6.882 Final Project (2020)

Important Dates:

- Proposal due: due April 7 (on Stellar)

- Proposal feedback: by April 14 (available on Stellar)

- Project milestone presentations: April 28, 30 (in class)

- Project report due: May 12 (on Stellar)

- Project presentations: May 12

Process

The final project in 6.882 will consist of the following components: proposal, milestone presentations, research project and writeup, and final presentation. Projects may be done individually or in teams of two; we encourage you to do it in a team.

The proposal (one per team) will be a written document, 1 - 2 pages long, outlining the work to be done. It should include a plan with at least 4 steps, and indicate your internal deadlines for each of those steps. If there are multiple participants, the division of responsibility should be made clear. In addition, please include your assessment of what the "risks" to the project are: that is, what things do you think might turn out to be more difficult than planned, and what thoughts do you have about how to mitigate the risks?

If you are going to do an empirical study, be sure that you think about what method to use as a "baseline". It might be running a simple off-the-shelf algorithm or an alternative really simple approach.

Remember that almost anything will turn out to be harder and more time-consuming than you expect. Try to arrange your project so that there are intermediate milestones that can serve as alternative finishing points, in case you don't get to the end. It will be much better to turn in a polished version of a small-scale project than to find yourself at the end of the term with a three-quarters implemented system of great depth and scope.

The instructors will provide written feedback by April 14 and be available for feedback meetings that week.

A project milestone presentation (one per team) of about 5-10 minutes will be scheduled for all teams. At that time you should have some initial results to discuss.

The project report (one per team) will be a written document of about $5n$–$8n$, where n is the number of people in your group, including whatever graphs and tables are necessary to make your point. If you use a two-column format, as in conferences, this is about $4n$–$6n$ pages. The report is the means by which you communicate the process and results of your project, so it should be clear, coherent, and well written. Do not dump out large quantities of data or code or uninterpreted charts. Emulate the expositional style of a technical conference paper.

The main goals are to: make clear what your findings are, why you think they came out the way they did, and why that might be important and to be precise enough to allow someone to replicate your experiments (or verify your proofs).

A final presentation (one per team) of 5 - 10 minutes will be scheduled.

Projects

You have approximately 5 weeks to do this project (starting with proposals), and we expect it to take about 6 person-hours per week; so that's 30 person-hours for a single-person project and 60 person-hours for a two-person project. You'll have to make a plan and stick to it, to avoid getting behind and doing a bad rush job at the end.

Here are some ideas for types of projects. Replicating an experiment is probably the best option if you don't have a concrete idea of something different to do.

Apply a technique Take one or more of the methods that we have talked about in class and apply them to a problem. Compare their performance and elucidate why they perform differently, if they do. Do they do a good job on the problem?

This is most interesting if you can apply it to some other research question or problem you know about. A big issue here is being sure that you can get the data and computation that you need.

You don't necessarily have to implement all (or even any) of the algorithms you use. There are several toolkits available with many learning algorithms already implemented in them. However, if you don't do any implementation yourself, we would expect something deeper in the way of problem formulation or modeling.

Replicate an experiment Often, the best way to understand something is to replicate an experiment reported in the literature.

There are huge numbers of papers in these journals and conferences, some of which are good, some bad, some hard, some easy. If you're going to pick your own paper, please run it by an instructor before you hand in your project proposal.

Note that replicating someone else's results is notoriously difficult. There are often a lot of things left unsaid in technical papers, which have a real effect on the outcome. Part of the value of trying to do this is learning how to be clearer and more complete in future papers you may write.

Something else If you are more theoretically inclined, and have an idea for a theoretical direction to pursue, or want to do something else different, we're certainly open to the idea. The proposal / discussion process will be very important in this event.

Computer time Think about your computation resources. We have $100 per student of credits available on AWS, which we will distribute soon. Remember that deep learning and, especially, reinforcement learning methods require huge running times.

Collaboration

You may do your project in teams of up to 2. If you work in a team, you must:

- Make clear before you start what the division of labor will be.

- Make clear in the written report what the division of labor actually was (it's fine if it deviates from the proposal, but it must be specific and accurate).

- Be sure that the participants understand all of the work (it will not be a sufficient answer, to a question in the presentation that you don't know something because that's the part your partner worked on).

Projects done by 2 people will be expected to have 2 times as much technical depth and content as those done by a single person. For joint projects, the written work may be done jointly.

Be sure to cite all papers and web sites consulted during the course of your project, as well as to acknowledge other students or TAs who helped you substantially.

Relationship to other classes We expect that your project will be only for 6.882. If you want to do something with another class or your ongoing research, please meet with an instructor and explain the situation.

Grading

The final project is worth 55% of your final grade, broken down as follows:

- research content (35%)

- writing style (10%)

- checkpoint presentation (5%)

- final presentation (5%)