Dialog Design - Gesture & Pen Interfaces

This material has been developed by Georgia Tech HCI faculty, and continues to evolve. Contributors include Gregory Abowd, Jim Foley, Elizabeth Mynatt, Jeff Pierce, Colin Potts, Chris Shaw, John Stasko, and Bruce Walker. Last updated by Valerie Summet, Emory University. Permission is granted to use with acknowledgement for non-profit purposes. Last revision: February 2011.
Dialog Styles

1. Command languages
2. WIMP - Window, Icon, Menu, Pointer
3. Direct manipulation
4. Speech/natural language
5. Gesture & pen
Agenda

- Mobile device overview
- Input styles
How to use a Mobile Device

I FOUND THE ULTIMATE TOOL FOR THE MOBILE PROFESSIONAL.

IT'S A COMBINATION PDA, PHONE, PAGER, DIGITAL CAMERA, FAX, E-MAIL, LAPTOP AND SHREDDER.

IT CLIPS RIGHT TO MY BELT!

IT'S A CELL PHONE SHAPED LIKE AN OLD MAN'S HEAD.

IT SITS ON YOUR SHOULDER SO YOU DON'T LOOK AS IF YOU'RE TALKING TO YOURSELF.

PEOPLE PROBABLY TOLD EDISON THAT HIS LIGHTBULB WAS CREEPY TOO.
Personal Digital Asst. (PDA)

Apple Newton (1993)

Palm VII  Palm IIIc

HP Jornada

Handspring Visor
PDAs

• Became common and widely used in late 90s, early 00s.
• Smaller display (160x160), (320x240)
• Few buttons, interact through pen
• Improvements
  ▪ Wireless, color, more memory, better CPU, better OS, BlueTooth
• Caught between
  ▪ Increasingly capable cell phones
  ▪ Increasingly portable laptops
Now...

- Mobile phones largely surpassed PDAs
- Apps (3rd party) to perform tasks
  - Calendar
  - Email
  - etc.
No Shredder...

IT'S A COMBINATION PDA, PHONE, PAGER, DIGITAL CAMERA, FAX, E-MAIL, LAPTOP AND SHREDDER.
Input

- Touch is dominant form
- Main techniques
  - Soft keyboard
  - mini-QWERTY keyboard
  - Numeric keyboard => text (multi-tap, T-9)
  - Stroke recognition - strokes not in the shape of characters
  - Free-form ink
  - Hand printing / writing recognition
- Sometimes can connect keyboard (bluetooth)
Soft Keyboards

• Common on mobile devices
Soft Keyboard

- Presents a small diagram of keyboard
- You click on buttons/keys with pen/finger
- QWERTY vs. alphabetical
  - Tradeoffs?
  - Alternatives?
Numeric Keypad - T9

- Tegic Communications developed
- You press out letters of your word, it matches the most likely word, then gives optional choices
- Faster than multiple presses per key
- Used in mobile phones
- [www.tegic.com/t9](http://www.tegic.com/t9)
Stroke Recognition - Graffiti

- Graffiti - Unistroke alphabet on Palm PDA
Stroke Recognition - Cirrin

- Developed by Jen Mankoff (CMU)
- Word-level unistroke technique
- UIST ‘98 paper
- Use stylus to go from one letter to the next
Stroke Recognition - Quikwriting

- Developed by Ken Perlin
- UIST ‘98 paper
Quikwriting Example
Shapewriter

- IBM research:
  - Zhai,
  - Kristensson
  - Smith.
- Begun in late 90s.
Free-form Ink

• Ink is the data, take as is

• Human is responsible for understanding and interpretation

• Like a sketch pad
Hand Printing & Hand Writing Recognition

- Recognizing letters and numbers and special symbols
- Lots of commercial systems
- English, kanji, etc.
- Not perfect, but people aren’t either!
  - People - 96% handprinted single characters
  - Computer - >97% is really good

- OCR (Optical Character Recognition)
Recognition Issues

- Off-line vs. On-line
  - Off-line: After all writing is done, speed not an issue, only quality.
    - Work with either a bit map or vector sequence
  - On-line: Must respond in real-time - but have richer set of features - acceleration, velocity, pressure
- Use best-guess pattern matching, including digram, trigram probabilities and word lists to remove ambiguity
  - 1 l l
More Issues

• Boxed vs. Free-Form input
  ▪ Sometimes encounter boxes on forms

• Printed vs. Cursive
  ▪ Cursive is much more difficult to impossible

• Letters vs. Words
  ▪ Cursive is easier to do in words vs individual letters, as words create more context
Define a series of (hopefully) simple drawing gestures that mean different commands in a system

- Might mean delete
- Insert
- Paragraph
Use Modes

• Often, want a mix of free-form drawing and special commands

• How does user switch modes?
  ▪ Mode icon on screen
  ▪ Button on pen
  ▪ Button on device
Error Correction

• Having to correct errors can slow input tremendously

• Strategies
  ▪ Erase and try again
  ▪ When uncertain system shows list of best guesses
  ▪ …
A Different Application

• Signature verification

• But not with a mouse :)