CHAPTER 10: APPLICATIONS

An Introduction to Multiagent Systems

http://www.csc.liv.ac.uk/~mjw/pubs/imas/
Agents are indicated for domains where autonomous action is required.

Multiagent systems are indicated for domains where:

- processing nodes have competing/conflicting viewpoints or objectives.
- control, data, expertise are distributed.
- control is impossible or impractical.
- control, data, expertise are conflicting.
- centralised control is impossible or impractical.

Application Areas
Some Applications

- E-commerce agents
- Internet agents
- Interface agents
The idea is to move away from the direct manipulation paradigm that has dominated for so long.

- mail readers
- web browsers
- news reader

Pioneering work at MIT Media Lab (Pattie Maes):

- News reader
- Web browsers

The initiative:

The idea is to move away from the direct manipulation paradigm that has dominated for so long.

1.1 Interface Agents
Nicholas Negroponte's Vision

"The agent answers the phone, recognises the caller's disturbance, when...


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Email Reading Assistants

MAXIMS (Pattie Maes, 1994) ‘learns to prioritize, delete, forward, sort, and archive mail messages on behalf of a user...’

Each time a new event occurs (e.g., email arrives), MAXIMS records the situation action pairs generated. Situation characterized by features of event:

- sender of email, recipients, subject line, etc.

MAXIMS works by ‘looking over the shoulder’ of a user and learning about how they deal with email.
When a new situation occurs, MAXIMS matches it against previously recorded rules.
Predicts user action, and generates a confidence level.

- Rules can be "hard coded"; even get help from other users.

  - "Tell me" and "Do it":
    - Agent acts: "Tell me" > Confidence > "Do it".
    - Agent makes suggestion: Confidence > "Tell me".
    - Agent gets feedback: Confidence < "Do it".

- Confidence level compared against two thresholds:

  - An Introduction to Multiagent Systems 2e
  - Chapter 10
  - http://www.csc.liv.ac.uk/~mjw/pubs/imas/
MAXIMS has a simple, personality, (a face icon), communicating its mental state to the user.
It is not easy to find the right information (even with the help of search engines). Even systematic searches are difficult.

Agents on the Internet

Syntactic searches are superficial — no standards for home pages, not systematic. Structure on the net is sidetracked:

- Human factors: we get bored by slow response, get tired, miss things easily, misunderstand, get sidetracked.
- Organizational factors: structure on the net is superficial — no standards for home pages, not systematic.

Systematic searches are difficult:

- It is not easy to find the right information (even with the help of search engines).
The sheer amount of information presented to us leads to 'information overload'.

http://www.csc.liv.ac.uk/~mjw/pubs/imas/
• What we want is a kind of "secretary": someone who understood the things we were interested in, and brought to our attention information that is of interest. We cannot afford human agents to do these kinds of tasks.

• So we write an agent to do these tasks.

• But we have other kinds of tasks (and in any case, humans get suffer from the drawbacks we mentioned above).

• We cannot afford human agents to do these kinds of tasks.
Tourguides

• The idea here is to have agents that help to answer the question 'where do I go next' when browsing the WWW.

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• Such agents can learn about the user's preferences in the same way that MAXIMS does, and rather than just providing a single, uniform type of hyperlink actually indicate the likely interest of a link.

http://www.csc.liv.ac.uk/~mjw/pubs/times/12
Indexing agents will provide an extra layer of service. The idea is to use the raw information provided by search/indexing agents such as Google and Lycos, together with knowledge of the users' goals, preferences, etc., to provide a personalized service.

http://www.csc.liv.ac.uk/~mjw/pubs/imas/
FAQ servers.

The idea here is to direct users to FAQ documents in order to answer specific questions.

Since FAQs tend to be knowledge intensive, structured documents, there is a lot of potential for automated FAQ servers.

FAQ-finders
Expertise finders try to understand the users' wants and the contents of information services, in order to provide a better information provision service. Currently, WWW search tools would simply take the words "intelligent" and search on them. This is not ideal: Google has no model of what you mean by this search, or what you really want. Suppose I want to know about experts in intelligent agents.

Expertise finders
Another important rationale for Internet agents is the potential for e-commerce.

Examples:
- Flight from Manchester to Dusseldorf with veggie stores;
- Find the cheapest copy of MS Office from online restaurants;
- Meal, window seat, plus hotel, taxis, entertainment;
- Find the cheapest copy of MS Office from online.

Most commerce is currently done manually. But there is no reason to suppose that certain forms of commerce could not be safely delegated to agents.
First generation: comparison shopping agents.

- 1995: Bargain Finder from Andersen;
- 1997: Jango from NETBOT;
- 2003: Froogle from Google.

Examples:

Second generation: negotiation, brokering, ...

First & Second Generation E-Commerce Systems

http://www.csc.liv.ac.uk/~mjw/pubs/imas/17
Jango

• Jango (Doorenbos et al., Agents 97) is good example of e-commerce agent.

Long-term goals:

1. Help user decide what to buy.
2. Finding specs and reviews of products.
3. Make recommendations.
5. Monitoring "whats new" lists.
Isn’t comparison shopping impossible? WWW pages all different!

Jango/ShopBot exploits several regularities in merchant WWW sites:

- Corporate regularity: sites designed so that pages have same look’n’feel;
- Navigation regularity: sites designed so that products easy to find;
- Vertical separation: merchants use white space to separate products.
Two key components of Jango/Shopbot:

- learning vendor descriptions;
- comparison shopping.