

CS-7630 Autonomous Robotics

Homework – Useful tools

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Office hours: 10:00 to 18:00.

In this homework, we will complete two elements that will be useful for the final project:

- SLAM aided occupancy mapping
- Charging station docking

Step 1: SLAM-aided occupancy mapping

The Costmap2D package is documented here: http://wiki.ros.org/costmap_2d/Tutorials/Configuring%20Layered%20Costmaps

The tb_slam package in /cs_share/pradalier/vrep_ros_ws/src contains a costmap.launch launch file to get you started.

For cost map to work, your own slam system should be configured properly and working. This is the objective of this first stage.

To evaluate this first stage, use Costmap2D and your marker-supported SLAM to build a map of the GTL floor (not the computer lab).

Step 2: Charging station docking

The Turtlebot is somewhat able to automatically dock on its own charging station. This is documented here: <http://wiki.ros.org/kobuki/Tutorials/Automatic%20Docking>

However, the documentation only provides a launch file. Your goal is to create your own task (remember the task system from the control homework...) and associated mission to call activate automatic docking and handle failures.

To test it, create a mission that starts from the docking station, undock (reverse 1m using GoToPose), move a little bit, then come back to a position where the turtlebot can see the docking station and activate docking.

Alternatively, you can use your control tasks to implement the docking based on the turtlebot position you estimate from the SLAM layer.