CS6301 Introduction to Robot Manipulation and Navigation Project Presentation and Final Report

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1 Presentation

The project presentations will be held on 12/4 and 12/6. The assignments of the groups are

- 12/4, Monday, Groups: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
- 12/6, Wednesday, Groups: 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

The list of projects:

- Group 1: Semantic Exploration and Mapping of Unknown Environments for Mobile Robots
- Group 2: GOAT: Autonomous Weed Detection and Removal System
- Group 3: Robotic Arm: Shape-Based Object Recognition and Manipulation
- Group 4: Autonomous Sorting of Trash Objects Based on Structure using Gazebo Robot Simulation
- Group 5: Language Guided Manipulation
- Group 6: Development of a Robotic System for Efficient Item Delivery in Healthcare
- Group 7: Language Guided Manipulation System
- Group 8: MediAssist: Robotic Medication Companion for Elderly Care
- Group 9: Image-Recognition Based Robotic Arm Screw System
- Group 10: RoboServe: An Autonomous Food-Serving Robot with Mobile Manipulation
- Group 11: Pitcher This: A ROS-Based Robotic Arm for Autonomous Baseball Picking
- Group 12: GraspBot Navigator
- Group 13: Reinforcement Learning for Targeted 3D Object Top-Down Grasping with Emphasis on Selective Shape Manipulation
- Group 14: The Autonomous Navigator and Object Grasper

- Group 15: Reinforcement Learning for Vision-based Robot Grasping
- Group 16: From Speech to Actions: Speech-based Robot Manipulation and Navigation System using Natural Language Processing
- Group 17: Autonomous Kitchen Assistant: Prototype for Model Based Grasping
- Group 18: Large Language Model Based Virtual Robot Pick-Place Manipulation
- Group 19: Object Selection from Table: A Multimodal Approach Using Text Input
- Group 20: Training Robots for Object Grasping

Each group has 6 minutes for the presentation and questions. Please use slides to describe your project, and show a demo of the project if you have one.

Make sure you practice your presentation beforehand. A timer will be used. You will have to stop the presentation if you run over 6 minutes.

Evaluation criteria: The grading will be based on the overall quality of the presentation in terms of content, clarity, and question answering.

2 Final Report

The project final report should be prepared using the the ICRA double column latex format. A useful online LaTex tool is Overleaf `https://www.overleaf.com/`. We have the ICRA latex template accessible here via overleaf: `https://www.overleaf.com/read/rwmhwnwjkrmc`. You can download a copy of the template or make a copy in overleaf for your own project, and then edit it.

In this project final report, please describe the following items according to your project:

- **Title**. The title of your project.
- **Team Members**. List the names of the team members.
- **Abstract**. Give an overview of the project.
- **Introduction**. Describe the motivation of the project, i.e., why do you want to work on this problem. Then describe an overview of the framework/method/system.
- **Related Work**. Discuss the related work of your project.
- **Method**. Describe your solution for the project. For example, describe each component of the framework in details. Try to use figures to illustrate the method instead of only using text. "A picture is worth a thousand words".
- **Experiments**. In this section, you can first describe the simulation environments or datasets and evaluation metrics. Then describe what experiments you have done for the project by adding experimental results to the report. Use figures and plots to show these results.
- **Conclusion**. Describe the take-home messages of the project and conclude the report.
- **References**. Cite related works in the report.

Evaluation criteria: The grading will be based on the overall quality of the report in terms of writing, content and clarity.

Minimum page requirement: 4 pages. The report should be at least 4 pages with the ICRA format (excluding references, i.e., without references, the content should be at least 4 pages). You can go beyond 4 pages, but make sure it is less than 6 pages (excluding references).

An example ICRA paper: you can check the structure of the following paper for reference `https://yuxng.github.io/Papers/2020/meng_icra20.pdf`.

3 Project Submission

Please submit the following items to eLearning. You can zip all the files.

- (Required) Final report in pdf format
- (Required) Presentation slides in pdf format (Do not have UNet IDs in it for releasing online)
- (Required) Source code of your project
- (Required) A demo video in mp4 format