CS344M
Autonomous Multiagent Systems
Spring 2008

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The University of Texas at Austin

Good Afternoon, Colleagues

Are there any questions?

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- learn own language

Logistics

- Programming assignment 4 - any questions?

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- Final project

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Logistics

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- RoboCup simulation event, intenet league

Joint Intentions – Setting

How agents **form and disband** teams

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Joint Intentions – Setting

How agents **form and disband** teams

- Agents in dynamic multiagent world

- Neither complete nor correct beliefs

  – Positive introspection: know own beliefs

- Changeable goals, fallible actions

- Don't know others' beliefs/goals

Starting Point – Individuals

Persistent goal: relative to q to achieve p

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- What's the role of q?

- What's the difference between goal, intention?

2 proposals for teams

Joint commitment not just intention where agent is team

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Why too weak and too strong?

Joint Commitment

Weak achievement goal (WAG): relative to q *with respect to a team* to achieve p

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Weak achievement goal (WAG): relative to q *with respect to a team* to achieve p

- Individually wants p
  OR
- Believes p true, impossible, or irrelevant, AND has a goal of team knowing it.

4 cases

Joint Commitment

Joint Persistent Goal (JPG): relative to q to achieve p

- mutually believe p false, but mutually know all desire p true
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- Overhead: automatic goal to communicate status

Establishing JPGs

- Communication (basis for KQML)

- Observation (requires co-presence)

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- Communication (basis for KQML)

- Observation (requires co-presence)

- Any other way?

Discussion

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Discussion

> "Capabilities for teamwork cannot be patched on, but must be designed in from the start." (Grosz, 1996)

- Agree or disagree?

Locution: What is said (physical)

{Per,Il}locution - p.14

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Locution: What is said (physical)

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Perlocution: Intended effects

Example: "Please close the window."

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BDI - p.20

- Beliefs: What the agent thinks to be true

- Desires: What it wants to be true

- Intentions: What it plans to do

- A way of organizing an agent

- Not a well-defined method

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Student-led Discussion

- Thomas Alton: "Good" teams

STEAM

- An implementation/extension of joint intentions

- Goals

    – Anticipate teamwork failures
    – Flexibility and re-use

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  – Coherence: all use same plan, commitment protocols
  – Communication cost — decision theoretic
  – Replanning — role dependencies

Team Operators

- Have preconditions, effects, termination rules

- Automatically establish joint intentions

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Domains

- Attack:

  – Fly to holding point
  – Send out scouts
  – Shoot at enemy

- Transport:

  – Escorts protect transports

- RoboCup

Observed Problems

- Commander returns to home alone after failing, others stayed

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Solved generally with STEAM

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- Used in 3 domains with different characteristics

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- Communication efficiency

- Encoding and modification effort