CS344M
Autonomous Multiagent Systems

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Good Afternoon, Colleagues

Are there any questions?

UTCS Department of Computer Sciences
The University of Texas at Austin

Logistics

- Programming assignment 4 - any questions?

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- Next week's readings posted

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ACL Desiderata

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Reliability: reliable, secure, authentication possible, error handling

Three-layer organization

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(tell
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    :content (PRICE IBM 14)
    :receiver joe
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    :ontology NYSE-TICKS)
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- Sample FIPA applications on resources page

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Soccer server communication

- What is the soccer server communication protocol?

- How does it relate?

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> An example protocol

Joint Intentions – Setting

How agents **form and disband** teams

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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

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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.

$\boxed{\text{4 cases}}$

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

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- Overhead: automatic goal to communicate status

Establishing JPGs

- Communication (basis for KQML)

- Observation (requires co-presence)

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- Any other way?

Locution: What is said (physical)

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Example: "Please close the window."

Discussion

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- Agree or disagree?

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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- Automatically establish joint intentions

- To establish, "all team members must simultaneously select" a team operator to establish a joint intention

- Agents maintain "team state:" model of team's mutual beliefs

Domains

- Attack:

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

- Transport:

    – Escorts protect transports

- RoboCup

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Solved generally with STEAM

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- Communication efficiency

- Encoding and modification effort

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- Potential applications?

  – Some listed on their web site
  – Question answering, retrieval of captioned information, machine translation, speech recognition, semantic data mining, . . .

Pursuit Activity

Group 1: homogeneous, non-communicating

Group 2: homogeneous, communicating

Group 3: heterogeneous, non-communicating

Group 4: heterogeneous, communicating

Student-led Discussion

- David Terei: Sort yourselves by age

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- No verbal or written language is allowed.

- Any form of gesturing is OK, except for "skywriting" or writing with one's finger.

- Other ways of conveying characters are ok.

- All other forms of communication are allowed, be creative.