

CS344M

Autonomous Multiagent Systems

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Good Afternoon, Colleagues

Are there any questions?

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- Sandholm says “no Nash equilibrium exists”?
- Difference between axiomatic and strategic bargaining?
- How to calculate social welfare metric of a protocol?
- Why use Dutch auction?

Logistics

- Peer review process (due today) - thoughts?

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- Final tournament: Wednesday 12/9 at 7pm in GDC 5.302

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- Explain how you will evaluate performance (test statistical significance)

Auctions vs. voting

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

Gibbard-Satterthwaite

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What about Clarke tax algorithm?

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- Push-over: Rank someone higher to get someone else elected
 - e.g. in a protocol with multiple rounds

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Criterion of independence of irrelevant alternatives. If one set of preference ballots would lead to an overall ranking of alternative X above alternative Y and if some preference ballots are changed without changing the relative rank of X and Y , then the method should still rank X above Y .

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Not all possible!

Condorcet Voting

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- A pairwise method
- Smith set: smallest set of candidates such that each candidate in the set preferred over each candidate not in the set
- Every candidate in the Smith set is relevant

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- 40: $B > C > A$
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- Does that solve everything? What about cycles?

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small market, both can come out favorably

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- Let o^* be the selected outcome

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- Another version
 - One person makes an offer
 - Other accepts, rejects, or counters
 - If counters, \$.05 lost
 - Game ends with an accept or reject

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Anonymity: no discrimination

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

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$$\text{Maximize } u_1(o) * u_2(o)$$

General Equilibrium

Consumers: utilities, endowments

Producers: production possibility sets

Variables: prices on goods

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 - Braess' paradox

Other DRDM

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

Contract Nets

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 - Hill-climbing leads to optimum
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 - 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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2. May decommit insincerely (wait for other) - inefficient contracts executed.

Coalitions

- Formation
- Optimization within
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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