

CS378
Autonomous Multiagent Systems
Spring 2006

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Final RoboCup Tournament
Tuesday, May 16th, 2006

Agents

1. Sense
2. Decide (“think”)
3. Act

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3. Act

Situated in an Environment

Environments

Environment \Rightarrow sensations, actions

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- fully observable vs. partially observable
- deterministic vs. non-deterministic
- episodic vs. non-episodic
- static vs. dynamic
- discrete vs. continuous
- single-agent vs. multiagent

RoboCup

An international AI and Robotics research initiative

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- Use **soccer** as a rich and realistic test-bed

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 - 2 teams of agents on a field with 2 goals
 - **Purpose:** direct ball into opponent's goal

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- Robot and simulation **competitions**

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 - 2 teams of agents on a field with 2 goals
 - **Purpose:** direct ball into opponent's goal
- Robot and simulation **competitions**
- Workshops; RoboCup-Jr; RoboCup-Rescue

Research Challenges

- Multiple **teammates** with a common goal
- Multiple **adversaries** — not known in advance

Research Challenges

- Multiple **teammates** with a common goal
- Multiple **adversaries** — not known in advance
- **Real-time** decision making necessary
- **Noisy** sensors and actuators
- Enormous state-space

RoboCup Simulator

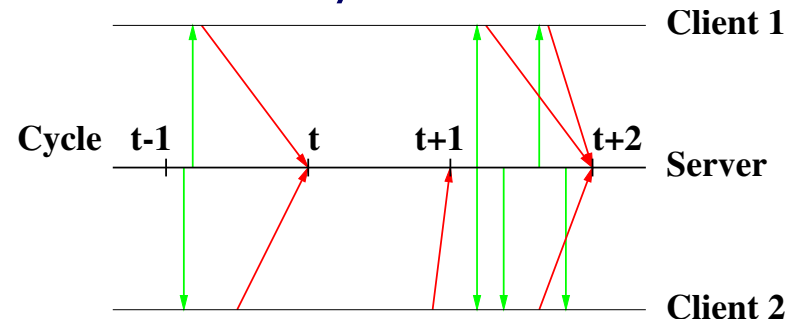


RoboCup Simulator

- Distributed: each player a separate client
- Server models dynamics and kinematics

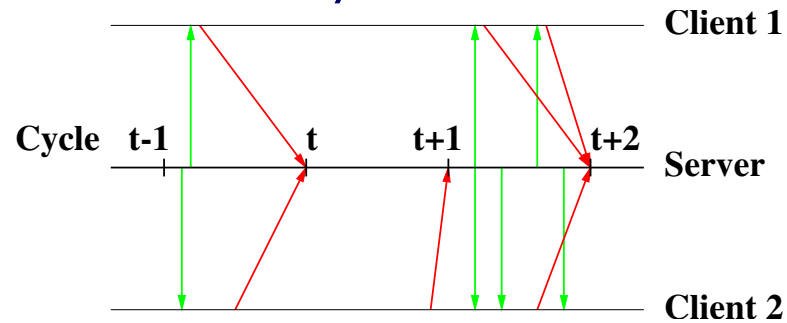
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- Clients receive **sensations**, send **actions**



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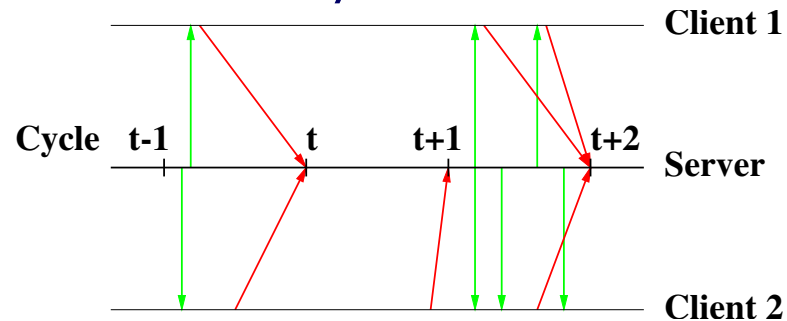
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- Parametric actions: **dash, turn, kick, say**

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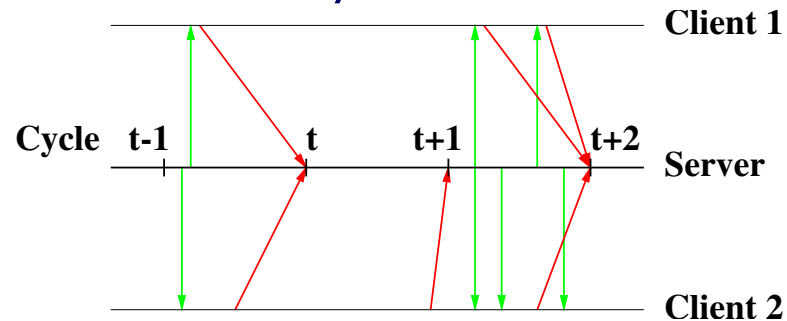
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- Abstract, noisy sensors, hidden state
 - **Hear** sounds from limited distance
 - **See** relative distance, angle to objects ahead

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- Parametric actions: **dash, turn, kick, say**
- Abstract, noisy sensors, hidden state
 - **Hear** sounds from limited distance
 - **See** relative distance, angle to objects ahead
- $> 10^{9^{23}}$ states
- Limited resources : stamina
- Play occurs in real time (\approx human parameters)

Schedule

- Overview
- **Tournament part 1**
- Another class project: coaching
- Video: real soccer robots
- Tournament part 2
- Challenge matches: winner vs.:
last year's champ, UvA-trilearn 2003, Brainstormers 2005

The Teams

- **Marigo**
- **YoHoHo**
- **Team America**
- **Untitled**
- **Goal Rushers**

- **Listos**
- **Dynamic**
- **HIVE**
- **Team Voodoo**

Nimmagadda, Ristroph
Bland, Gray
Huie, Hasan
Plaisance, Romer
Kret, Massey

Huerta, Nelson
Rathmann, Marocha
Menzies, Ma
Schneider, Guimbarda

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- **FOOBAR BAZ**

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- Two groups (5 and 4) with round robins (16 games)
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 - 5th place, 7th place, and 8th place games
- Run **off-line**, but results kept secret

Group 1 Round Robin

	A	B	C	D	E	Pts
A Marigo	—	*				
B YoHoHo	*	—				
C Team America			—			
D Untitled				—		
E Goal Rushers					—	

Group 1 Round Robin

	A	B	C	D	E	Pts
A Marigo	—	7-2				3
B YoHoHo	2-7	—				0
C Team America	*		—			
D Untitled				—		
E Goal Rushers					—	

Group 1 Round Robin

	A	B	C	D	E	Pts
A Marigo	—	7-2	1-4			3
B YoHoHo	2-7	—				0
C Team America	4-1		—			3
D Untitled		*		—		
E Goal Rushers					—	

Group 1 Round Robin

	A	B	C	D	E	Pts
A Marigo	—	7-2	1-4			3
B YoHoHo	2-7	—		0-5		0
C Team America	4-1		—			3
D Untitled		5-0		—		3
E Goal Rushers				*	—	

Group 1 Round Robin

	A	B	C	D	E	Pts
A Marigo	—	7-2	1-4			3
B YoHoHo	2-7	—		0-5		0
C Team America	4-1		—			3
D Untitled		5-0		—	1-2	3
E Goal Rushers				2-1	—	3

Group 1 Round Robin

	A	B	C	D	E	Pts
A Marigo	—	7-2	1-4	1-2	0-3	3
B YoHoHo	2-7	—	0-9	0-5	0-9	0
C Team America	4-1	9-0	—	*		6
D Untitled	2-1	5-0		—	1-2	6
E Goal Rushers	3-0	9-0		2-1	—	9

Group 1 Round Robin

	A	B	C	D	E	Pts
A Marigo	—	7-2	1-4	1-2	0-3	3
B YoHoHo	2-7	—	0-9	0-5	0-9	0
C Team America	4-1	9-0	—	0-1	*	6
D Untitled	2-1	5-0	1-0	—	1-2	9
E Goal Rushers	3-0	9-0		2-1	—	9

Group 1 Round Robin

	A	B	C	D	E	Pts
A Marigo	—	7-2	1-4	1-2	0-3	3
B YoHoHo	2-7	—	0-9	0-5	0-9	0
C Team America	4-1	9-0	—	0-1	2-2	7
D Untitled	2-1	5-0	1-0	—	1-2	9
E Goal Rushers	3-0	9-0	2-2	2-1	—	10

Group 1 Rankings

	A	B	C	D	E	Rank
A Marigo	—	7-2	1-4	1-2	0-3	4
B YoHoHo	2-7	—	0-9	0-5	0-9	5
C Team America	4-1	9-0	—	0-1	2-2	3
D Untitled	2-1	5-0	1-0	—	1-2	2
E Goal Rushers	3-0	9-0	2-2	2-1	—	1

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- Challenge matches: winner vs.:
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Coaching

- **FOOBAR BAZ**

Knox, Edwards, Doyle

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Schedule

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- Tournament part 1
- Another class project: coaching
- Video: real soccer robots
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last year's champ, US Open, UvA-trilearn 2003

Group 2 Round Robin

	G	H	I	J	Pts
G Listos	—				
H Dynamic		—			
I HIVE			—	*	
J Team Voodoo				—	

Group 2 Round Robin

	G	H	I	J	Pts
G Listos	—				
H Dynamic	*	—			
I HIVE			—	2-1	3
J Team Voodoo			1-2	—	0

Group 2 Round Robin

	G	H	I	J	Pts
G Listos	—	1-1			1
H Dynamic	1-1	—			1
I HIVE			—	2-1	3
J Team Voodoo		*	1-2	—	0

Group 2 Round Robin

	G	H	I	J	Pts
G Listos	—	1-1		*	1
H Dynamic	1-1	—		4-2	4
I HIVE			—	2-1	3
J Team Voodoo		2-4	1-2	—	0

Group 2 Round Robin

	G	H	I	J	Pts
G Listos	—	1-1		5-0	4
H Dynamic	1-1	—	*	4-2	4
I HIVE			—	2-1	3
J Team Voodoo	0-5	2-4	1-2	—	0

Group 2 Round Robin

	G	H	I	J	Pts
G Listos	—	1-1	*	5-0	4
H Dynamic	1-1	—	1-4	4-2	4
I HIVE		4-1	—	2-1	6
J Team Voodoo	0-5	2-4	1-2	—	0

Group 2 Round Robin

	G	H	I	J	Pts
G Listos	—	1-1	2-0	5-0	7
H Dynamic	1-1	—	1-4	4-2	4
I HIVE	0-2	4-1	—	2-1	6
J Team Voodoo	0-5	2-4	1-2	—	0

Round Robin Rankings

	A	B	C	D	E	Rank
A Marigo	—	7-2	1-4	1-2	0-3	4
B YoHoHo	2-7	—	0-9	0-5	0-9	5
C Team America	4-1	9-0	—	0-1	2-2	3
D Untitled	2-1	5-0	1-0	—	1-2	2
E Goal Rushers	3-0	9-0	2-2	2-1	—	1

	G	H	I	J	Rank
G Listos	—	1-1	2-0	5-0	1
H Dynamic	1-1	—	1-4	4-2	3
I HIVE	0-2	4-1	—	2-1	2
J Team Voodoo	0-5	2-4	1-2	—	4

Playoffs

8th Place: YoHoHo vs. ?

7th Place: Team Voodoo vs. Marigo *

5th Place: Dynamic vs. Team America

Semifinal: Listos vs. Untitled

Semifinal: Goal Rushers vs. HIVE

3rd Place: ? vs. ?

1st Place: ? vs. ?

Playoffs

8th Place: YoHoHo vs. Marigo *

7th Place: Team Voodoo vs. Marigo

6-2

5th Place: Dynamic vs. Team America

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3rd Place: ? vs. ?

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Playoffs

8th Place: YoHoHo vs. Marigo 0–5

7th Place: Team Voodoo vs. Marigo 6–2

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Playoffs

8th Place: YoHoHo vs. Marigo 0–5

7th Place: Team Voodoo vs. Marigo 6–2

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8th Place: YoHoHo vs. Marigo 0–5

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1st Place: Listos vs. ?

Playoffs

8th Place: YoHoHo vs. Marigo 0–5

7th Place: Team Voodoo vs. Marigo 6–2

5th Place: Dynamic vs. Team America 3–0

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3rd Place: Untitled vs. Goal Rushers *

1st Place: Listos vs. HIVE

Playoffs

8th Place: YoHoHo vs. Marigo 0–5

7th Place: Team Voodoo vs. Marigo 6–2

5th Place: Dynamic vs. Team America 3–0

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Semifinal: Goal Rushers vs. HIVE 0–5

3rd Place: Untitled vs. Goal Rushers 0–1

1st Place: Listos vs. HIVE *

Playoffs

8th Place: YoHoHo vs. Marigo 0–5

7th Place: Team Voodoo vs. Marigo 6–2

5th Place: Dynamic vs. Team America 2–0

Semifinal: Listos vs. Untitled 3–0

Semifinal: Goal Rushers vs. HIVE 0–5

3rd Place: Untitled vs. Goal Rushers 0–1

1st Place: Listos vs. HIVE 2–0

Final Standings

- | | |
|------------------------|----------------------|
| 1. Listos | Huerta, Nelson |
| 2. HIVE | Menzies, Ma |
| 3. Goal Rushers | Kret, Massey |
| 4. Untitled | Plaisance, Romer |
| 5. Dynamic | Rathmann, Marocha |
| 6. Team America | Huie, Hasan |
| 7. Team Voodoo | Schneider, Guimbarda |
| 8. Marigo | Nimmagadda, Ristroph |
| 9. YoHoHo | Bland, Gray |

Challenge Matches

- Listos vs. RoboTrapper *
- Listos vs. UVA Trilearn 2003
- Listos vs. Brainstormers 2005

Challenge Matches

- Listos vs. RoboTrapper 2–0
- Listos vs. UVA Trilearn 2003 *
- Listos vs. Brainstormers 2005

Challenge Matches

- Listos vs. RoboTrapper 2–0
- Listos vs. UVA Trilearn 2003 0–18
- Listos vs. Brainstormers 2005 0–11

For More Information

- www.robocup.org
- www.cs.utexas.edu/~AustinVilla
- www.cs.utexas.edu/~pstone

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**Layered Learning in Multiagent Systems:
A Winning Approach to Robotic Soccer**
Peter Stone. MIT Press, 2000.