

Intelligent Agents

Jane Hsu

Outline

- Agents: An Introduction
- Agent Architecture
- Prototype Agents
 - Internet Software Agents
 - Intranet Printer Agents
- Concluding Remarks

Agents: An Introduction

If agents are the solution....
.....What is the problem?

People are constantly suffering from

- Too much **work**
- Too much **information**
- Too little **time**

Scenario: Information Filtering

Upon logging in, you are presented with a list of emails, sorted in order of importance by your PDA.

You are then presented with a list of news articles; your attention is drawn to one particular article, which describes a new work related to your own.

After an electronic discussion with a number of other agents, your PDA has already obtained a relevant technical report for you from an FTP site, in the anticipation that it will be of interest.

Scenario: Action & Planning

You are editing a file, when your PDA requests your attention: an email has arrived, which contains notification about a paper you submitted to an important conference.

The paper has been accepted, and without prompting, the PDA begins to look into travel arrangements, by consulting a number of databases and networked information sources.

A short time later, you are presented with a summary of the cheapest and most convenient travel options.

The Problems

Computers today don't have such capabilities yet!

- Passive --- computers as tools
- Inflexible
- System-centered
- Lack of goals

Almost all you need to know is there, but you can never find it!

The Basic Properties of Agents

- Acting on behalf of its user
 - Autonomous
 - Communicative and collaborative
- Task-oriented
 - Competent
 - Proactive
- Adapting to its environment and user
 - Reactive and evolutionary
 - Personalized

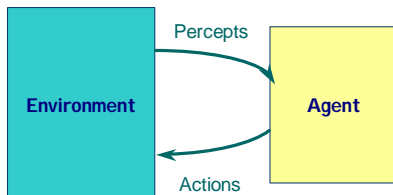
7

Important Research Issues

- Agent Theory
- Agent Architecture
- Agent Languages
- Enabling Technologies
 - Reasoning
 - Planning
 - Learning
- Applications

8

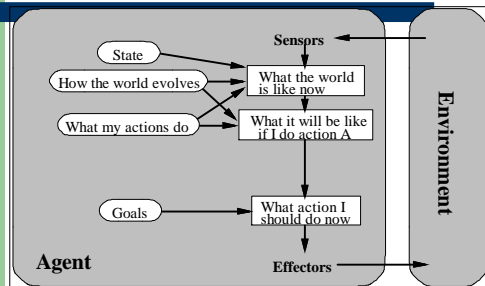
Embedded Agents



$$C: P^n \rightarrow A$$

9

Goal-Based Agents



10

Agent Architectures

- Deliberative agent architecture
- Reactive agent architecture
- Behavior-based agent architecture
- Hybrid agent architecture
- Distributed/mobile agent architecture
- Communicative/collaborative agents

11

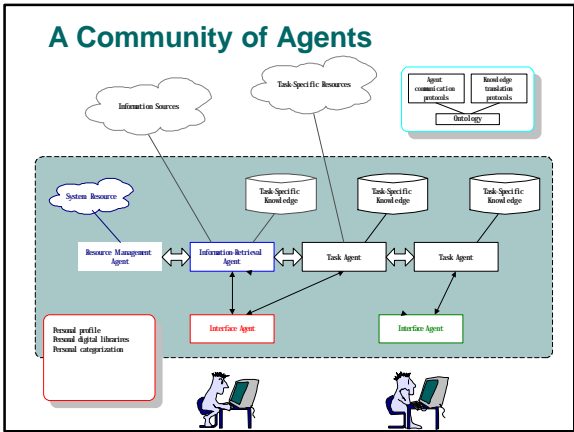
Client-Agent-Server Model

- Clients request for
 - Information
 - Goal achievements
- Servers provide
 - Data
 - Services/Resources
- Agents
 - Data --> Information --> Knowledge
 - Sequence of actions, i.e. Plans

12

Taxonomy of Agents

- Information Agents
 - filtering & recommendation
 - discovery & retrieval, e.g. FAQ miner
- Task Agents
 - resource management, e.g. printer agent
 - meeting scheduling, travel arrangements
- Interface Agents
 - personal assistants, e.g. email agent
 - dynamic profiling



Internet Softbots [Etzioni, UW]

The Information Food Chain

Softbots: personal assistants for

- email
- white page
- shopping etc.

Search Engines, Indices & Directories
Spiders & Software Robots
World Wide Web

Software Agents [Maes, MIT]

Human-Computer Interaction
Bottom-Up Approach to AI
The Network as An Intelligent Machine

- Completely distributed
- Mix of humans and machines
- Extremely robust and fault-tolerant

Firefly

- Collaborative filtering
- Personalized content and services

Printers in An Intranet Environment

- Printer Location
- Resolution
- Fonts
- Color / BW
- Speed
- Current Load
- Ready Status

Conventional Tools for Printing

command line

- `lpr -Php5 -s thesis.ps`

menu-driven

- fill the columns and entries in the interface

