Good Afternoon, Colleagues

Are there any questions?
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- From last week: Difference between open and closed loop?
Logistics

- Thesis defense Monday 11/30 at 10am: GDC 3.516
  - Daniel Urieli: Autonomous Trading in Modern Electricity Markets
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• All grades should now be out
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- Extra credit for taking class survey (provide screenshot as proof)
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- Final projects due next week (team on Tuesday, report on Thursday)!
Class Tournament Teams TODO

- Have penalty kick behavior ready
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- No ground truth measurements provided during games
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• 2D: You can create and compile in a custom banner (not required)
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- Include source code with a README
Class Tournament Teams TODO

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- No ground truth measurements provided during games
- 2D: You can create and compile in a custom banner (not required)
- 3D: Make sure that you’re using a legal set of agent types
- Include source code with a README
- Include a log file of your team playing
Important Items for Final Reports

- Have at least 3 citations (2 non-RoboCup)
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  - Citations include title, authors(s), venue of publication, year
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  - For “RoboCup-X: Robot Soccer World Cup X” RoboCup symposium papers editors are not authors!
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• Include some statistical significance test – you can run games in parallel on condor
Paper Sections

- **Abstract**: brief summary of what paper is about and the results it will show
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- **Introduction/Motivation**: briefly discuss problems/ideas that will be addressed and why the topic/focus of the paper is important
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- **Background:** give technical background information necessary for understanding the paper
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- **Background:** give technical background information necessary for understanding the paper

- **Methodology/Algorithm Description:** explain the new ideas/algorithms that the paper is presenting
Paper Sections

- **Experimental Setup**: detail the experimental setup used to test out the ideas/algorithms/hypothesis in the paper
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- **Related Work:** work related to what has been presented and possibly compares and contrasts related work with that of the work presented in the paper
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- **Results/Analysis**: results and analysis of experiments
- **Related Work**: work related to what has been presented and possibly compares and contrasts related work with that of the work presented in the paper
- **Summary/Conclusion**: short summary of work presented in the paper as well as possibly mentioning future work
Last week: Trading Agent Competition

- Put forth as a **benchmark problem** for e-marketplaces (Wellman, Wurman, et al., 2000)

- Autonomous agents act as **travel agents**
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  - **Agent**: simulated travel agent with 8 clients
  - **Client**: TACtown ↔ Tampa within 5-day period
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  - **Agent**: simulated travel agent with 8 clients
  - **Client**: TACtown ↔ Tampa within 5-day period

- **Auctions** for flights, hotels, entertainment tickets
  - **Server** maintains markets, sends prices to agents
  - Agent sends bids to server **over network**

**Goal**: analytically calculate optimal bids
High-Level Strategy

- Learn model of expected hotel price
High-Level Strategy

- Learn model of expected hotel price distributions
High-Level Strategy

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- For each auction:
  - Repeatedly sample price vector from distributions
High-Level Strategy

- Learn model of expected hotel price distributions
- For each auction:
  - Repeatedly sample price vector from distributions
  - Bid avg marginal expected utility
Finals

<table>
<thead>
<tr>
<th>Team</th>
<th>Avg.</th>
<th>Adj.</th>
<th>Institution</th>
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<td>4154</td>
<td>AT&amp;T</td>
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<td>2859</td>
<td>3338</td>
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</table>

- **ATTac** improves over time
- **livingagents** is an open-loop strategy
Other TAC competitions

- Supply Chain Management
- Ad Auctions
- Power
Recursive Modeling Method

- What should I do?
Recursive Modeling Method

- What should I do?
- What should I do given what I think you’ll do?
Recursive Modeling Method

- What should I do?
- What should I do given what I think you’ll do?
- What should I think you’ll do given what I think you think I’ll do?
Reading Overview — Vidal and Durfee

Recursive Modeling Method

- What should I do?
- What should I do given what I think you’ll do?
- What should I think you’ll do given what I think you think I’ll do?
- etc.
Prediction Method

- Watch for patterns of others
Prediction Method

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  - Might have incorrect expectations, especially if environment changes
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- Trade-off between time and performance gain
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• Use deeper models
  – Includes physical and mental states
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• Trade-off between time and performance gain

• When is it worthwhile to model deeper?
Lessons

- Modeling can help
- There is a lot of useless information in recursive models
- Approximations (limited rationality) can be useful
PLASTIC-policy for Ad Hoc Teamwork

• Forced to work with a group of unknown teammates on HFO task
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- Start with learned models of prior teammates - FQI
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PLASTIC-policy for Ad Hoc Teamwork

- Forced to work with a group of unknown teammates on HFO task
- Start with learned models of prior teammates - FQI
- Select model that is believed to be closest to current teammate(s) - polynomial weights algorithm from regret minimization
- Plan using selected model to perform well on task
Where do Models Come From

Observation:

- Tambe and RMM: use existing model
  - No building a model
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What if we can’t build a full model in advance?
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Observation:

- Tambe and RMM: use existing model
  - No building a model

What if we can’t build a full model in advance?

- What are some incremental approaches for building a predictive model?
Play me at RoShamBo

- Rock beats scissors
- Scissors beats paper
- Paper beats rock
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- What is your strategy before modeling me?
Play me at RoShamBo

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- What is your strategy before modeling me?
- What is your strategy after modeling me?
Play me at RoShamBo

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- What is your strategy before modeling me?
- What is your strategy after modeling me?
- Am I modeling you?
Play me at RoShamBo

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- Scissors beats paper
- Paper beats rock

- What is your strategy before modeling me?
- What is your strategy after modeling me?
- Am I modeling you?
- Would your end strategy change if I can?
Discussion

• How do you deal with a teammate/opponent who is adapting to you as well?
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- Applications of ad hoc teamwork?
Discussion

- How do you deal with a teammate/opponent who is adapting to you as well?
- Applications of ad hoc teamwork?
- What if there was communication?
Discussion

- How do you deal with a teammate/opponent who is adapting to you as well?
- Applications of ad hoc teamwork?
- What if there was communication?
- How would you build an ad hoc teammate?