HCI: History in 3 Waves

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https://youtu.be/QUQsqBqxoR4?t=7s
Some Computer History
Charles Babbage (1822)

Difference Engine: a mechanical calculator.

Analytical Engine: 1st general purpose computer

Designed but never built.

Ada Lovelace: 1st computer programmer

Lady Ada (Limor Fried)
Atanasoff-Berry Computer (1941)

First electronic
digital computing
device

At Iowa State!
Eniac (1943)
Harvard Mark I (1944)

Paper tape readers with physical patches
IBM SSEC
(1948)

From IBM Archives
Programming Languages

Moving beyond punch cards
FORTRAN, 1957 from IBM
   – Dorothy Vaughan
COBOL, 1960
   – Grace Hopper, “Mother of COBOL”

Still “Batch Processing” – no interaction
Vannevar Bush (1945)

“As We May Think” in *Atlantic Monthly*

“wholly new forms of encyclopedias will appear, ready made with a mesh of **associative trails** running through them, ready to be dropped into the **memex** and there amplified”

http://www.theatlantic.com/doc/194507/bush
J.C.R. Licklider

1960 – Described “Man-Computer Symbiosis”

- Time-sharing
- Networking
- Human-centered focus
Ivan Sutherland

Light pen
Hierarchy: pictures & subpictures
Icons
Copying
3D rotation
Douglas Englebart

NLS: oNLine System

“Mother of all demos” at 1968 conference
– Hypertext
– Windows
– Audio + video conferencing
– File version control
– Mouse & control box

Note: no Unix, no ARPAnet/Internet yet
Alan Kay

Dynabook, 1969

“Imagine having your own *self-contained knowledge manipulator* in a portable package the size and shape of an ordinary *notebook*. Suppose it had enough power to out-race your senses of sight and hearing, enough capacity to store for later retrieval *thousands of page-equivalents* of reference materials, poems, letters, recipes, records, drawings, animations, musical scores...”
Personal Computers

IBM XT/AT, 1981
- Command line
- Many sold

Xerox Star, 1981
- WIMP GUI
  (Windows, Icons, Menus, Pointers)
- Commercial failure

Apple Lisa, 1983
- Based on Xerox Star
- Failed

Apple Macintosh, 1984
1987: Apple’s Knowledge Navigator vision

Takes place in 2011

What does it get right?
What’s wrong?
What do we still need to do?

Notes:
• iPhone 2007
• iPad 2010
• Siri 2011
HCI History: 3 Waves
First Wave
Treat human like a machine.
What can it do?

Cognitive Science
Psychophysics
Human Factors

People at desks at work.
LONG-TERM MEMORY

\[ \delta_{LTM} = \infty \]
\[ \mu_{LTM} = \infty \]
\[ \kappa_{LTM} = \text{semantic} \]

WORKING MEMORY

VISUAL IMAGE STORE

\[ \delta_{\text{VIS}} = 200 \left[ 70-1000 \right] \text{ msec} \]
\[ \mu_{\text{VIS}} = 17 \left[ 7-17 \right] \text{ letters} \]
\[ \kappa_{\text{VIS}} = \text{Physical} \]

AUDITORY IMAGE STORE

\[ \delta_{\text{AIS}} = 1500 \left[ 900-3500 \right] \text{ msec} \]
\[ \mu_{\text{AIS}} = 5 \left[ 4.4-6.2 \right] \text{ letters} \]
\[ \kappa_{\text{AIS}} = \text{Physical} \]

**Cognitive Processor**

\[ \tau_C = 70 \left[ 25-170 \right] \text{ msec} \]

**Perceptual Processor**

\[ \tau_P = 100 \left[ 50-200 \right] \text{ msec} \]

**Motor Processor**

\[ \tau_M = 70 \left[ 30-100 \right] \text{ msec} \]

Eye movement = 230 \left[ 70-700 \right] \text{ msec}
Stroop

Tell me the colors of the words on the next 2 slides.

E.g.

RED
BLUE
Chess

Who is winning?
Chess

Who is winning?

How do you know?
Chess

Who is winning?
How do you know?
What do you remember?

Experts vs. Amateurs
QUICK! How many items do I have in my shopping cart?
QUICK! How many items do I have in my shopping cart?
Reasoning

Fact:
- All cards have letter on one side and number on the other

Rule:
- If there’s a vowel on one side, there’s an odd number on the other side.

Question:
- Which card(s) do you turn over to verify the rule?
Reasoning (2)

Fact:
- All cards represent people - the person’s drink is on one side, age is on the other.

Rule:
- If the person is drinking alcohol, he or she must be over 21

Question:
- Which card(s) do you turn over to verify the rule?
What's missing from the First Wave?
Second Wave

Whole human Groups of Humans
Situated action / intent

CSCW Participatory Design

Workplace groups Technology is separate
Flight 1549: Lands in the Hudson (2009)
What's missing from the Second Wave?
Third Wave
Social dynamics
Culture
Emotion

Affective computing
Human-Agent Teaming

Non–work activities

Gilbert, SPIRE-EIT 2015
HCI Homework: Bad Usability Scavenger Hunt

Find 2 interfaces that are frustrating for the user (websites or physical items: Doors, Chairs, Game Controllers, etc.) and capture them (photo or screenshot) by end of Friday.

Describe:

- The user’s task and context
- What is working/not working, what could make it better
- Blog them: start post title with “HCI: ”
- Due by end of Friday