



## Personal Assistants

### Intelligent User Interfaces

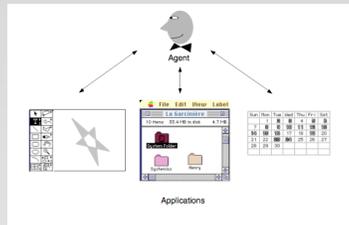
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## Readings

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- Segal & Kephart, MailCat: An Intelligent Assistant for Organizing E-Mail, AA'99
- Berry et al, A Personalized Time Management Assistant: Research Directions, AAAI SS 2005

## Basic Concepts



Lieberman, IUI'98

- Goals/tasks
- Mixed initiative collaboration
- Utility measures (costs, benefits)
- Also called “user interface agents”

## 12 Principles for Mixed-Initiative UI

(From: [E. Horvitz, CHI'99](#))

1. Developing significant *value-added* automation
  - genuine value over direct manipulation
2. Considering *uncertainty* about a user's goals
3. Considering the status of user's *attention* in the timing of services
  - consider costs and benefits of deferring action
  - minimize distraction

## 12 Principles for Mixed-Initiative UI

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4. Inferring *ideal action* in light of costs, benefits and uncertainties
  - expected value of taking actions
5. Employ *dialog* to resolve key uncertainties
  - take advantage of interaction
  - but consider cost of interaction
6. Allowing efficient *direct* invocation and termination
  - access to “underlying” interface
7. Minimizing the *cost of poor guesses* about action and timing

## 12 Principles for Mixed-Initiative UI

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8. *Scoping precision* of service to match uncertainty, variation in goals
  - gracefully degrade, do less if uncertain
9. Providing mechanisms for efficient agent-user collaboration to *refine* results
10. Employing *socially appropriate* behaviors for agent-user interaction
  - e.g., courteous language

## 12 Principles for Mixed-Initiative UI

11. Maintaining working *memory* of recent interactions

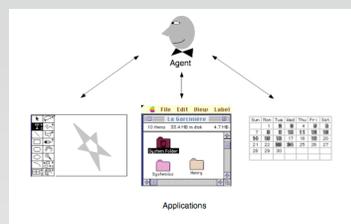
- shared short-term experience

12. Continuing to *learn* by observing

- about user's goals, etc.

## Issues in Agent-Application Integration

(From: [H. Lieberman, IUI'98](#))



- Granularity of the event protocol
- Sharing an interface between agent & application
- Parallelism between the agent & application

## Readings

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- Segal & Kephart, MailCat: An Intelligent Assistant for Organizing E-Mail, AA'99
  - minimizing cost of poor guesses
  - scoping precision of service
  - “low end” example
- Berry et al, A Personalized Time Management Assistant: Research Directions, AAAI SS 2005
  - employing dialog to resolve uncertainties
  - learning by observing
  - “high end” example