Interaction among agents that plan

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From Agent Theory to Agent Implementation  
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1 Background

2 AgentSpeak(PL)

3 Communication and Cooperation

4 Conclusions and Questions
AgentSpeak(L)

- Procedural agent language
- Based on the BDI model
- Designer specifies plans in a library
  - Plans encode procedures
  - Plans are characterised by trigger and context condition
  - Goals are implicit in the plans
Planning in AgentSpeak(PL)

- AgentSpeak(L) + Planning
  - Standard AgentSpeak(L) language
  - Planner invoked through an atomic action
- In principle, any state-space planner can be used

![Diagram of planning process]
Speech-act based communication

- Popular model of communication in agent languages
- Used in languages like KQML and FIPA
- In our paper, we need the following speech acts:
  - *ask* – to request information from others
  - *tell* – to supply information to others
  - *achieve* – to request another agent to achieve a procedural goal
Plan Patterns

- Patterns here are *plan rewrite rules*
- Take as input one or more plans
- Create new plans based on the original plans

![Diagram of interaction among agents that plan]

F. Meneguzzi and M. Luck (KCL)
Communication

Interaction among agents that plan
Randall

+!watchTV : at(randall,home)
  <- +watchingTV.

+!open(store) : at(randall,store)
  <- ...
    +open(store).

+!remoteOpen(store) : at(dante,store)
    & ready(dante)
  <- .send(dante,achieve,open(store));
    .wait(done(open(store)));
    +open(store).

+!goal_conj([watchingTV, open(store)])
  : at(randall,home)
  <- !watchTV;
    !remoteOpen(store).

Dante

+!open(store) : at(dante,store)
  <- ...
    +open(store).

+!requestOpen(store) : at(dante,store)
  <- !open(store);
    .send(randall,tell,done(open(store)).
Conclusions

- We show a simple, yet effective cooperation mechanism
- System generates speech-act dialogs (in a way)
- Allows a minimum specification for agents to communicate and distribute control
- Two outstanding issues (foreseen as modules):
  - Distribution
  - Reliability
Session Questions

- What is important about the task/problem addressed?
  - Gap in agent languages regarding support for the multi part of MAS

- In what way(s) did the adopted theory/the implementation framework help/hinder you with solving your problem?
  - Jason has a plan library with KQML communication
  - Lacks proper reflection
  - Plan patterns not very flexible
More Session Questions

In what interesting ways is the realised system (over-/under-)determined? I.e., ”how satisfied” are you with the degree and quality of control achieved?

- Planning changes AgentSpeak(L) reasoning cycle