1 Introduction

- There have been a significant number of deployed agent applications.

- **Distributed systems** use agents as processing nodes. It is an effort to localize responsibility and decision-making abilities.

- **Software assistants** are agents that look over a person’s shoulder and try to help out, often by communicating with other agents.

2 Agents For Workflow

- **Workflow** is the process of moving work around a company.

- For example, when a student application arrives at USC it enters a workflow process. Different people review different parts of it, adding their comments, until a decision is finally made. The process can take many different paths.

- There are now workflow languages. Most important is **BPEL4WS** a joint IBM and Microsoft proposal.

- We are studying how to turn these workflow descriptions into running systems, automatically.

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2.1 ADEPT

- The ADEPT project is an example of an agent-based workflow management system.
- Developed for British Telecom.
- The system aims at providing customers with a quote for the installation of a network that satisfies the customer’s requirements.
- Agents were created for the customers service, design, surveyor, legal divisions, and for each person in them.
- Agents can respond to unpredictable events.

[^1]: http://www.ecs.soton.ac.uk/~nrj/adept/
2.2 ADEPT Architecture

- Used CORBA for communications.
- Used standard expert system shell.
- Did not use FIPA (too early).
- Legacy databases wrapped as agents.
- Little AI. Used pre-built pans.
- Rule-based system used to implement communication decisions.
- Coarse-grained agents.

3 Distributed Sensing

- The Distributed Vehicle Monitoring Testbed aimed at solving the problem of coordinating sensors in a field so as to track a target.
- Our own [TargetShare[^]] project aimed to do the same, but with much smaller sensors.

[^]: [http://www.cse.sc.edu/~vargasje/targetshare/](http://www.cse.sc.edu/~vargasje/targetshare/)
• The problem has lead to a lot of research in multiagent systems, from partial global planning to distributed constraint satisfaction.

• Depending on the specifics of the problem description, distributed sensing can be viewed as different problems.

4 Information Retrieval

• An information agent has access to some information resources and is able to gather and collate answers to users’ questions.

• The agent should give a coherent view of all the heterogeneous resources.

• It should provide personalized services in order to overcome the information overload problem.

• The system should be scalable.

• The system should be adaptive and self-optimizing.

4.1 MAXIMS

• The $\text{MAXIMS}^5$ project implemented collaborative interface agents.

• Agent would look over the shoulder of a user as he read email and re-filed it into folders.

• MAXIMS records events as situation→action pairs.

• It generates a confidence level associated with each prediction.

• User can hard-code rules.

• User gives feedback to agent about predictions.

• Agents share and compare information so as to improve their prediction (spam avoidance).

4.2 UMDL

\[http://agents.media.mit.edu/publications/aaai-ymp/aaai.html\]
• The University of Michigan Digital Library was an early attempt at building a multiagent information system (started before the web existed).

• Content owners exist, each with different query languages and pricing mechanisms.

• Users only want one interface.

• The UMDL uses collection and user interface agents to deal with the outside.

• Mediator agents provide intermediate information services such as virtual collections.

• Facilitator agents are a special class of mediators which exist solely to enable coordination among agents. They were mostly auction agents.

5 Agents for E-Commerce

• They are there to enable:

  • Need identification : helping the user identify some need he has which is met by an existing product.

  • Product brokering : the consumer obtains information about the features of the products that are available.

  • Merchant brokering : the consumer obtains information about the merchants.

  • Negotiation : they agree on the terms of the transaction: price, warranty, delivery method, etc.

  • Purchase and delivery : money and product exchange hands.

  • Product and service evaluation : consumer and merchant provide feedback on each other.
### 5.1 Agent E-Commerce Examples

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<th>Bargain Finder</th>
<th>Jango</th>
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### 6 Agents for Human-Computer Interaction

- Most interfaces are based on the idea of *direct manipulation*.
- Agents hope to enable indirect manipulation: Do what I want.
- The agent should also take the initiative, rather than waiting for an explicit command.
- The agent will then be, in effect, cooperating with the user to achieve a given task.
7 Agents for Virtual Environments

• The OZ project was an early attempt to develop artistically interesting, highly interactive, simulated worlds...to give users the experience of living in (not merely watching) dramatically rich worlds that include moderately competent, emotional agents.

• In the last couple of years the research topic of AI in games has become fairly popular (very popular in the development community).

• Agents need to be entertaining. This means they cannot be too good.

• In many games, agents need to coordinate, either with the user or with other agents.

• An active research platform is Gamebots for Unreal Tournament.

8 Agents for Social Simulation

• Agent systems are used as tools for simulating social situations.

• The Journal of Artificial Societies and Social Simulation consists of only this type of research.

[[http://www.gameai.com/]
http://www.planetunreal.com/gamebots/
http://jasss.soc.surrey.ac.uk/JASSS.html]
• Also, NetLogo is a product of this need.
• This simulations can have several benefits:
  • Allows one to observe phenomena that might be derived via analysis, but haven’t.
  • Can observe alternatives to a phenomena observed in nature.
  • Properties that are difficult to observe in nature can now be seen.
  • Sociality can be modeled explicitly. Agents can be built to cooperate or not.

9 Conclusion
• Many applications exist.

• Predictions:
  • The establishment of standards for semantic markup and agent communications with trigger an explosion in applications.
  • Agents will become like actors for games (Mario), whose personalities will dictate behavior.
  • Few people will trust agents with their money.

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This talk is available at [http://jmvidal.cse.sc.edu/talks/agentapplications](http://jmvidal.cse.sc.edu/talks/agentapplications)
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[http://ccl.sesp.northwestern.edu/netlogo/]