CS378
Autonomous Multiagent Systems
Spring 2005

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Week 4b: Thursday, February 9th
Good Afternoon, Colleagues

Are there any questions?
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- Scientific community? Good for domains other than Thm proving?
- Legacy systems — saved by agents?
- Maintaining a hierarchy like distributed systems / fault tolerance?
- Bayesian uncertainty
Logistics

- Programming assignment 4 - any questions?
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- Orchestra (as a MAS)
Bayes Rule

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- 10% of people tested have cancer: $P(C) = .1$
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Bayes: $P(C|S) = \frac{P(C) \times P(S|C)}{P(S)}$
Some Definitions

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  [Image 40x33 to 271x61]
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[Image of the University of Texas at Austin logo]

Peter Stone
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- **Multiagent Systems**: Behavior coordination or behavior management.
  - No necessary guarantees about other agents.
  - Individual behaviors typically simple relative to interaction issues.
Multiagent Systems

- Study, behavior, construction of possibly preexisting autonomous agents that interact with each other.
  - incomplete information for agents
  - no global control
  - decentralized data
  - asynchronous computation
Why Multiagent Systems?

(7)
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(7)

- Some domains require it. (Hospital scheduling)
- Interoperation of legacy systems (works?)
- Parallelism.
- Robustness.
- Scalability
- Simpler programming.

“Intelligence is deeply and inevitably coupled with interaction.” – Gerhard Weiss
Organizations

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- Engineering
Dimensions and issues

- cooperative vs. competitive
- communication
- trust
- recursive modeling
- coalitions
- game theory
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Convoy example
Conflicts, Resources

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- Negotiation, game theory
Multiagent Planning

- Complex individual agents
- Teamwork modeling
  - Modeling of teammates and opponents
- Recent: emphasis on flexibility in dynamic environments
Communication

- Middle agents (brokers)
- Standard languages
- Ontologies

More next week
Individual Agents

• Purely reactive agents have disadvantages
  – Can’t react to nonlocal info or predict effects on global behavior
  – hard to engineer

• Hybrid approach better

• Hard to evaluate agent architecture against one another