Some thoughts on Agent Communication

why it's important
and what's important about it

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What do agents do when they get there?

- They talk to other agents who are there
  - stationary agents who live there
  - other mobile agents who are visiting
- Communication among agests is ***essential***
- Do they need to travel to do this?
  - no, but agent meeting places can provide some communication services

Cooperating agents

- Agents are ***cooperating*** processes
- Cooperation is stronger than ***coordination***
  - – auto drivers in a convoy *vs*. drivers in traffic
- Cooperation involves ***mutual commitment*** to a ***shared goal***
- This requires communication among the agents, in general, to achieve ***mutual knowledge*** of the goal and commitment.

Co-presence and mutual knowledge?

- One reason groups of people actually meet to talk is it helps participants establish mutual knowledge.
- A and B mutually know P iff

know(A,P)	know(B,P)
know(A,kn(B,P))	know(B,kn(A,P))
know(A,kn(B,kn(A,P)))	know(B,kn(A,kn(B,P))) etc...

- Maybe agent meeting places should help agents achine such mutual knowledge?

Communication requires common language

Common language can be decomposed into

- common syntax
- common semantics
- common lexicon
- common pragmatics (e.g., rules and conventions for discourse, practical knowledge of world)

Common agent communication language

Some existing components that can be used independently or together.

- **KIF** -- knowledge interchange format *(syntax)*
- **Ontolingua** - a language for defining sharable ontologies *(semantics)*
- **KQML** - a high-level interaction language *(pragmatics)*
- **Protolingua** - a language for defining protocols as ATNs of communicative primitive *(pragmatics)*

Infrastructure to support agent communication

- standard ontologies
- standard services and protocols to support them
- standard utility agents
  - agent name serrvers
  - brokers, facilitators, etc.

Mobile knowledge as mobile declarative code

- Motivations for dynamic sharing of knowledge are similar to those for mobile code.
  - teaching agents to fish is better than feeding them
  - spreading new knowledge via the grapevine
- Problems are similar as well
  - dangerous ideas and mental viruses
- The difference?
  - no sense of identity (KIDs?) for a logical sentence.