Rob Haitani Video
Mobile design is evolving rapidly!

Newton

Palm Pilot

iPhone

Source: Apple, Palm
There was the Newton ...

Apple Newton MessagePad

The Newton OS GUI

Photograph of screen displaying Checklist, some bullet points checked and/or "collapsed"

Newtton screen displaying a Note with text, "ink text", a sketch, & vectorized shapes

Source: The Simpsons, Wikipedia
The Newton had problems

Design Issues

- Recognition (relied on it too much, didn’t work well enough)
- Physical size (too big)
- Connectivity (not much)

“Hey, Take a memo on your Newton”

“Beat Up Martin”

“The Original Apple Newton's handwriting recognition was made light of in The Simpsons episode”

“Baahh!”

Source: The Simpsons, Wikipedia
The Palm Pilot improved on the

Design Wins

- Recognition: simple graffiti
- Physical size: fits in the front pocket
- Connectivity: easy sync

Source: Palm 1000 Retrospective, Palm V, Rob Haitani in Moggridge, *Designing Interactions*, Ch. 3. From the Desk to the Palm.
http://www.designinginteractions.com/interviews/RobHaitani

Jeff Hawkins, Palm
[What about the Foleo?]

Rob Haitani, Palm OS
[Designs] what should be most prominent based on frequency of use, and strives to make the most often used interactions accessible in a single step.
iPhone keeps going

Design distinctions
- Tactile Input
- Disambiguation of input
- Animations

Source: Apple
A Prediction about Mobile

- “All appliances evolve until they have a clock”
- “All apps evolve until they have e-mail”
  ...
- “All mobile devices will evolve until they have network connectivity”
What makes mobile design exciting?

Many Design Choices

- Think different from GUI/Web
- Swiss army vs. dedicated
- Pen/speech modalities
- Integrate with other tasks
- Social apps
What makes mobile design difficult?

Design constraints

- Limited attention/Interactions bursty
- Screen size small
- Form factor
- Limited network connectivity
- Speech / pen / multimodal
Ideas for dealing with limited attention

- Minimize keystrokes
- Provide overview + detail
- Understandable interface at a glance
- Design with tasklets
- Minimum set of functions
Example approach: Nokia Navi-Key

Reducing number of buttons

Example approach: Blackberry

- Optimized for e-mail and simple text apps

Source: Research In Motion
Mobile Algorithm: Disambiguation w/ Dictionary

- Dictionary based (such as T9, PocketPC)
  - e.g., 2-2-5-3
  - able 2-2-5-3-0
  - cake 2-2-5-3-N-0
  - bald 2-2-5-3-N-N-0
  - calf 2-2-5-3-N-N-N-0
- Lots of “N” = Next

Mobile Algorithm: Disambiguation w/ Predictive

- Predictive (such as BB SureType, Letterwise)
  - e.g., t-h-
  - e A%
  - i B%
  - o C%
  - u D%
  - ...

Comparison between Dictionary and Predictive

Figure 11. Comparison of entry rates (wpm) with practice for , , and .
(Note: and figure are from Figure 6. Simulated figures are from Figure 10 with 0.85 frequency of words in dictionary)

Eye to the Future: Sensor Networks

Live Ad Hoc Sensor Network showing Light Intensity

A handful of network sensor 'dots'

Lots of 'dots' - getting ready for the big demo

Source: UC Berkeley Smart Dust Program, Largest Tiny Network Yet, http://webs.cs.berkeley.edu/800demo/
Eye to the Future: Mobile Device Proliferation

- A 2002 study calculated there were around 4.2 million CCTV cameras in the UK - one for every 14 people.
- "If you go forward 50 years, you are probably talking about one million forms of sensor per person in the UK," he said.
- This was a conservative estimate, he said. "More aggressive" calculations suggest there could be 20m sensors per person.

Source: BBC, “Sensor rise powers life recorders"
In 1954 Harold S. Osborne, the recently retired chief engineer for AT&T, made the following prediction (quoted in Conly 1954, p. 88):

"Let's say that in the ultimate, whenever a baby is born anywhere in the world he [sic] is given at birth a number that will be his telephone number for life. As soon as he can talk, he is given a watchlike device with 10 little buttons on one side and a screen on the other [see Figure 8.1]. Thus equipped, at any time when he wishes to talk with anyone in the world, he will pull out the device and punch on the keys the number of his friend. Then, turning the device over, he will hear the voice of his friend and see his face on the screen, in color and in three dimensions. If he does not see him and hear him, he will know that the friend is dead."
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<tr>
<td>16–19-year-old males</td>
<td>7 h 14 m</td>
<td>7 h 05 m</td>
<td>7 h 05 m</td>
<td>6 h 57 m</td>
<td>6 h 35 m</td>
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<td>20–29-year-old males</td>
<td>5 h 15 m</td>
<td>4 h 55 m</td>
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<td>4 h 37 m</td>
<td>4 h 53 m</td>
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<td>16–19-year-old females</td>
<td>7 h 26 m</td>
<td>7 h 45 m</td>
<td>7 h 28 m</td>
<td>7 h 12 m</td>
<td>6 h 59 m</td>
<td>7 h 17 m</td>
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<td>20–29-year-old females</td>
<td>9 h 54 m</td>
<td>9 h 09 m</td>
<td>8 h 33 m</td>
<td>7 h 30 m</td>
<td>7 h 17 m</td>
<td>7 h 15 m</td>
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1876: sees the birth of the telephone. The first historical words spoken by Alexander Graham Bell on the night of the 10th March are: "Mr. Watson, come here; I want you!"

1921: the combination of the telephone and radio enables officers at the Detroit Michigan Police Department to communicate with each other from patrol car to patrol car.


1935: the first phone call around the world

1936: the Zuse Z1 is the first program-controlled binary computer. It is mainly relay based and can perform eight different commands: read numbers from memory, write numbers to memory, decimal-binary conversion, binary-decimal conversion, addition, subtraction, multiplication and division.

1936: Canadian Al Gross, invents the walkie-talkie. Eleven years later he also patents the telephone pager, which did not become a great success until the 1970s.

1946: John von Neumann creates a Computing Machine that uses a single storage structure to hold both the set of instructions on how to perform the computation and the data required or generated by the computation. Most modern computers still use this architecture.

1946: AT&T Corporation launches the first commercial mobile telephone service for private customers.

1947: William Shockley invents the 'transfer resistance device', later known as the transistor. It revolutionises the incorporated electronics and gives the transistor a reliability that could not be achieved with vacuum tubes.

1962: Telstar is the first active communications satellite in space.

1968: Douglas Engelbart invents an 'X-Y' Position Indicator to assist user navigation on a computer screen. Twenty years later, as the computer mouse, it becomes the standard input device for personal computers.