CS395T Agent-Based Electronic Commerce Fall 2006

Peter Stone

Department or Computer Sciences The University of Texas at Austin

Week 10a

Good Afternoon, Colleagues

Are there any questions?





• Thursday's class - no readings





- Thursday's class no readings
- Next readings





- Thursday's class no readings
- Next readings
- CAT how to proceed?



- Thursday's class no readings
- Next readings
- CAT how to proceed?
 - Assume agent strategies will improve; or
 - Work on agent strategies



- If you choose with the minority: +1
- If you choose with the majority: 0



- If you choose with the minority: +1
- If you choose with the majority: 0
- What are the pure strategy Nash equilibria?



- If you choose with the minority: +1
- If you choose with the majority: 0
- What are the pure strategy Nash equilibria?
- What are the mixed strategy Nash equilibria?



- If you choose with the minority: +1
- If you choose with the majority: 0
- What are the pure strategy Nash equilibria?
- What are the mixed strategy Nash equilibria?
- What's the most intuitively "rational" solution?



- If you choose with the minority: +1
- If you choose with the majority: 0
- What are the pure strategy Nash equilibria?
- What are the mixed strategy Nash equilibria?
- What's the most intuitively "rational" solution?
 Symmetric mixed strategy Nash equilibrium



- If you choose with the minority: +1
- If you choose with the majority: 0
- What are the pure strategy Nash equilibria?
- What are the mixed strategy Nash equilibria?
- What's the most intuitively "rational" solution?
 Symmetric mixed strategy Nash equilibrium
- Will everyone do that?



If all believe few will go, all will go. But this would invalidate that belief. Similarly, if all believe most will go, nobody will go, invalidating that belief.



If all believe few will go, all will go. But this would invalidate that belief. Similarly, if all believe most will go, nobody will go, invalidating that belief.

locane powder



If all believe few will go, all will go. But this would invalidate that belief. Similarly, if all believe most will go, nobody will go, invalidating that belief.

locane powder

• Applies in other games (RoShamBo)



 Define a set of strategies, agents choose from among them



- Define a set of strategies, agents choose from among them
- Strategies are history-based



- Define a set of strategies, agents choose from among them
- Strategies are history-based
 - Where do strategies come from?



- Define a set of strategies, agents choose from among them
- Strategies are history-based
 - Where do strategies come from?
 - What about hybrid strategies?



- Define a set of strategies, agents choose from among them
- Strategies are history-based
 - Where do strategies come from?
 - What about hybrid strategies?
 - What about modelling others?



- Define a set of strategies, agents choose from among them
- Strategies are history-based
 - Where do strategies come from?
 - What about hybrid strategies?
 - What about modelling others?
- Compelling?



- Define a set of strategies, agents choose from among them
- Strategies are history-based
 - Where do strategies come from?
 - What about hybrid strategies?
 - What about modelling others?
- Compelling?
- Humans vs. agents any difference?



- -1 if you go and there are ≥ 12 going
- 0 if you don't go
- 1 if you go and there are < 12 going



- -1 if you go and there are ≥ 12 going
- 0 if you don't go
- 1 if you go and there are < 12 going
- Hand up if you're going decide before the signal



- -1 if you go and there are ≥ 12 going
- 0 if you don't go
- 1 if you go and there are < 12 going
- Hand up if you're going decide before the signal
- How differerent from the beauty contest?



- -1 if you go and there are ≥ 12 going
- 0 if you don't go
- 1 if you go and there are < 12 going
- Hand up if you're going decide before the signal
- How differerent from the beauty contest?
- Is aiming for right at 60% good?



- -1 if you go and there are ≥ 12 going
- 0 if you don't go
- 1 if you go and there are < 12 going
- Hand up if you're going decide before the signal
- How differerent from the beauty contest?
- Is aiming for right at 60% good?
- What's relation to co-evolution?



- -1 if you go and there are ≥ 12 going
- 0 if you don't go
- 1 if you go and there are < 12 going
- Hand up if you're going decide before the signal
- How differerent from the beauty contest?
- Is aiming for right at 60% good?
- What's relation to co-evolution?
- Applications?



• Paramter sensitivity — 3 regimes ($2^m/N$)



- Paramter sensitivity 3 regimes ($2^m/N$)
 - random
 - inefficient
 - in between



- Paramter sensitivity 3 regimes ($2^m/N$)
 - random
 - inefficient
 - in between
- Allocative vs. informational efficiency



- Paramter sensitivity 3 regimes ($2^m/N$)
 - random
 - inefficient
 - in between
- Allocative vs. informational efficiency
- Less information \Longrightarrow better performance



- Paramter sensitivity 3 regimes ($2^m/N$)
 - random
 - inefficient
 - in between
- Allocative vs. informational efficiency
- Less information \Longrightarrow better performance
 - More randomness



- Paramter sensitivity 3 regimes ($2^m/N$)
 - random
 - inefficient
 - in between
- Allocative vs. informational efficiency
- Less information \Longrightarrow better performance
 - More randomness
 - How does this relate to auction theory?



- Paramter sensitivity 3 regimes ($2^m/N$)
 - random
 - inefficient
 - in between
- Allocative vs. informational efficiency
- Less information \Longrightarrow better performance
 - More randomness
 - How does this relate to auction theory?
- Relation to efficient market hypothesis?





• Strategy simplex



- Strategy simplex
- System volatility computation



- Strategy simplex
- System volatility computation
- Stochastic fictious play approximation (p. 10)



- Strategy simplex
- System volatility computation
- Stochastic fictious play approximation (p. 10)
- Markov chain of memory (p. 12)



- Strategy simplex
- System volatility computation
- Stochastic fictious play approximation (p. 10)
- Markov chain of memory (p. 12)
- Dynamical stability



• Sai on relevance to financial markets



Emerging order from disorder — connection to chaos theory?



- What's the role of historical information?
- What if each agent were given random (but common) historical information each step?

