Homework 5

Intro to Robotics

(Due 11:59 pm, December 4, 2022)

Write a report on designing a robotic system to solve the service tasks in Robotic Grasping and Manipulation Competition (RGMC). The description of the tasks is at https://rpal.cse.usf.edu/rgmc_icra2022/Competition-Task-Service.pdf

Your report should include:

- Robotic system schematic drawing (10 pts). The drawing should include all necessary hardware components such as robots and sensors and where they should be positioned.
- Selection of robots, gripers, and sensors (20 pts). Provide a list of selected hardware in detail and the rationale of your selection.
- Software architecture schematic drawing for three of the six tasks (20 pts). Provide the detailed components of your software architecture and how they are connected. It may include data collection, training, and other things.
- Provide running flowcharts of your software for three of the six tasks (30 pts). It should include all steps such as perception, motion planning, trajectory generation, and error handling.
- List of ideas (10 pts). Provide a list of five ideas you have learned from the existing solutions who in the videos at https://www.youtube.com/channel/UC8F4S4EjTAo2JbwdzbyKnCA/videos
- List of challenges you anticipate (10 pts). Provide a list of five challenges you anticipate your robotics system will not be able to overcome.

More information about challenges and solutions can be found in this paper https://ieeexplore.ieee.org/document/9619964 . The homework will be discussed regularly in class.

Submit your report as a PDF file. In the report, indicate if you want to tour the Robot Perception and Action Lab and run your HW4 code on the UR5e robot. Students with satisfactory scores will be invited.