

CSE 571 - Robotics

Open-ended Project

1 Description

The open-ended project can be an implementation/application of state-of-the-art algorithms to novel robotics problems, or an algorithmic contribution to current state of the art. Project will be completed in teams of two to three. You are free to come up with your own project ideas and use your preferred simulation environment (subject to approval).

2 Deliverables

The proposal and mid-progress report will be hosted on a Google Doc. For the final report, you will submit a PDF so that you can use Latex.

Proposal [1 page] The proposal should include:

- The team members working on the project and each team member's experience.
- A paragraph summarizing the proposed project. Specify what simulation environment or frameworks you are going to use. The instructor/TAs will provide feedback to help guide you.
- A rough timeline with a list of milestones.

Mid-Progress Report [1-2 pages] A progress report of successes and unforeseen problems. If the timeline/project outcome needs to be updated, please make those changes in your blog, and note this in the mid-progress report.

Final Report [3-5 pages] The final report will summarize the project. Please include any references if you are building off of them (references are excluded from the page count). In addition to the final report, teams must submit a 5-minute presentation video describing the project/results.

3 Timeline

- Proposal: due on 4/17/20.
- Mid-Progress Report: due on 5/8/20.
- Final Report: due on 6/5/20.

Suggested Project Ideas

Here are some project ideas from last year:

<https://courses.cs.washington.edu/courses/cse571/19wi/projects.pdf>

Also, you are welcome to discuss with us if you have any cool idea in mind.

Resources

Simulation environments that can be useful for your project:

- MuJoCo <http://mujoco.org>
- PyBullet <https://www.pybullet.org>
- Gazebo <http://gazebo.org>
- Habitat <https://aihabitat.org>
- Gibson <http://gibsonenv.stanford.edu>
- AI2 THOR <https://ai2thor.allenai.org>

Popular deep-learning frameworks that you can use for training models:

- PyTorch <https://pytorch.org>
- Tensorflow <https://www.tensorflow.org>
- MXNet <https://mxnet.apache.org>

Academic conferences where you can find related papers:

- RSS <https://roboticsconference.org/>

- ICRA <https://www.ieee-ras.org/conferences-workshops/fully-sponsored/icra>
- CoRL <http://robot-learning.org>
- IROS <https://www.ieee-ras.org/conferences-workshops/financially-co-sponsored/iros>
- Computer vision conferences: CVPR, ICCV, ECCV

Companies / organizations that are doing robotics-related research:

- NVIDIA <https://www.nvidia.com/en-us/research/robotics/>
- OpenAI <https://openai.com>
- Google Robotics <https://research.google/teams/brain/robotics/>
- Facebook AI <https://ai.facebook.com>
- Self-driving related: Uber, Waymo.