CS 430 - Artificial Intelligence
Spring 2009 - Guidelines for AI Research Paper
Out: February 24, 2009
Topic Choice Due: Friday, March 13, 2009
Outline with References Due: Tuesday, March 24, 2009
Draft Due: Tuesday, April 7, 2009
Paper Due: Monday, April 20, 2009
Presentations: Tuesday, April 21, 2009

The main goal of this assignment is to research a topic in Artificial Intelligence that will not be covered in any detail in the class. Each student will write a report and give a presentation on a topic of their choosing.

Logistics
Each student is responsible for:

- an approximately 10-page written report, due on April 20. The report will be distributed to the rest of the class at the time of the presentation
- a 20-minute class presentation
- 3-5 questions suitable for the take-home final exam on the material covered in the presentation and in the report.

Paper topics must be approved by the instructor no later than Friday, March 13. Some possible topics are listed below. Topics will be assigned on a first-come basis, so inform the instructor as soon as possible of your preference. An outline of the paper with references must be submitted no later than Tuesday, March 24. A draft of the paper is due no later than Tuesday, April 7. The final paper is due Monday, April 20, with presentations on Tuesday, April 21.

Grading will be as follows: 50% of the research paper grade will be on the written report. Factors include completeness of information, clarity of prose, relevance of examples. Submitting items in a timely manner will also be considered. 50% of the research paper grade will be on the presentation. Factors include clarity of presentation, fielding questions, and facilitating discussion.

Report Content
Your report should follow standard formatting for technical reports. Report sections should be titled and numbered with subsections being subnumbered. The report pages should be numbered starting with the cover page (but the cover page should not have a number printed on it). The report should include the following:

1. An overview of the goal of the research topic. What problem it being solved? Or what benefits are expected to be realized?
2. Background necessary to understand the research topic. This may include definitions, reminders of algorithms previously studied, etc.
3. The bulk of the report should be on explaining the research topic and showing how it is used.
4. A conclusion tying the research topic to current applications.
5. A numbered list of references in alphabetical order by first author or organization. Citations should be of the form "[#]" where # is the number of the reference in the list.
The written report will be handed out to the class on the day of the presentation.

**Presentation**
Each student will make one 20-minute presentation on their research topic, including time for questions. The presentation should be an overview of the report pointing out the highlights. Please do not read your entire report to the class. Throughout the presentation, the presenter should be prepared to answer questions.

Presentation software may be used, but is not required. Overhead slides may be used. Instructor can have slides made from handouts.

**Research Topics**
Here is a list of possible research topics. This is certainly not an exhaustive list. You may suggest others, but get instructor approval FIRST.

1. Definition and description of work in traditional AI application areas not covered in class such as expert systems, natural language processing, machine learning, computer vision, etc.
2. Definition and application of AI techniques not covered in class such as genetic algorithms/programming, fuzzy logic, neural networks, higher-order constraint propagation, Bayesian networks, hidden Markov models, etc.
3. History of and state-of-the-art application of AI techniques to real-world application areas such as constraint propagation in printed circuit routing or scheduling, A* search and other path-finding algorithms for computer game non-player characters, adversarial search in turn-based game-playing (e.g., chess, checkers, bridge, backgammon, or Scrabble), machine vision and pattern recognition in weapons targeting, etc.