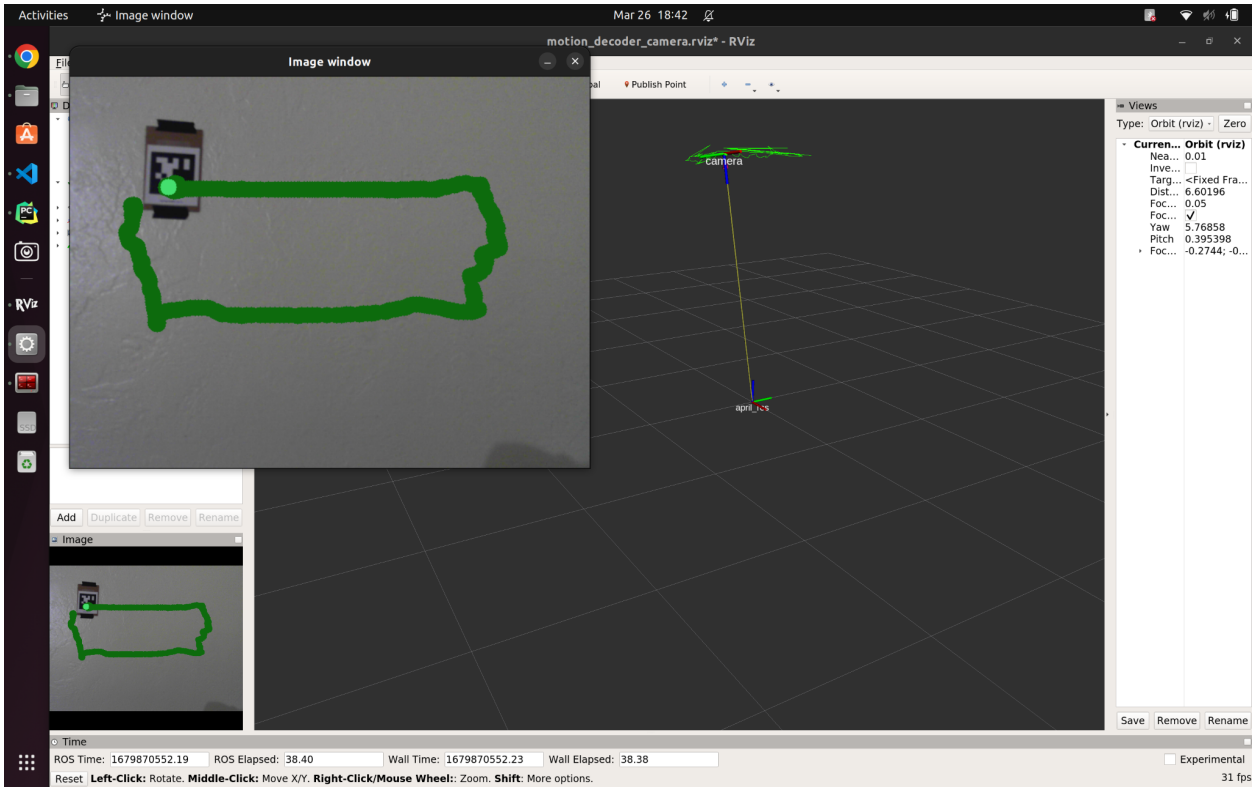


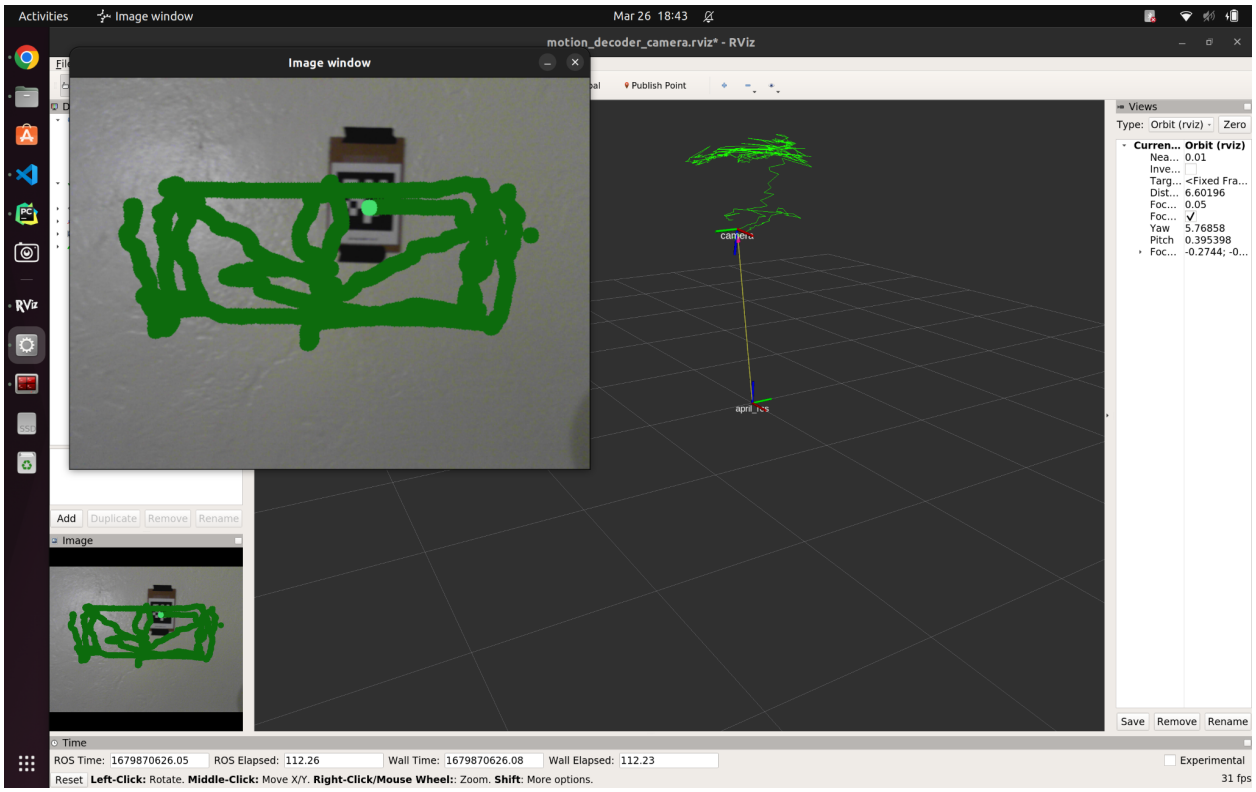

Activities
Image window
Mar 26 18:38
motion_decoder_apriltag.rviz - RViz
Image window
Publish Point
Views
Type: Orbit (rviz)
Zero
Curren... Orbit (rviz)
Nea... 0.01
Inve...
Targ... <Fixed Fra...
Dist... 6.50689
Foc... 0.05
Foc... ✓
Yaw 6.15358
Pitch 0.480398
Foc... 0; 0; 0
April_ros
cam_fra
Add
Duplicate
Remove
Rename
Image
Save
Remove
Rename
Time
ROS Time: 1679870328.54
ROS Elapsed: 33.50
Wall Time: 1679870328.57
Wall Elapsed: 33.41
Experimental
Reset
31 fps


Activities
Image window
Mar 26 18:38
motion_decoder_apriltag.rviz - RViz
Image window
Publish Point
Views
Type: Orbit (rviz)
Zero
Curren... Orbit (rviz)
Nea... 0.01
Inve...
Targ... <Fixed Fra...
Dist... 6.50689
Foc... 0.05
Foc... ✓
Yaw 6.15358
Pitch 0.480398
Foc... 0; 0; 0
April_ros
cam_fra
Add
Duplicate
Remove
Rename
Image
Save
Remove
Rename
Time
ROS Time: 1679870331.74
ROS Elapsed: 36.70
Wall Time: 1679870331.77
Wall Elapsed: 36.61
Experimental
Reset
Left-Click: Rotate. Middle-Click: Move X/Y. Right-Click/Mouse Wheel:: Zoom. Shift: More options.
31 fps

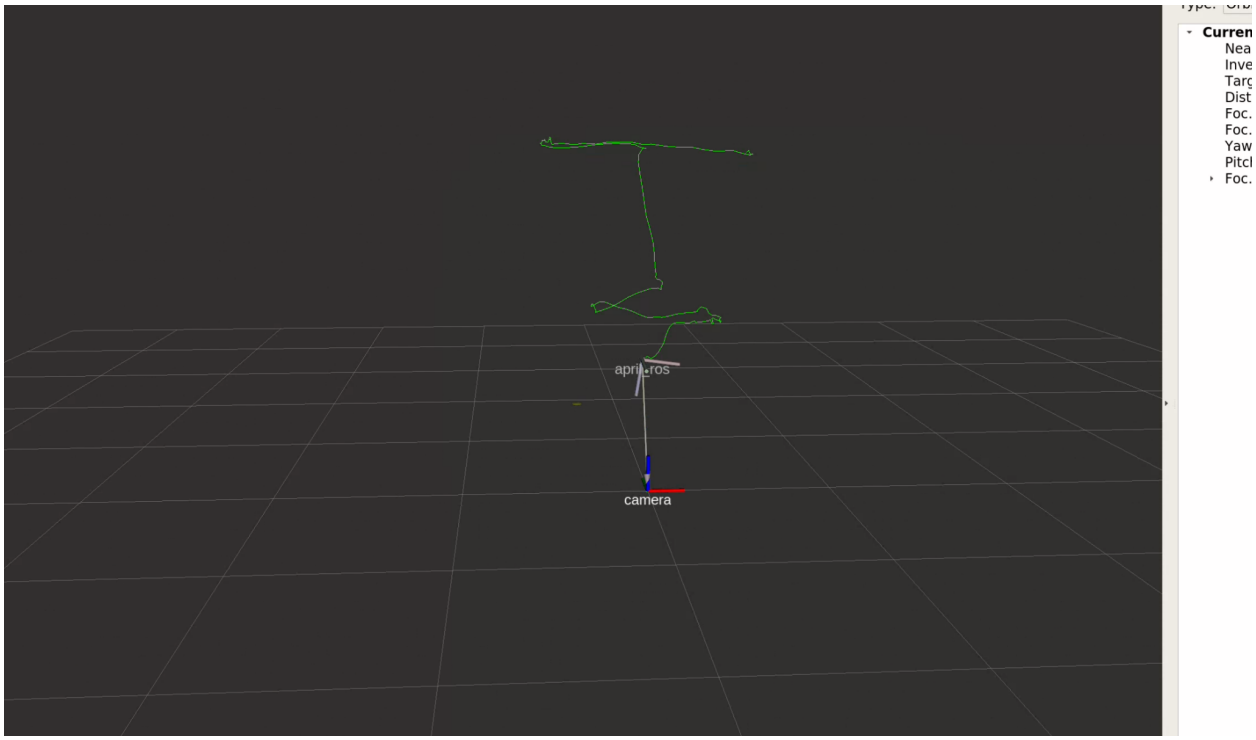
Camera moving green circles & rviz trajectory visualization: light green is the current circle and dark circles are the trajectories

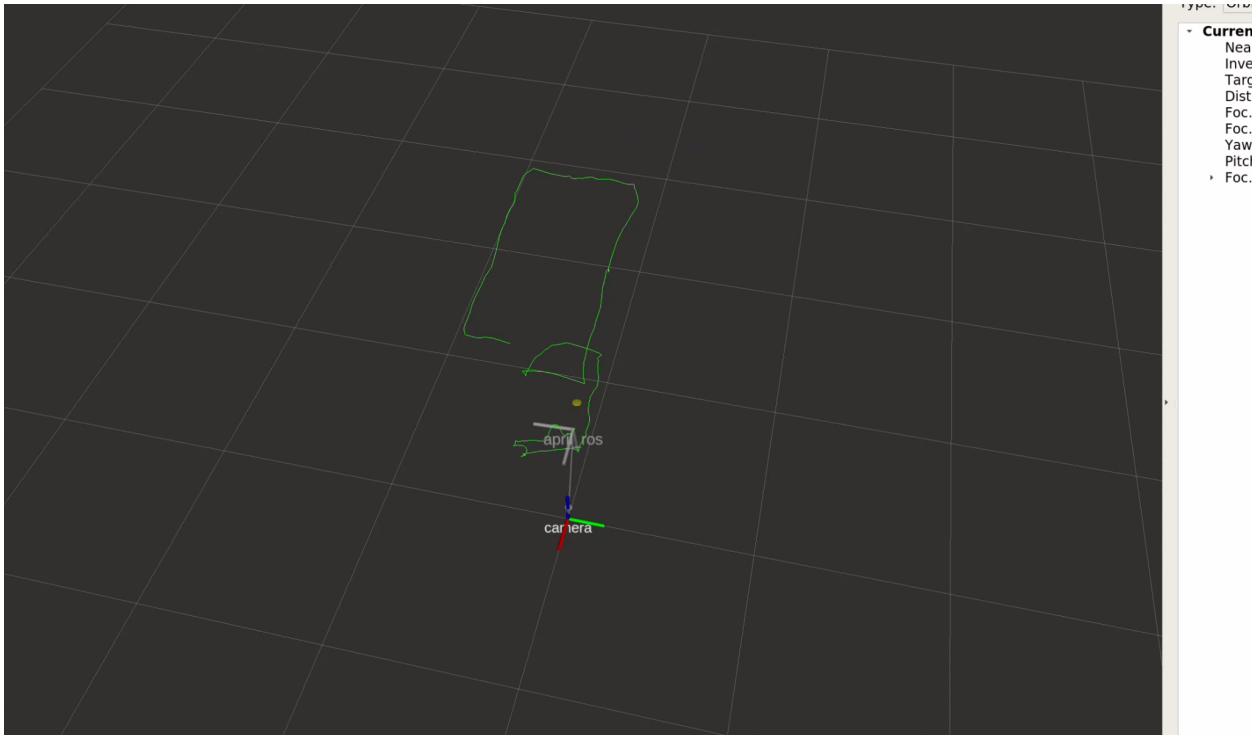


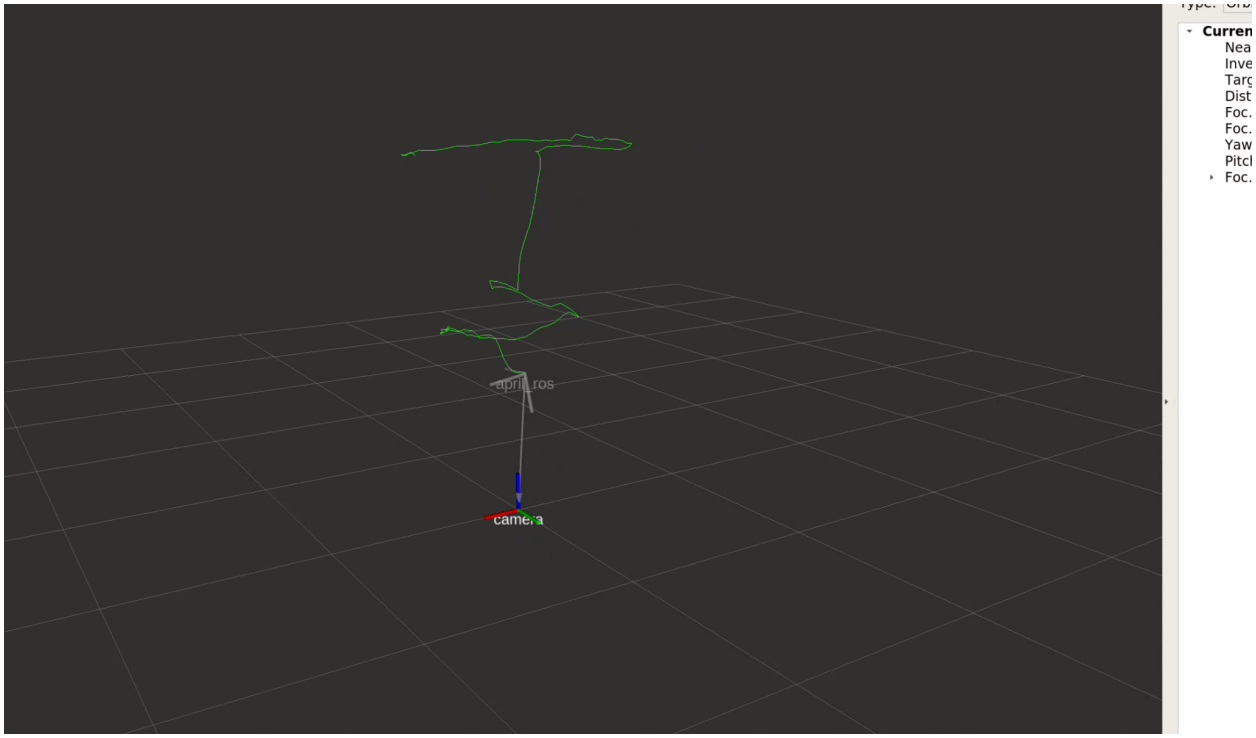



Activities
Image window
Mar 26 18:43
motion_decoder_camera.rviz* - RViz
Image window
Publish Point
Views
Type: Orbit (rviz)
Zero
Curren... Orbit (rviz)
Nea... 0.01
Inve...
Targ... <Fixed Fra...
Dist... 6.60196
Foc... 0.05
Foc...
Yaw 5.76858
Pitch 0.395398
Foc... -0.2744; -0...
camera
April_tcs
Add
Duplicate
Remove
Rename
Image
Save
Remove
Rename
Time
ROS Time: 1679870626.05
ROS Elapsed: 112.26
Wall Time: 1679870626.08
Wall Elapsed: 112.23
Experimental
Reset
Left-Click: Rotate. Middle-Click: Move X/Y. Right-Click/Mouse Wheel:: Zoom. Shift: More options.
31 fps

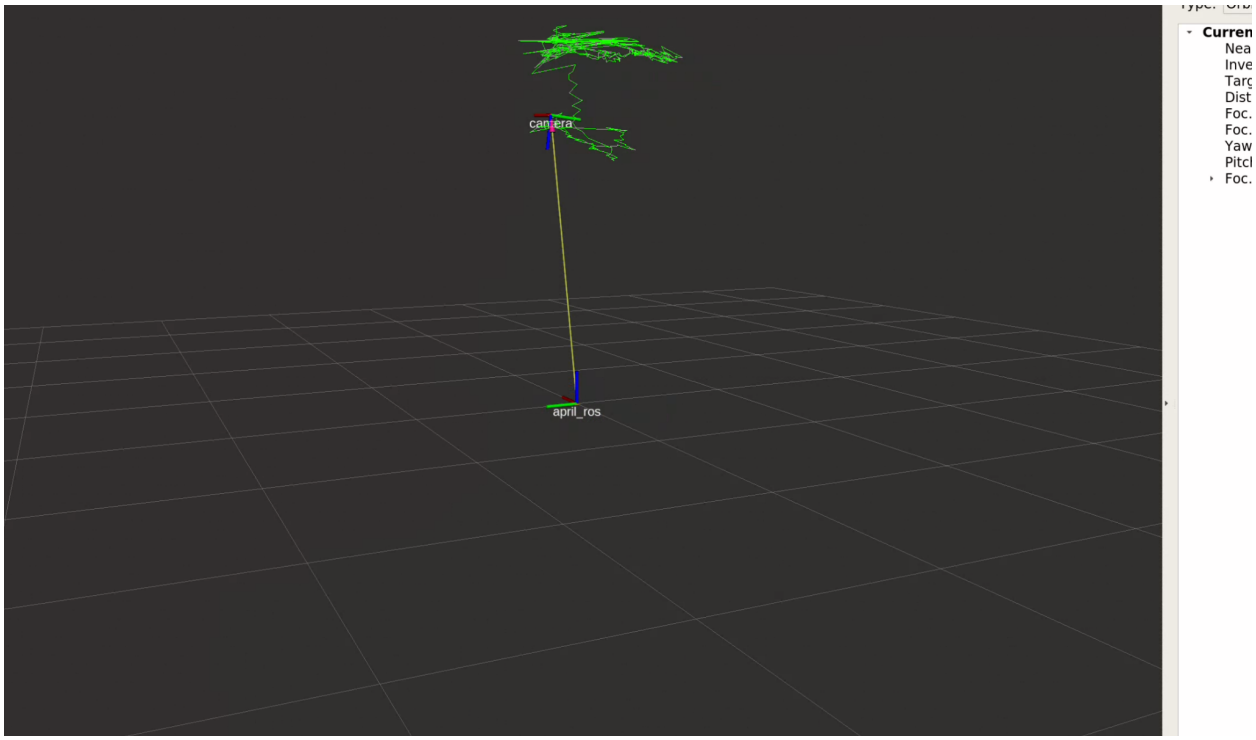
Apriltag moving rviz trajectory visualization result

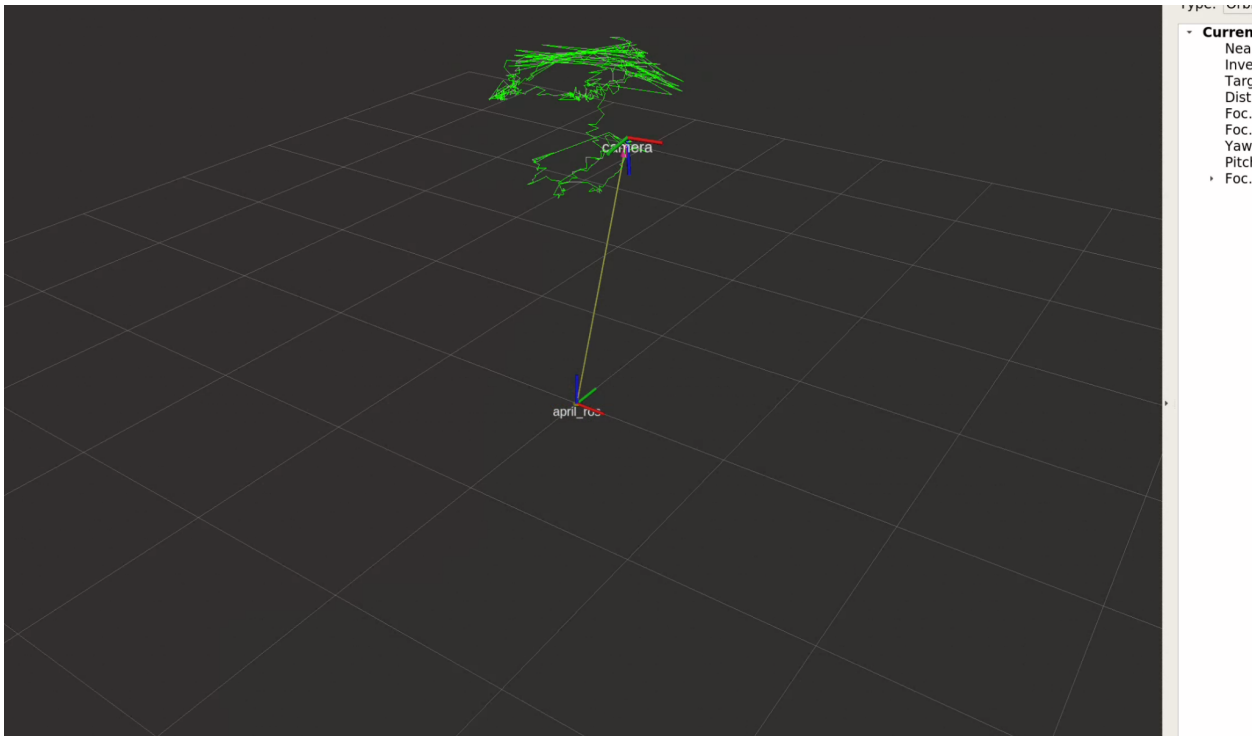


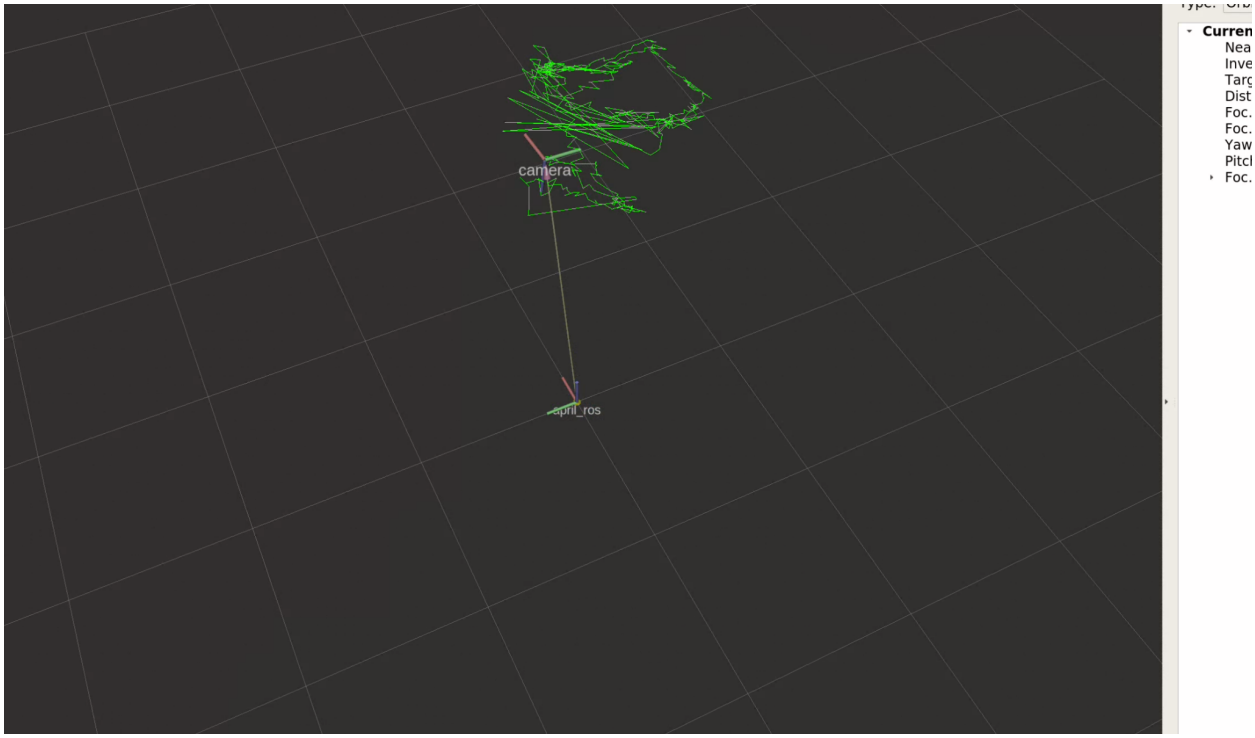


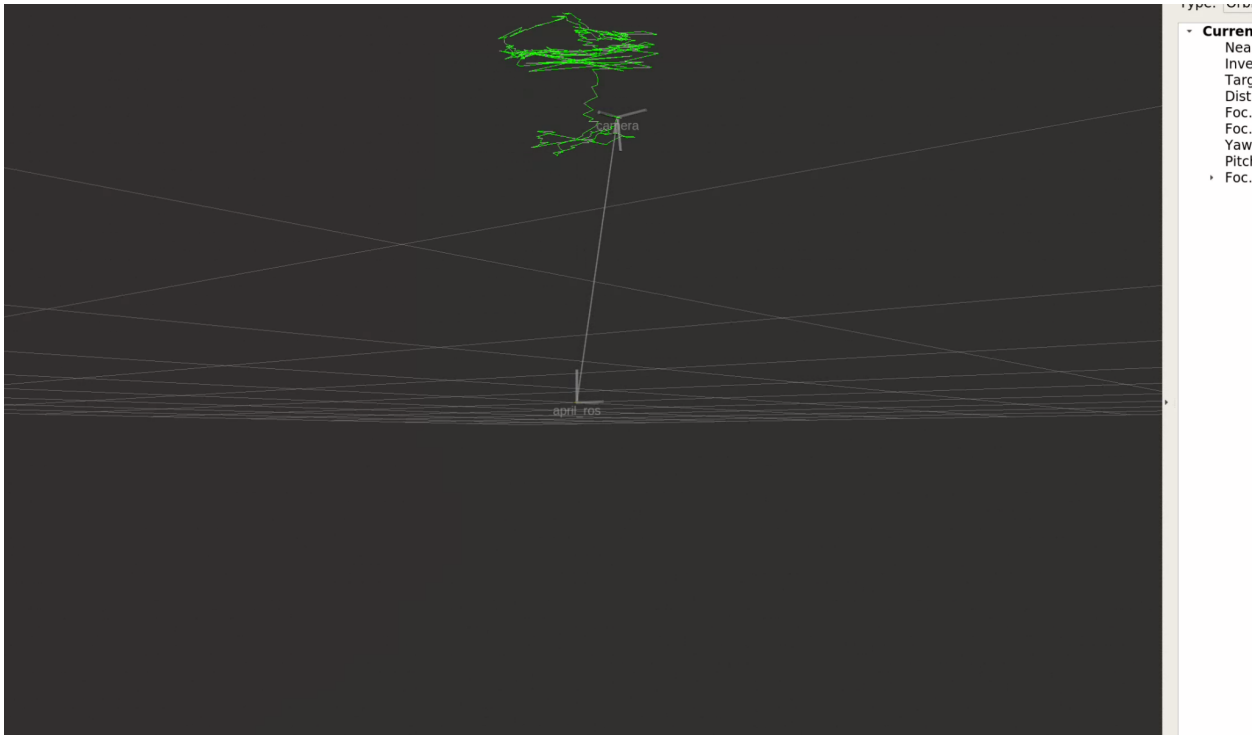

apriltag_ros
camera
Curren
Nea
Inve
Targ
Dist
Foc.
Foc.
Yaw
Pitch
Foc.

Camera moving rviz trajectory visualization result






camera
april_ros
Curren
Nea
Inve
Targ
Dist
Foc.
Foc.
Yaw
Pitcl
Foc.


camera
april_ros
Curren
Nea
Inve
Targ
Dist
Foc.
Foc.
Yaw
Pitcl
Foc.

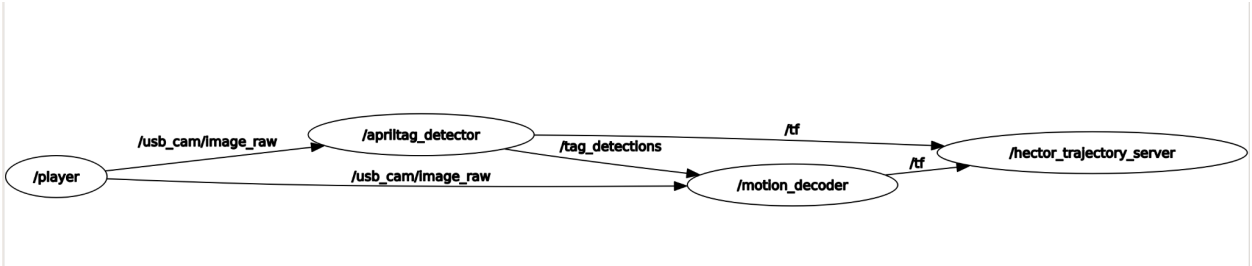
Short video clips of the end result. (Trajectories shown in RVIZ and the green circles drawn on the video feed inside rviz).

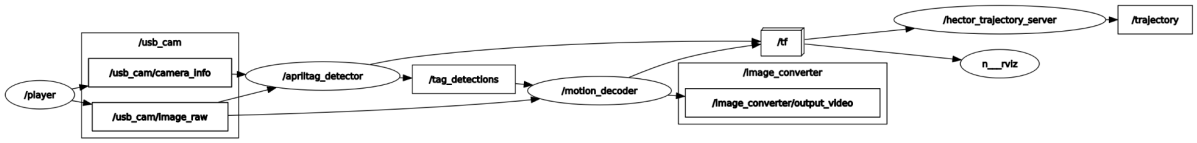
Apriltag results (the tf disappeared after it finished running so I took it before it ended)

Camera results (the tf disappeared after it finished running so I took it before it ended)

I am attaching the entire process video just in case.
Aptiltag entire running process video
Camera entire running process video

Rosgraph





How to use the package in my project?

In real life, this can be used to track where our robot is (assuming the robot has an april tag on it) in the camera frame. We can use the tf transformations too if we have many robots working in the same space. In our project in particular, we can have a april tag on the endeffector to track its position relative to the base camera.

How was this assignment?

This assignment was nice because it dealt with a lot of packages and was really hands-on. I learned a lot. The difficulty was also okay. However, there are a few things that need to change in terms of instructions as there were changes in the dependencies. I am adding my log here.

```
1. change apriltags_ros.launch
   <launch>
   <node pkg="apriltag_ros" type="apriltag_ros_continuous_node" name="apriltag_detector"
output="screen">
       <!-- Remap topic required by the node to custom topics -->
       <remap from="image_rect" to="/usb_cam/image_raw" />
       <remap from="camera_info" to="/usb_cam/camera_info" />

       <!-- Optional: Subscribe to the compressed stream-->
       <param name="image_transport" type="str" value="raw" />

       <!-- Select the tag family: 16h5, 25h7, 25h9, 36h9, or 36h11(default) -->
       <param name="tag_family" type="str" value="tag36h11" />
```

```
      <!-- Enable projected optical measurements for more accurate tag transformations -->
      <!-- This exists for backwards compatability and should be left true for new setups -->
      <param name="projected_optics" type="bool" value="true" />

      <!-- Describe the tags -->
      <rosparam param="standalone_tags">[
      {id: 0, size: 0.163513},
      {id: 1, size: 0.163513, frame_id: a_frame},
      {id: 2, size: 0.163513, frame_id: tag_2},
      {id: 3, size: 0.163513},
      {id: 4, size: 0.163513},
      {id: 5, size: 0.163513}]
      </rosparam>
   </node>
   </launch>
2. in apriltags_ros.launch change to

      <param name="tag_family" type="str" value="tag36h11" />
3. Change CMakefile and the cpp file: apriltags_ros to apriltag_ros
```

etc

I used apriltag_ros