Speech Acts: Austin

Speech Acts

Speech Acts

Speech Acts

Agent Communication

Agent Communication

Agent Communication

Chapter 7: Communicating

An Introduction to Multiagent Systems

http://www.csc.liv.ac.uk/~mjw/pubs/imas/
Searle (1969) identified various different types of speech acts:

- **representatives**: such as informing, e.g., 'It is raining'
- **directives**: attempts to get the hearer to do something, e.g., 'Please make the tea'
- **commisives**: which commit the speaker to doing something, e.g., 'I promise to ...'
- **expressives**: whereby a speaker expresses a mental state, e.g., 'Thank you'
- **declarations**: such as declaring war or christening, e.g., 'The door is closed'
- **representational**: such as informing, e.g., 'It is closed'

When can one say someone has uttered, e.g., a representative speech act?

- performative = request
  - content = "the door is closed"
  - performative = inform
  - content = "the door is closed"

When does one define the semantics of speech acts?

Plan Based Semantics

In general, a speech act can be seen to have two components:

- **performative verb**: (e.g., request, inform, ...)
- **propositional content**: (e.g., "the door is closed")

There is some debate about whether this (or any) speech act is appropriate.

- Speech acts, such as declaring war or christening.
Plan-based Semantics for Request 

\[(\text{s}, h, \phi)\]

**pre:**
- \(\text{s} \text{ believes } h \text{ can do } \phi\)
- \(\text{s} \text{ believes } h \text{ believes } h \text{ can do } \phi\)

**post:**
- \(\text{request}(\text{s}, \phi)\)
- \(\phi \text{ want } s \text{ believe } s \text{ can do } \phi\)
- \(\phi \text{ want } s \text{ believe } h \text{ can do } \phi\)
- \(\phi \text{ want } s \text{ believe } h \text{ can do } \phi\)

---

**Example KQML/KIF dialogue (A)**

A to B: (ask-if (> (size chip1) (size chip2)))
B to A: (reply true)
B to A: (tell (= (size chip1) 20))
B to A: (tell (= (size chip2) 18))

---

KQML is a language for expressing message content.

- request (the answer is ...)
- reply (it is true that ...)
- perform (please perform the following action ...)
- ask (it is true that ...)

KQML is an 'outer' language, that defines various acceptable communicative verbs, or performatives.

- URI: http://www.csc.liv.ac.uk/~mjw/pubs/imas/
Example KQML/KIF dialogue (B)

(stream-about
  :sender A
  :receiver B
  :language KIF
  :ontology motors
  :reply-with q1
  :content m1)

(tell
  :sender B
  :receiver A
  :in-reply-to q1
  :content
  (= (torque m1) (scalar 12 kgf))

(http://www.csc.liv.ac.uk/~mjw/pubs/imas/)

Example

(tell
  :sender B
  :receiver A
  :in-reply-to q1
  :content
  (= (status m1) normal)

(http://www.csc.liv.ac.uk/~mjw/pubs/imas/)

FIPA

• More recently, the Foundation for Intelligent Physical Agents (FIPA) started work on a program of agent standards — the centerpiece is an ACL.

• Basic structure is quite similar to KOML:
  - performative in FIPA.
  - housekeeping: e.g., sender etc.
  - content: the actual content of the message.

Example

(inform
  :sender agent1
  :receiver agent5
  :content
  (= (price m1) (scalar 20150))

  :language sl
  :ontology hpl-auction)

Example KQML/KIF dialogue (B continued)
**FIPA “Inform” Performatives**

The content is a statement.

**Pre-condition** is that sender:
- holds that the content is true;
- intends that the recipient believes the content;
- does not believe that the recipient already believes that the content is true.

**Rationaleffect** is that sender:
- hopes to bring about;
- “tautological effect” — what the sender of the message already believes.

**FIPA “Request” Performatives**

The content is an action.

**Pre-condition** is that sender:
- intends action content to be performed;
- believes recipient is capable of performing this action;
- does not believe that sender already intends action to be performed;
- believes recipient is aware of intentions that the recipient believes the content.

**Rationaleffect** is that sender:
- holds that the content is true;
- intends that the recipient believe the content;
- hopes to bring about.

The meaning of inform and request is defined in two parts:
- predefined in terms of these:
- inform and request are the two basic performative definitions.

Others are macro definitions.