TIAGo Training Sessions

Gripper control

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Introduction

TIAGo T.S.

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Gripper specifications

- The gripper is composed of 2 motors, each one controlling one of the fingers

Joint name	Range	Open	Closed
gripper_left_finger_joint	[0, 0.04]	0.04	0.0
gripper_left_finger_joint	[0, 0.04]	0.04	0.0

Gripper joystick mapping

- The gripper can be open and closed with the joystick

Gripper trajectory controllers (I)

- Topic interface:

  /gripper_controller/command trajectory_msgs/JointTrajectory

```
rostopic pub -1 /gripper_controller/command trajectory_msgs/JointTrajectory "header:
  seq: 0
  stamp:
        secs: 0
        nsecs: 0
  frame_id: ''
joint_names: ['gripper_left_finger_joint', 'gripper_right_finger_joint']
points:
- positions: [0.015, 0.015]
  velocities: []
  accelerations: []
  effort: []
  time_from_start: {secs: 1, nsecs: 0}"
```

Gripper trajectory controllers (II)

```
rostopic pub -1 /gripper_controller/follow_joint_trajectory/goal control_msgs/FollowJointTrajectoryActionGoal "header:
  seq: 0
  stamp: { secs: 0, nsecs: 0 }
  frame_id: ''
goal_id:
  stamp: { secs: 0, nsecs: 0 }
  id: ''
goal:
  trajectory:
                header:
                seq: 0
                stamp: { secs: 0, nsecs: 0 }
                frame_id: ''
                joint_names: ['gripper_left_finger_joint', 'gripper_right_finger_joint']
                points:
                -
                positions: [0.0, 0.0]
                velocities: [0.0, 0.0]
                accelerations: []
                effort: []
                time_from_start: { secs: 0,  nsecs: 500000000 }
                -
                positions: [0.03, 0.03]
                velocities: [0.0, 0.0]
                accelerations: []
                effort: []
                time_from_start: { secs: 1,  nsecs: 0 }
                -
                positions: [0.0, 0.0]
                velocities: [0.0, 0.0]
                accelerations: []
                effort: []
                time_from_start: { secs: 1, nsecs: 500000000 }
  path_tolerance: []
  goal_tolerance: []
  goal_time_tolerance: { secs: 0,  nsecs: 0 }"
```

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Action interface:

/gripper_controller/follow_joint_trajectory control_msgs/FollowJointTrajectoryAction

Parallel gripper controllers

- Topic interface:

/parallel_gripper_controller/command trajectory_msgs/JointTrajectory

/gripper_controller/follow_joint_trajectory control_msgs/FollowJointTrajectoryAction

```
rostopic pub -1 /parallel_gripper_controller/command trajectory_msgs/JointTrajectory "header:
  seq: 0
  stamp:
          secs: 0
          nsecs: 0
  frame_id: ''
joint_names:
- 'parallel_gripper_joint'
points:
- positions: [0.08]
  velocities: []
  accelerations: []
  effort: []
  time_from_start: {secs: 1, nsecs: 0}"
```

This is the distance between fingers

Gripper current limit controller

- Topic interface to change the current limits:

  /gripper_current_limit_controller/command pal_control_msgs/ActuatorCurrentLimit

  Ex.: set max current to 5%

```
rostopic pub /gripper_current_limit_controller/command pal_control_msgs/ActuatorCurrentLimit
"actuator_names: ['gripper_left_finger_motor', 'gripper_right_finger_motor']
current_limits: [0.05, 0.05]"  --once
```

- Topic interface to query the current limits:
  /gripper_current_limit_controller/state pal_control_msgs/ActuatorCurrentLimit

```
rostopic echo -n 1 /gripper_current_limit_controller/state

actuator_names: [‘gripper_left_finger_motor’, ‘gripper_right_finger_motor’]
current_limits: [0.05, 0.05]
```


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Gripper grasping

- Service interface

  /gripper_controller/grasp std_msgs/Empty

  This service makes the gripper close the fingers until a grasp is detected.

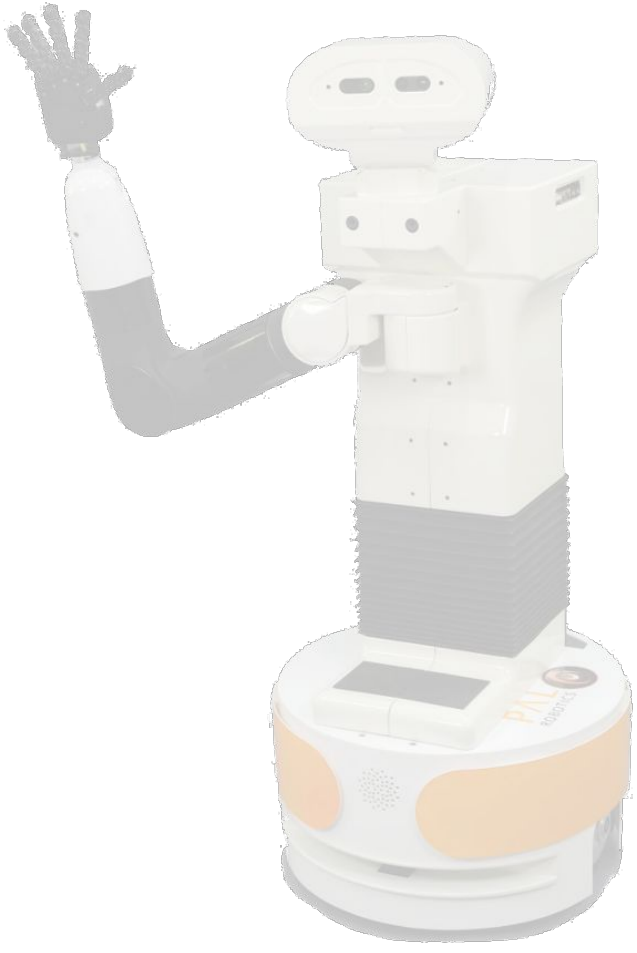
  When that happens the controller keeps the fingers in the position reached at that moment in order to hold the object and not overheating the motors

  rosservice call /gripper_controller/grasp

Gripper fingers

- New fingers can be attached

Questions?



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