Good Afternoon, Colleagues
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Are there any questions?
Logistics

- Class registration
Logistics

- Class registration
- Problems with the assignment?
Logistics

- Class registration

- Problems with the assignment?
  - 3.1: Goal formulation vs. problem formulation
Logistics

- Class registration
- Problems with the assignment?
  - 3.1: Goal formulation vs. problem formulation
- Mailing list
Logistics

● Class registration

● Problems with the assignment?
  – 3.1: Goal formulation vs. problem formulation

● Mailing list
  – CC Daniel (urieli@cs), and me on everything
Logistics

- Class registration

- Problems with the assignment?
  - 3.1: Goal formulation vs. problem formulation

- Mailing list
  - CC Daniel (urieli@cs), and me on everything

- Next week’s assignments up
Logistics

- Class registration
- Problems with the assignment?
  - 3.1: Goal formulation vs. problem formulation
- Mailing list
  - CC Daniel (urieli@cs), and me on everything
- Next week’s assignments up
- Forum for AI talk on Friday at 11
Pending Questions

- Input: device or perceptions?
- Output: actuators or decisions?
Formalizing the Activity

Knowns:
Formalizing the Activity

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 the Activity

Knowns:
• $O = \{\text{Blue, Red, Green, Black, ...}\}$
• Rewards in $R$
• $A = \{\text{Wave, Clap, Stand}\}$

Unknowns:
**Formalizing the Activity**

**Knowns:**
- \( \mathcal{O} = \{ \text{Blue, Red, Green, Black, \ldots} \} \)
- Rewards in \( \mathbb{R} \)
- \( \mathcal{A} = \{ \text{Wave, Clap, Stand} \} \)

| \( o_0, a_0, r_0, o_1, a_1, r_1, o_2, \ldots \) |

**Unknowns:**
- \( \mathcal{S} = 4 \times 3 \) grid
- \( \mathcal{R} : \mathcal{S} \times \mathcal{A} \rightarrow \mathbb{R} \)
- \( \mathcal{P} : \mathcal{S} \rightarrow \mathcal{O} \)
- \( \mathcal{T} : \mathcal{S} \times \mathcal{A} \rightarrow \mathcal{S} \)
Formalizing the Activity

Knowns:

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

Unknowns:

- \( S = 4 \times 3 \) grid
- \( R : S \times \mathcal{A} \rightarrow \mathbb{R} \)
- \( P = S \rightarrow \mathcal{O} \)
- \( T : S \times \mathcal{A} \rightarrow S \)

\( o_i = P(s_i) \)
Formalizing the Activity

Knobs:

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

Unknowns:

- $S = 4 \times 3$ grid
- $R : S \times A \mapsto \mathbb{R}$
- $P = S \mapsto O$
- $T : S \times A \mapsto S$

\begin{align*}
o_i &= P(s_i) & r_i &= R(s_i, a_i)
\end{align*}
Formalizing the Activity

**Knowns:**

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

**Unknowns:**

- \( \mathcal{S} = 4 \times 3 \) grid
- \( \mathcal{R} : \mathcal{S} \times \mathcal{A} \mapsto \mathbb{R} \)
- \( \mathcal{P} = \mathcal{S} \mapsto \mathcal{O} \)
- \( \mathcal{T} : \mathcal{S} \times \mathcal{A} \mapsto \mathcal{S} \)

\[
o_i = \mathcal{P}(s_i) \quad r_i = \mathcal{R}(s_i, a_i) \quad s_{i+1} = \mathcal{T}(s_i, a_i)\]
Formalizing the Activity

Knowns:

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

Unknowns:

- $S = 4 \times 3$ grid
- $R : S \times A \mapsto R$
- $P = S \mapsto O$
- $T : S \times A \mapsto S$

$$o_i = P(s_i) \quad r_i = R(s_i, a_i) \quad s_{i+1} = T(s_i, a_i)$$
Next week: Relaxing the Assumptions

- Textbook readings: continuous spaces, nondeterminism, partial observations, unknown environments, ...
- Responses both Monday and Wednesday
- Search programming assignment