CS378
Autonomous Multiagent Systems
Spring 2004

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Week 8a: Tuesday, March 9th

Good Afternoon, Colleagues

Are there any questions?

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Logistics

- Heterogeneous players exist

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- Next week's readings posted

Readings Overview – OASIS

- Concretization of BDI

  – Decision nodes, chance nodes $\Rightarrow$
  beliefs, desires, intentions trees
  pause

- Real time: *assume significant changes to state can be determined instantaneously*

  – No blind execution
  – No constant reevaluation

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  Implemented in an airport!

Class Discussion

Charles Su on BDI

General Domain Characteristics

- Non-deterministic ($\Rightarrow$ beliefs)

- Action choices ($\Rightarrow$ intentions)

- Multiple objectives, possibly incompatible ($\Rightarrow$ desires)

- Environment determines best actions ($\Rightarrow$ desires)

- Incomplete information ($\Rightarrow$ beliefs)

- Dynamic world ($\Rightarrow$ intentions)

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Can't just use decision theory

Decision Theory

- Choice nodes: system gets to choose

- Chance nodes: environment selects randomly

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Deliberation Functions

- Maximin: aim for a best, worst case

- Expected utility: aim for a best expected case

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Examples

Air-traffic Management

70–80 agents at a time

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- One agent per aircraft

- Sequencer

- Wind modeller

- Coordinator

- Trajectory checker

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Keep schedule until complete or impossible

BDI

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Beliefs: All possible wind velocities and trajectories

Desires: Pruned to only keep the right ETA

Intentions: Pruned further to keep only the best in terms of fuel consumption, etc.

Electric Elves: Human Org. Support

- Proxy agents for meeting scheduling

- Activities within an individual research project

- Meeting planning with participants outside the organization

Challenges

- Adjustable autonomy

- Reliable information access

- Capability matching

- Agent coordination

- Scaling up to continual, reliable usability

Technologies

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- MDPs to choose to delay risky decisions

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- Capability characterization language

- Adaptive wrappers for info sources

- Data mining from publication records

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> Used continuously for several months

Question

- Are we ready for free flight and automatic proxy agents?