CS378
Autonomous Multiagent Systems
Spring 2005

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Week 12b: Thursday, April 14th

Good Afternoon, Colleagues

Are there any questions?

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- How can you make agents vote insincerely?

Logistics

- Progress reports back on Tuesday

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- Reactions to Greg's discussion on opponent modeling?

Logistics

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- Reactions to Greg's discussion on opponent modeling?
  - Coach competition opportunity

Class Discussion

Bobby Narula on game theory in practice

General Equilibrium

Consumers: utilities, endowments

Producers: production possibility sets

Variables: prices on goods

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  - Braess' paradox

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small market, both can come out favorably

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  - If rejects, both get nothing
- Another version
  - One person makes an offer
  - Other accepts, rejects, or counters
  - If counters, $.05 lost
  - Game ends with an accept or reject

Nash Bargaining Solution

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Anonymity: no discrimination

Pareto efficiency: if one does better, other does worse

Independence of irrelevant alternatives: removing outcomes doesn't change things

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Independence of irrelevant alternatives: removing outcomes doesn't change things

Maximize $u_1(o) * u_2(o)$

Other DRDM

- Contract nets: task allocation among agents

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  - Leveled commitment (price)

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- Coalitions

Other DRDM

- Contract nets: task allocation among agents
  - Contingencies
  - Leveled commitment (price)
- Coalitions
  - Formation
  - Optimization within
  - Payoff division

Contract Nets

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- Backing out of contracts
  - Contingency (future events)
  - Leveled commitment (price)
  - What are some of the tradeoffs?

Contingency vs. leveled commitment

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1. Hard to track all contingencies

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1. Breacher's gain may be smaller than victim's loss

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1. Hard to track all contingencies
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3. What if only one agent observes that relevant event happened?

Leveled commitment problems:

1. Breacher's gain may be smaller than victim's loss
2. May decommit insincerely (wait for other) - inefficent contracts executed.

Coalitions

- Formation
- Optimization within
- Payoff division

DRDM Summary

For many agents: voting, general equilibrium, auctions

For fewer agents: auctions, contract nets, bargaining

Possible in all: coalitions

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All self-interested, rational agents

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  - result affects all

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- Voting: maximize social good
  - result affects all
- Auctions: maximize profit
  - result affects buyer and seller

Class Discussion

Neil Sachanandani on auctions