Les usages des systèmes d’information et leur co-évolution

or

Co-Adaptive Systems

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Responsable équipe-projet in|situ|
Research problem

Today’s computers:
… are too complex
… do not scale well
… overwhelm their users

We must manage this complexity:
Point designs are not enough
Desktop metaphor does not scale
Automation is not sufficient
It is getting worse ...

Interaction with
- Massive amounts of data
- Distributed interfaces / Ubicomp
- Wide variety of users

Uncontrolled chaotic effects
- small causes, big effects

WIMP interfaces are at their limit
- they do not scale well and
- we have no viable alternative
Moore’s law continues…

- Mainframes
- Mini-computers
- Personal computers
- Laptops
- Palmtops
- Smart cards
- Smart phones
- Smart pens

Cost


QuickTime™ and a decompressor are needed to see this picture.
...but users are not getting smarter

Interaction is a sensory-motor phenomenon
Fundamental trade-off:

Power versus simplicity

Simple things should remain simple
Complicated things should be possible
Fundamental trade-off: Power versus simplicity

How do we move the curve?
Three interaction paradigms

**Computer as tool**
- First person interfaces
- Empower users

**Computer as partner**
- Second person interfaces
- Delegate tasks

**Computer as medium**
- Third person interfaces
- Communicate
Joint lab: INRIA, Univ. Paris-Sud, CNRS

Our goals:

- to augment human capabilities
- to generate novel forms of interaction
- to explore the next generation of interactive systems
Multi-disciplinary approach

Theoretical

Artifact design

Empirical

Model → new model

prototype → system

observation → evaluation

re-evaluation
We can augment …

Human memory
PageLinker

Human perception
Sigma Lenses

Human motor skills
Semantic pointing
PageLinker

Take advantage of the context of use to support memory
Sigma Lenses

Take advantage of human visual system,
Focus + Context,
to support navigation
Take advantage of Fitts’ law, and disassociate motor and visual space to improve accuracy.

QuickTime™ and a decompressor are needed to see this picture.
We can also help users innovate!

Interactive software use is a co-adaptive phenomenon

Users *adapt to the software* presented to them

Users also *adapt that software* for their own purposes
Co-Adaptation

Similar to the concept of biological co-evolution... but without the DNA

How do we create interactive systems that are explicitly designed to support appropriation by users?
We can help users to...

understand what the computer is doing

communicate what they want

modify how the computer reacts
Object tracker: Gesture recognition

Providing users with real-time feedback to help them guide recognition by the computer.
Octopocus: Mark recognition

Users can combine *feedforward* to show the current options and *feedback* to show what the recognizer sees.

Distinguishes expert and novice use.
Façades: Reconfiguring interfaces

Users can adopt parts of any interface (Linux) and reconfigure it for specific needs.
Interaction browser: User-defined commands

Controllers can link their marks on flight strips to the RADAR and other computer displays.
Musink: Delayed interpretation

Musicians can create their own musical symbols and, over time, tell the computer how to interpret them.
Co-Adaptive systems

Allow users to adapt the system themselves, for their own needs

... by adding dynamic feedback

... by adding in-context feedforward

... by providing hooks for customization
Situated Interaction

Where do we go from here?

Making systems smarter:
by adding humans

Making humans smarter:
by adding computers