CS4910: Deep Learning for Robotics

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T/F, 3:25-5:05pm
Behrakis Room 204

https://www.ccs.neu.edu/home/dmklee/cs4910_s22/index.html

https://piazza.com/northeastern/spring2022/cs4910a/home

Double check that the wiring is good on your robot

Rotate joints by hand in both directions, make sure that there is no pinching or strain placed on wires

Final Project

Do **interesting** work in deep learning with an application to robotic manipulation

What you should consider when choosing a project

1. Is the project of interest to me?
2. Can I reasonably complete the project (e.g. generate compelling results) by the end of the semester?
3. Will I be working on a novel problem or approach?
4. Is there a way I can integrate the xArm into the work?
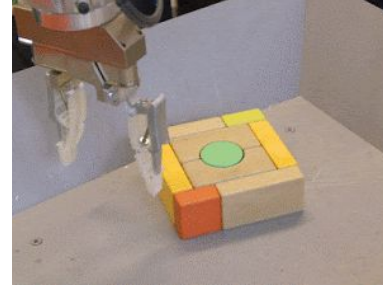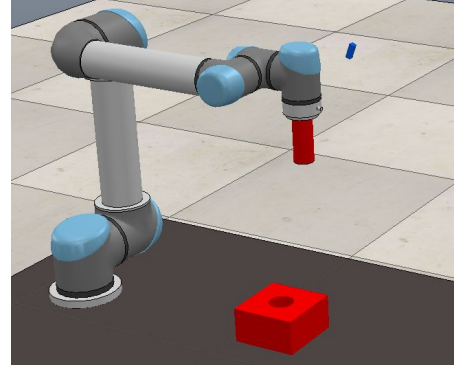
Example Projects

Top-Down Grasping of Novel Objects

Predicting Depth Image from RGB images

Learning to push objects

Game-playing agent

Peg-insertion

Project Deliverables

Project Quick Pitch [Feb 22]

Project Proposal [March 1]: 1 page; briefly describe problem, method(s), datasets/simulator set-up; request additional sensors/robots; list any anticipated challenges

Project Milestone [TBD]: 1-2 pages; assess progress and major difficulties; make prediction about what final result will be achieved

Google site [last day of class]

- Problem description, proposed method, results and discussion
- Plots of results
- Videos or images generated by method
- Release code (especially for running on robot)

Quick Project Pitch [Tuesday Feb 22]

Think of what projects/methods you want to work on. Identify one that you can present to the class. We will discuss the idea together and try to flesh out the details of how to approach the problem and formulate it into a concrete project proposal.

When brainstorming ideas, consider:

- What datasets or RL env would be used?
- What methods could be explored?
- What metric would be used to evaluate success?

The course going forward

Tuesdays: Special Topics Lecture

45 min presentation
45 min demo or paper discussion

Fridays: In-class Working

Week A [Optional]:
Ask questions, work with teammates

Week B:
- 5min progress reports on each project
- Provide feedback to each other
- Peer code reviews?

Special Topics

- RL with Continuous Actions
- Grasp Mechanics and Planning
- Learning from Demonstrations
- Symmetry in Neural Networks
- Transfer Learning
- Self-supervised Learning
- Goal-Conditioned RL
- Real-world Data Collection
- Overcoming the Sim2real Gap
- ...other robotics topics
- ...computer vision topics

On the horizon

Next Tuesday:

- HW3 questions
- Project Quick Pitches
- Example Project Walk-through

Next Friday:

- Special Topic Lecture

Survey to provide feedback

https://forms.gle/ixzfm7x54cbxaxoF7