Artificial Intelligence

General Course Information

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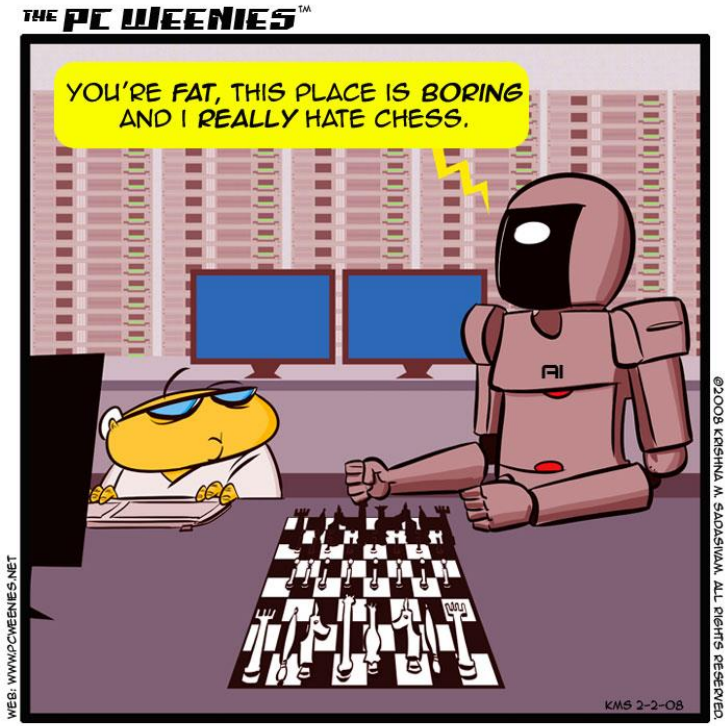
Artificial Intelligence

- Professor: Edirlei Soares de Lima
  - Education:
    - B.Sc. in Computer Science – UnC
    - M.Sc. in Computer Science – UFSM
    - Ph.D. in Computer Science – PUC-Rio
  - Teaching Experience: PUC-Rio, UNIRIO, UERJ, UE-IADE
  - Game Experience:
    - Game Engines: RPG Builder, 3D Game Builder (http://www.3dgamebuilder.com.br/);
    - Research Projects: most are related with Logtell (http://www.icad.puc-rio.br/~logtell/);
    - Games: Krimson (Best Game Award at SBGames 2010 – Indie Game Development Festival), and several other prototype games.
  - More Information: http://www.inf.puc-rio.br/~elima/

What is Artificial Intelligence?

- Artificial intelligence (AI) is about making computers able to perform the **thinking tasks** that humans and animals are capable of.
  - Computers are very good at: arithmetic, sorting, searching, play some board games better than humans, ...
  - Computers are not very good at: recognizing familiar faces, speaking our own language, deciding what to do next, being creative, ...



HOW YOU'LL KNOW WHEN YOU'VE TRULY SUCCEEDED IN THE FIELD OF A.I. RESEARCH.

What is Game AI?

- While academic AI concerns solving problems optimally, game AI is all about entertaining players.
  - Complexity Fallacy: it is a common mistake to think that complex game AI equals better character behavior.
  - Illusion of Intelligence: the player believes an agent is intelligent, then it is intelligent.
  - Perception Window: most players will only come across some characters and enemies for a short time.

Artificial Intelligence

- Games & Apps Development – AI: learn common and fundamental artificial intelligence concepts and techniques.

- Module Content:
  1. Introduction to Artificial Intelligence;
  2. Pathfinding;
  3. Finite State Machines;
  4. Automated Planning;
  5. Randomness and Probability;
  6. Sensor Systems;
  7. Steering Behaviors for Autonomous Agents;
  8. Behavior Trees;
  9. Machine Learning.

Method

- Active and experiential learning:
  - Theoretical concepts;
  - Practical examples;
  - Implementation exercises;
- Game framework: Unity
- Semester's PBL team project:
  - Implementation of the game AI using the techniques learned during the course.

Evaluation

- Continuous Assessment (bipartite):
  - [50%] Intermediate assessment:
    - [60%] Individual exercises on the concepts learned;
    - [40%] Three intermediate deliveries of the team project (within the semester's PBL team project).
  - [50%] End of term assessment:
    - [100%] Final delivery of the team project (within the semester's PBL team project) with individual discussion.

- Final Assessment:
  - [100%] Individual project development, delivery, and discussion.

Evaluation

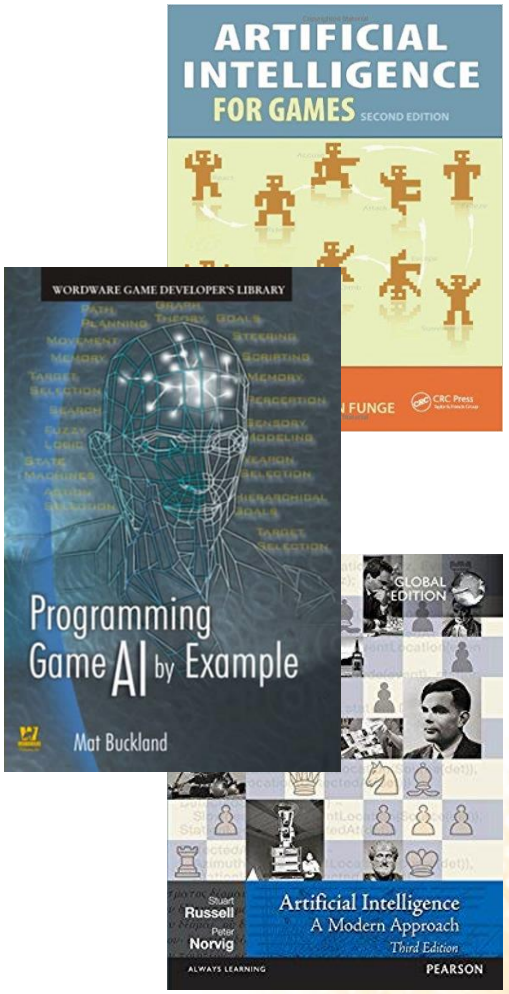
- Project Deliveries:
  - **1st delivery**: identification of the AI necessities:
    - Definition of the enemies/NPCs that require AI;
    - Description of the desired behaviors for the enemies/NPCs;
    - Identification of the AI techniques needed;
  - **2nd delivery**: working prototype with basic AI:
    - Implementation of the AI for the main enemy/NPC;
  - **3rd delivery**: full implementation of the AI:
    - Implementation of the AI for all enemies/NPCs;
  - **4th delivery**: final version of the game:
    - Overall implementation and integration of the AI in the game.

Bibliography

- Millington, I., Funge, J. (2009). **Artificial Intelligence for Games** (2nd ed.). CRC Press. ISBN: 978-0123747310.

- Buckland, M. (2004). **Programming Game AI by Example**. Jones & Bartlett Learning. ISBN: 978-1-55622-078-4.

- Russell, S. and Norvig, P. (2009). **Artificial Intelligence: A Modern Approach** (3rd ed.). Prentice-Hall. ISBN: 0-13-604259-7.



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- Course webpage:
  - http://www.inf.puc-rio.br/~elima/game-ai/

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