Evaluating Intelligent Game Design Techniques
CSC591 Fall 2010
David L. Roberts
Course Project

Goals

The goals of this project are to design, implement, and conduct a study to evaluate the effectiveness of an Artificial Intelligence or Machine Learning technique applied to either the authoring process or gameplay experience of a computer game. You are not required to contribute a breakthrough to AI or ML. The quality of your work will be evaluated based upon the design of your study and your interpretation of its results—not on the technical sophistication of your AI or ML implementation or a successful outcome. Because you will not be evaluated on your implementation, you may use existing code as long as you cite your source.

Requirements

Working with a partner (or two if absolutely necessary), you are expected to contribute the following:

1. An informal project proposal.
2. A formal project proposal.
3. An exempt IRB proposal to be reviewed, revised as necessary, and accepted by the course instructor.
4. A final eight page paper prepared as if a submission to the annual AI and Interactive Digital Entertainment (AIIDE) conference.
5. A final presentation of your work in class.

Note that the informal, formal, and IRB proposals will not be graded. You will, however, receive feedback. Your project grade will be determined based on your paper submission and presentation; however, failure to complete any of the project components by the deadline will result in a zero for the project and an F in the course.

In addition to the requirements listed here, every group will be expected to give a brief project update during selected class meetings. These updates won’t be graded for the project, but will count as homework grades as discussed in the course syllabus.

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 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: in class on 9/16

Your informal proposal is a one page document that should 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. Recall, good research questions address two aspects of research: 1) why it’s important; and 2) the falsifiable claim to be verified.

Keep in mind that your evaluation of this idea is bound by the “waiver of IRB application for course projects” policy which is included for reference at the end of this assignment. Read them carefully. Failure to comply with these regulations means not only trouble for you, but trouble for the course instructor as well.

Formal Proposal

Due: in class on 9/30

Your formal proposal is a 3–5 page document that should describe your project in more details. To avoid problems later in the semester, I strongly encourage you to compose your formal proposal using the AAAI style that will be required for your final submission. 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 informal proposal and make them concrete. Your research question(s) should be well-formed and explicit.

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. Note that your IRB proposal is due in a few weeks. Your formal project proposal should begin to address your IRB proposal contents as well.

IRB Proposal

Due: in class on 10/14

Your IRB proposal protocol MUST BE EXEMPT. At this point we should have discussed in class what criteria are used to determine if an IRB protocol is exempt. For reference, a list can be found on the NCSU IRB page here: http://www.ncsu.edu/sparcs/irb/exempt.php.

You must submit to the instructor, not the IRB, an application for exempt research (found here: http://www.ncsu.edu/sparcs/irb/docs/exemption_request.doc) along with all supporting materials including an informed consent document, any surveys you plan to use, all recruiting materials, and a description of your methods for safe-guarding and/or anonymizing research data as well as your research process and recruiting practices. A sample consent form can be found here: http://www.ncsu.edu/sparcs/irb/docs/irbconsent.doc. Recall that you are bound by the policy for “waiver of IRB application for course projects” included at the end of this assignment for reference.
Final Paper

Due: in class on 11/23

Your final paper will count for 65% of your project grade.

Your final paper should be eight pages and formatted according to the AAAI style guidelines (http://www.aaai.org/Publications/Author/author.php). A successful paper should 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, two citations are too few, but 50 are probably too many.

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 study design, 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 list of all works cited; and 8) A section acknowledging any other sources of contribution to the project (e.g., a faculty mentor).

Final Presentation

Due: in class on 11/30

Your presentation will count for 35% of your project grade.

Presentations will scheduled on 11/30 and 12/2. To be fair, all presentation materials will be due by the start of class on 11/30.

Each group will have 25 minutes to present their work. Only one group member should present, but all members will receive the same presentation grade. 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 a lot of material to cover in 25 minutes, so make sure to practice your presentation ahead of time.
Waiver of IRB Application Policy

Specifically, class-assigned projects using humans as subjects for “purely educational purposes” do not meet the criteria in the federal definition of research. “Purely for educational purposes,” means that the class-assigned activities are conducted for pedagogical reasons only, and data from the activities or results of the activities are not intended to be used outside of the class. In these cases, classroom projects are not considered “research” under the federal regulations that govern the use of human subjects in research and do not qualify for IRB review.

Below are conditions for class projects. It is important that class-assigned projects meet the conditions in section A and if an instructor decides to use class-assigned projects involving human subjects, h/she accepts responsibility for ALL responsibilities in section B.

A. The following are guidelines for class-assigned projects that are not considered human subject research and do not require IRB approval:

1. Data obtained from class-assigned projects CANNOT be used outside of the class, for example in publications, presentations at professional meetings, applications for funding, or used in independent/honors/thesis/dissertation research (including activities preparatory to such research, i.e. pilot data). In rare occasions, if class-assigned projects yield unexpected results that warrant further investigation or analysis in preparation for use outside the class setting, IRB approval for such activities may be sought and granted. Please note that approval under such circumstances is not guaranteed and any data collected under a class project waiver may not be disseminated prior to IRB approval.

2. The project(s) cannot involve vulnerable populations. This includes minors (under 18), prisoners, or persons lacking the capacity to give informed consent.

3. The project(s) cannot expose human subjects to more than “Minimal Risk” or involve sensitive topics (see below). “Minimal risk” is when “the probability and magnitude of harm or discomfort in the research are not greater in and of themselves that those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.” [45CFR 46.102(i)]

Sensitive Topics - The following topics are considered sensitive topics for class project activities:

- sexual orientation, sexual behaviors or attitudes regarding sexual conduct, practices of contraception incest, rape, sexual molestation, abortion and/or pregnancy
- substance use and/or abuse including, but not limited to, alcohol, marijuana, steroids, amphetamines, narcotics and any prescription medication legally or illegally obtained
- questions regarding mental health (e.g., suicide, depression, obsessive compulsive behaviors including, but not limited to, gambling, smoking, eating, etc.)
- traumatic experiences of an individual, including war or combat experiences of veterans

4. Project activities may not include the acquisition of data from private, identifiable records such as academic or medical records.
5. The project must involve the voluntary participation of individuals without any coercion or pressure being placed upon them by the researcher.

B. Instructors who implement class-assigned projects accept the following responsibilities:

1. Instructors bear the primary responsibility for the class-assigned project activities, and for ensuring the rights and welfare of the human subjects.

2. Review class assignment projects and determine if each project meets the criteria listed in 1-5 in section A above.

3. Instructors are responsible for keeping all paperwork associated with the class projects for a period of one calendar year.

4. Oversee the conduct of all project activities, and assure that ethical principles are adhered to in the conduct of those activities.

5. Review all methods and instruments used in each project.

6. Document that students receive permission to conduct project activities at institutions other than North Carolina State University. This includes letters from school authorities, for example.