

## Agents

Addendum to Chapter 5 notes for  
textbook

## Agents that Reduce Work and Information Overload

- Pattie Maes, Communication of the  
ACM July 1994/Vol. 37, No. 7, 31-40.

## Contra direct manipulation

- “The currently dominant interaction metaphor of *direct manipulation* requires the user to initiate all tasks explicitly and to monitor all events.
  - This metaphor will have to change if untrained users are to make effective use of the computer and networks of tomorrow.”

## Autonomous agents

- Implement a complementary style of interaction, which has been referred to as *indirect management*.
  - Instead of user-initiated interaction via commands and/or direct manipulation, the user is engaged in a cooperative process in which human and computer agents both initiate communication, monitor events and perform tasks.
  - The metaphor used is that of a *personal assistant* who is *collaborating with the user* in the same work environment. The assistant becomes gradually more effective as it learns the user’s interests, habits and preferences (as well as those of his or her community.)

## Competence & Trust

- **Competence:**
  - How does an agent acquire the knowledge it needs to decide when to help the user, what to help the user with and how to help the user?
- **Trust:**
  - How can we guarantee the user feels comfortable delegating tasks to an agent?

## Earlier Approaches

- End-user programming (e.g., user programmed rules for sorting mail)
  - Competence (depends on user)
  - Trust (do you trust your own programming skill)
- Knowledge-based approach (build large system with expertise about domain and user tasks, e.g., UCego --- help for user in solving problems in UNIX)
  - Competence (huge amount of work for knowledge engineer; also knowledge is fixed once and for all.)
  - Trust (programmed by somebody else, user may not know limits, way it works, ...)

## *Autonomous Agent Approach*

- Under certain conditions, an interface agent can “program itself”
  - The agent is given a minimum of background knowledge, and it learns appropriate “behavior” from the user and from other agents.
  - the use of the application has to involve a substantial amount of repetitive behavior (with the actions of one user or among user
  - this repetitive behavior is potentially different for different users.” (p812)
- Less work for user
- Agent can adapt to user over time

## Agents acquire competence from four different sources

1. Observing and imitating the user
2. Receiving positive and negative feedback from the user
3. Receiving explicit instructions from the user
4. Asking other agents for advice

## Claim

- The set of tasks or applications an agent can assist in is virtually unlimited: information filtering, information retrieval, mail management, meeting scheduling, selection of books, movies, music, and so forth.

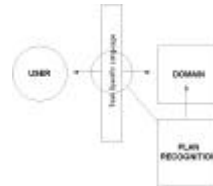
## Four Example Agents

- Electronic mail agent
  - Learns to prioritize, delete, forward, sort, archive mail messages
- Meeting scheduling agent
  - Assists user with the scheduling of meetings (accept/reject,(re)schedule, negotiate meetings times)
- News filtering agent
  - Helps the user filter Usenet Netnews.
  - Train “news agents” on examples of (+) articles
- Entertainment selection agent (music or books)
  - Does social filtering.
  - The agents rely on finding correlations between different users.
  - Every user has an agent that memorizes likes and dislikes
  - Agents find other agents that are correlated, accepting recommendations from other correlated agents.

## Adaptive Components & Conversational Agents

- Adaptive Component
  - Adjust system response to user’s goals and preferences
  - Suggest hyper link, Macro operators, Adjust presentation of information, Sort mail, Improve retrieval of information, Assist in planning
- Conversational Agents
  - Conversational interaction with agent to do trip planning
- Both adaptive components & Conversation agents require agent can identify/recognize user intent

## Plan Recognition with Task Specific Language



## Plan Recognition with Intent Expression Language

