ComS 572: Principles of Artificial Intelligence
Department of Computer Science
Iowa State University

Term Projects

Students in ComS 572 are required to complete a research or design project in AI on a topic to be chosen in consultation with the instructor. A written report on the project and an oral presentation is expected at the end of the semester. You should work in small groups (consisting of 3 members each) on the term project. The project report should be written in the form of a scholarly manuscript (with citations to relevant literature).

Term project is in essence, a research project. You may make use of all the resources available at your disposal, including the published work of others, publicly available code, publicly available data sets, as well as consultation with others (fellow students, faculty, or other experts on the topic of your project). Note however, that your conduct of the project should be guided by the best practices of academic research and writing. In particular, you should exercise utmost care to avoid plagiarism: the deliberate use of someone else's language, ideas, data, code, or other original material that is not common knowledge without properly acknowledging the source. You should also familiarize yourself with appropriate ways to acknowledge the contributions of others and to cite all your sources.

Students are expected to work in teams of 3 members on the term project. Collaboration within a team is expected and encouraged. Each team member is expected to contribute to all aspects of the project: including conception of the initial idea, planning, implementation (including design and analysis of algorithms, design, implementation, and testing of code, experimental evaluation) and reporting (including organization and writing of the report). However, because each individual brings unique abilities to a team, and one of the goals of working in a team is to take advantage of the unique abilities of the team members, it is not unusual for the contributions of individual team members to vary across tasks. To ensure that each team member gets credit for his or her contributions, the final report should include a statement of contributions that explicitly identifies the contributions of each team member and a statement that every team member concurs with the contents of the report. To avoid possible misunderstanding, it is advisable to for the each group to meet with the instructor and discuss each member's role with the instructor before beginning to work on the project. If there are irreconcilable differences among members your team, you should notify the course staff as early as possible (but after having made a good faith effort to resolve the differences among yourselves) so we can help resolve the differences or suggest alternatives. In the event that the dispute among team members is not resolved to

everyone's satisfaction, the instructor's assessment (if necessary, based on discussions with by each member) will be binding.

An ideal project should be one that demonstrates some creativity, attempts to answer some interesting research questions, or offers an interesting AI solution to a problem of practical interest. The project should be based on independent study of some topic extending beyond the material discussed in class. If your background is in another discipline (e.g., engineering, biological sciences, business, etc.) you are encouraged to pick a topic that would allow you to explore the application of AI to solve a problem of interest in your area of expertise.

Suggested Topics

The list of topics given below is meant to be suggestive, but not exhaustive.

- Design, implement, and evaluate some simple web application for applications such as
    - web search querying multiple relational data bases based on user vocabulary
    - discovering and visualizing conceptual relations among documents
- Design, implement and evaluate an AI/machine learning algorithm for use in an application such as
    - news or email spam filtering
    - personalized information retrieval and recommendation from the web for news articles, movies, or music
    - a personal assistant for meeting scheduling
    - classification of macromolecular sequences
    - an application of your choice (discuss it with the instructor first)
- Comparative evaluation of alternative AI-based machine learning approaches on a broad range of classification tasks
- Design and implementation and experimental evaluation of tools for reasoning with Bayesian networks

The descriptions given here are rather brief, so please feel free to talk to the instructor to explore possible project ideas in greater detail.

Term Project Timeline

- By **October 19**, form your group and select a project topic. Email to the instructor: the title of your project, a brief (several paragraphs) outline of the project, and a list of group members as well as the role of each member.
- By **November 9**, email to the instructor: a brief summary of the goals of the project, the basic approach to be followed and anticipated results along with the relevant bibliography.

- **November 30**, **project due**. The final version of the project report accompanied by all the source code, relevant data, and experimental results, should be submitted via Canvas.

- The week of **December 3 - 7**, oral presentations in class, to be scheduled.

Instructions for Preparing the Term Paper

The term paper will be graded on the basis of originality, technical soundness, organization, clarity of presentation, grammar and style, adequacy of the bibliography, as well as the significance of the results. It should be presented as a technical paper and will be evaluated as though it is being refereed for presentation at a conference. You are encouraged to look at papers published in one of the major national or international conferences (e.g., AAAI, ICML) as a model for your term paper. You are encouraged to use AAAI's latex macros or word templates.