CS343
Artificial Intelligence

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The University of Texas at Austin
Good Morning, Colleagues
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Are there any questions?
Logistics

- Questions about the syllabus?
Logistics

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- Class registration
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- Problems with the assignment?
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- Problems with the assignment?
- Piazza — useful discussion yesterday
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  - CC Kim (houck@cs), and me on everything
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• Questions about the syllabus?

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• Problems with the assignment?

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• Assignments up through week 3
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• Assignments up through week 3
Example Intelligent (autonomous) Agents

- Autonomous robot
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- Information gathering agent
  - Find me the cheapest?
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  - Decides what to buy/sell and does it
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- Meeting scheduler
Example Intelligent (autonomous) Agents

- Autonomous robot
- Information gathering agent
  - Find me the cheapest?
- E-commerce agents
  - Decides what to buy/sell and does it
- Air-traffic controller
- Meeting scheduler
- Computer-game-playing agent
Not Intelligent Agents

- Thermostat
- Telephone
- Answering machine
- Pencil
- Java object
Environments

Environment $\rightarrow$ sensations, actions
Environments

Environment $\implies$ sensations, actions

• fully observable vs. partially observable (accessible)
Environments

- Environment $\mapsto$ sensations, actions
- fully observable vs. partially observable (accessible)
- single-agent vs. multiagent
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- known vs. unknown
Student Examples

- game bot
- robot waiter
- bowling robot, ping pong player
- kiva robots, Mars rover, robot suturing agent
- Wall-E
- Words with friends word checker
- thermostat
- trading agent
- Siri
- Briggo
- piano playing agent
- unhappiness agent
BE a learning agent
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- You, as a group, act as a learning agent
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- Actions: Wave, Stand, Clap
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- **Actions**: Wave, Stand, Clap
- **Observations**: colors, reward
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- **Goal**: Find an optimal *policy*
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- You, as a group, act as a learning agent
- **Actions**: Wave, Stand, Clap
- **Observations**: colors, reward
- **Goal**: Find an optimal *policy*
  - Way of selecting actions that gets you the most reward
How did you do it?
How did you do it?

- What is your policy?
- What does the world look like?
How did you do it?

- What is your policy?
- What does the world look like?
Formalizing what Just Happened

Knowns:
Formalizing what Just Happened

**Knowns:**

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

\[ o_0, a_0, r_0, o_1, a_1, r_1, o_2, \ldots \]
Formalizing what Just Happened

Knocks:

- $O = \{\text{Blue, Red, Green, Black, \ldots}\}$
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$$o_0, a_0, r_0, o_1, a_1, r_1, o_2, \ldots$$

Unknowns:

Peter Stone
Formalizing what Just Happened

Knowns:
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Unknowns:
- \( S = 4 \times 3 \) grid
- \( R : S \times A \mapsto \mathbb{R} \)
- \( P = S \mapsto O \)
- \( T : S \times A \mapsto S \)
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\[
o_i = P(s_i) \quad r_i = R(s_i, a_i) \quad s_{i+1} = T(s_i, a_i)
\]
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Next week: Search

- Textbook readings
- Responses both Monday and Wednesday
- Python tutorial due