CS344M
Autonomous Multiagent Systems
Spring 2008

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Good Afternoon, Colleagues

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Are there any questions?

Logistics

- Reading responses

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  – Sorry about textbook availability!

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- Programming assignment
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- Next week's readings are up:
  - Brooks' reactive robots
  - A more deliberative architecture
  - RoboCup case study
- Class discussions start Thursday
  - Finalize after the first few

Franklin and Graesser Definition

An autonomous agent is a system situated within and a part of an environment that senses that environment and acts on it, over time, in pursuit of its own agenda and so as to affect what it senses in the future.

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1. "over time. . . so as to affect what it senses in the future"

2. "in pursuit of its own agenda"

Thermostats

- Are they agents or not?
- How does Wooldridge resolve this?

My Requirements of Agents

- They must **sense** their environment.
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Multiagent systems: Interact with other agents

Learning agents: Improve performance from experience

Autonomous Bidding, Cognitive Systems,
Traffic management, **Robot Soccer**

Your Agent Examples

Your Agent Examples

Automotive: Anti-lock brake system (2); Engine Control Unit; Adaptive cruise control; Traffic light.

Physical Control: Automatic sprinkler system; Auto coffee maker; Washing machine; Electric Guitar

Software Control: File system indexer; Bittorent client; Auto song shuffler for radio

Human monitoring: Pacemaker

Game/entertainment: First Person Shooter enemy; Poker bot

Service: Stock trading agent

Formalizing My Example

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- $\mathcal{O} = \{$Blue, Red, Green, Black, $\ldots\}$
- Rewards in $\mathbb{R}$
- $\mathcal{A} = \{Wave, Clap, Stand\}$

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Unknowns:

- $\mathcal{S} =$ 4x3 grid
- $\mathcal{R} : \mathcal{S} \times \mathcal{A} \mapsto \mathbb{R}$
- $\mathcal{P} = \mathcal{S} \mapsto \mathcal{O}$
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Environments

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- fully observable vs. partially observable (accessible)
- deterministic vs. non-deterministic
- episodic vs. non-episodic
- static vs. dynamic
- discrete vs. continuous
- single-agent vs. multiagent

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- learning?

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It is worth observing that state-based agents as defined here are in fact no more powerful than the standard agents we introduced earlier. In fact, they are *identical* in their expressive power.

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Reactive Agents

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Reactive agents for Thursday's assignment task?

Discussion

What new autonomous do you expect to see in the next 10 years?