COMPSCI 590.2 - Final Project

Due date: December 13, 2017

1 Project Scope

For this project you will work with another student (consultant) on the theory or application of reinforcement learning techniques. Acceptable projects include the following:

1. Proving a new theorem about an existing reinforcement learning method (ambitious).
2. Proposing a modification to an existing reinforcement learning method and evaluating this modification against the standard method on several benchmark data sets.
3. Developing a hypothesis about how different reinforcement learning methods compare and evaluating this hypothesis using these learning methods on many different benchmark data sets.
4. Proposing an application of machine learning to an interesting problem that you care about, selecting methods to try, doing your best to make them work, and discussing the results.

This is only a partial list. Other ideas are also possible if you clear them with me first.

You should aim to do something novel in your proposal. It does not need to be a publishable result, but you should aim higher than merely reproducing a known result. There can be novelty in your choice of techniques and/or the match between techniques and problems.

2 Leads and consultants

Every student is required to lead one project and be a consultant on at least one other project. A project lead is expected to do the majority of coding and writing for the project, while a consultant is expected to help with brainstorming, debugging, and possibly domain expertise. You may not serve as a consultant for somebody if he or she is also serving as a consultant for you.

3 Project Proposal

You should turn in a proposal for your project to me (email is fine) no later than October 20. This should be an approximately one page description of what you plan to do. You are, of course, free to (and encouraged to!) turn in a proposal earlier. Your proposal should include the following:

- The goal of the project.
- What you expect to learn or discover from doing the project
- A summary of techniques you expect to apply in the project
- A description of how you would measure success or failure
- Your name and the name of your consultant
The role of your consultant

At least 3 references that are relevant to your project. This is to spare you the embarrassment of not having an answer when I ask if you’ve done a google search on the keywords for your project.

I will aim to give feedback on your writeup within a week of receiving it, but do not wait to receive feedback. You should continue to work on your project while I am reviewing the proposals. I’ll try to flag proposals that are in greatest need of attention and give feedback sooner rather than later.

4 Project Write Up

By December 13, you should turn in a document describing your efforts and a link to any code you’ve produced. Note that it is perfectly fine to use standard libraries or code that you have found in reputable software distributions if you cite your sources.

As a rough guideline, you should aim for a writeup of 10-15 single column, double spaced pages. However, I won’t be counting pages and this is only a very rough guideline. You shouldn’t pad your writeup with worthless text to reach this size. If you can describe what you’ve done clearly and concisely in much less space than this, that’s great. I’ll expect your writeup to address (at least) the following issues:

1. What problem does your project address? If you have chosen an application area, please remember that I may not be an expert in the application you have chosen, so be sure to describe the application area clearly.

2. What methods did you use to address the problem?

3. What is the reason you picked the methods you picked? Can you justify theoretically or empirically that this was the best choice?

4. How did you validate your results?

5. What difficulties did you encounter and how did you try to overcome them?

6. What would be the next step if you were to extend this project?

7. What did you learn from this?

8. How did your consultant contribute to your project?

Remember to include a complete bibliography.

Note that it is not a requirement for a good project to have successful experimental results. Sometimes things don’t work out as you planned. Your grade will be based upon your scholarly and insightful application of the things you have learned in class.

Your final project grade will be determined 70% from your own project and 30% from any projects on which you consult. (If you consult on more than one project, your 30% will be averaged.) This provides you an incentive to focus on your own project, but also provide useful guidance on projects for which you are consulting.