

# 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 2 to 3. You are free to come up with your own project ideas and use your preferred simulation environment.

### 2 Deliverables

The proposal and mid-progress report will be hosted on Google Docs. For the final report, you will submit a PDF.

**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-term 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 Presentation [5 mins]** Each team will present a 5-minute presentation on their project either in-person or via Zoom. The presentation should include the problem statement, methods, results, and conclusion.

**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).

### 3 Timeline

- Teams & Proposal: due on **Apr 15**
- Mid-term Report: due on **May 6**
- Final Presentation: due during **Exam Week** (exact time and venue TBD)
- Final Report: due on **Jun 7**

### 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.