MRC 2023 Navigation Assignment 2

This assignment is about safe navigation on a real robot. The goal is to let the robot move 5 meters through a corridor without colliding with obstacles that are not known in advance.

Setup

For this assignment, you can use the same setup as for the exercise 'The art of not crashing' in week 1. A lot of the code, such as for obtaining laser, odometry and bumper data, can be reused here.

Assignment

Position the robot at the start of a 1-2 meter wide corridor. In this corridor, there are obstacles that are not known by the robot in advance, but can be detected by the robot's laser.

The challenge is to move 5 meters through the corridor without collisions. Slightly touching the walls or obstacles is allowed, however, bumping (i.e., driving head-on into a wall) is not allowed.

Implement your solution to tackle this challenge. The approach can be inspired by the methods explained during the lecture, methods you find in literature or online, or ideas that you come up with yourself, it's all fine if you can explain how it works.

Testing

Test your code both in simulation and on the real robot. Create your own corridor (in the simulator and for the real robot) with obstacles and let the robot move through the corridor while avoiding the obstacles. If your solution works on the real robot, also try to walk through the corridor yourself while the robot is on its way and see how it reacts to you!

Submission

Upload on your group's GitLab page:

- Code with comments/documentation

And on your group's wiki page:

- A description of the main idea behind your approach
- Screen recordings of the simulation results
- A video of the robot's performance in real life