Introduction to Robot Intelligence (CSCI-UA 480-073) Homework 4

Instructor: Lerrel Pinto

October 24, 2024

Submission Instructions

This project is due on **November 7, 2024, 11:59 PM**.

This is a hardware project. Submit a video showcasing the robot completing the specified task, and your solution code. The video should be roughly 60-90 seconds.

One member from your team must upload them on the course Gradescope **as two separate files**, with the video in `.mp4` and code in `.py` or `.zip` format. **You will be graded together as a team for all the robot homeworks. Include NetIDs of all team members in the submission.**

Project: Localization and State Estimation

In this project, we will program the rover to autonomously follow a course.

- Choose a simple 2D course for the rover to follow (square, circle, etc.)
- Your rover should follow the designated course autonomously. You can use the LIDAR, camera, and motor encoders on the robot to achieve this.
- Pick up the rover and put it down nearby, away from the course. It should correct itself and return to the designated course.

Extra Credits (10 points)

Complete this project without using LIDAR.

Resources

1. LIDAR documentation
2. Course follower
3. Interfacing SlamTec LIDAR with Raspberry Pi

Grading

- (25) **Video**: In your video, show a live onboard camera view on the left, and an overhead view on the right. Follow this example video.
- (30) **Course following**: Clearly show that the rover can autonomously follow a designated course. You will be graded on the course following quality and robustness.
- (45) **Perturbation recovery**: Pick up the rover and put it down nearby, away from the course. Clearly show that the rover can return to and resume the original course. You will be graded on the robustness and efficiency of the recovery.
- **Do not plagiarize.** All teams involved in plagiarism will be penalized.