

**CSCI 450: Artificial Intelligence
Fall 2019
Assignment: AI Research Spotlight
Points: 15% of final grade**

Overview:

One of the goals of this class is for you to become familiar with the literature and current research topics of AI, along with some concrete examples of ongoing AI projects. Another of the goals is for you to become aware of both the possibilities and the problems incumbent in AI research. This assignment is designed with these goals in mind. For this assignment, you will first select an AI **research project** that relates to the topics that we are covering in class. Looking over the course schedule, select a topic in which you are interested, and search for **ongoing research projects** involving that topic. Appropriate research projects should have **several papers published** about the work. After reading and understanding the papers, you will write a paper summarizing the project and analyzing the benefits and challenges presented by the research (the required contents of the paper are described in further detail below). During each of the lecture periods listed on the schedule, a project summary will be presented to the class.

There is a wealth of AI stories/teasers at <http://aitopics.org>. Note that only a portion of these will lead you to a reasonable research project which has actual conference or journal publications. Some are industry projects and won't have enough published information for you to get technical details. But it's a decent starting place.

I would really like your selected project to be something that interests you. If there's an area that you're interested in that isn't represented in the provided resources, please let me know – I will work with you to find a relevant project for you to use. Also, feel free to do independent research to find interesting projects. If you find something that you're interested in, and there's enough information available on the project, you can use certainly use it. So please don't feel constrained in your selection. **Project selection and scheduling must be completed by Wednesday, September 10th or 11th at noon (by the end of your section's lab period).**

Required Contents:

Your report must contain the following content:

1. Introduction – provide context for the project
2. Detailed description of the project – this description should provide enough detail for someone who has not read papers about the project to understand the goals, architecture and utilized technology of the project.
3. Contributions – this section should enumerate and explain the contributions of the project. Each research project that we will be examining "pushes the envelope" in some way and advances the field of AI. What are the areas where this occurs in this project?
4. Limitations – each paper that you read will contain a lot of positive claims about the value of the project. It's part of the author's job to sell the paper to the reviewers and readers. In this section of the paper, I want you to do some critical thinking about the project that you're examining. Take a few steps back and think about the limitations or shortcomings of the approach. How far away is the research from making real contributions?
5. Conclusion – in this section of the report, I want you to share your opinions on this research. Is it an interesting area to you? Is it what you expected

when you first heard or read the description of the project? What conclusions does this project make you draw about the future possibilities or problems in AI research?

6. Bibliography – this section should include the references of the papers that you read in order to complete your report. Use ACM citation format.

References: You should have **at least five references**. They do not need to all be publications by the researchers directly involved in the project you are writing about. You can pull in references to competing projects, foundational research, or general references on the techniques being utilized.

Citations: You should use in-text citations throughout the paper, following the ACM format (<https://www.acm.org/publications/authors/reference-formatting>).

Length requirements: 10 double-spaced pages (2500 words)

The first version of your written report is due at the beginning of class on the day that you're scheduled to give your class presentation. Please bring a hard copy for me. **The rough draft must be a complete draft, meeting the length requirements!** I will give you recommended and required changes, and you must submit the final version within a week of receiving my comments. You should submit the final version as a .pdf document via autolab.

In the presentation (which should be **approximately 10 minutes in length**), I want to hear a clear presentation of the major points in your report (PLEASE – don't read your report! That would be too much detail!) Come ready to share what you've learned and answer any questions that the class might have. Your presentation and report should be sure to emphasize the aspects of the project that relate to the topic we're covering in class (learning, planning, neural nets, etc.)

Grading:

Project selection and scheduling/Rough draft completion: 10%

Presentation: 15%

Final paper: 75%

Schedule:

Notice that I do want to have the reports spread throughout the semester, so that each topic that we cover in class is linked to a concrete example of AI research. This means that there is a maximum number of "slots" per topic. There is, however, a lot of overlap between topics. So, for example, if you're interested in Natural Language Processing and don't manage to get one of those slots, we can probably find an NLP project that addresses learning or planning or whatever other area is available on the schedule. If you know that you're definitely interested in a particular area (or a particular date!), see me as soon as possible to reserve that slot. You don't need to have identified your project to schedule a slot.

Broad Topics:

Heuristic/Adversarial Search

Constraint Satisfaction

Reasoning under Uncertainty

Machine Learning

Planning

Neural Networks

Bayesian Networks

Artificial Life/Genetic Algorithms

Natural Language Processing

Robotics/Machine Vision