Chair of Computational Modeling and Simulation
TUM School of Engineering and Design
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Autonomous Navigation with the Go1 Robot

Autonomous navigation is one of the most critical tasks in deploying mobile robots everywhere. To address these challenges, your task is to implement a system that allows a Go1-legged robot to autonomously navigate in a small environment, detecting target elements in certain locations.

Project Characteristics

Modeling:
Mathematics:
Programming:
Science:

Task

1. **Getting familiar with a robotic simulation environment and the available Go1 setup.**
2. **Simulate the Autonomous navigation with the robot;** this includes localization, path planning, and obstacle avoidance. [1]
3. **Detection of objects of interest** related to construction (e.g., bricks or given QR codes) [2].
4. **Experimental validation with the real robot.**

Figure 1: Real Go1 with a mapping system.

Optional:

- Add an arm manipulator over the simulated robot. [3]

Figure 2: Simulated Go1 with a mapping system in Gazebo.

[1] Legged Autonomous Inspection | Nicolas G. Morales 2024. Website. GitHub.
[2] GitHub - pietrolechthaler/UR5-Pick-and-Place-Simulation: Simulate the iteration of a UR5 robot with Lego bricks
[3] Fu, Zipeng, Xuxin Cheng, and Deepak Pathak. "Deep whole-body control: learning a unified policy for manipulation and locomotion." Conference on Robot Learning. PMLR, 2023. https://manipulation-locomotion.github.io/

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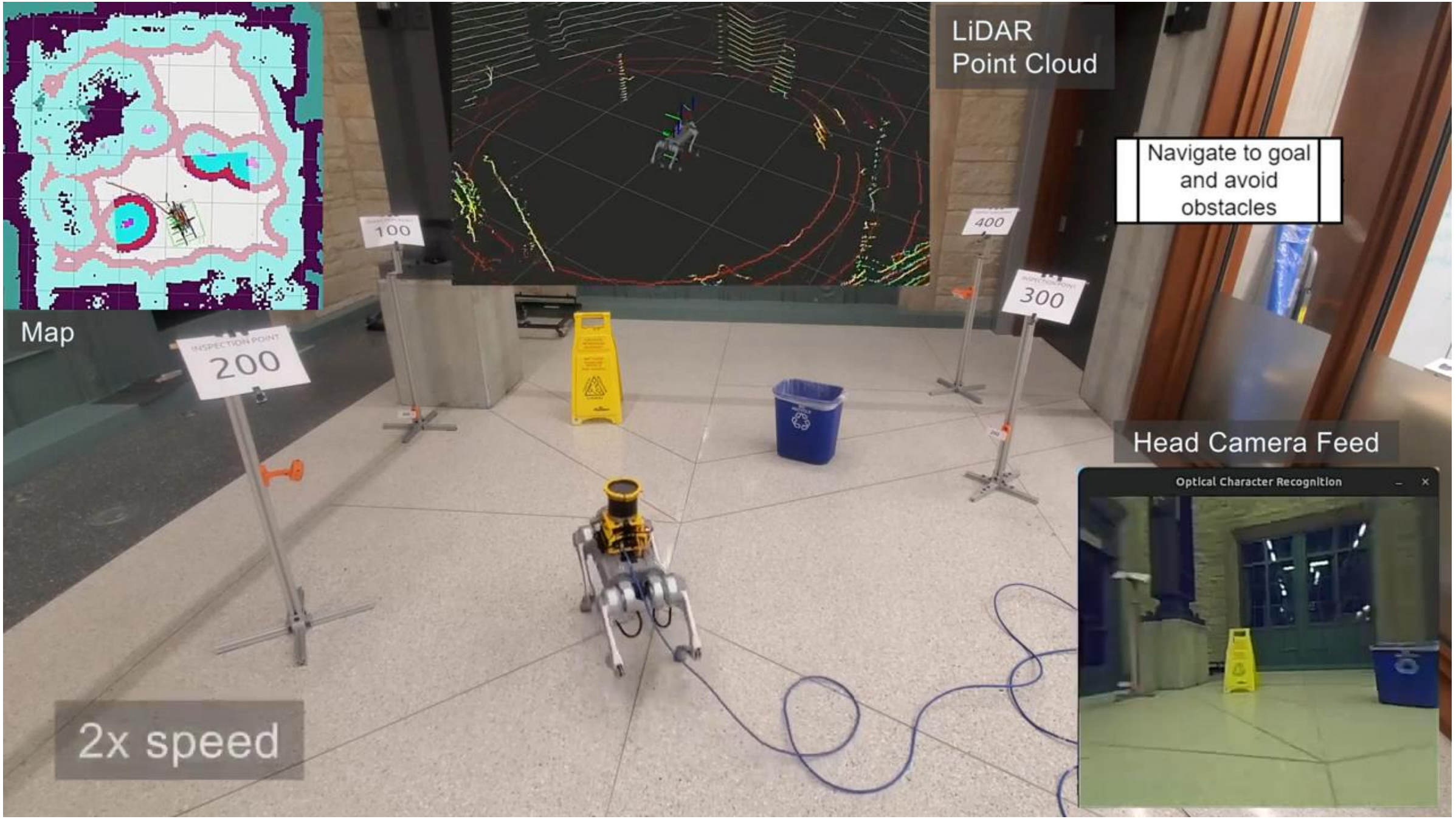

[1] Legged Autonomous Inspection | Nicolas G. Morales 2024. [Website. GitHub.]