UMIST

Centre for HCI Design

Multimedia Design for the Web

Alistair Sutcliffe & Leon Watts

Centre for HCI Design
Department of Computation
University of Manchester Institute of Science & Technology
P.O. Box 88
Manchester M60 1QD, UK

a.g.sutcliffe@co.umist.ac.uk

http://www.co.umist.ac.uk/hci_design/index.htm

UMIST

Centre for HCI Design

Tutorial Outline

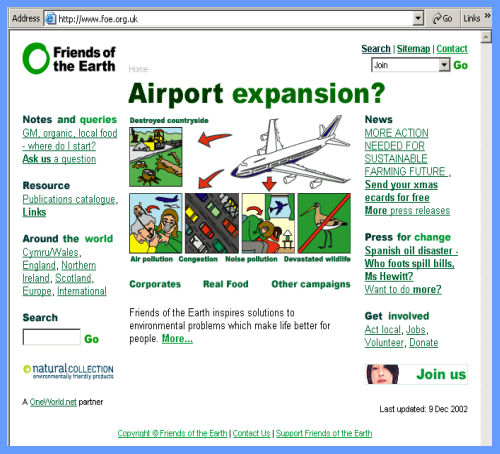
9.00 - 10.30	Background psychology for multimedia design
coffee	
11.00 - 12.30	Design process: Information Architecture Case study - requirements & content Media selection and integration
lunch	
1.30 - 3.30	Attraction & Attention Case study - storyboards
tea	
4.00- 5.30	Storyboard walkthroughs Multimedia dialogues

UMIST

Centre for HCI Design

Design problems

- Choosing the right media to convey the message
- Making sure the message and theme are clear and coherent
- Directing the user's attention - thread of viewing/reading
- Optimise the User Experience- but what *is* engaging and attractive interaction ?



UMIST

Centre for HCI Design

Applying Psychology to Design

- Perception: how people receive information. Vision and hearing are prime modalities; but touch, smell, taste in the future
- Cognition: how people comprehend information and reason with it
- Attention: how we manage multiple demands on limited cognitive resources
- High-level model of human information processing as "tool for thought"
- Design principles and guidelines based on cognitive models and experimental evidence

UMIST

Centre for HCI Design

Vision

- Central vision for detail, peripheral vision for awareness (movement but not much else)
- Visual perception is an abstracted view of reality; seeing is by interpretation - "what we see is what we know"; visual illusions
- Eye scans over images in rapid movements or *saccades;* look at complex detail, odd/separate features, object boundaries, colour
- Visual acuity varies widely (age, colour blind); also depends on ambient light
- Detail best in high contrast (foreground/background)

CHI 2003 Tutorial *Multimedia & the Web*

UMIST

Centre for HCI Design

Where will you look in this image ?

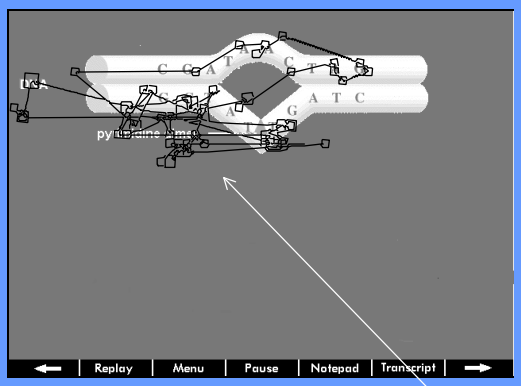
What information will you extract ?

CHI 2003 Tutorial *Multimedia & the Web*

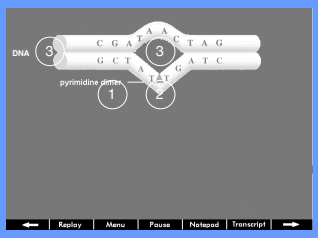
UMIST

Centre for HCI Design

Eye tracking



Fixations



Rapid scans - fixations followed by jumps - saccades mainly unconscious control

CHI 2003 Tutorial

Multimedia & the Web

UMIST

What you see depends on ...

Centre for HCI Design

... your motivation, knowledge, animation, layout structure, density, colour, expectations

CHI 2003 Tutorial

Multimedia & the Web

UMIST

Centre for HCI Design

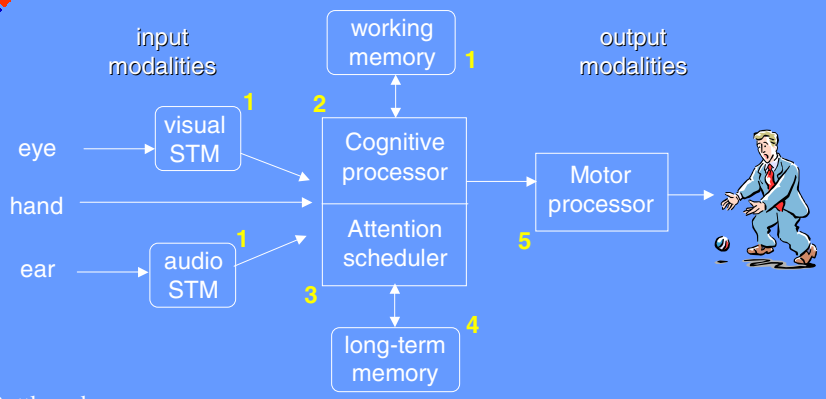
Hearing

- Abstracted view of reality, separate processing for speech: what we hear is what we expect to hear
- Transient modality, subject to interference: background noise, directional or broadcast modality
- Human speech recognition tolerates mispronunciations, non-grammatical sentences, dialects
- Sound/speech discrimination varies with age, depends on frequency (pitch), amplitude (loudness) and contrast (foreground/background: Db ratio)

UMIST

Centre for HCI Design

Cognitive User Model



Bottlenecks
1. Capacity overflow: information overload
2. Integration: common message?
3. Contention: conflicting channels
4. Comprehension
5. Multi-tasking input/output

UMIST

Centre for HCI Design

Working Memory

- Limited capacity: 7 +/- chunks, but chunk size depends on abstraction
- Chunking helped by making patterns and associations explicit, e.g. telephone numbers 020 7477 8000 better than 02074778000
- Demands on working memory: input from senses, vision and hearing + facts used in reasoning + facts retrieved from long term memory + output (speech, actions)
- We manage by chunking and rapid time-slicing between input/process/output but easy to overwhelm WM with too much MM input

UMIST

Centre for HCI Design

Long-Term Memory

- Remembering: two-phase process - recognition then recall.
- Memorisation helped by reasoning and problem solving - depth of encoding
- Memorisation helped by chunking (abstraction), clear structure, access paths and context
- Multimedia can help by providing richer access paths and memorisation context (visual, verbal, audio cues), also richer schema
- Consistent content and navigation structure help memorisation and recall

UMIST

Centre for HCI Design

Selective Attention

- Input competition from the world: vision, hearing, etc., with reasoning, memorisation and action
- Background and foreground processes; automatically monitor the world while thinking, talking, etc.
- Attention directed to change in the world: sound, moving image are very salient
- Too many inputs at once will create conflicts, continual stimuli over a long period can cause stress

CHI 2003 Tutorial *Multimedia & the Web*

UMIST

Centre for HCI Design

Reading and Viewing Multimedia

- Dynamic media - film, video, speech - we have no choice but to process in sequence; onset of a dynamic medium grabs attention
- Text: also processed mainly in sequence, reading order of syntax, but may skip/scan
- Still image: viewing sequence more complex. What we comprehend in an image depends on:
  - what we look at (motivation, task)
  - what we know
  - how salient objects are in the design
- Need to control user's reading/viewing sequence – attention to theme, key items

CHI 2003 Tutorial *Multimedia & the Web*

UMIST

Centre for HCI Design

Session 2
Design Process

- Requirements and task/information analysis
- User analysis
- Media selection and integration
- Outline scripting

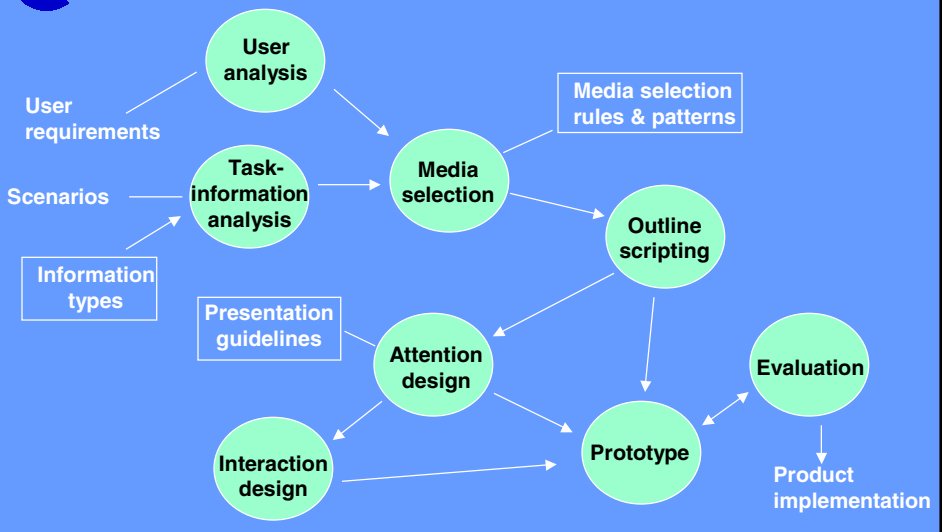
CHI 2003 Tutorial

Multimedia & the Web

UMIST

Centre for HCI Design

Design process



CHI 2003 Tutorial

Multimedia & the Web

UMIST

Centre for HCI Design

Session 3
Presentation and Dialogue Design

- Planning thematic threads through several media
- Presentation layout: sequential or concurrent
- Drawing attention to key facts especially in image
- Specifying explicit links between different content: design of *contact points*
- Dialogue, navigation and interaction

UMIST

Centre for HCI Design

Presentation Techniques

•Techniques are used to draw the user's attention to key items in content

• Direct user's viewing/reading sequence via contact points

- Direct contact point: highlight in both source and destination

- Indirect contact point: highlight only in source or destination medium

• Sequence highlights to direct viewing within and between media

• Contact points in hypermedia become link and anchor cues

UMIST

Centre for HCI Design

Design for Attention

- Visual image media: movement, on/off effects, highlights, outline, shape, size, symmetry, oddity, icons, symbols (arrows), zoom/pan to foreground objects
- Text: blink, bold, font size, font type, underline, format, caption links, and content reference
- Speech: voice tone (prosody), change speaker, rate, loudness, and content reference

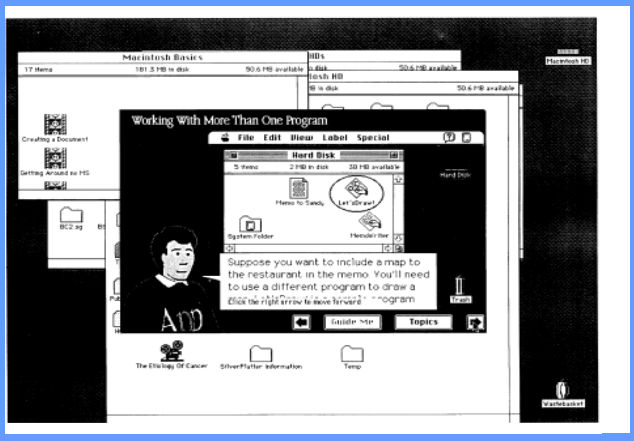
  - "look at figure 1", "find the mouse beneath the table", "beware of the delete..."

- Animation: zoom/pan to foreground, close-ups, freeze frame, cuts, overlay markers, icons
- Window management: foreground window, centre embed displays; tracing techniques: links,arrows, landmarks

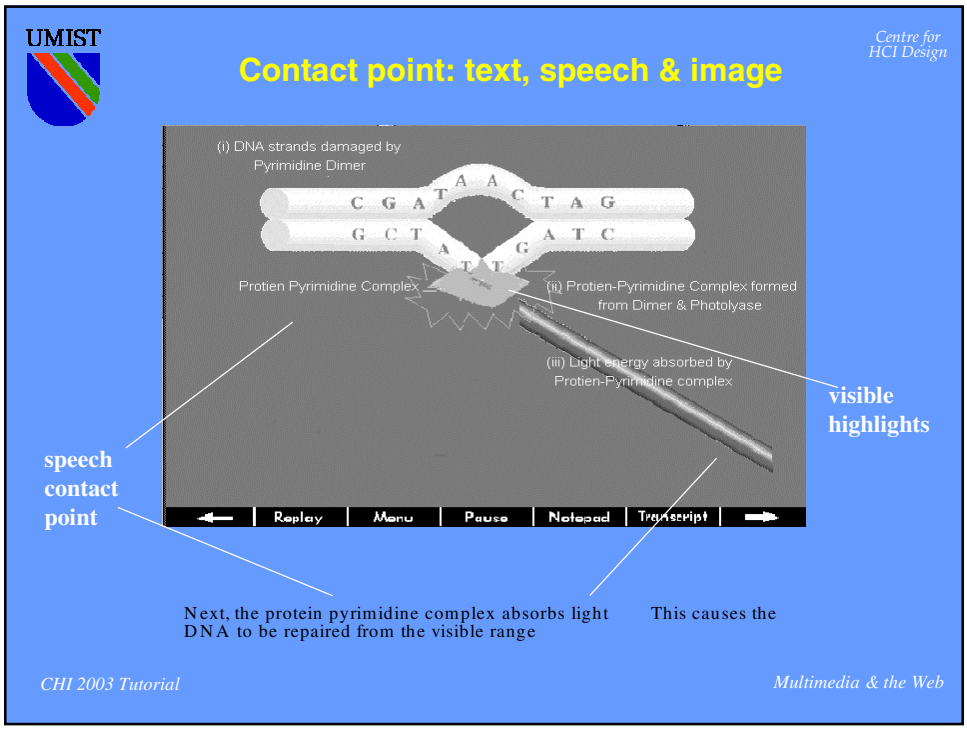
UMIST

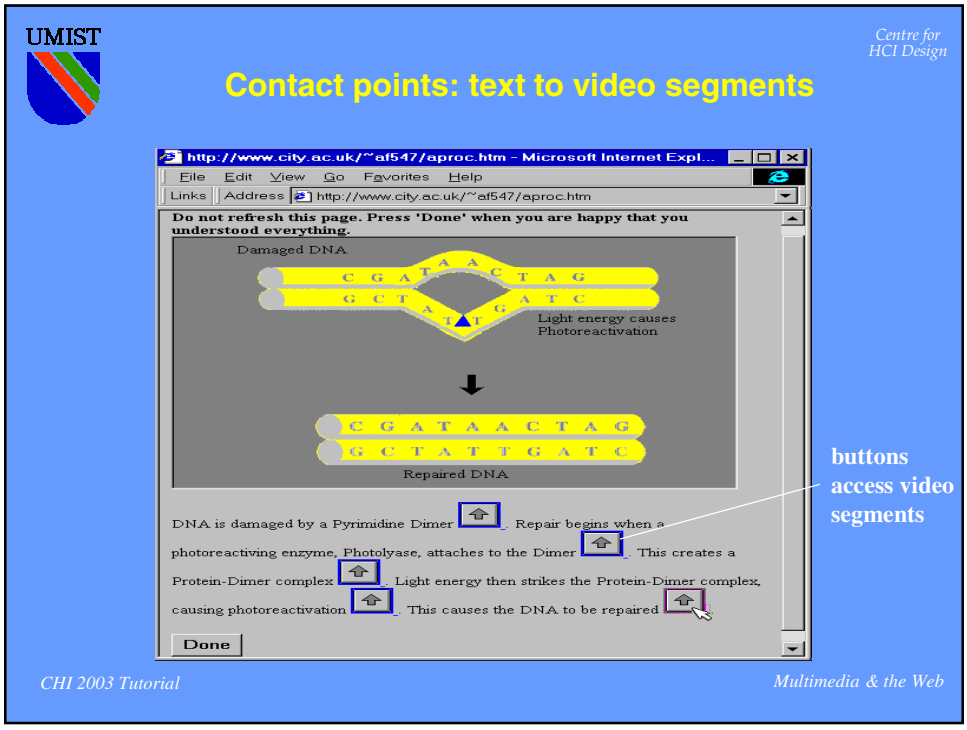
Centre for HCI Design

Contact point example



Text and speech linked to image with boundary effect


UMIST
Centre for HCI Design
Contact point: text, speech & image
(i) DNA strands damaged by Pyrimidine Dimer
Protien Pyrimidine Complex
(ii) Protien-Pyrimidine Complex formed from Dimer & Photolyase
(iii) Light energy absorbed by Protien-Pyrimidine complex
Replay
Menu
Pause
Notepad
Transcript
visible highlights
speech contact point
Next, the protein pyrimidine complex absorbs light DNA to be repaired from the visible range
This causes the
CHI 2003 Tutorial
Multimedia & the Web


UMIST
Centre for HCI Design
Contact points: text to video segments
http://www.city.ac.uk/~af547/aproc.htm - Microsoft Internet Expl...
File Edit View Go Favorites Help
Links Address http://www.city.ac.uk/~af547/aproc.htm
Do not refresh this page. Press 'Done' when you are happy that you understood everything.
Damaged DNA
Light energy causes Photoreactivation
Repaired DNA
DNA is damaged by a Pyrimidine Dimer
Repair begins when a photoreactivating enzyme, Photolyase, attaches to the Dimer
This creates a Protein-Dimer complex
Light energy then strikes the Protein-Dimer complex, causing photoreactivation
This causes the DNA to be repaired
Done
buttons access video segments
CHI 2003 Tutorial
Multimedia & the Web

UMIST

Centre for HCI Design

Interaction

- Interaction engages users: motivating also improves learning
- Ideas? - interactive metaphors for navigation, games, quiz, user as actor in presentation
- Dialogue plans from task analysis, scenarios
- Prototype and/or storyboards for early evaluation; feedback from users

UMIST

Centre for HCI Design

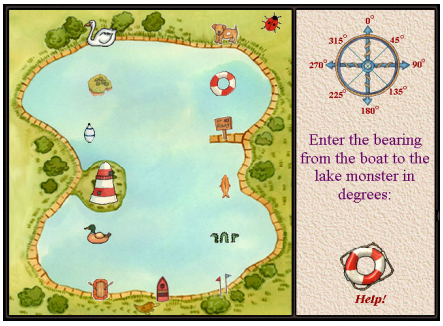
Structuring Dialogues

- Dialogue sequences based on scenarios, use cases or task analysis
- For information-intensive applications, dialogue becomes access and navigation problem
- Navigation links & controls based on information architecture: list, hierarchy, network, lattice
- Design access paths are menus (hierarchies), links and maps (networks), tables (lattice)
- Add controls for media resources, user interaction/ manipulation

UMIST

Navigation Metaphor: Example

Centre for HCI Design



Conceptual explanation: notion of direction and navigation
Abstract objects and actions…… space, vectors, directions, move on bearing
Metaphor of real world used with designed image and text

UMIST

Navigation/Control Metaphors

Centre for HCI Design

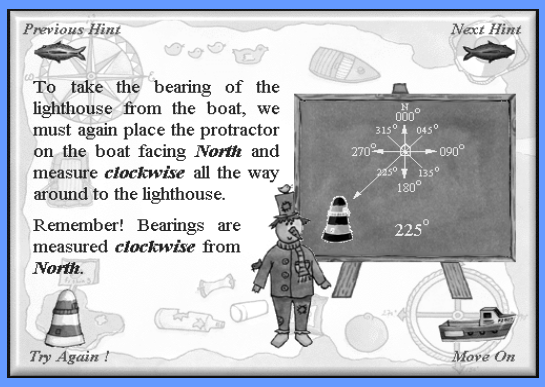
- Zoom/Pan controls
- Compass metaphor: movement within image/ structure
- Timeline: navigation by sequence, date, history
- Card index: content structure
- Agent metaphors: move *self/presence*

→ always test metaphors; your interpretation might not be the user's

UMIST

Centre for HCI Design

Simple controls



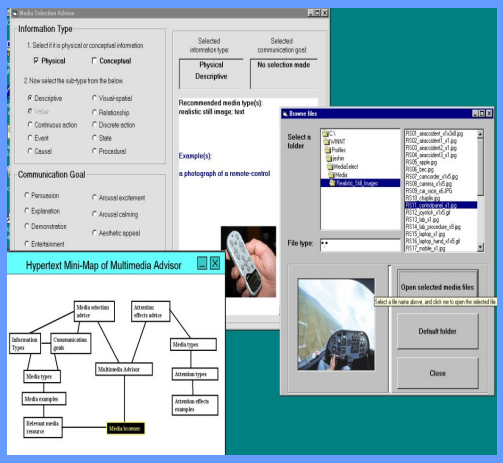
Browser style controls, more complex metaphors, e.g. compass to navigation within an image or media stream

UMIST

Centre for HCI Design

Navigation Controls

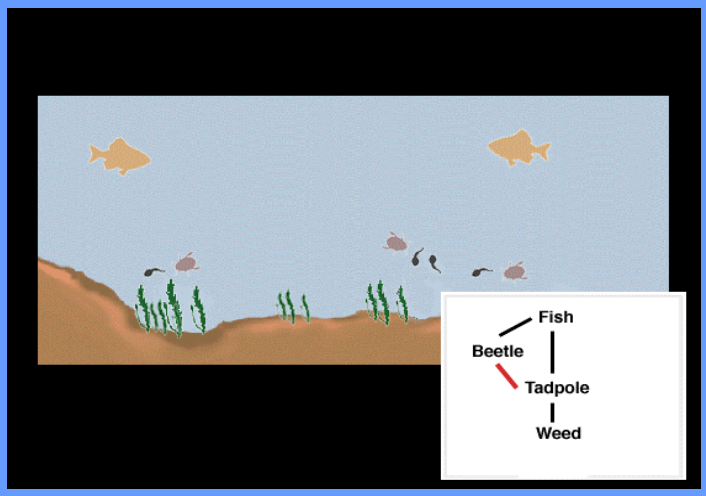
- Web Browser-style controls: Back, Forward, Home
- Video metaphor controls for dynamic media << | Stop| Play | >>
- Content-addressable browsing: thumbnails, video segments
- Bookmarks, visit-lists, overview maps of navigation space, you-are-here markers
- Guided tours, active links (destination hints & queries)



UMIST

Centre for HCI Design

Pondworld (Rogers & Scaife, 1999)



Integrates real world view with abstract diagram + interaction

UMIST

Centre for HCI Design

Summary of Session 3

- Dialogue network diagram/site map: specify navigation paths, dialogue/interaction
- Facilities provided for navigation support
- Cues, prompts & metaphors for navigation and interactive support; predictability
- Feedback, status messages, and presentation; observability and understanding
- Designs for interactive functions to support user's task (or learning)