COMP702: Classical Artificial Intelligence

1: What Is AI?

Module introduction

Aim

To confidently implement artificial intelligence techniques which are commonly used to solve problems in industry.

Description

This module introduces you to the core techniques of artificial intelligence (AI): computational techniques for tackling problems that normally require human intelligence. You will refine your understanding of these techniques by applying them to well-defined problem domains, laying the foundation for more complex applications in subsequent modules. A deep knowledge of the past and present of AI will equip you for future developments in this fast-moving field.

Description (cont)

This module covers "classical" AI focusing upon techniques that are commonly applied to decision-making and content generation in games and beyond. Applications of such techniques include the authoring of non-player character behaviours in games, the navigation of complex environments, the formation of logistical plans with respect to constraints, and the generation of content in creative domains. You will build a portfolio of AI instances applied to simplified versions of these and other domains. Thus you will study the strengths and weaknesses of standard AI techniques, gaining the ability to select appropriate technologies to solve real problems and to contextualise recent advances in the field.

Assignments

- Assignment 1: Portfolio of AI Instances (100%)
- A portfolio of **three** AI demos
  - Authored behaviours
  - Search / planning
  - Logic programming / constraint solving
- See LearningSpace for assignment brief
- See MyFalmouth for deadline

Timetable

- See MyTimetable
- Weekly **lectures** (1hr) — taught content
- Weekly **workshops** (2hr) — development support
- Fortnightly **seminars** (2hr) — paper discussion

Paper Club

Please read the following paper ahead of next week's seminar:
Shoulson A., Garcia F.M., Jones M., Mead R., Badler N.I. (2011) Parameterizing Behavior Trees. In: Allbeck J.M., Faloutsos P. (eds) Motion in Games. MIG 2011. Lecture Notes in Computer Science, vol 7060. Springer, Berlin, Heidelberg
(See LearningSpace for PDF link)

What is “Classical” AI?

What is AI?

- ✗ Simulating human brains or human intelligence
- ✓ Performing tasks by machine (or by software) which would ordinarily require human intelligence
- ✓ Making decisions to achieve goals

What is AI?

- ✗ Programming machines to learn by themselves
- ✓ Machine learning is an important sub-field of AI, but there are many other AI techniques

What is AI?

- ✗ Programming machines to possess general intelligence, self-awareness, consciousness
- ✓ Maybe one day, but for now this is pure sci-fi
- ✓ Programming machines to carry out (or learn to carry out) a specific type of task

What is classical AI?

- A.k.a. **Good Old Fashioned AI**
- A.k.a. **Symbolic AI**
- Based on symbolic ("human-readable") representations of problems, logical systems, search spaces
- As opposed to machine learning, evolutionary algorithms etc which tend to be "black boxes"

Applications of AI in games

- Enemies and other NPCs
- Opponents in {board, card, strategy} games
- Automated playtesting
- Directors, hints, adaptive difficulty
- Procedural content generation
- Content production tools
- Procedural narrative
- Agent-based simulations
- ...

Why game AI?

- Games are a useful testbed for new AI technologies
- Game theory is a useful mathematical abstraction for many types of problem
- Game AI is more than pure problem solving — game AI needs to create an entertaining experience