1. Real-Time Decision Support Meeting

Fridays 14:00-15:00
CSC 333
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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