

HW07 ROS Services

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ros2matlabPose.m

Set endEffectorAdjustment to zero.

Check how many inputs were given:

- If only one argument is provided, assume no frame or tool adjustments.
- Else If two arguments are provided, assume no tool adjustment, but possible frame adjustment.

End if

If tool adjustment flag is active

- Store the tool offset distance from the options dictionary into endEffectorAdjustment.

End if

If no frame adjustment is required

- Determine p's type to properly extract the position and orientation.
- Extract p's position and orientation accordingly.

Else

- Determine p's type to properly extract the position and orientation.
- Extract p's position and orientation accordingly.
- Add the endEffectorAdjustment to the z coordinate
- Rotate the orientation by -90° about the z axis.

End if

Combine the position and orientation into one output and return that value.

get_robot_object_pose_wrt_base_link.m

Retrieve robot handle r from optns dictionary.

Retrieve frame adjustment, tool adjustment, and z-offset values from optns options dictionary.

Display: “Get object pose from Gazebo...”

Use get_model_pose() to get world to robot (W_T_R) and world to model (W_T_M) pose.

Use ros2matlabPose() to convert ros poses to matlab poses and store it in mat_W_T_R, mat_W_T_M accordingly.

Compute mat_R_T_M by taking the inverse of W_T_R and matrix multiplying it by W_T_M.

Add the z_offset to the z position of the object to simulate grabbing from the top instead of the center of mass.

Replace the rotation of mat_R_T_M with a top-down rotation matrix, so it picks from the top.

If get_robot_gripper_pose_flag is set

use 'gripper_tip_link' as the end effector

else

use 'tool0' as the end effector

Try to use getTransform to get the transformation from 'base_link' to end effector and store it in current_pose.

If it fails, try again.

Convert the current_pose from ros to matlab using ros2matlabPose() and store it in mat_R_T_G.

mat_R_T_G (robot to gripper) and mat_R_T_M (robot to object) are returned from the function.

Transformations

```
"Base to tip Transform: "
1.0000  0.0025  -0.0037  0.0975
0.0025  -1.0000  0.0040  0.1339
-0.0036  -0.0040  -1.0000  1.0447
0          0        0      1.0000
```

```
"Base to Object Transform: "
-0.0000  1.0000  -0.0000  -0.0323
1.0000  0.0000  0.0000  0.7998
0.0000  0  -1.0000  0.0483
0          0        0      1.0000
```

Youtube link: <https://youtu.be/6oGZ-MF4Pyl>

Github Repo link:

https://github.com/Hermenamikhael/matlab_ros_support/tree/7e1081affd756535a3cf7a68d2abb7be164ec1e0/hw/hw08_get_matlab_goal_pose