# Intelligent Interface Agents

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## Agent Visionaries

Nicholas Negroponte
Alan Kay
Apple
¡ Knowledge navigator video
H.P.
¡ 1995 video
FRIEND21 project (Japan, 1994)
¡ Metaware
¡ Agency
Digital, etc.¡ ..

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## Dynabook [Alan Kay, 1968]

Portable interactive personal computer
As accessible as a book
About the size of *Time Magazine*
Linked (by radio) to a network
Synthesis of text,visuals, animation, audio w/ high resolution color display
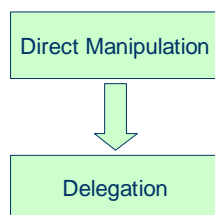Stylus input
Massive memory
Lightning speed

Alan Kay currently heads Viewpoints Research Institute in Los Angeles.

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## Dynadots [Nicholas Negroponte, 1989]

Future computers are a society of objects that
Intercommunicate with each other
Serve special needs: delegation
Are distributed all over the place
Offer plural human interface: speech/gesture
Are ¡old friends¡ with shared experiences
The Theatrical Metaphor: the stage is set with characters of your own choice or creation

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## Paradigm Shift in Interface Design

Direct Manipulation

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Delegation

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## Interface Agents

Agents assist users by
Hiding the complexity of difficult tasks
Performing tasks on the user¡s behalf
Training/teaching the user
Helping different users collaborate
Monitoring events and procedures

## Previous Approaches

Making end user program the interface agent.
- ¡ E.g. Oval [Malone & Lai] ¡ a collection of user-programmed rules for processing information related to a particular task.

Endowing an interface agent with extensive domain-specific background knowledge.
- ¡ Knowledge-based: domain/user model
- ¡ Plan recognition

## Major Concerns

Competence: how does an agent acquire the knowledge it needs to decide
- ¡ When to help the user?
- ¡ What to help the user with?
- ¡ How to help the user?

Trust: how can we guarantee that the user feels comfortable delegating tasks to an agent?

## Training An Interface Agent

Hypothesis: An interface agent can *program itself*, under the following conditions:
- ¡ Substantial amount of repetitive behavior
- ¡ Different behaviors for different users

Initially, the agent is given a minimum of background knowledge.

The user is given time to build up a model of how the agent makes decisions.

The agent gives explanations for its reasoning and behavior in terms of past examples.

## MIT Media Lab

Interface agents by Pattie Maes
Interface agents by Henry Lieberman

## Reconnaissance Agents

Programs that look ahead in the user¡s browsing activities and act as an advance scout to

Save the user needless searching

Recommend the best paths to follow
- ¡ Warn you if a page is irrelevant
- ¡ Alert you if a link merits your attention

Infer user preferences and interests by tracking interactions between the user and the machine over the long term.

## Agent-Assisted Web Browsing

A cooperative search activity between the human user and the computer agent

A middle ground between narrowly targeted retrieval and completely unconstrained manual browsing

## Examples

Letizia ¡ local reconnaissance
¡ Searching the neighborhood of the current page

Powerscout ¡ global reconnaissance
¡ Searching the web using a search engine

¡ Learn user preferences from watching the user¡s browsing
¡ Provide continuous, real-time display of recommendations

## User Effort vs. Data Connectivity



## Search Interface



## The One-Input Interface

A simple box for text entry
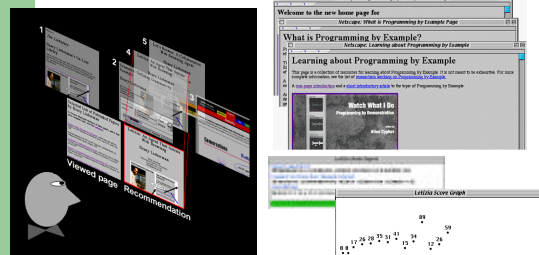Users type in anything they want, and then hit ¡Go¡.

How specific in describing interests?
Single word vs. multiple words?
Basic query vs. advanced query?
Which search engine?
Browsing vs. searching?
Which result is actually of interest?

## The Zero-Input Interface

The computer could already know about your interests before you enter any word.
Present-day computers throw away valuable history information.
¡ Click on a link ¡ interests in the subject of the link
Systems should track past user behavior and use it to predict future interests.
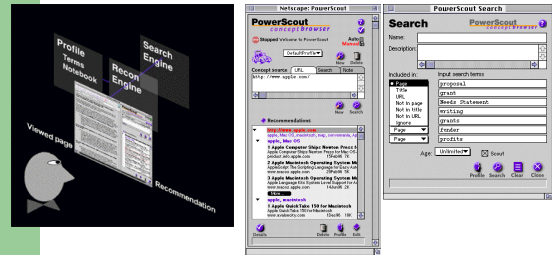
## Letizia [Lieberman, 1995]

## Letizia Agent

Tracing links from the original page

Spiraling out to pages one link away, then two links away, and so on

Dropping the current search and initiating a new search when the user switches pages

Exploring the semantic neighborhood

## PowerScout



## PowerScout Agent

Introducing ¡concept browsing¡ ¡ browsing links not specified by a document¡s author, but nonetheless semantically relevant to the document being viewed.

Formulating concepts by extracting keywords from the current page.

Profiles: user-declared long-term interests