Animation in a Peripheral Display:
Distraction, Appeal, and Information Conveyance in Varying Display Configurations

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What is a peripheral display?

People are opportunistically able to examine these displays

Not suitable for mission critical matters
Example systems

InfoCanvas
Informative Art
Digital Family Portrait
Dangling String
Kandinsky
Tickers
Animation

- Minimally use motion or animation, especially not continuous [Maglio & Campbell, CHI ’00]

- Animations may minimally impact users of certain tasks [McCrickard et al Interact ‘03]

- Guidelines for motion-based techniques [Bartram et al Intl Jnl HCI ‘03]

- Change blindness [Intille Ubicomp ‘02]
Introducing bluegoo

• Created to explore issue of animation in peripheral displays
• Create a level of visual interest
• Collage-based system:
  • What’s Happening [Zhao & Stasko, AVI ‘02]; Notification Collage [Greenberg & Rounding, CHI ‘01]
  • CollageMachine [Kerne, CHI Extended Abstracts ‘97]
• Run on second / third display, lobby display
Auto accident snarls traffic on connector
Auto accident snarls traffic on connector

Image library
auto accident snarls
traffic connector
from story
image placement / scaling
opacity / translation / scaling
background color
textual cues

Auto accident sn
Demo
Research Questions

- Can animation provide increased visual appeal in peripheral displays?
- Does that animation necessarily also increase distraction?
- Can people infer the topic matter of the kind of collages?

Evaluating peripheral displays is difficult
Study Design
Primary task

- Air France’s U.S. Web site
- Flight departures
- Airfares
- Policies
- $50 incentive
Secondary task

- Eight Bluegoo collages
- Appr. 18 minutes
- Ended on black screen
## Study Design

<table>
<thead>
<tr>
<th></th>
<th>motivated</th>
<th>non-motivated</th>
</tr>
</thead>
<tbody>
<tr>
<td>side-by-side</td>
<td></td>
<td></td>
</tr>
<tr>
<td>angled</td>
<td>$20 + $50</td>
<td>$50</td>
</tr>
<tr>
<td>projection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>above</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N = 32 (6 female), $5 compensation
Results

Average Number of Recalled Stories

<table>
<thead>
<tr>
<th>Orientation</th>
<th>No Motivation</th>
<th>Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side-by-side</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Angled</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Above</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Projection</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Average Time to Completion

<table>
<thead>
<tr>
<th>Orientation</th>
<th>No Motivation</th>
<th>Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side-by-side</td>
<td>2000</td>
<td>1500</td>
</tr>
<tr>
<td>Angled</td>
<td>1500</td>
<td>1000</td>
</tr>
<tr>
<td>Above</td>
<td>1000</td>
<td>500</td>
</tr>
<tr>
<td>Projection</td>
<td>500</td>
<td>2000</td>
</tr>
</tbody>
</table>
“Noticing the Secondary Display”

Angled Display Non-Motivated Condition
Number of Stories Recalled: 3, 2, 1, 0
Average: 2.75 out of 8
### Information Conveyance Findings

<table>
<thead>
<tr>
<th>Event</th>
<th>Mean</th>
<th>S</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>China fears girl died of bird flu</td>
<td>4.8</td>
<td>1.8</td>
<td>8.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Pope on the road to sainthood</td>
<td>3.9</td>
<td>2.4</td>
<td>9.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Malaysia warned over pirated CDs</td>
<td>5.4</td>
<td>1.3</td>
<td>6.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Internet phone calls on the rise</td>
<td>2.7</td>
<td>1.8</td>
<td>10.0</td>
<td>1.0</td>
</tr>
<tr>
<td>No trade deal at Americas summit</td>
<td>2.0</td>
<td>1.4</td>
<td>7.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Qualitative Findings

• “I completely did not see it.”

• “The second display was not distracting because I was able to choose to not look at it when I didn’t want to.”

• “The fact that the display was opaque made it kind of fun--like ‘what’s going on here?’ It’s almost like a game and I could see it being fun in other domains.”
Discussion

- Low subjective ratings for distraction along with any significant difference in task completion time

- Visual interest is a mixed bag
  - Mean level of interest 3.6 out of 10
    Motivated: 5.3 out of 10
    Non-motivated: 1.6 out of 10
  - Wide-ranging responses from 9 to 2 for aesthetics
  - Terms: artistic (10), easy-on-the-eye (13), tranquil (13), disruptive (1)
Conclusions

- Animation can be used judiciously in large-scale, monitor-sized applications....
- Interview feedback and survey data indicate people find animation effects appealing.
- Angled displays result in higher self-reported distractions.
Future Work

• Combination of animation techniques

• Explore the ability to disregard animation in the periphery

• Evaluate a semi-motivated condition

• Effects of animation on angled displays
Thank you!

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