Computers

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CS-1Q HCI

CS-1Q: HCI (Lecture 2) ⓒ C.W. Johnson, 2001

Introduction

• Logical and physical I/O devices.

Dialogue styles:
text; forms; menus; graphics.

• WYSIWYG, Metaphor and Direct Manipulation.

• Breakdown.

Input Devices

• Several physical devices implement a logical device.



 $\label{eq:constraint} Acknowledgement: \ Microsoft \ and \ Ericsson$

- Text input implemented by:
- keyboards, speech recognition, handwriting, gloves.

Input Devices

• Pointing implemented by:

- mice, touch-screens, tracker balls, eye-tracking.

• Cameras also used to provide input: – automatic facial recognition using feature extraction.

• People are themselves becoming input devices: - *context aware* systems track the user's location.

Output Devices

• Printed output:

- laser printers; ink-jets; impact and thermal printers.



Acknowledgement: Panasonic and NEC

- Graphical output:
- CRT or LCD displays; projectors.

Output Devices

• Audio output:

- stereo/surround speakers; headphones.



- Potential problems:
- earcons or auditory icons?
- pitch/timbre, relationship to music?

Virtual Reality

- Displays: helmet mounted or projection.
- Input devices: head and body tracking.



 $\label{eq:acknowledgement: www.vrealities.com} Acknowledgement: www.vrealities.com$

- Many usability issues:
- most systems lack force feedback;
- stresses on body holding a 3D position;
- parallax problems and nausea.

Virtual Reality

- Force feedback or *haptics*:
- joysticks; motor-driven feedback; The Bed;
- some of these are input and output devices.



• Financial expense, relaibility etc.

Desktop Virtual Reality

- Technologies:
- QuicktimeVR;
- Virtual Reality Markup Language;
- DirectX and Spatial Audio.



- Many usability issues:
- 3D spatial positioning with 2D devices;
- navigation and way-finding is hard;
- animation of environments requires scripts;
- VRML 'face plant'.

Dialogue Styles

• Dialogue styles:

- manner in which information is presented and received.

- The most common are:
- Text (embedded systems, phones);
- Forms (B2B systems, call centres);
- Menus (desktop systems, some web interfaces);
- Graphics (desktop, palmtops, the web).

- Most interfaces now mix all of these styles;
- but proportions vary depending on users.

Text

- Fonts:
- describe the shape of a character;
- serif vs sans-serif.



ELEPHANT

• Point size:

- determines size of a character;
- 1 point is a 72nd of an inch.

• It's the RELATIVE not the absolute size.

Forms

- More advanced forms:
- automatic parsing, context-sensitive.

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• Must provide title of the form.

Forms

- Navigation:
- tab to move between fields;
- ENTER to submit the form.

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• Must provide a cancel option.

Menus

• Many different types:

- hierarchical; pull down; tear-off; pop-up.



• The magic number is 7 + or - 2.

Menus

• Low consequence options at the top.

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• Dynamic menus reconfigured by item frequency.

Graphics

• Icons help to promote product identity.



• What is the *semantics* of the image?

WYSIWYG

• What you see is what you get.

\slideitem{What you see is not what you get.}

• Few systems print exactly what you see on the screen.

• Fonts on the printer differ from those on screen.

• Can be deeply frustrating...

Metaphor

• Computers rely on binary signals, people don't.

• Provide an abstract view of underlying complexity.

• Show a desktop with folders and a trash-can.

• Do not show complex path information: $D: \setminus > Users \setminus profiles \setminus Johnson$

Direct Manipulation

- Good metaphors:
- support skill transfer;
- good metaphors reduce training requirements;
- good metaphors encourage exploration.



- But *direct manipulation* systems must support: - rapid, incremental and reversible actions.
 - What happens when the metaphor breaks down?

Summary

• Logical and physical I/O devices.

Dialogue styles:
text; forms; menus; graphics.

• WYSIWYG, Metaphor and Direct Manipulation.

• Breakdown.

Further Reading

- Shneiderman on:
- interaction devices pp305-343;
- direct manipulation pp 185-228.

• Lots more, read it for open assessment!