

Making Nifty Assignments Niftier and Not So Nifty Assignments Nifty with Online Technologies

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Abstract

In this paper we describe various AI assignments and how online technologies have made these assignments more interactive. Online or distance courses use technologies such as discussion boards, blogs, wikis, online exams, and surveys, to portray course materials. By incorporating these into our AI courses, we can create a virtual environment that fosters peer-to-peer learning and collaboration.

Introduction

Online or distance educators have used a mixed bag of “tricks” to teach their students. The more traditional online educator makes heavy use of classroom management systems, such as Blackboard, in their asynchronous courses. Some educators make use of web conferencing software to deliver course content synchronously. This gives students more of a face-to-face experience. (A. Quigley, 2002) All the tools used for online instruction can be used to enhance face-to-face instruction.

Kumar argues, “I want to bring to your attention the artifacts that you or your colleagues may have created and are used in your research labs. I would like to appeal to you to bring these artifacts into your classrooms. Incorporate them into your lab assignments and have your AI students get some experience with them.” (D. Kumar, 1999) In bringing “artifacts” into our Artificial Intelligence course at The College of Staten Island, we have made use of many of the online techniques to enhance old, and to create new fun, nifty assignments and projects for our students. These technologies, although used in an Artificial Intelligence course, can be used to enhance projects in other computer science courses as well.

The Discussion Board

Possibly, the most used tool in online education is the discussion board. In many humanities classes, the discussion board is used to debate a controversial

concept or to discuss an assigned reading. The same can be done in an Artificial Intelligence class.

Previously, one of our AI assignments was to have students evaluate the paper *Deep Blue* by Murray Campbell, A. Joseph Hoane, and Feng-hsinung Hsu. They were then told to discuss, in a minimum 2 page paper the following issues:

1. What were the improvements Deep Blue made over Deep Thought? Use as reference the article itself, the video *The Chip and the Chessmaster*, and the IBM deep blue website given below.
2. Do you think that Deep Blue had an unfair advantage? Use facts from the paper to support your opinion. You may also use information from deep blue's web site.
<http://www.research.ibm.com/deepblue/home/html/b.html>

Instead of writing a paper, the assignment now requires students to do the above using a discussion board. This fostered more peer interaction between students. Students were told to state their position to the question, citing examples from the paper. Each student was to agree or disagree with at least two other student's posts, again, using examples cited from the paper to support their position.

One advantage of having this discourse in a discussion board format as opposed to an in class discussion, is that the informal writing needed for discussion boards allows students time to research and formulate a more fact based, well phrased position and response. Another advantage is that ALL students participate in the discussion. The discussion isn't dominated by the more outgoing students. Even those students who never speak in class, express themselves in a discussion board. In fact these types of students tend to be most positive about this educational technology.

Blogs

Based on an idea by one of our colleagues, we used a blog to create a digital help desk titled, "Frustrations". Blogs differ from discussion boards in that the flow of conversation is more linear. Students make a posting and other students are able to comment on the post. Therefore there are no more than two levels of discourse. Discussion boards allow for posts, response to the posts, response to the response to the post, etc.

In our AI class, throughout the semester, students work on creating a model-based, goal-based soccer playing agent, based on the concepts outlined in our text. (S. Russell, P. Norvig, 2003). In addition, this agent has a learning component, where it uses a trained neural network to do the line following tasks needed to get to goal. (S. P. Imberman, 2004) Students are given instructions on how to build a robot, a link to Interactive C, (a programming language for the robot), and an open ended set of instructions to build such an agent. Students have varied experience with using robots and Interactive C. The blog allows students to post any programming issues they may have, get help with architectural issues, and just blog about their robot agents in general. The blog encourages students time to interact with each other about the project outside of the class lab. This essentially extends the time students are able to access help. Although instructor supervised, most of the help is peer to peer. Students learn from students. Another benefit is the camaraderie that develops. In the "old days" students would "hang out" in the computer lab, often working on projects into the wee hours of the night. Nowadays with personal desktop or laptop computers, assignments are done in a dorm room, or in the case of our school, at home, both of which are more isolating environments. By establishing a virtual place where students can interact, we regain some of the benefits of peer learning that the old time computer labs brought.

Wikis

Wikis are collaborative web documents. Wikis can be edited and modified by a group of people. Probably the most famous wiki is Wikipedia. Creative use of Wikis in AI courses can generate interesting results.

Most AI courses cover some background information about the origins and beginnings of the field. Most times this takes place in the form of lectures and/or readings. It is hard for students to get excited about the material when presented as such. When teaching this topic in our course, we created an *Interactive History of AI* Wiki. The wiki was seeded with a basic history timeline. Students were encouraged to add to the timeline by adding a new entry, linking to a website that had more information on an

existing entry, inserting interesting video, inserting photographs, etc. Students were told to cite any web sites, articles, etc. used in the creation of the wiki, and to use quotations where appropriate.

Students were very involved with the wiki. When the assignment ended, the editing feature of the wiki was deactivated. Students protested saying that they were still finding information that they wished to share with their classmates.

Below is a sample of some of the entries made by students:

Logic Programming for Intelligent Reasoning

*"Logic programming, particularly represented by the language **Prolog** (Colmerauer et al. 1973), is probably the most important and widespread application of automated theorem proving. During the early 1970s, it was discovered that logic could be used as a programming language (Kowalski 1974). What distinguishes logic programming from other traditional forms of programming is that logic programs, in order to solve a problem, do not explicitly state how a specific computation is to be performed; instead, a logic program states what the problem is and then delegates the task of actually solving it to an underlying theorem prover."*

(text copied from

<http://plato.stanford.edu/archives/fall2001/entries/reasoning-automated/#12>)

Look Everybody I found an article about AI's Involvement in Games and it has this quote:

"The Best Games adapt to the player to provide an entertaining experience. But handling adaptation in immersive 3D worlds isn't trivial! In terms of AI, the Challenge is to build a system that:"

1. Requires little work to script each possible adaptation

2. Allows you to control the outcome to prevent unrealistic situations."

The Article is :

<http://aigamedev.com/architecture/learn-realistic>

To help guard against any copyright infringements, our wiki is kept inside our Blackboard classroom management system as opposed to housing it on one of the free online wiki sites. Another advantage of using the classroom management system's wiki tool is that most management systems allow the instructor to view the document as it changes. Blackboard will document the number lines changed by a student, and the number of edits a student makes, thus making it easier to grade the project. Wikis

can also be used to increase peer to peer learning. For example, one colleague encourages his students to use a wiki to create a class study guide.

Wikis are a great way for commuter institutions such as ours to foster collaborative work among students. Many of our students go to school and work full or part time. Unlike residential colleges, our students either live at home or in off campus housing that may be a distance from the college. It is much harder for students to physically “get together”. Because of time and distance constraints, students find collaborating with other students difficult. Wiki’s are asynchronous, removing much of the physical barriers to collaboration therefore making these types of collaborations more feasible.

In addition to the wiki, students were required to complete an online exam based on the AI History Wiki. The exam was not an actual test, but a graded homework assignment. The homework was organized in the form of multiple choice/short answer type questions. The advantage to this is that, again, classroom management systems have methods for automatically grading short answer questions and entering the grades into grade books maintained by these systems. Most times these grade books can be exported into standard formats such as CSV files and imported into excel spreadsheets. The exam also focused students on which portions of the wiki were important to know for the “real” exam.

Online Surveys

One assignment that we continually do is to simulate a Turing test by having students converse with online chatbots. (S. P. Imberman 2005). In this assignment, students choose two chatbots and provide the instructor with a digital copy of their conversations with these bots. They also converse with two classmates who they haven’t known previously. This is to prevent the students from conversing on a personal level, since the chatbots are not very personal. The conversations are collected and then randomly presented to the students, who then classify each conversation as to whether their classmate is conversing with a chatbot or another classmate. The results are tabulated to see how close online chatbots come to passing the Turing test.

Previously, all conversations were posted online in a single web page document. A paper checkoff sheet was used by the students to record their classifications. The results were tabulated in class from these checkoff sheets. This semester, all conversations were placed into a survey that was implemented by our classroom management system. There were several advantages for this. The survey was configured such that students could only access it once,

and each conversation was individually presented to the students instead of all at once. By doing it this way we were able to have students classify each conversation, without being influenced by subsequent conversations. This wasn’t possible with the web based approach.

Another advantage was that the management system collated and organized the results. Usually we would spend one class period discussing the conversations and doing the collations and analyses. Now we were able to spend more time on discussing the reasons why certain human conversations seem more robotlike, and why some robot conversations seemed more humanlike! Below is a sample of a conversations between a student and a chatbot that was voted by all to be a student-student conversation. Students were instructed to label each conversant as either Person A or Person B.

person a: hi person b, how is the weather by you?
person b: it is hot and sunny, how about you?
person a: it is cold and sunny where I live.
person b: where do you live?
person a: NY, and you?
person b: NY, do you like video games?
person a: yes, my favorite system is ps3 and I am waiting for Final Fantasy 13
person b: Me too! What is your favorite food?
person a: pizza, what is yours?
person b: lasagna is the greatest, do you smoke?
person a: no, it is bad for health. Do you?
person b: no I do not for the same reason.
person a: hopefully smoking can end, do you agree?
person b: yes, it should end asap
person a: what was dinner last night?
person b: lasagna, and what was yours?
person a: pizza with mushrooms
person b: sounds good, I like mushrooms too.
person a: my Favorite topping!
person b: mine is black olives.

Discussion and Conclusions

For our course we used the blogs, wikis, and discussion board that is integrated into Blackboard, the classroom management system used at our institution. There are many free blog, wiki and discussion board sites on the internet one can use, some better than Blackboard. Our decision to stay within the institution’s classroom management system was influenced by administrative ease (all students are automatically registered into a site for each class) and the security offered by the management system. In addition, various grading tools for wikis and

discussion boards are available in Blackboard that allows the instructor to more easily see each student's contribution.

The assignments presented in this paper represent class assignments that were enhanced using online techniques. Other more traditional assignments involved solving a 16 puzzle using heuristics (S. P. Imberman 2005), solving the cannibals and missionaries problem using depth first search, and a semester long project to create an intelligent robotic agent, in association with the MLExAI project (<http://uhaweb.hartford.edu/compsci/ccli/cria.htm>), were also assigned.

In the past, this course has been taught in a traditional face to face format. For the first time this semester we are attempting to accommodate our student's time schedules by offering the course as a hybrid online course. Hybrid online courses have some online classes and some face to face classes. Our robotics project was done in our robotics lab and was by necessity face to face. Our lecture/discussion component was done face to face, and recorded using *Camtasia Studio* software (www.techsmith.com) for asynchronous online viewing. The course is ongoing and as of yet we have no real data as to the effectiveness of this approach. Anecdotal evidence seems to indicate positive student feedback on assignments and lectures.

Summary

In this paper we have illustrated how online techniques and technologies can enhance AI assignments. By creating a digital extension to an AI course, one can encourage more peer to peer interaction, collaboration, and learning. Automatically graded homework can encourage instructors to provide more homework practice. Wikis, blogs, and discussion boards allow students to express their enthusiasm and frustrations with course materials. They also provide a venue where project assistance need not wait until the next class meeting. Overall, the learning experience can be extended given these various technologies.

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