DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF TORONTO

CSC318S

THE DESIGN OF INTERACTIVE COMPUTATIONAL MEDIA

Lecture 13 — 2 March 1998

INTERACTION THROUGH ANIMATION, VIDEO, AND MULTIMEDIA

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13.1 Motivation

Enrich dialogues

Higher information transmission

More enjoyable interfaces

Appeal to different cognitive styles, e.g., left brain, right brain

Show things that cannot be described in words

13.2 Animation at the interface

Uses of animation at the interface

Identification	What is this?
Transition	Where have I come from and gone to?
Orientation	Where am I?
Choice	What can I do now?
Demonstration	What can I do with this?
Explanation	How do I do this?
Feedback	What is happening?
History	What have I done?
Interpretation	Why did that happen?
Guidance	What should I do now?

VIDEO — Animated Icons (Baecker, Small, and Mander, Apple Computer, Video Supplement to CHI '91 Paper)

In Lecture 11, showed basic technique of animated icons for Demonstration

Remainder of video:
- Problem icons
- Control issues
- Animation + sound effects
- Media-intensive animation

Will show *VIDEO — Sorting Out Sorting (Baecker, 1981),* but first a video sampler

13.3 Interaction techniques & scientific visualization

VIDEO — The Dynamic Image (Baecker, U of T, 1987)

Highly interactive dragging, rubber-band rectangles, use of constraints in NEWSWHOLE (Tilbrook, 1974)

3D input tools (Chan, 1987)

Scientific visualization
- Display of 4D hypersolids (Olshevsky, 72)
- Display of molecular dynamics (Parr, 71)
- Display of growth of teeth (Tuori, Hill, 76)
- Bubblepeople (Badler, mid 80s)
- 3D magnetic resonance imagery (Joy, 87)
- Enhanced program typesetting (Baecker/Marcus, 87)
- General-purpose hashing machine (Booth, 77)

VIDEO — Visual Information Seeking Using the Film Finder (Shneiderman & Ahlberg, U. of Maryland, SGVR 97, 1994)

Graphical selection sliders for specifying queries
Starfield displays
Rapid interaction

13.4 Maps at the interface

Use — Geographic-based information display and manipulation

Class: Imagine what kinds of displays you can generate of geographic information?

Class: Imagine what kinds of interaction you can do with geographic information?

Example, using maps and video — The Aspen Project (Andy Lippman, M.I.T. Architecture Machine Group, circa 1980)

13.5 Video at the interface

Use — Appeal, excitement, realism, authenticity of real video

Video compression standards and technology
QuickTime, MPEG, H.261 and other standards

VIDEO — The Movie Manual Project (Backer and Gano, The Architecture Machine Group, M.I.T., circa 1980, SGVR 13, 1984)

13.6 Multimedia at the interface

Medium (Webster's Third New Int'l. Dictionary)
- "Something through or by which something is accomplished, conveyed, or carried on ..."
- "a channel, method, or system of communication, information, or entertainment ..."
- "the material or technical means for artistic expression ..."

Multimedia — Computer technology ...
- Text, images, sounds, animation, video
- Example: Electronic encyclopedias — multimedia Beethoven and Shakespeare
- Multiple methods of representation and access

The Movie Manual also illustrates *hypertext* and *hypermedia*

Hypertext is branching text, with links that can be used for navigation (e.g., Glossary items in the Movie Manual)

13.7 3D at the interface

Uses
- Deal with real world, which is three-dimensional
- Add level of dimensionality, increased display space, to represent and manipulate complex abstractions
- Artificial reality, virtual reality

VIDEO — Information Visualization Using 3D Interactive Animation (Xerox PARC, SGVR 63)
- Cone trees
- Cam trees
- Perspective wall
- Linked visualizations

Augmented reality — overlay computer graphics on live video of real world

VIDEO — Augmented Reality with Graphical Overlay of Stereoscopic Images — ARGOS (Milgram, U of T, SGVR 88, 1993)
Augmented reality
3D display
Stereo display
Virtual pointers

13.8 Agents with point of view at the interface

Use

Direct manipulation forces you to do it all yourself, which may be very slow and repetitive

Imagine instead *delegating* to an intelligent assistant

Multiple agents could represent different abilities, perspectives, points of view

VIDEO example not to be shown — Guides 3.0 (Apple Computer, SGVR 63)

Most recent phenomenon — avatars, representations of 3D animated faces, other anthropomorphisms

13.9 Multi-modal dialogues

Elements

- Large display surfaces (e.g., video projection)
- Voice output
- Output of sounds
- Voice input
- Large scale storage of digital data (CD/ROM)
- Large scale storage of video data
- Hand inputs (e.g., data glove)
- Tracking of body movements
- Tracking of eye movements

The real payoff – Use in combination

- e.g., Put That There (already shown) — Voice recognition, voice synthesis, English language recognition, gesturing in 3D (pointing), large screen display