Video Game AI: Lecture 1
Course Intro

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AI for Video Games

- What are we talking about today:
  - About this course
    - Homework, exams, projects
  - Intro to AI in games (first ~hour)
    - How does it related to other AI
    - What is hard/interesting/fun

Announcements

- International Tabletop Day
  - http://tabletopdaydenver.eventbrite.com/#
- Summer Research Positions

Course Details

- Inverted classroom style
- Short assignments in XCode / iOS
  - One blogging assignment
- Group project
  - Build compelling AI game

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AI for Video Games

- Your instructor:
  - Developed games for fun while in university
    - Dome Wars (Mac)
  - Worked in academia on more traditional games
  - Worked in industry applying research
    - Dragon Age: Origins

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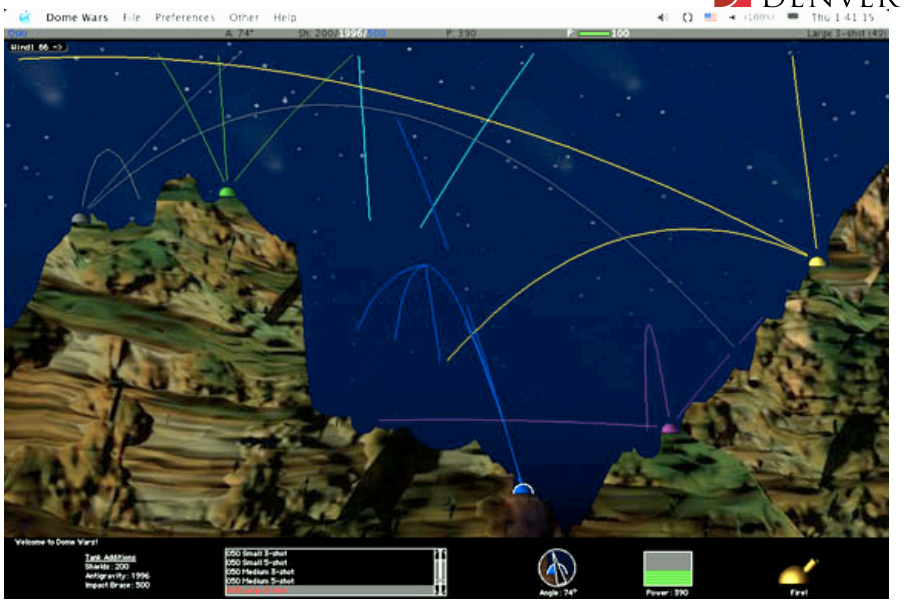

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Artificial Intelligence

- What do you think of when someone says

Artificial Intelligence

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Artificial Intelligence

- What is intelligence?
- Merriam-Webster:
  - (1) : the ability to learn or understand or to deal with new or trying situations : reason; also : the skilled use of reason (2) : the ability to apply knowledge to manipulate one's environment or to think abstractly as measured by objective criteria (as tests)
  - http://www.merriam-webster.com/dictionary/intelligence

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Artificial Intelligence

- What is artificial intelligence?
- Merriam-Webster:
  - 1: a branch of computer science dealing with the simulation of intelligent behavior in computers
  - 2: the capability of a machine to imitate intelligent human behavior

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Video Game AI versus Academic AI

- Game AI programmers have to ship a title
  - As a consequence very pragmatic
    - Use whatever works
    - What is quick to implement
    - What produces robust behavior
    - What you can learn to use qui

Chris Hecker's Wish List for Researchers

1. robustness
2. simplicity
3. performance

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Video Game AI versus Academic AI

- Academic AI researchers want to perform research and publish papers
  - As a consequence:
    - Are interested in theoretical performance
    - Are interested in what can be proven
    - Are interested in problems not faced in games
    - May not show explain why something won't work
    - There are very few end-users

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Industry versus academia

- Lots of fun things in industry
  - Work on projects that millions of people may play
  - Challenging problems
    - Will understand problems deeper than any academic
- But…
  - May have to put out fires

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What is the goal of AI?

- Is it to crush humans?
  - Perhaps in academics
- It is to entertain humans!

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AI and robotics

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AI is related to robotics

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AI is hard: the uncanny valley

Masahiro Mori, 1970

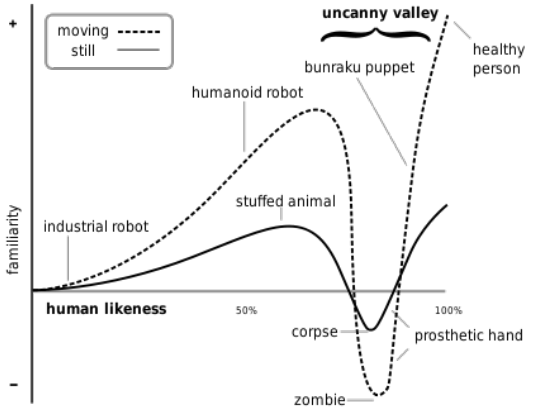

Image from: http://en.wikipedia.org/wiki/Uncanny_valley

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Where is the AI?

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(Weak) AI can be used to your advantage

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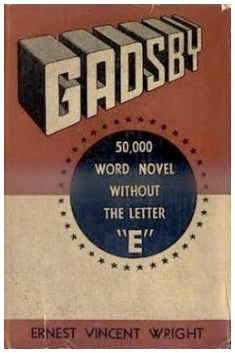
Key ideas for this course

- Good design is more informed by what you can't do than what you can do
  - Embrace restrictions as a way to be creative



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Key ideas

- Human perception is everything
  - Good AI is good animation
  - Good AI is good game design
  - Good AI is good sound design

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AI and animation / graphics

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AI and Game Design

- AI is often used to teach players how to play a game
  - Players get more competent and can beat progressively harder AI
  - Does the challenge continue once the game is mastered?
- AI in *Empire: Total War* couldn't attack amphibiously
  - Leaves glaring holes in strategy
  - In *Rise of Nations* land forces can turn into boats
- Made the game more interesting; better design!

Example from Soren Johnson "The Chick Parabola", Game Developer Magazine, Sept. 2010

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Key ideas

- AI should be exactly smart enough, but not smarter
  - The intelligence required depends on the interactions
  - The longer on screen, the more likely to do something “dumb”

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Bad movement in games!

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Bad movement in games!

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Key ideas

- AI should be exactly smart enough, but not smarter
  - The intelligence required depends on the interactions
  - The longer on screen, the more likely to do something “dumb”
- It is easy for something smart to be interpreted as dumb by the users
  - It is also easy for something dumb to be interpreted as something smart!

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Want to build good AI?

- Observe the world:
  - How do people around you behave?
  - Watch:
    - How people move in conversation
    - How far apart people stand
    - How a new person joins a conversation
    - How people avoid each other
    - How gaze is adjusted

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AI is an open question

- GDC Talk by Chris Hecker: Structure vs Style
- In graphics how is structure defined?
  - Triangles & texture mapping
  - Triangles have a simple structure
  - Artists can “easily” author and define the style
- What is the Photoshop of AI?

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Unfortunately...

- We aren’t going to talk about these high-level topics for most of the course
  - You need to know the architectures and techniques that are being used
    - Many of these are generic to Computer Science
    - We will discuss how they are used to create interesting behavior
  - Then, we can return to the discussion in the last week of the course

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A few AI people to follow on twitter

@AiGameDev, Alex Champandard (aigamedev.com)

@dskline - Dan Kline

@MikkoMononen - Mikko Mononen (Recast)

@zoombapup - Phil Carlisle

@spyparty / @checker - Chris Hecker

@jurney - Chris Jurney

@jorkin - Jeff Orkin, F.E.A.R.; MIT PhD student

@plushapo - Borut Pfeifer

https://twitter.com/#!/tuan_kuranes/ai/members