Change Awareness

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CPSC 781

Outline

- Collaborative Editing
- Change Awareness
  - Importance
  - Comprehension
  - On Paper
  - On the Computer

Collaborative Editing

- Common artifacts
  - Viewed / Manipulated by 2+ people
- Modes
  - Coordinated with others
  - Not coordinated with others
  - Drift between the two

Change Awareness

- Importance
  - Duplication of effort
  - Conflicts
  - Introduction of new mistakes
  - Group consensus

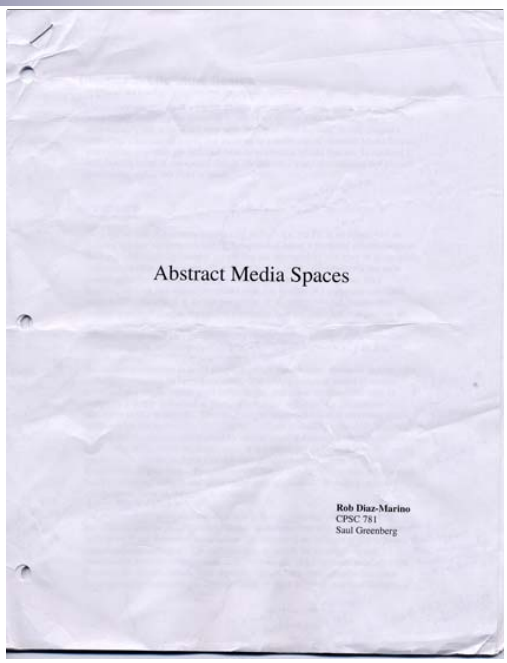
Change Awareness

- What information is necessary to comprehend change?
  - Who – Presence, Identity, Authorship
  - What – Action, Intention, Artifact
  - Where – Location, Gaze, View, Reach, Context
  - When – Event History, Order
  - Why – Cognitive/Motivational History
  - How – Process, Outcome

[2] Tam, J., and Greenberg, S. (2005)

On Paper

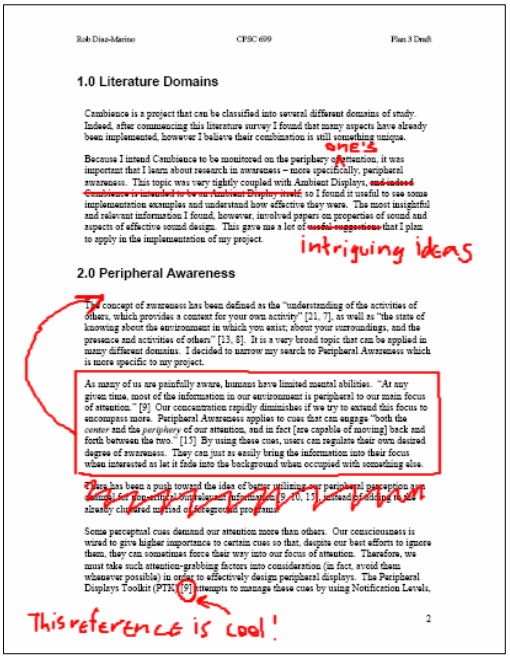
- Wear
  - Happens automatically
  - Ex. wrinkled edges, folds, creases, dog-ears, smudges, tears, spills, bindings…



[1] Hill, Hollan, Wroblewski, McCandless

On Paper (2)

- Editing Markup
  - Insertions
  - Annotations
  - Strikeouts
  - Overwrites
  - Block moves
  - Block scribbles



Rob Diaz-Marino CPSC 699 Plan 3 Draft

1.0 Literature Domains

Cambience is a project that can be classified into several different domains of study. Indeed, after commencing this literature survey I found that many aspects have already been implemented, however I believe their combination is still something unique.

Because I intend Cambience to be monitored on the periphery of attention, it was important that I learn about research in awareness – more specifically, peripheral awareness. This topic was very tightly coupled with Ambient Displays, ~~and indeed Cambience is intended to be an Ambient Display itself~~, so I found it useful to see some implementation examples and understand how effective they were. The most insightful and relevant information I found, however, involved papers on properties of sound and aspects of effective sound design. This gave me a lot of ~~useful suggestions~~ that I plan to apply in the implementation of my project.

2.0 Peripheral Awareness

The concept of awareness has been defined as the "understanding of the activities of others, which provides a context for your own activity" [21, 7], as well as "the state of knowing about the environment in which you exist, about your surroundings, and the presence and activities of others" [13, 8]. It is a very broad topic that can be applied in many different domains. I decided to narrow my search to Peripheral Awareness which is more specific to my project.

As many of us are painfully aware, humans have limited mental abilities. "At any given time, most of the information in our environment is peripheral to our main focus of attention." [9] Our concentration rapidly diminishes if we try to extend this focus to encompass more. Peripheral Awareness applies to cues that can engage "both the *center* and the *periphery* of our attention, and in fact [are capable of moving] back and forth between the two." [15] By using these cues, users can regulate their own desired degree of awareness. They can just as easily bring the information into their focus when interested as let it fade into the background when occupied with something else.

There has been a push toward the idea of better utilizing our peripheral perception and attention for non-critical but relevant information [8, 10, 15], instead of adding to the already cluttered myriad of foreground programs.

Some perceptual cues demand our attention more than others. Our consciousness is wired to give higher importance to certain cues so that, despite our best efforts to ignore them, they can sometimes force their way into our focus of attention. Therefore, we must take such attention-grabbing factors into consideration (in fact, avoid them whenever possible) in order to effectively design peripheral displays. The Peripheral Displays Toolkit (PTK, [9]) attempts to manage these cues by using Notification Levels,

2

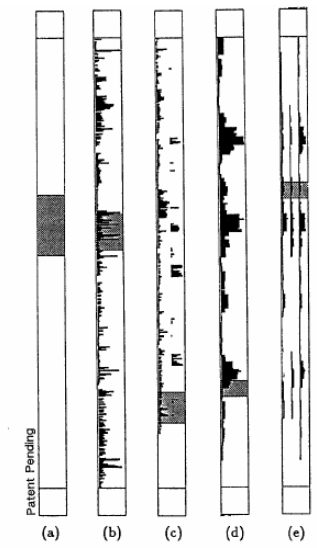
On the Computer

- Views
  - Artifact
  - People
  - Workspace

On the Computer (2)

- Wear does not automatically accumulate
  - Simulated
  - Ex. Attribute-mapped scroll bars [1]

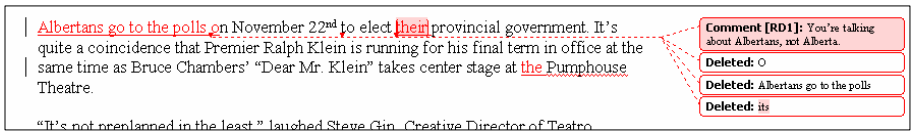
    (a) Normal scrollbar
    (b) Total edit wear
    (c) Two categories of edit wear
    (d) Total read wear
    (e) Three categories of read wear



[1] Hill, Hollan, Wroblewski, McCandless

On the Computer (3)

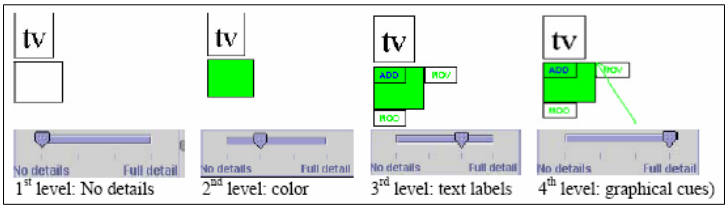
- Differencing (two versions)
  - Sequential Deltas – ex. Unix Diff
  - Annotations and Markups – ex. Word
  - Highlighting – ex. Word
  - Overviews – entire doc miniature
  - Graphical Playback – storyboard/animation



[2] Tam, J., and Greenberg, S. (2005)

On the Computer (4)

- Differencing (multiple versions)
  - File Differencing
  - Real-time Differencing – while typing
  - Version Control Systems – ex. CVS
  - History Systems – Playback, Undo



[2] Tam, J., and Greenberg, S. (2005)

Questions?

References

1) William C. Hill, James D. Hollan, Dave Wroblewski, Tim McCandless. (1992) **Edit wear and read wear.** Proceedings of the SIGCHI conference on Human factors in computing systems, June 1992.
2) Tam, J., and Greenberg, S. (In Press - Accepted May 2005) **Framework for Asynchronous Change Awareness in Collaborative Documents and Workspaces.** International Journal of Human Computer Studies, Elsevier.