CS344M
Autonomous Multiagent Systems

Prof: Peter Stone

Department of Computer Science
The University of Texas at Austin
Good Afternoon, Colleagues

Are there any questions?
Good Afternoon, Colleagues

Are there any questions?

– Could a chatbot tune into current events
Logistics

- Final reports due to me on Thursday
- Just one point off if turned in at my office by Friday at 4pm
  - Only if you’re in class on Thursday!
Discussion

- Should agents model emotions?
Discussion

The Turing Test
Course recap

- You’ve read.
Course recap

• You’ve read.

• You’ve reacted and formed opinions.
Course recap

• You’ve read.

• You’ve reacted and formed opinions.

• You’ve spoken.
Course recap

- You’ve read.
- You’ve reacted and formed opinions.
- You’ve spoken.
- You’ve written.
Course recap

- You’ve read.
- You’ve reacted and formed opinions.
- You’ve spoken.
- You’ve written.
- You’ve coded for a task with no right answer and no way of knowing that you’re done.
Course recap

- You’ve read.
- You’ve reacted and formed opinions.
- You’ve spoken.
- You’ve written.
- You’ve coded for a task with no right answer and no way of knowing that you’re done.

Do you like CS research?
What have we covered?

1. Autonomous agents: What is an agent?
What have we covered?

1. **Autonomous agents:** What is an agent?
2. **Agent architectures:** Subsumption, 3T
What have we covered?

1. Autonomous agents:
   - What is an agent?

2. Agent architectures:
   - Subsumption, 3T

3. Multiagent Systems:
   - Overview, subsumption
What have we covered?

1. **Autonomous agents:** What is an agent?  
2. **Agent architectures:** Subsumption, 3T  
3. **Multiagent Systems:** Overview, subsumption  
4. **Communication and Teamwork:** ACLs, Joint Intentions
# What have we covered?

1. **Autonomous agents:**
   - What is an agent?

2. **Agent architectures:**
   - Subsumption, 3T

3. **Multiagent Systems:**
   - Overview, subsumption

4. **Communication and Teamwork:**
   - ACLs, Joint Intentions

5. **RoboCup case studies**
What have we covered?

1. Autonomous agents: What is an agent?
2. Agent architectures: Subsumption, 3T
3. Multiagent Systems: Overview, subsumption
4. Communication and Teamwork: ACLs, Joint Intentions
5. RoboCup case studies
6. Swarms and ant-based approaches: “Go to the Ant”
What have we covered?

1. **Autonomous agents:**
   - What is an agent?

2. **Agent architectures:**
   - Subsumption, 3T

3. **Multiagent Systems:**
   - Overview, subsumption

4. **Communication and Teamwork:**
   - ACLs, Joint Intentions

5. **RoboCup case studies**

6. **Swarms and ant-based approaches:**
   - “Go to the Ant”

7. **Applications:**
   - KIVA, intersection traffic
<table>
<thead>
<tr>
<th>Topic</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Autonomous agents:</td>
<td>What is an agent?</td>
</tr>
<tr>
<td>2. Agent architectures:</td>
<td>Subsumption, 3T</td>
</tr>
<tr>
<td>3. Multiagent Systems:</td>
<td>Overview, subsumption</td>
</tr>
<tr>
<td>4. Communication and Teamwork:</td>
<td>ACLs, Joint Intentions</td>
</tr>
<tr>
<td>5. RoboCup case studies</td>
<td>“Go to the Ant”</td>
</tr>
<tr>
<td>6. Swarms and ant-based approaches:</td>
<td>KIVA, intersection traffic</td>
</tr>
<tr>
<td>7. Applications:</td>
<td>Nash equilibrium</td>
</tr>
<tr>
<td>8. Game theory:</td>
<td></td>
</tr>
</tbody>
</table>
## What have we covered?

1. **Autonomous agents:**
   - What is an agent?

2. **Agent architectures:**
   - Subsumption, 3T

3. **Multiagent Systems:**
   - Overview, subsumption

4. **Communication and Teamwork:**
   - ACLs, Joint Intentions

5. **RoboCup case studies**

6. **Swarms and ant-based approaches:**
   - “Go to the Ant”

7. **Applications:**
   - KIVA, intersection traffic

8. **Game theory:**
   - Nash equilibrium

9. **Statistical measurements:**
   - t-tests
What have we covered?

1. Autonomous agents: What is an agent?
2. Agent architectures: Subsumption, 3T
3. Multiagent Systems: Overview, subsumption
4. Communication and Teamwork: ACLs, Joint Intentions
5. RoboCup case studies
6. Swarms and ant-based approaches: “Go to the Ant”
7. Applications: KIVA, intersection traffic
8. Game theory: Nash equilibrium
9. Statistical measurements: t-tests
10. Distributed rational decision making: voting, ...
What have we covered?

1. Autonomous agents: What is an agent?
2. Agent architectures: Subsumption, 3T
3. Multiagent Systems: Overview, subsumption
4. Communication and Teamwork: ACLs, Joint Intentions
5. RoboCup case studies
6. Swarms and ant-based approaches: “Go to the Ant”
7. Applications: KIVA, intersection traffic
8. Game theory: Nash equilibrium
9. Statistical measurements: t-tests
10. Distributed rational decision making: voting, ...
11. Auctions: FCC spectrum auctions, TAC
<table>
<thead>
<tr>
<th>No.</th>
<th>Topic</th>
<th>Subtopics/Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Autonomous agents:</td>
<td>What is an agent?</td>
</tr>
<tr>
<td>2.</td>
<td>Agent architectures:</td>
<td>Subsumption, 3T</td>
</tr>
<tr>
<td>3.</td>
<td>Multiagent Systems:</td>
<td>Overview, subsumption</td>
</tr>
<tr>
<td>4.</td>
<td>Communication and Teamwork:</td>
<td>ACLs, Joint Intentions</td>
</tr>
<tr>
<td>5.</td>
<td>RoboCup case studies</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Swarms and ant-based approaches:</td>
<td>“Go to the Ant”</td>
</tr>
<tr>
<td>7.</td>
<td>Applications:</td>
<td>KIVA, intersection traffic</td>
</tr>
<tr>
<td>8.</td>
<td>Game theory:</td>
<td>Nash equilibrium</td>
</tr>
<tr>
<td>9.</td>
<td>Statistical measurements:</td>
<td>t-tests</td>
</tr>
<tr>
<td>10.</td>
<td>Distributed rational decision making:</td>
<td>voting, ...</td>
</tr>
<tr>
<td>11.</td>
<td>Auctions:</td>
<td>FCC spectrum auctions, TAC</td>
</tr>
<tr>
<td>12.</td>
<td>Agent modeling:</td>
<td>coaching, RMM, tracking teams</td>
</tr>
</tbody>
</table>
What have we covered?

<table>
<thead>
<tr>
<th></th>
<th>Autonomous agents:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>What is an agent?</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Agent architectures:</td>
<td>Subsumption, 3T</td>
</tr>
<tr>
<td>3</td>
<td>Multiagent Systems:</td>
<td>Overview, subsumption</td>
</tr>
<tr>
<td>4</td>
<td>Communication and Teamwork:</td>
<td>ACLs, Joint Intentions</td>
</tr>
<tr>
<td>5</td>
<td>RoboCup case studies</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Swarms and ant-based approaches:</td>
<td>“Go to the Ant”</td>
</tr>
<tr>
<td>7</td>
<td>Applications:</td>
<td>KIVA, intersection traffic</td>
</tr>
<tr>
<td>8</td>
<td>Game theory:</td>
<td>Nash equilibrium</td>
</tr>
<tr>
<td>9</td>
<td>Statistical measurements:</td>
<td>t-tests</td>
</tr>
<tr>
<td>10</td>
<td>Distributed rational decision making:</td>
<td>voting, ...</td>
</tr>
<tr>
<td>11</td>
<td>Auctions:</td>
<td>FCC spectrum auctions, TAC</td>
</tr>
<tr>
<td>12</td>
<td>Agent modeling:</td>
<td>coaching, RMM, tracking teams</td>
</tr>
<tr>
<td>13</td>
<td>Multiagent learning:</td>
<td>multiagent RL</td>
</tr>
</tbody>
</table>
What have we covered?

1. Autonomous agents: What is an agent?
2. Agent architectures: Subsumption, 3T
3. Multiagent Systems: Overview, subsumption
4. Communication and Teamwork: ACLs, Joint Intentions
5. RoboCup case studies
6. Swarms and ant-based approaches: “Go to the Ant”
7. Applications: KIVA, intersection traffic
8. Game theory: Nash equilibrium
9. Statistical measurements: t-tests
10. Distributed rational decision making: voting, ...
11. Auctions: FCC spectrum auctions, TAC
12. Agent modeling: coaching, RMM, tracking teams
13. Multiagent learning: multiagent RL
14. Entertainment agents chatbots, music bots
The original question

- What is an agent?
Course recap

- I’ve been impressed by the levels of discussions we’ve had in class
- I’m happy with the progress in writing that many of you have made
- I’m proud of all of you for sticking with it through such a demanding course
Course recap

• I’ve been impressed by the levels of discussions we’ve had in class

• I’m happy with the progress in writing that many of you have made

• I’m proud of all of you for sticking with it through such a demanding course

THANKS!!!
Surveys

- Positive and negative feedback useful
Surveys

- Positive and negative feedback useful
- Invitation to send more feedback online
Surveys

- Positive and negative feedback useful
- Invitation to send more feedback online
  - Should the course be run again?
  - How should it change?
Surveys

- Positive and negative feedback useful
- Invitation to send more feedback online
  - Should the course be run again?
  - How should it change?
- Most important: course rating, instructor rating, written comments
Next Meeting

• The tournament!
Next Meeting

- The tournament!
- Monday, December 13th
- JES 217A
- 9am–noon
Next Meeting

- The tournament!
- Monday, December 13th
- JES 217A
- 9am–noon
- Come prepared to talk (informally) about your team