User Interface Design and Programming
CS422

Image & Representation

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Book

- From “Designing Visual Interfaces” by Mullet and Sano
Images

- Images are particularly important in three areas:
  - identification
  - expression
  - communication
Sign

- a sign is 'something that stands for someone or something in some respect or capacity'
- product of a 3-way relation between the representamen (that which represents), the object (that which is represented), and its mental interpretant (the intelligence doing the substitution)
3 Levels

- **Syntactics** - internal structure of the representation
- **Semantics** - relation between the sign and the meaning of the sign
- **Pragmatics** - effectiveness of the syntax/semantics for a particular person/community
Representation

• Representation depends on establishing a clear relationship between a representation and its object

• Icon - denotes its object by virtue of its own likeness or resemblance to the object

• Index - refers to the object indirectly, by means of an association

• Symbol - denotes the object by convention alone
The concept of *Fire* can be represented visually as an *icon* (a) through visual resemblance to flames, as an *index* (b) through visual suggestion of smoke (sound, temperature, or smell would work as well, in this case), or as a *symbol* (c) such as the Medieval alchemists conventional notation.
186: The ease of interpretation varies with the level of abstraction of the sign representation. As highly concrete, realistic representations are simplified, they become easier to interpret – up to a point beyond which further abstraction begins to obscure the sign's semantics. After Nadin (1989).
Principles

• **Immediacy** - should be recognized at a glance without having to analyze it

• **Generality** - imagery is normally used to represent a class of objects, not a particular instance - abstraction creates generality

• **Cohesiveness** - as in the previous week, images are not viewed in isolation but as part of an overall system - shared components and individual components

• **Characterization** - function by focusing on essential characteristics

• **Communicability** - interpretation depends on the creator and viewer sharing a common environment (physical, cultural, conceptual)
Examples

• Nuclear...

BE INFORMED
NUCLEAR BLAST

1. Take cover immediately, below ground if possible, though any shield or shelter will help protect you from the immediate effects of the blast and the pressure wave.

2. Consider if you can get out of the area;

3. Or if it would be better to go inside a building and follow your plan to "shelter-in-place".
Error: misleading syntax

answer: takeoffs and landings (plane viewed from the top, arrow viewed from the side)
if you need to think about the image and especially if you have to break the image into pieces to understand it, then it doesn’t work

- a what does this mean?
- b,c images that differ in just the direction of an arrow are hard to parse
- d small details are hard to parse
While it's good to have a certain amount of regularity, those regular elements should not be the focus of the images.
Error: using type as image
Error: - using images for abstract concepts

a - here is where balloon help is really useful to try and put some text on the screen to ID these icons
b - boomerang for 'no-op'?
c - does the stairway suggest sort ascending and sort descending
d - step through a macro?
a - master task list (stove icon, things you want to do someday but aren’t scheduled for a particular day – on the back burner)
b - magnet movies an entry from one page to another in an appointment book, axe tool breaks links established by the anchor tool, footprints are backtrack
c - label looks more like a price tag, scrolled text?
Error: culture or language dependencies

a - defaults, screen dump, C-shell, hello world
b - DOS icon is an image of the original IBM PC - remember those
c - debugger
d - (apple for the teacher?)
e - spelling
f - back burner
g - drag on
Error: offensive or suggestive imagery

a - kill icon from next-step
b - overly intrusive
c - overly suggestive ???????
d - gestures are culturally based, gun for killing tasks
e - lots of connotations here
f - diembodied limbs - taboo in some cultures
g - more dead tasks
Techniques

• Selecting the right vehicle
• Refinement through progressive abstraction
• Coordination to ensure visual consistency
1. if the concept to be communicated is a concrete, familiar object or a tangible, externally obvious state, use an iconic sign

2. if the concept to be communicated will be used repeatedly throughout an application or environment, consider establishing a conventional symbolic or indexical sign, especially if an existing sign can be borrowed from the 'real' world

3. in most other cases - and particularly when the concept to be communicated is an abstract process or a subtle transition between states - a textual label should be used

4. avoid, as much as possible, the mixing of purely textual, iconic and indexical or symbolic signs within a single image set
Refinement

1. determine the appropriate level of abstraction for your image set, based on the subject matter, audience, and display resolution

2. begin with an image seen from the viewpoint including the most characteristic contours. The source can be a photograph, drawing, or sketch of the object from the desired point of view.

3. use the trace overly technique to rapidly develop a series of drawings derived from the original image. Omit details until only the most essential or characteristic elements remain. Experiment with different combinations of elements to identify those that best characterize the object.

4. simplify complex shapes into regular geometric forms where possible. Repeatedly tracing the outline of the shape through multiple layers will itself tend to regularize the image.

5. eliminate contour information that is not required for recognition of the object. Experiment with negative space to suggest contours.
Coordination

1. begin with sketches of a full set of images that have been sufficiently developed to establish the visual characteristics of each image

2. use a similar or identical point of view and type of perspective for each image. Determine the predominant viewpoint and redraw any divergent images from the new perspective

3. use a similar form of representation and level of abstraction (i.e. don’t combine icons with symbols)

4. use a consistent size, orientation, layout, color, and overall visual weight for each image. Use a layout grid to help insure consistent internal structure across images

5. wherever possible, use the same elements - including line weights, curvatures, textures, and forms - throughout the image set. In fact, it is not difficult to completely redraw the entire image set using standard components once a formal vocabulary has been defined
Examples

- Gnome
- KDE