CS 7632 Game AI - Syllabus

Instructor

Jeff Wilson, PhD
Senior Research Scientist
Institute for People and Technology
jeff.wilson@gatech.edu

Description

Welcome to CS 7632 Game AI.

As applied to video game development, Artificial Intelligence serves a different purpose than general AI research. This is due to the fact that general AI is often concerned with finding a correct and/or optimal answer. However, the goal of Game AI is to simply provide a fun gameplay experience. Because of this, Game AI solutions may involve cutting corners, tricking the game player, or otherwise cheating in regard to implementation. Game AI also faces the challenge of limited computational resources as video games involve a lot of subsystems that must work in coordination such as graphics, sound, physics simulation, etc. Game AI is often a lower priority in this list of game features and further motivates the corner cutting strategies.

While Game AI generally leverages concepts from classic AI research, you will see that there are many unique implementation strategies for achieving a fun game play experience. The Game AI course covers topics including agent movement, path planning, decision making, goal-oriented behavior, learning, and procedural content generation.

Technical Requirements and Software

The majority of software development is performed with the Unity Engine and the C# programming language. Students need a Windows PC or Mac capable of running Unity. Some assignments may use supplementary tools such as Python.

Suggested Background Knowledge

Students are expected to be familiar basic computer science concepts such as algorithms and data structures. Students should also have a strong background in software development.

Students are not expected to be familiar with the Unity Engine. For those not already familiar with C#, familiarity with a strongly typed object-oriented programming language such as Java is helpful.

Assignment Weighting

Note: Assignments and weighting may change semester to semester. Please see Canvas for specifics.

Type	Assignment	Value
Exams	(30% Total)	
	Midterm – Covers all lecture topics up to the date of the exam	15%
	Final – Not cumulative. Covers all lecture topics since the midterm	15%
Individual Assignments	(70% Total)	
	Grid Navigation	7%
	Path Network	7%
	Navmesh	14%
	A*	14%
	Decision Making (Finite State Machine)	14%
	Procedural Content Generation	14%

Recommended Text

Artificial Intelligence (AI) for Games 3rd Edition
Millington & Funge
ISBN-13: 978-1138483972
ISBN-10: 1138483974

Free version via GT SSO login: https://learning.oreilly.com/library/view/ai-for-games/9781351053280/

Lecture Topics

Subject to change.

1. Course Intro
2. Agent Movement Steering Behaviors
3. Coordinated Movement
4. Path Planning
5. Decision Making: Finite State Machines, Rule based systems, Decision trees, etc.
6. Planning
7. Learning
8. Procedural Content Generation

Course Policies

Attendance

Institutional approval is required to make up for missing a class event that requires participation (e.g. submitting an exam or assignment). However, this is rarely an issue as deliverables are generally available to complete over a range of dates.

Refer to the Course Catalog for procedures for obtaining an institutional ruling on excused absences and other exceptions. You might start with the Attendance Policy: http://www.catalog.gatech.edu/rules/4/

Academic Integrity

Collaboration
You and fellow students are welcome to discuss assignments with each other, but you may not share code or detailed solutions. Piazza is recommended for assignment discussions.

Generally, you should expect to author all code necessary to complete each assignment. You must not obtain code or libraries from 3rd parties to complete your assignments unless specifically provided/approved.

If you have any doubts regarding interpretation of the integrity policy, please contact the TAs or instructor(s) for clarification.

The Office of Student Integrity will be notified if an academic integrity violation is suspected.

Plagiarism
Do not copy code from current or former students of the class. It's best that you don't even look at anyone else's code or other authored deliverables.

Also, please don't host your assignments in a publicly accessible location (e.g. github).

Self-Plagiarism
Double-dipping with another course deliverable requires approval in advance from all instructors involved (e.g. video game design, capstone project, etc.). You must obtain approval even if you aren't taking the courses in question during the same semester.

You can use your own code/assets (exclusively your own) that you developed without advanced permission if it is unrelated to your GT coursework. You still need to cite it in your readme though.

Late Policy

A 24-hour grace period is allowed for late submission with no penalty, unless otherwise noted. Assignments are not accepted beyond 24 hours late.

Incompletes

Incompletes are rarely given for this course.

The institutional policy is available here:

http://www.registrar.gatech.edu/students/igrades.php

Note the line:
"If the student is missing so much work that a passing grade could not have been assigned…"

Be aware that "work" referred to above includes all course assignments, including those not due yet.

Hardships are best addressed via normal course withdrawal or as a last resort, petition to withdraw after drop day. Note that late withdrawals are very rarely granted if requesting withdrawal from an individual class as opposed to full withdrawal due to hardship.

Communicate with your advisor, instructors, and Dean of Students regarding hardships as soon as problems arise.

Warning About Cross List Double-Dipping

DegreeWorks blocks "double-dipping" on cross-listed course credits! If you previously took CS 4731 (undergrad section) and counted it towards a degree, you cannot count CS 7632 towards another degree.
There is no slipping through the cracks, DegreeWorks *will* catch you! (but Oscar will not warn you when registering).

This policy applies to ALL cross-listed GT courses.