CS344M
Autonomous Multiagent Systems

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Good Afternoon, Colleagues

Are there any questions?

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- Pending questions:
  - How are agents like automatons?
  - What is episodic?
  - What is deterministic?
  - Set theory in states/actions?
  - Is a pencil an agent?

Logistics

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- 2D or 3D?

Self-Introductions

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- Name, year, major
- At least one other thing about yourself

Discussion

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.

- Is this a good definition?
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- Can you do better?
- Do they need to be social? persistent?
- Can they cease to be agents in a different environment?
- Autonomy

Varieties of Autonomy

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- What's Wooldridge's take on where autonomous agents lie on the spectrum?
  - Decide how to act so as to accomplish **delegated** goals
- Also mentions **adjustable** autonomy

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

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- single-agent vs. multiagent

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- learning?

Formalizing My Example

Knowns:

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

$$o_0, a_0, r_0, o_1, a_1, r_1, o_2, \ldots$$

Unknowns:

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

$$o_i = \mathcal{P}(s_i) \qquad r_i = \mathcal{R}(s_i, a_i) \qquad s_{i+1} = \mathcal{T}(s_i, a_i)$$

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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 for next Thursday's assignment task?

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Can we possibly expect an agent to perform well in such tasks?