1 Introduction

The lectures and readings in this class will cover a wide variety of topics in AI. The project will allow you to study an area in depth and make a research contribution to one or more of these fields. I’m fully aware that the seminar topic is fairly vague and broad, so pick something you can be passionate about and enjoy. The end result should be a conference-style paper detailing your work and results.

Projects may be done in groups of 2-3 people (you may work alone with permission, but groups are highly encouraged). All members of the group will receive the same grade (unless there are extraordinary circumstances) and all projects will be graded to the same standard, regardless of group size. When you submit to a conference, you do not get extra credit with the program committee for working alone.

Projects will be graded on the following criteria:

- **Relevance**—The topic must be related to the topics in this class.

- **Significance**—Does your research contribute to AI in an interesting way? Could other people use your ideas/results and build on them? Does the project address a problem better than previous research? Does it provide unique data, unique conclusions on existing data, or a unique theoretical or pragmatic approach?

This is probably the hardest criteria to satisfy, but the most important. One of the best ways to do significant work is to read recent papers in your area and think about what questions that work poses but does not answer. Are there additional experiments that could be done that could answer those questions? What if you wanted to use their ideas under different assumptions, or in a different environment? For those of you of a more pragmatic bent, think of an interesting domain where AI ideas/techniques might be useful. What unique challenges are posed by working in this domain?

The main thing to remember here is that it is not enough to “build something cool.” You need to conduct research that answers a question and contributes to our knowledge.

- **Technical Soundness**—Are your concepts correct and accurate? Is your math right? Are your experiments designed well and executed correctly? Does your system have major technical flaws?

- **Novelty**—Are the problems or approaches novel? Is this a novel combination of familiar techniques? Is it clear how this work differs from previous contributions? Is related work adequately referenced?

This is very important. One of the main things you should be doing in your proposal writing process is determining whether your proposed work is novel and justifying it. If you discover that your work is not novel part-way through the important thing to do is to be honest about this and set up a meeting with me. We will probably be able to find an angle on the work that still makes a contribution.

- **Quality of Evaluation**—Are claims well-supported by theoretical analysis or experimental results? How convincing is the evidence in support of the conclusions? Are you careful (and honest) about evaluating both the strengths and weaknesses of the work?

- **Clarity**—Is the paper clearly written? Is it well-organized? Does it adequately inform the reader? (A superbly written paper provides enough information for the expert reader to reproduce its results.) If you have concerns about your technical writing ability, you may wish to take advantage of the Drexel writing center (http://www.drexel.edu/writingcenter/).
1.1 Grading Breakdown

The project as a whole constitutes 40% of your grade. This is broken down as follows:

- Project pre-proposal—ungraded, but failure to turn it in will adversely affect your project proposal grade.
- Project proposal (10%)
- Presentation (5%)
- Final Paper (25%)
- Total (40%)

2 Important Dates

- Thursday, October 4, 2017: Project Pre-proposal.
- Thursday, October 26, 2017: Project proposal due.
- Thursday, December 7, 2017: Project presentation due.

3 Project Pre-proposal

The pre-proposal should be short paragraph identifying the members of your group and description of your project. You should submit this on BBLearn. This pre-proposal will resassure me that you are thinking about your project and give me the opportunity to offer advice before the project proposal is submitted.

4 Project Proposal

The project proposal is a document with a maximum 2 pages of text (I advise using a tight two-column paper formatting). Your references may take up an additional page.

The proposal should have the following sections:

- Problem Statement and Motivation: What is the problem that you are solving? Why is it relevant and interesting? Why would the results you are proposing to achieve be significant?
- Approach: How do you plan to go about solving this problem? What system will you build/or algorithm will you design? What techniques are involved? This section will vary highly based on the type of project you are proposing, but should convince me that you know what you’re doing and that you have a plan for attacking the problem.
- Related Work and Novelty: What other work has been done on this topic and how is it related to what you are trying to do? What other research papers are closest to yours? This section should demonstrate that (1) you have explored the space in some detail and you know what’s out there and (2) your work is a novel contribution.
- Evaluation Approach: How will you (and I) determine if your approach solves the problem? Negative results (demonstrating that an approach does not work) are acceptable here, provided that the approach was promising. In research, we shouldn’t always know how things will turn out. This can be either theoretical analysis or experimental results.
• Milestones: How will you get the work done? Present a timeline of what and when various work will be accomplished. If you are working in a group, discuss how the work will be divided. What is the simplest version of your project that you can absolutely promise will be done by December 7? How do you hope to extend it if you have time?

• Bibliography: containing the references cited in your proposal

You may be asked to revise your proposal if I believe it will lead to an unsatisfactory final project. In this case, your proposal grade will be based on both the original and revised proposals. Unlike the pre-proposal presentation, the proposal is a binding document which I will use to evaluate your final project. Minor deviations from it are okay, but any major changes need to be approved by me. If you are unsure if a change is ok, just ask.

5 Presentation

Each group will present their work on the final day of class. Groups should choose one member of the group to give the presentation, though all members can contribute to answering questions from the class and myself. This is your opportunity to show off the work that you did. The presentation should be clear, engaging, and demonstrate your contributions. Think of it as an advertisement for your paper (But don’t leave us in suspense—in general, suspense is a bad thing in research papers. Tell us what you did up front. I promise I’ll read the whole thing). If appropriate, demo your project. I will inform you of the length of the presentations when I know how many projects there are. If a group contains only online members, they will submit a video presentation.

6 Final Paper

Papers must be a maximum of 6 pages and formatted in double-column 10 pt font. I suggest using LaTeX, many conferences (AAAI, usenix, ACM, IEEE) provide appropriate templates. You should also provide a one-page or less document explaining how what you have done reflects or differs from your proposal.

The paper should contain:

• An abstract, summarizing your problem and results.

• An introduction, describing and motivating your problem. Spell out the research contributions here (remember, no suspense).

• A Background section. This should provide enough background on your topic for a fellow grad student who has taken cs680 (and did a project on an unrelated topic) to understand your paper. If your work is directly based on another piece of research, your should discuss that work here.

• Approach. Discuss your approach here in more detail than you did in the proposal. If I wanted to redo your project, I should be able to figure out how by reading this.

• Evaluation section. This is where you show me how you came to your conclusions. Detail your methodology, then give me the results. Explain the strengths and weaknesses of the approach.

• Related work. Basically the same as in the proposal, but add anything you’ve discovered since.

• Conclusions. What have you (and the reader) learned because of your project? Which part is most significant? Where could you (or someone else) take this work from here?

• A Bibliography, containing the referenced cited in your paper.

All projects are different. You may need additional sections or to present your work a little differently. We will be reading many papers this year in class (and you will be reading more on your project topic). These papers will give you an idea of the proper tone and organization of the paper.