The Art of Tangible Bits
A Tribute to Engelbart
The Program for the Future
December 8, 2008
The Tech Museum of Innovation, CA

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英雄
hero
Douglas Engelbart
Augmenting Human Intellect

1968

December 9th, 1968
NLS (oN-Line System) demo
at FJCC 68 in San Francisco
Engelbart’s Beacon to the Future

1968 NLS demo
1978 Star
1997 g-speak
2008 TBits
2054 Minority Report

future

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1 context

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Future is not to predict, but to invent.

Alan Kay
What drives Creation?

- Vision
  - Concepts, principles
- Users’ need
  - Applications
- Technologies
What drives Creation?

Vision
Concepts, principles

Users’ need
Applications

Technologies

What drives Creation?

Vision
Concepts, principles

Users’ need
Applications

Technologies

Business
HCl/usability
What drives Creation?

Vision
Concepts, principles

Our focus

Users’ need
Applications

Technologies
What drives Creation?

Vision
Concepts, principles

Users’ need
Applications

Technologies

Why? Life Span

Vision
Concepts, principles

>100 y

Applications
Need, users, task, evaluation

~10 y

Technologies

~1 y
1990

ClearBoard
NTT Human Interface Labs

My Art Work in 1959
Shared Drawing 1992
Collaborative Visual Thinking

Ref. Study on Shared Drawing and VideoDraw (PARC)
Prof. Larry Leifer, Dr. John Tang, Dr. Scott Minneman,

ClearBoard
NTT Human Interface Laboratories

Ishii and Kobayashi, 1992
ClearBoard
Seamless integration of interpersonal and shared drawing spaces

Ishii and Kobayashi, 1992
NTT Human Interface Laboratories

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1995
Joined MIT Media Lab

再起
Reboot
Tangible Bits

Physical embodiment of digital information and computation
Eyes are in charge, but hands are underemployed.

Orrery: Tangible Representation of Knowledge

Aesthetics which value haptic interaction with specialized physical objects ... but much richness has been lost.
Abacus: Origin of Tangible Bits

Hiroshi ISHII, born 2/4/56  Alisa ISHII, born 9/1/04
Tangible Bits paper presented at CHI ‘97

March 22-27, 1997

“Tangible Bits” paper presented at CHI ‘97 in Atlanta
Tangible Bits (TUI)

Graphical User Interface
• Intangible representation (pixels on a screen) +
• Generic input devices as “remote-controllers”

Tangible User Interface
• Tangible representation as interactive control mechanism to manipulate the information and computation
• Continuity between physical and digital representation in design

Urp running on the Sensetable

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“The Computer for the 21st Century”

“The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.”

Mark Weiser
July 23, 1952 - April 27, 1999

musicBottles (jazz)
musicBottles (classical)

Origin: Weather Bottle

present for my mother
soy sauce bottle
in her kitchen
PingPongPlus
Ishii, Lee, Wisneski, Orbanes 1999

- Digital augmentation of ping pong play with "reactive table."
- Ball tracking using microphone array underneath table.
- “From competition to collaboration”

- ICC, Tokyo 2000
- Centre Pompidou, Paris 2003
- Victoria and Albert Museum, London 2005
PingPongPlus at Centre Pompidou, Paris 2003

- Digital augmentation of ping pong play with "reactive table."
- Ball tracking using microphone array underneath table.
- "From competition to collaboration"

Invisible
extension of body - good fit

- customize
- personalize
- adapt
- co-evolve
painter = color maker

art

& science

I/O Brush
Kimiko Ryokai, Stefan Marti, & Hiroshi Ishii
Explore patterns of colors and textures through familiar materials

I/O Brush History Mode
Kimiko Ryokai, Stefan Marti, & Hiroshi Ishii

• From where the ink came from?
I/O Brush History Mode
Kimiko Ryokai, Stefan Marti, & Hiroshi Ishii

• Capturing and weaving the (hi)story for every stroke

The World as the Palette
Colors in Barcelona
inspire

1997
Dr. John Underkoffler
I/O Bulb & Luminous Room
I/O Bulb and Luminous Room
Underkoffler and Ishii, 1997 - 1999

• I/O Bulb
  – High resolution output, two-way information

• Luminous Room
  – Multiple I/O bulbs illuminating architectural space

Urp:
Urban Planning Workbench (an I/O Bulb AP)
Underkoffler and Ishii, 1997 - 1999

light reflections

wind

shadows

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**Urp:** Urban Planning Workbench
Underkoffler and Ishii, 1997 - 1999

**Luminous Room**
with multiple I/O Bulbs
Underkoffler and Ishii, 1997 - 1999

Distributed Illuminating Light
Painted Bits (GUI) and Tangible Bits (TUI)

**Graphical User Interface**
- Intangible representation (pixels on a screen) *
- Generic input devices as “remote-controllers”

**Tangible User Interface**
- Tangible representation as interactive control mechanism to manipulate the information and computation
- Continuity between physical and digital representation in design

Urp running on the Sensetable

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Tangible User Interface

- physical
- digital

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5
future

2054
Minority Report
Minority Report
Future is now

December 8th, 2008
Program for the Future
The Tech Museum of Innovation
San Jose, CA
Early Warnings for the Future

MIT Media Lab
Future is not to predict, but to invent. Alan Kay

Engelbart’s Beacon to the Future

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The Future is Already Here - It's Just Not Evenly Distributed.

William Gibson
Today

2050

today

2050
How do you want to be remembered by people living in 2200? What will you leave for them?

memento mori
Thanks to my hero, Doug Engelbart!

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Thanks!

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