Questions?

• Project #2
• HW#3 due today
Survey

• Homework
  – Length
  – Interaction with project

• Reading
  – Distribution over time
  – Textbook

• Applications
  – Real world product examples

• Class participation
  – Frequent participants

• Confusing
  – Models
Cognitive engineering

- Gulfs of execution and evaluation [Norman 86]
Gulf of evaluation: statistical analysis (1)

Real world:

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.67</td>
<td>0.79</td>
</tr>
<tr>
<td>0.32</td>
<td>0.63</td>
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<tr>
<td>0.39</td>
<td>0.72</td>
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<tr>
<td>0.27</td>
<td>0.85</td>
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<td>0.71</td>
<td>0.43</td>
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<tr>
<td>0.63</td>
<td>0.09</td>
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<tr>
<td>0.03</td>
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<tr>
<td>0.20</td>
<td>0.54</td>
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<td>0.51</td>
<td>0.38</td>
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<tr>
<td>0.11</td>
<td>0.33</td>
</tr>
<tr>
<td>0.46</td>
<td>0.46</td>
</tr>
</tbody>
</table>

Conceptual model: x, y correlated?

Evaluation
Gulf of evaluation: statistical analysis (2)

Real world:

![scatter plot](image)

Conceptual model: $x, y$ correlated?

Evaluation
Gulf of evaluation: statistical analysis (3)

Real world:
\[ \rho = -0.29 \]

Conceptual model:
x, y correlated?
Gulf of execution: Drawing a rectangle (1)

Real world

Move 90 30
Rotate 35
Pen down
...

Gulf

Conceptual model:
Draw a rectangle
Gulf of execution: Drawing a rectangle (2)

Real world

Draw a rectangle

Rotate the shape

Conceptual model:
Draw a rectangle
Gulf of execution: Drawing a rectangle (3)

Real world

Gulf

Conceptual model: Draw a rectangle

Execution
Interaction design: a double gulf?
Cognitive engineering example

• Move “paper.tex” from ~/conferences/CHI_04 to ~/conferences/UIST_04

  – Using a Unix shell (current directory is ~)
  – Using a GUI (starting from the desktop, no window open)
Direct manipulation

• Central ideas
  – Object understood by their visual characteristic
    • Using good affordances
    • Using a good conceptual model and convincing metaphors
  – Actions understood in term of their effects on the screen
    • Rapid and incremental
    • Immediate visual feedback
    • Easily reversible

• Outcome
  – Direct engagement
    • the feeling of working directly on the task
    • No need to know the implementation details
  – The display becomes reality: the WYSIWYG interface
Grammatical structure

• Object-action (Noun verb)
  – Modeless
  – Action always within the context of objects
  – Examples
    • *Drag and drop*...
    • *Select and delete*

• Action-Object (Verb noun)
  – Modal
    • *Mode can be dangerous*
  – Often more efficient
  – Examples
    • *Pick a tool, then use it*...
Interface metaphors

• **Definition**
  – Use of one kind of object or idea in place of another to suggest a likeness or analogy between them

• **Purposed**
  – Leverages our knowledge of familiar, concrete objects/experiences
  – Transfer this knowledge to abstract computer and task concepts

• **Examples**
  – Desktop, files, folders, trash can…
  – Paintbrush in a painting program
Metaphors caveats

• Too limited
  – The metaphor restricts interface possibility

• Too powerful
  – The metaphor makes believe that the system can do things it can’t

• Too literal or cute
  – Make it difficult to operate

• Mismatched
  – The metaphor makes it difficult to carry out the task
Direct manipulation: Good or Evil?

• Good for intermediate users
  – Recognition versus recall trade-off
• Explicit versus implicit command
  – “rename each file by adding ‘_old’ to its name”
• Limit of reification
  – How to align an object?
• Metaphor might be too restrictive
  – WYSIAYG: What You See Is All You Get
• Applications mix
  – Direct manipulation
    • Tools, drag and drop interactions...
  – Abstraction
    • Menus, dialog boxes,...
Readings for next class

- CH 10
- Evaluating the design without users (web)