

Course Numbers: CS 4731/8803
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236 Technology Square Research Building (TSRB)
Course webpage: <http://www.cc.gatech.edu/~surban6/cs4731/>
Meeting Time: Tuesday/Thursday 2p-3:45p
Location: Klaus 2447
Office Hours: TBA
Last revised: 2013-05-13

Overview

Disclaimer: This syllabus is a mashup of the Game AI syllabi written by the previous three instructors of the course held at Georgia Tech.: Dr. Mark Riedl, Dr. Brian Magerko, and Brian O’Neill

The purpose of this course is for undergraduate and graduate students in Computing and related fields to gain a breadth of understanding of the toolbox of AI approaches employed in digital games. This involves learning some basic topics covered in other AI courses, but with a focus on applied knowledge within the context of digital games.

The discipline of (academic) Game AI was launched with a justification of interactive entertainment (i.e., computer games) as a domain of study in AI when they posited that computer games could act as testbeds for achieving human-level intelligence in computers, leveraging the fidelity of their simulations of real world dynamics [c.f. ‘Human-Level AI’s Killer Application: Interactive Computer Games’ by Laird and van Lent]. There is an additional (industry) perspective on AI for games: increasing the engagement and enjoyment of the player. This perspective is consistent with the perspective of computer game developers. For them, AI is a tool in the arsenal of the game to be used in lieu of real people when no one is available for a given role. Lectures and projects will explore both of these views of Game AI, with an emphasis on the latter.

Game AI is distinct from academic AI in that the end behavior is the target. Game AI programmers are less concerned with the underlying algorithms and more so with the end result. For example, if having an AI ‘cheat’ provides a more entertaining experience, then cheating will likely be a main component of the design. There are also characteristics of many games that focus Game AI on specific problems, like navigation through a virtual world, tactics, and believable behavior. Academic AI researchers are more concerned with rational behavior, knowledge representations, robust multi-agent communication, etc. However, there are overlaps between the two domains, where the desired behavior requires less cheating and more realistic decision-making. This course will survey topics related to this overlap, with a focus on applying what we review in depth through implementations in digital games.

Learning Objectives

Students in this course will:

- LO1: ...gain a breadth of understanding of current issues and techniques in academic and industry game AI.
- LO2: ...have hands-on experience in working with different game technologies and incorporating AI programming techniques within those technologies.
- LO3: ...gain valuable experience in communication skills about game AI topics, their own ongoing project work, and as critiques of others' works.
- LO4: ...better understand the relationship between game AI and aesthetics, narrative, and player experience.
- LO5: ...gain experience in working with a group on a self-directed final project.

Prerequisites

- AI Background
 - Coursework in artificial intelligence such as an introductory course in AI or a game AI course is required. System building, game development, or game design skills will be helpful but are not required. **Students should be comfortable with building complete systems and working with unfamiliar codebases.**
- Programming skills:
 - Students are required to have solid programming skills. Experience with c#/java or the ability to pick them up as part of the course is required. Development using SVN/git or other version control methods is highly encouraged, but not required or supported by the class (or the free version of Unity). **Students are expected to pick up pre-existing code bases and develop their AI code within that code base as part of the class.**
- Required books:
 - Millington's *Artificial Intelligence for Games* is required, and Buckland's *Programming Game AI by Example* is very strongly suggested. Books have been ordered at Engineers' Bookstore and are available on Amazon. There is also a "desk" copy ordered, and the library may have a copy.

Course Communication

In the past, T-square, Piazza, and Google groups have been used with success for this course. All students should add themselves to the GT Game AI group (<http://groups.google.com/group/gatech-gameai>). The use of the group is a resource for technical and design issues students have from year to year, rather than acting as a standalone discussion on T-square (<https://t-square.gatech.edu/portal>) or Piazza (<https://piazza.com/>). As a means of avoiding confusion about where to look for information, we will primarily use Piazza for all communication this summer. Rather than emailing technical questions to me, I encourage you to post your questions on Piazza to foster community. If you have any problems or feedback for the developers, email team@piazza.com.

All emails to me regarding the course should contain **GTGameAI** in the subject. Failure to include this in the subject may result in misfiling of the email and a lack of response.

Assignment Policy

Projects are due at 11:55pm via T-Square on the announced due date. Late work will not be accepted under any circumstances.

Each assignment comes with suggested milestones. Given the accelerated summer schedule, stricter adherence to these milestones will be necessary in order to ensure that you have sufficient time to complete the projects.

Grading Policy

Assignments and presentations will constitute 100% of your grade. You may lose up to 10% of your grade for failure to participate in class. There will be no exams, but I reserve the right to give unannounced quizzes (as a means to get us back on track) if attendance, participation, or completion of reading assignments fall below my expectations. All assignments and projects will be graded by letter grade. *Failure to use backup and version control development practices is not a valid excuse for late or missing submissions.*

Students will be expected to give presentations about their work on assignments prior to project deadlines. These presentations are informal, but give the opportunity to provide and receive feedback from the instructor and their peers about their progress on each project. Repeated failure to be present when called for such presentations will be reflected in your participation grade.

If you feel like the grade for a given project was not fair, please submit within 1 week (via email, with GTGameAI in the subject) of receipt of your grade a Word document or PDF containing the following:

- No more than 1 page of information
- A comparison between what you submitted and the grading criteria given for the assignment and the feedback given for your assignment
- What you feel your grade SHOULD be given this comparison

Please keep in mind that a requested regrade will prompt me to revisit your project in much greater detail. Your grade may change for the better or worse depending on what I see, but will be responsive to any reasonable and well-founded requests. Requests submitted more than a week after your grades have been returned to you will not be accepted.

Legalese

This syllabus should be considered a living document subject to change throughout the course of the semester. I reserve the right to modify any of these plans as need be during the course of the class; however, I won't do anything too drastic, and you'll be informed as far in advance as possible. There are multiple places in the class schedule to accommodate student interests in particular subjects.

I expect you to understand and follow the honor code