Today's Agenda

- Human abilities Vision
- Human abilities Cognition

Reminder: Literature Review Proposal (Graduate Only)

- A literature review on your selected HCI research topic
- A proposal including
 - The topic
 - A brief background introduction
 - A list of papers (tentative) you can add more papers later
 - You are expected to include 15+ papers in your final list
 - Proposal due 11:59pm EST, Sunday, Sep. 15, 2024

Reading Assignments

- Interaction Design Chapters 2, 3
- Understanding your users Chapters 1 & 2

Review: About the Visual System

- Brightness adaptation subjective brightness
- Brightness discrimination
 - Brightness discrimination at different intensity levels
- Perceived intensity is not a simple function of the actual intensity
- Illusory contours

What Do We Do with All of This Visual Information?

Perception of a scene involves multiple levels of perceptual analysis.

- <u>"Bottom up processing"</u>
 - Data-driven
 - Sensation reaches brain, and then brain makes sense of it
- <u>"Top down processing"</u>
 - Cognitive functions informs our sensation
 - E.g., walking to refrigerator in middle of night



Visual Search

Visual Search

Targets vs distractors

• Average search time =
$$\frac{N \times I}{2}$$

- N = number of items
- I = how much time you spend on each item
- Reduce search time:
 - Reduce N
 - Make all targets/distractors similar
 - Reduce I
 - Make each item clear

Visual Search

Parallel search vs. Serial search

Parallel Search

Find green "N"

- Search all items at once (search "at a glance")
- Pop-out effect
- Fast
- Effortless
- Few errors
- # of distractors does not matter

What type of processing? Bottom up!



Serial Search

- Find yellow "X"
- Search every item
- Slow
- Effortful
- Error prone!
- # of distractors matters



Reducing Search Time

- Reduce search time:
 - Reduce N
 - Reduce I
- What if you can't do that?
- Capitalize on bottom-up strategies?
 - Make target easy to locate (pop-out)
- Capitalize on top-down strategies?
 - Build on what people are familiar with



4 Normal



Document1 - Microsoft Word

Format . Tools . Table .

Paragraph...
 Bullets and Numbering...
 Bgrders and Shading...
 More Columns...

Tabs.

Window

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iew . Insert

Read Flow (Related to Visual Search)

Eye Movements

Pursuit movements

- Tracking an object across the visual field
 - i.e. following the path of the mouse

Saccades

- Abrupt, short, discrete movements
 - i.e. reading
 - Used a lot as a measurement in HCI!

Saccades-Reading

Pursuitmovements are almost completely automatic and generall yrequire physically moving stimulus. Incontrast to saccades, pursui tmovements are smoothly executed and are comparatively slow. G enerally, they are used to track an object moving in a stationary envir on ment; hence target velocity rather than target location is the appropriate stimulus.

Saccades-Reading

Pursuit movements are almost completely automatic and generally require physically moving stimulus. In contrast to saccades, pursuit movements are smoothly executed and are comparatively slow. Generally, they are used to track an object moving in a stationary environment; hence target velocity rather than target location is the appropriate stimulus.



Read Flow

Read-flow principle:

- Action items (buttons, links) should support the flow of the user in the same way as reading occurs.
- The last action should be the most-likely action to avoid backtracking.

Next Slide >>

- Left=back, stop, quit, cancel, previous
- Right=next, continue, submit



Read Flow



| 000 | Online Registration Renewal |
|--|---|
| Address: (() http://www.chrv.cs.gov/anline/vrir/vr_kop2.htm 90 | |
| New Arrivals <u>New to</u> <u>California?</u> | Before you begin, you must: |
| FAQs Site Map Title & Registration Information | Have not moved since receiving your renewal notice Have a renewal notice with a special RIN Number Have your Smog certification filed with DMV, if needed Have your Insurance filed with DMV, if needed Have one of the following credit cards: |
| Vehicle <u>Registration</u> Boat Registration | Note: A \$4 convenience fee for use of credit card |
| License and ID Card Information | transactions will be added to the amount shown on your renewal notice. |
| Driver License ID Cards Commercial License Vehicle Industry & Commercial Permits Special Plates Personalized Plates Disabled Placards Other Information Your DMV Records Other Service About DMV | Renewing your registration involves three simple steps: 1. Enter vehicle or vessel/boat information 2. Confirm record information and enter payment information 3. Receive confirmation number NOTE: If you are using either Netscape Navigator or Netscape Communicator, you may not be able to print. ************************************ |

DOES NOT FLOW

Some Visual Guidelines

Finally, I will leave you with some general design guidelines on human visual capabilities...

Some Visual Guidelines

- 1. Large font is good, so is contrast
- 2. Don't use too many graphics
 - distracting and bad for screen readers
- 3. Something is important?
 - make it "pop" (bottom up processing) to reduce visual search
- Simple text easier to read and understand
- 5. "Color match" when you can (consistency)

Some Visual Guidelines

- 6. Never blur pictures
 - bad for low vision
- 7. Blue is hard to read
 - less blue cones in fovea
- 8. Group similar items
- Use logical visual order helps with read flow
- 10.Think about foreground and ground



Cartoon courtesy of Jean Paul Jacob, IBM Research Emeritus & IBMer on Campus, UC Berkeley

9/12/2014

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19

COGNITION

Cognition

Norman's two general modes: (ID 3.2)

- Experiential cognition
 - Perceive, act, and react
 - Effortless
 - Requires a certain level of expertise and engagement
 - E.g., driving, reading, conversation
- Reflective cognition and slow thinking

Human Information Processing -General



Figure 1.3 A model of human information processing stages.

- I. Information from sensory system is perceived
- 2. Information is processed and transformed
- 3. Information is responded to

Cognition

Norman's two general modes: (ID 3.2)

- Experiential cognition
- Reflective cognition and slow thinking involving
 - Mental effort
 - Attention
 - Judgement
 - Decision making
 - New ideas and creativity, e.g., designing, learning, and writing a paper/book

Human Information Processing -Attention



Figure 1.3 A model of human information processing stages.

- Mental effort
- <u>Selecting</u> sensory channels for further processing

Selective Attention

Does NOT guarantee perception

• Awareness test

- TFL Viral Awareness Test (Moonwalking Bear) (youtube.com)
- <u>Test Your Awareness: Whodunnit (youtube.com)</u>
- The "Door" study
- <u>http://www.youtube.com/watch?v=FWSxSQsspiQ</u>



Quiz # 2 is available in Blackboard. Due date: 2:30pm EST, Tuesday, Sep. 10, 2024

Open book and open notes