1. Real-Time Decision Support Meeting

Fridays 14:00-15:00
CSC 333
http://www.cs.ualberta.ca/~mburo/rtds.html
rtds@cs.ualberta.ca

Agenda

- What are Real-Time Support Systems?
- Project Overviews:
  - Yours truly: Real-Time Games Research + Demonstration
  - Vadim Bulitko: ICRL Research Overview
- Discussion
  - Research Directions, Project Poll
  - Upcoming Presentations / Papers to read

What are Real-Time Decision Support Systems?

- Decision-making tools that require timely responses
- Real-world intelligent systems call for
  - **Autonomous** intelligent agents
  - acting in the face of **uncertain knowledge** and
  - **limited** computational resources
- Examples:
  - Dynamic air routing planning & flow management
  - Online Auction Decision Support
  - Advanced Chess
  - Tactical and strategic aid on the battle-field

Real-Time Strategy Games

- Very popular PC games. Million-sellers!
  - WarCraft, StarCraft (Blizzard)
  - Age of Empires (Ensemble Studios)
- Players set up **economy**, build **armies** and struggle over **resources** in a 2.5D world
- **real-time – 5+ simulation cycles/sec**

What makes RTS games hard?

- Imperfect information
- Hundreds of objects
- Micro-actions, tricks of the trade don't work
- Real-time action!

Computer opponents are stupid because they don't
adapt, look-ahead, grasp spatial and temporal relations, collaborate, ...
Easy for humans!

RTS game projects

- RTS programming environment, server
- State space abstraction & planning
- Opponent modeling, learning
- TD learning of low-level behavior
- Dealing with incomplete information: when and where to scout? What are the opponents' intentions?
- Finding safe routes fast ("path-finding")
- …

First Things First

- Create an RTS game programming environment – test-bed for future research
- Partly done: ORTS
  - Hack-free server-side simulation
  - Open message protocol
  - Clients can connect their own programs
  - Server only sends out information clients have access to
- Define a command hierarchy and associated computational decision models suited for machine learning