

Building Artificial Intelligence for Computer Games

CSC584–001, Spring 2017 Course Project

Requirements

The goal of this course project is to explore a game AI technique within a working game. A successful project will bring together one or more of the techniques we discuss in class to produce a technically interesting artifact. Your technique must be implemented in a working game that you either implement from scratch or extend from existing code. The choice of game and AI technique is completely up to you and your teammate(s); however, bear in mind that your AI technique should enable something interesting to occur in the game that didn't occur before your implementation. You should also devise a method to evaluate the performance of your technique.

Working with a partner or two, you are expected to contribute the following throughout the course of the semester:

1. An informal project proposal worth 5% of your project grade.
2. A formal project proposal worth 10% of your project grade.
3. A status update worth 20% of your project grade.
4. A final eight page paper, prepared as if a submission to the annual AI and Interactive Digital Entertainment (AIIDE) conference, worth 45% of your project grade.
5. A final presentation and demonstration of your project in class worth 20% of your project grade.

You will receive feedback on your proposals and your status update to incorporate into your final submission. Your project grade will be determined based on all five components of the project according to the weighting above. Failure to complete the project will result in a F for the course. A completed project will count as 20% of your overall course grade.

You may seek outside guidance on your projects. In fact, the help of a faculty mentor would be a big benefit to your project. As always, you may ask the course teaching assistant or instructor for guidance throughout the duration of the project. Be sure to appropriately acknowledge or cite any outside sources you use though.

Informal Proposal

Due: by the start of class on 2/1/17

At this point in the semester, you should have identified project collaborators and settled on an idea.

Your team's informal proposal is a **one** page document that should list the team members and briefly describe your idea for the project. A successful proposal will be detailed enough to communicate the problem being studied, the approach being used to solve it, the evaluation

methods used, and why somebody might care about your project. A successful proposal will concisely describe at least one *research question*. Good research questions address two aspects of research: 1) why it's important; and 2) the falsifiable claim to be verified.

Your informal proposal is worth 5% of your project grade.

What to submit: Your team's 1 *FULL* page informal project proposal, uploaded to moodle as a pdf before the start of class on 2/1/17.

Formal Proposal

Due: by the start of class on 2/22/17

Your formal proposal is a 3–5 page document that should describe your project in more detail. That is at least 3 *FULL* pages formatted using the AAAI style that will be required for all submissions. The style guide can be found at: <http://www.aaai.org/Publications/Author/author.php>.

Your formal proposal should incorporate all of the components of your informal proposal as well as address any feedback provided. The main difference between the informal and formal proposal is level of detail. Your formal proposal should take the relatively abstract ideas of your short informal proposal and make them both concrete and much more detailed. Your research question(s) should be well-formed and explicit. Your evaluation plan should be detailed, including descriptive ideas for experiments, test environments, baselines for comparison, *etc.*

If you put in the effort, there is no reason a significant portion of your formal proposal can't be used in your final paper verbatim.

Your formal proposal is worth 10% of your project grade.

What to submit: Your team's 3–5 page formal project proposal, formatted according to the AAAI style guide, uploaded to moodle as a pdf before the start of class on 2/22/17.

Project Update

Due: by the start of class on 4/4/17

At this point in the semester, you should be almost completely finished with your project. Anything remaining should be minor and not result in a substantive change to your project results. Therefore, your project update should be a close approximation to your final paper. It must be written in the AAAI style format linked to above, be approximately eight pages, and contain all of the relevant sections of a research paper (see the description of the final paper criteria below for more details). You will receive feedback on your project update and have an opportunity to address any concerns prior to the final submission. I encourage you not to take this portion of the project too lightly. If you have significant issues with your project, it will be too late to address them before the final submission.

Your project status update is worth 20% of your project grade.

What to submit: Your team's (approximately) 8 page project summary, formatted according to the AAAI style guide, uploaded to moodle as a pdf before the start of class on 4/5/17.

Final Paper

Due: before the start of class on 4/24/17

Your final paper should be eight (8) *FULL* pages and formatted according to the AAAI style guidelines (<http://www.aaai.org/Publications/Author/author.php>). A successful paper will be written clearly and proofread for typographical and grammatical errors. All relevant published work should be cited throughout the text of the paper. As a rule of thumb, aim to reference 8–12 high-quality publications in academic conferences or journals.

Your paper should address the following aspects of your project: 1) Background information, an overview of the problem studied, the research questions addressed, and a preview of the findings; 2) A detailed presentation of the AI or ML method evaluated; 3) A detailed description of the evaluation environment (game) used, clearly stating the hypothesis/hypotheses tested; 4) A results section presenting all of the data collected; 5) An interpretation section where highlights of the data are reiterated and some conclusions are drawn; 6) General conclusions and future work; 7) A section acknowledging any other sources of contribution to the project (*e.g.*, a faculty mentor); and 8) A list of all works cited. It may be helpful to think of these eight criteria as a top-level outline for your paper.

Your final paper is worth 45% of your project grade.

What to submit: Your team's 8 page final paper, formatted according to the AAAI style guide, uploaded to moodle as a pdf before the start of class on 4/24/17.

Final Presentation and Demo

Due: before the start of class on 4/24/17

Presentations will be scheduled on 4/24 and 4/26. To be fair, all presentation and demo materials must be uploaded to moodle before the first presentations start. You will be required to make your presentation from the materials you submit to moodle, so if you have any special requirements make sure they are sorted out ahead of time.

The amount of time each group will have to present will be determined by the number of projects, and will be communicated well in advance of the presentation submission deadline. Only one group member should present, but all members will receive the same presentation grade. Therefore, all group members should contribute to the preparation of the presentation materials. Successful presentations will communicate the problem studied, the approach taken, the experimental design, an analysis of data, and will clearly state any conclusions drawn. Note, that is likely to be a lot of material to cover in the time allotted, so make sure to practice your presentation ahead of time—you will be stopped at the time limit.

Your presentation and demonstration will count for 20% of your project grade.

What to submit: A properly-named .zip file containing your powerpoint or pdf presentation and any demo videos, uploaded to moodle prior to the start of class on 4/24/17.