

Les usages des systèmes d'information et leur co-évolution or *Co-Adaptive Systems*

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Wendy E. Mackay
Directeur de Recherche
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

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TIFF (LZW) decompressor
are needed to see this picture.

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It is getting worse ...

Interaction with

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

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Uncontrolled chaotic effects

- small causes, big effects

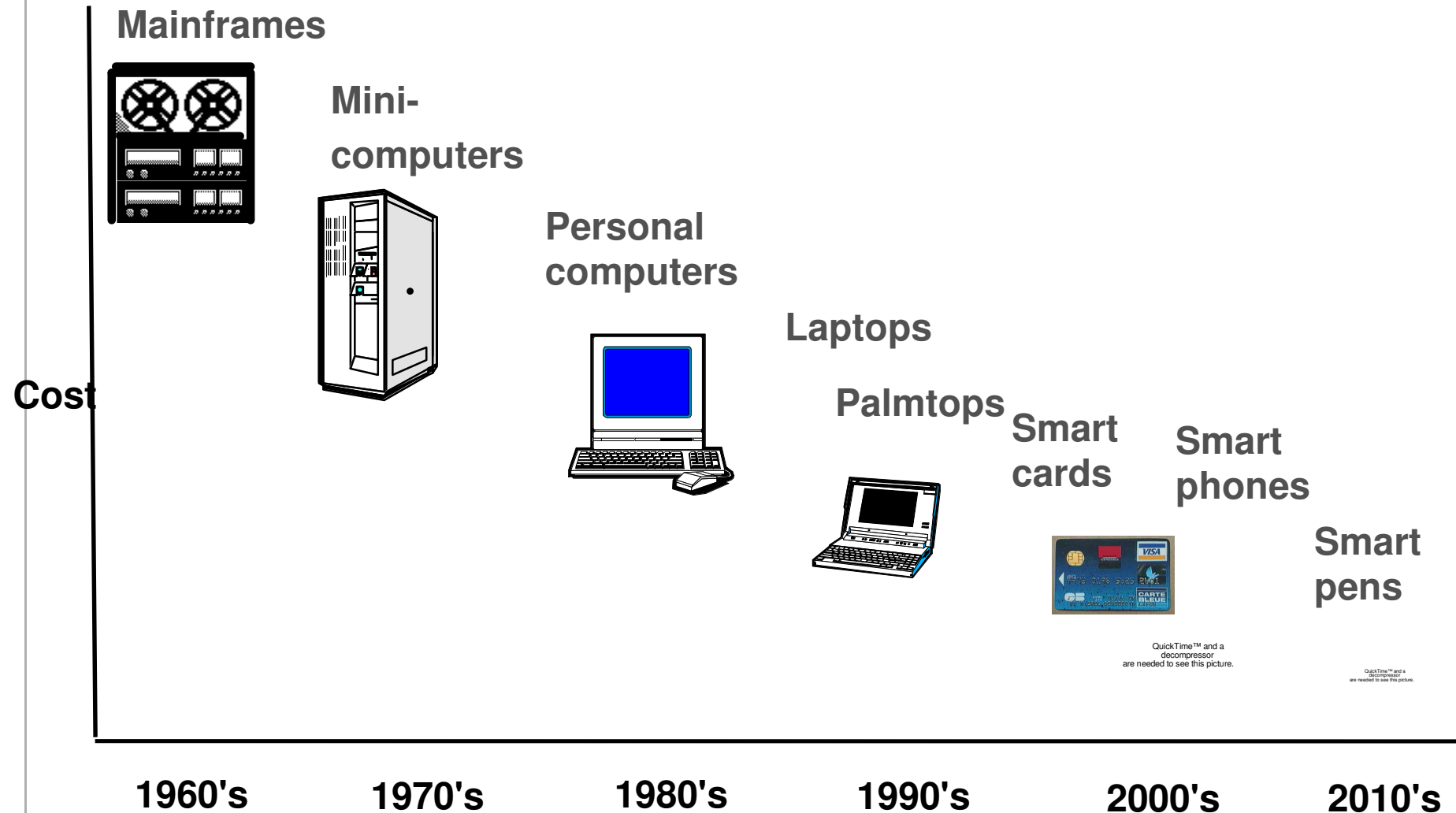
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WIMP interfaces are at their limit

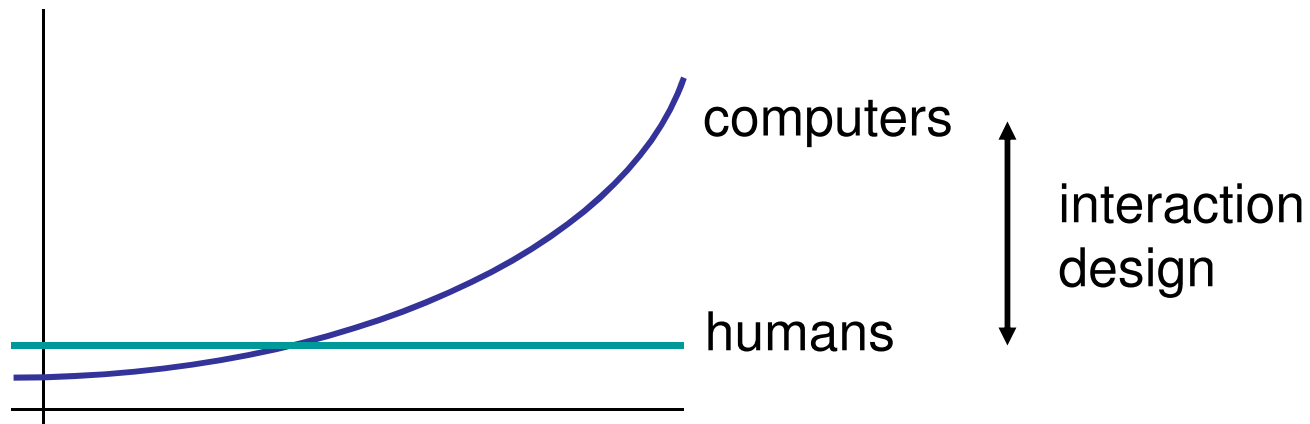
- they do not scale well and
- we have no viable alternative

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Moore's law continues...



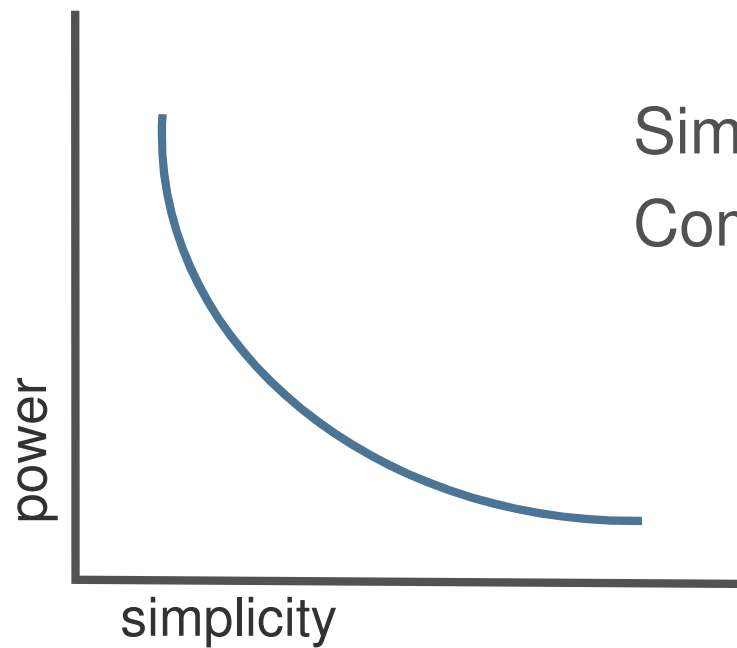
...but users are not getting smarter



Interaction is a sensory-motor phenomenon

Fundamental trade-off:

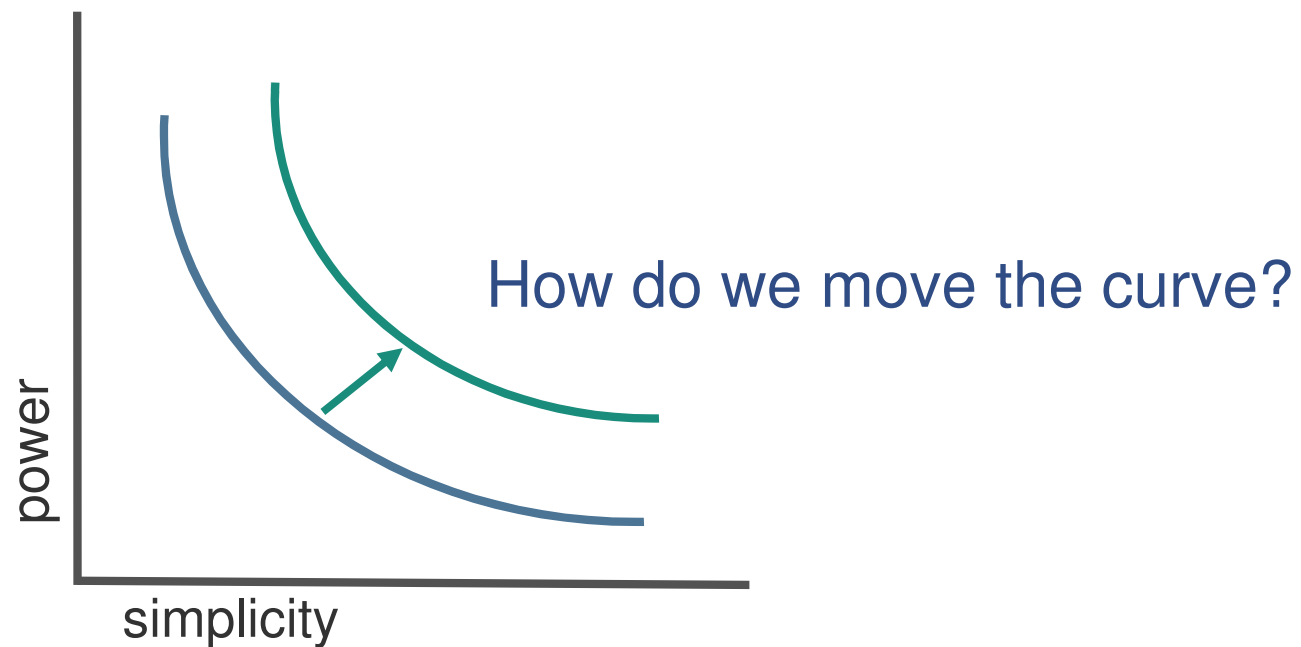
Power versus simplicity



Simple things should remain simple
Complicated things should be possible

Fundamental trade-off:

Power versus simplicity



Three interaction paradigms

Computer as tool

- First person interfaces
- Empower users



Human-
Computer
Interaction

Computer as partner

- Second person interfaces
- Delegate tasks



Artificial
Intelligence

Computer as medium

- Third person interfaces
- Communicate



Multi-
media

in|situ|

Joint lab : INRIA, Univ. Paris-Sud, CNRS

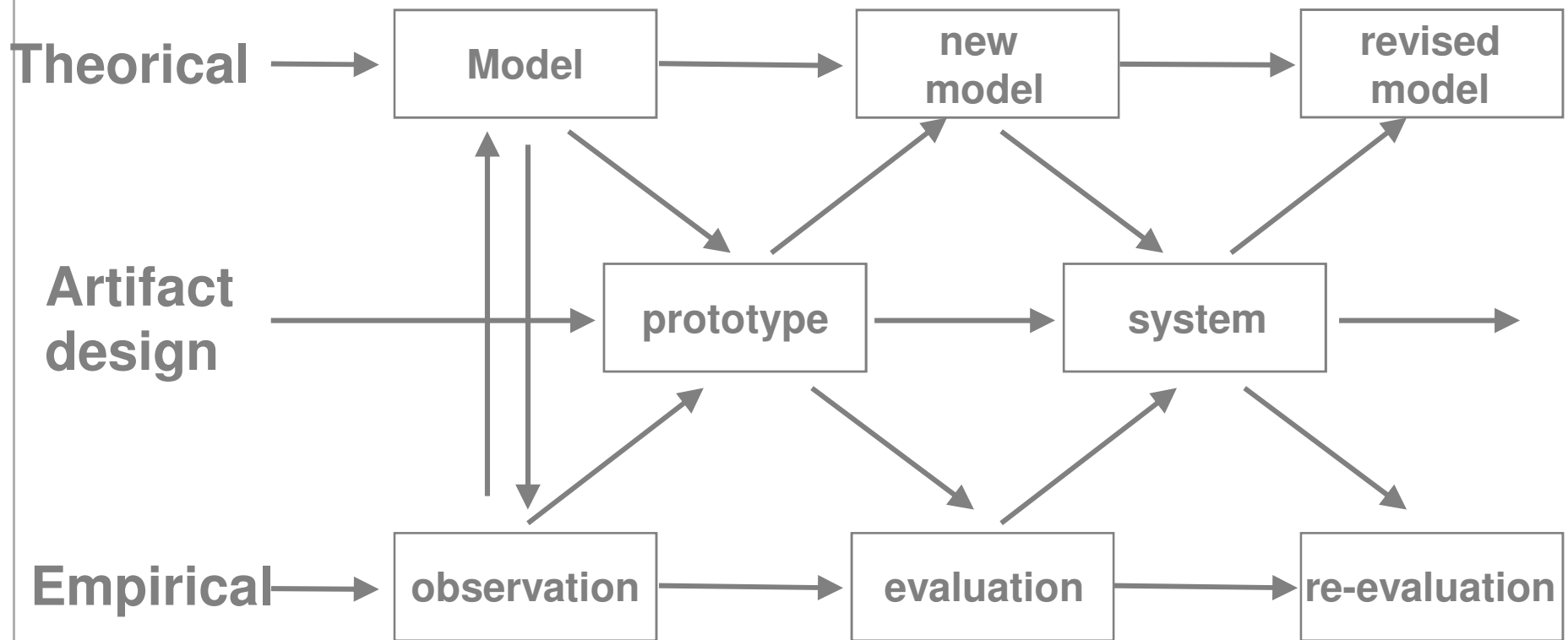
Our goals:

- to augment human capabilities

- to generate novel forms of interaction

- to explore the next generation of interactive systems

Multi-disciplinary approach



We can augment ...

Human memory

PageLinker

Human perception

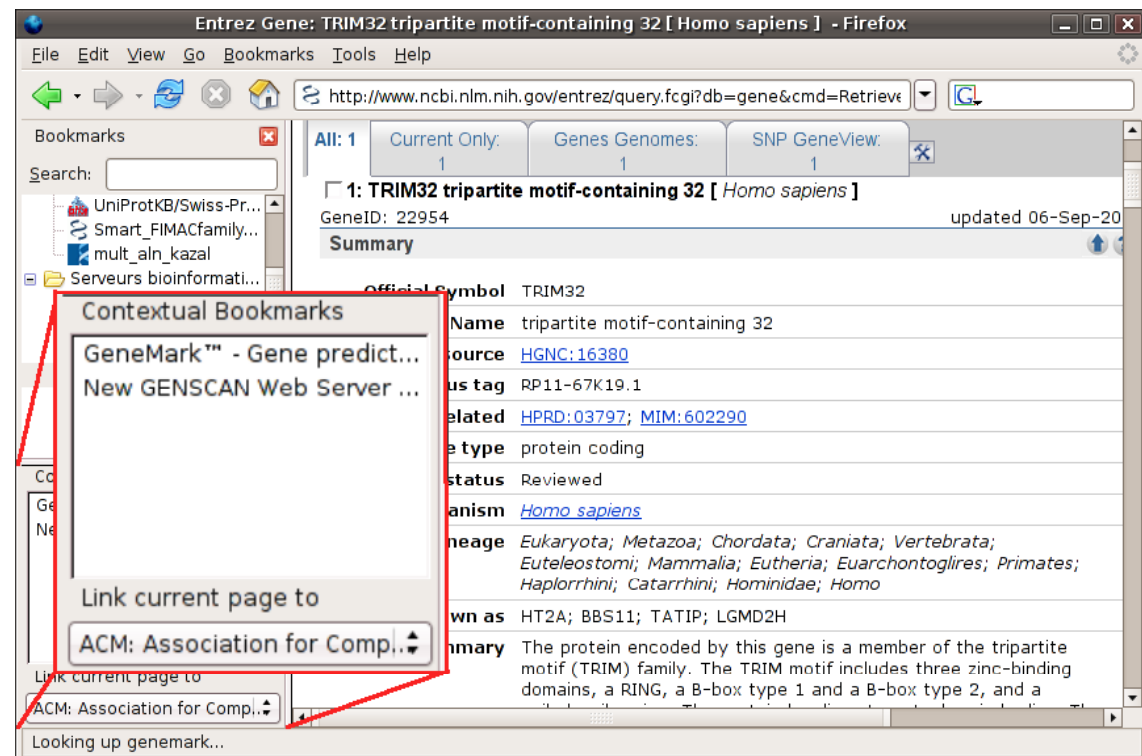
Sigma Lenses

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

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decompressor
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Semantic Pointing

Take advantage of Fitts' law,
and disassociate motor and visual space
to improve accuracy

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decompressor
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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

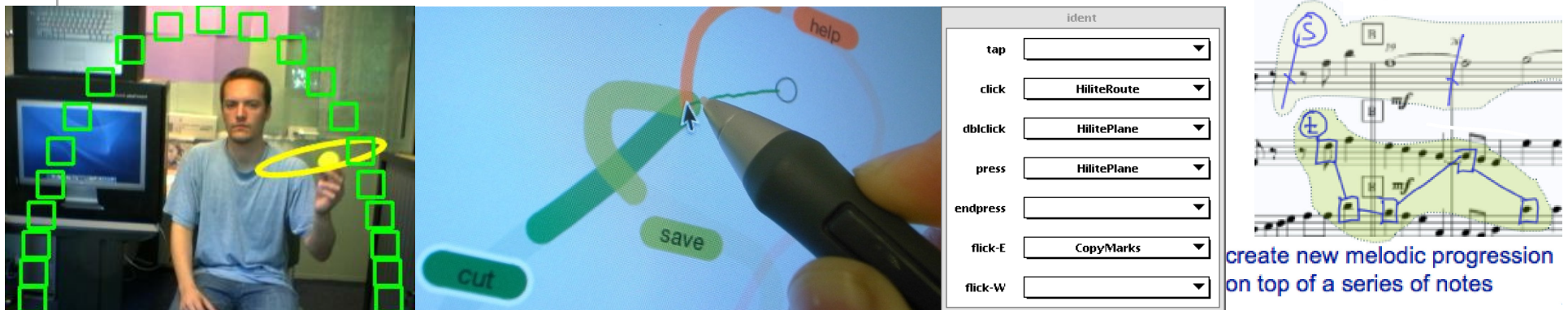
How do we create interactive systems
that are explicitly designed
to support appropriation by users?

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

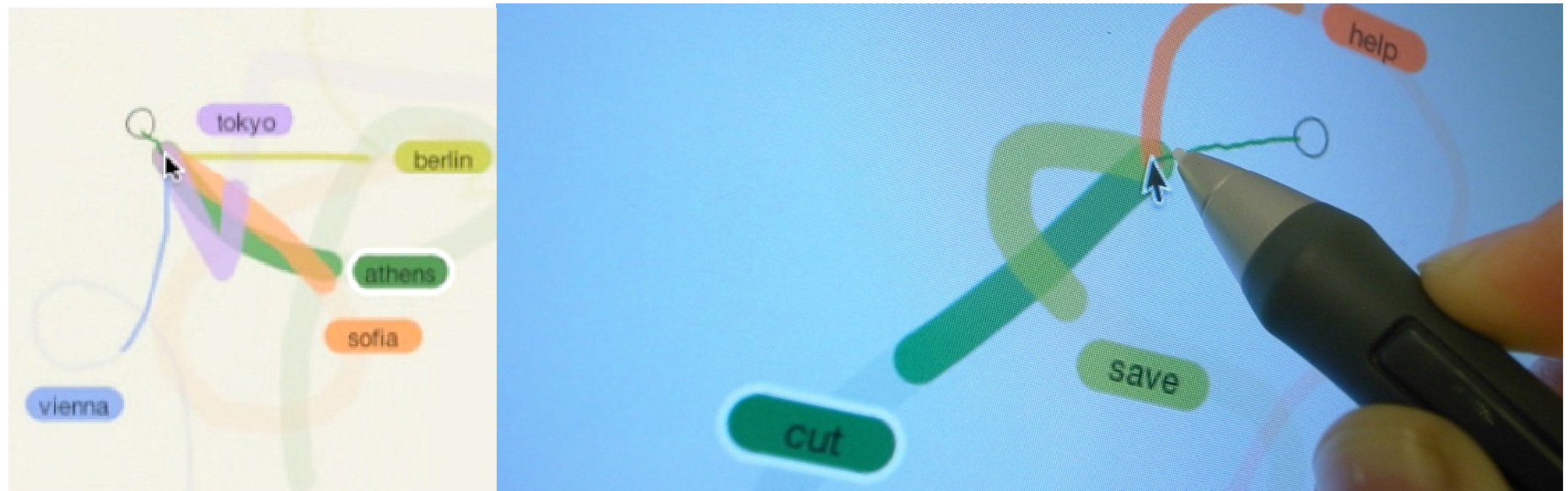
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Octopocus: Mark recognition

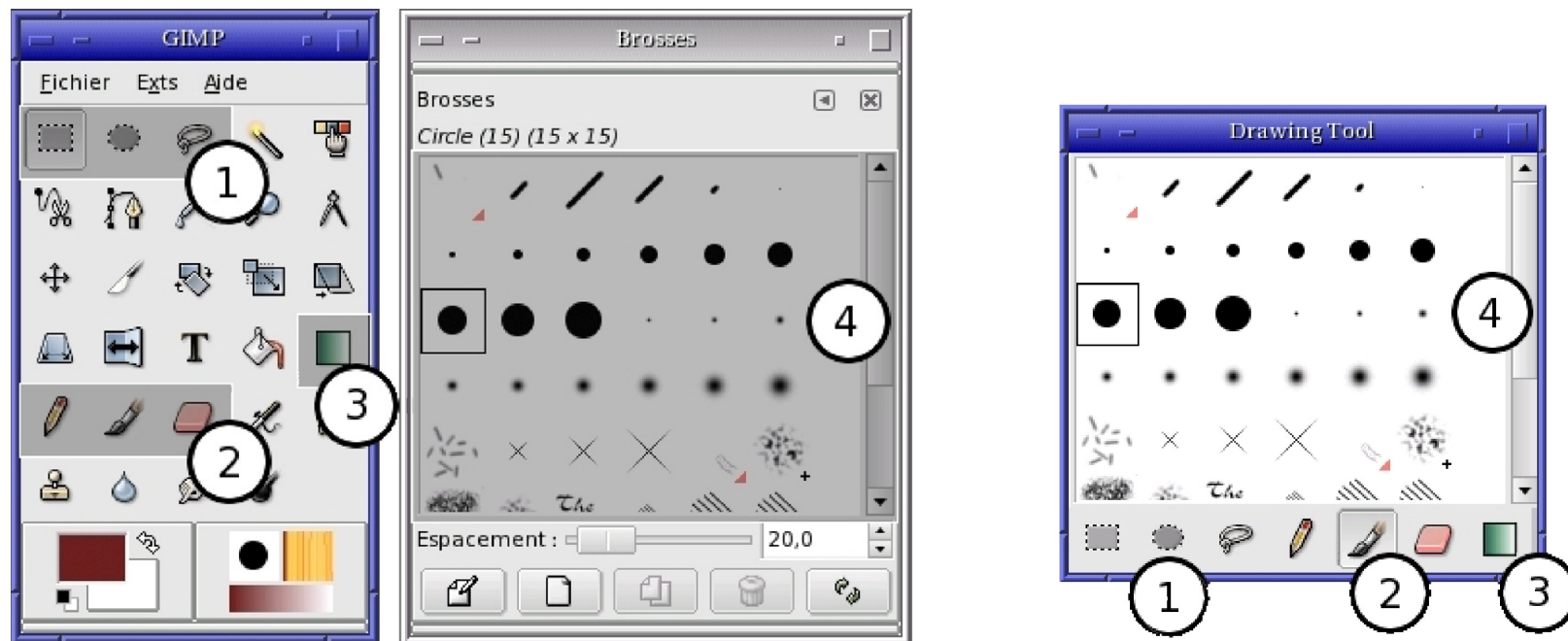
Users can combine *feedforward* to show the current options and *feedback* to show what the recognizer sees

Distinguishes expert and novice use



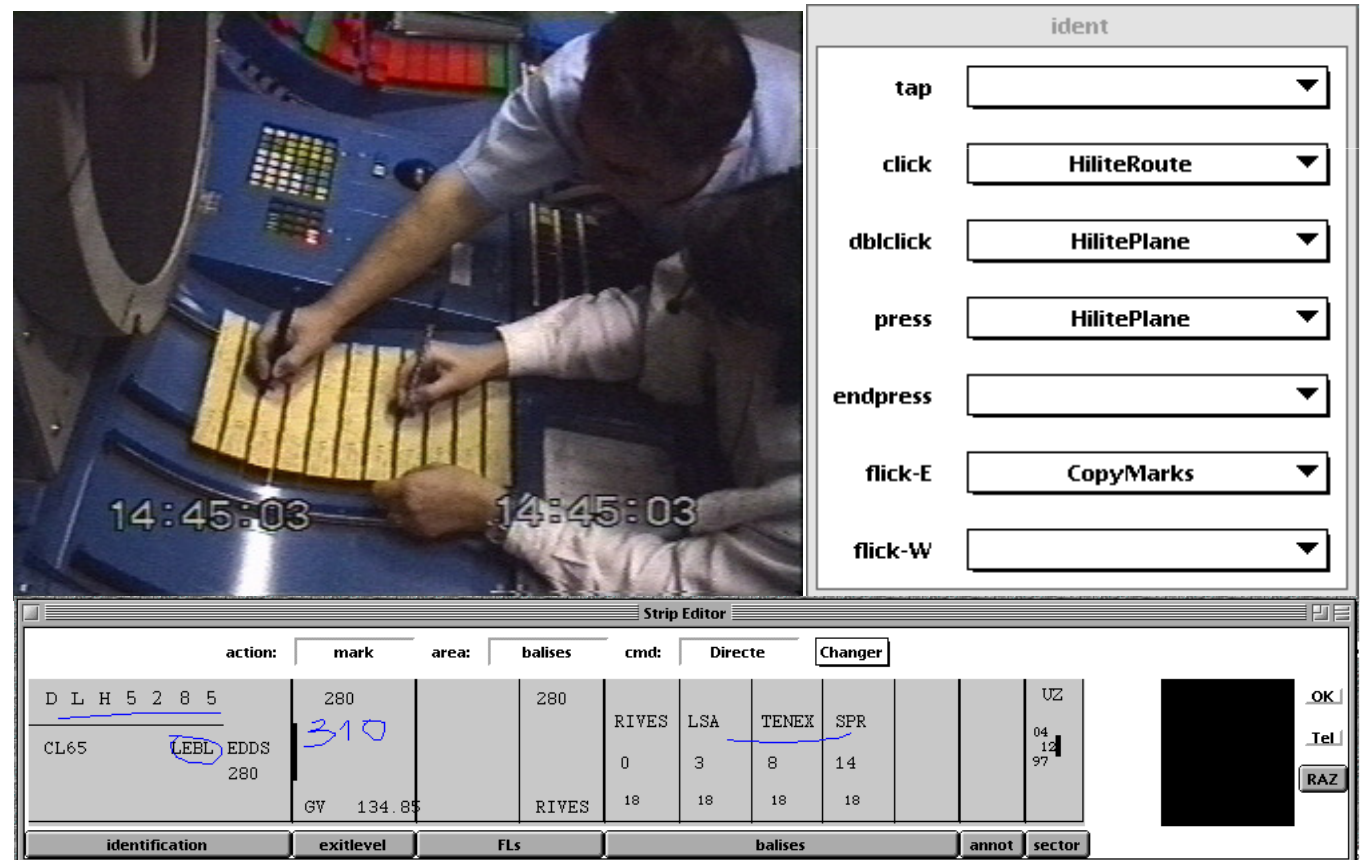
Façades: Reconfiguring interfaces

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

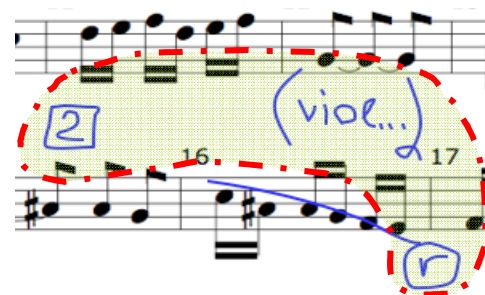
Musicians can create their own musical symbols
and, over time, tell the computer how to interpret them



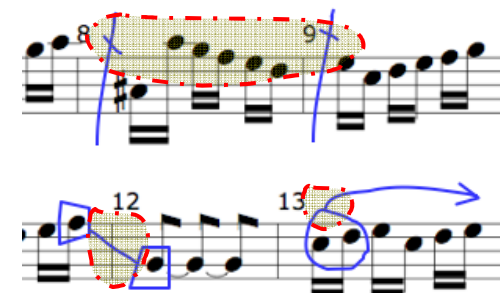
score pointers



scoping gestures



textual elements



connectors

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