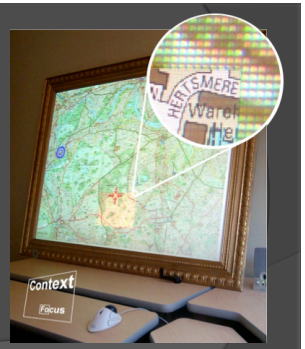
Dustin Dunsmuir

FOCUS + CONTEXT

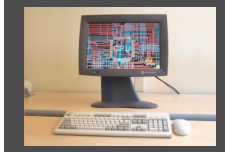
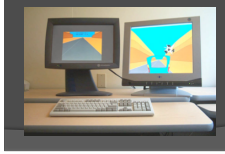
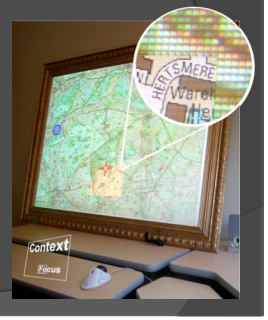
Papers

- Keeping things in context: a comparative evaluation of focus plus context screens, overviews, and zooming. Patrick Baudisch, Nathaniel Good, Victoria Bellotti, and Pamela Schraedley. CHI 2002.
- Evaluation of Semantic Fisheye Zooming to Provide Focus+Context. Andrew J. Aftam, John Briedis, Daisuke Fujiwara, Robert J.K. Jacob, Caroline G.L. Cao, and David Kahle. Human Factors and Ergonomics Society 51st Annual Meeting, 2007. p.459-463.
- An Improved Fisheye Zoom Algorithm for Visualizing and Editing Hierarchical Models. Tobias Reinhard, Silvio Meier, and Martin Glinz. Second International Workshop on Requirements Engineering Visualization, 2007.

Keeping Things in Context: A Comparative Evaluation of Focus Plus Context Screens, Overviews, and Zooming.



Interfaces

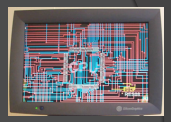
Field Study

- Interviewed fourteen experts
- Multi-scale content:

	Static		Dynamic
Task	Graphic Design	Chip Design	Air Traffic Control
Document	Poster: 1m	Wafer: 12cm	Zone: 50km
Smallest Object	Text: 1cm	Conductive Path: 3µm	Airplane: 50m
Smallest Detail	Align: 0.5mm	Grid 0.5µm	25m steps
Ratio	2,000	240,000	2,000

Static Data Study

- Circuit board
  - Path tracing
  - Verify connected pairs of pins



- Map of London distance comparison
  - Hotels and conference location marked
  - Which one is closer by taxi?

Results

- Focus + Context 21% and 36% faster and also preferred by the majority
- Overview + Detail slower due to switching views
- Problems noted:
  - Context not very usable, too blurry
  - Users cast shadows on display

Dynamic Data Study

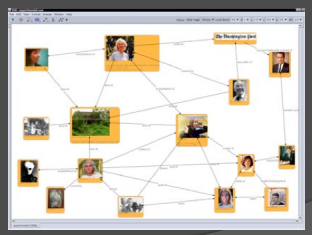
- Only overview + detail and focus + context
- Driving simulation
  - Subjects had to avoid rocks (in context) and nails (in focus)

- Focus + context had one third of the obstacles hit, and it was preferred
  - Peripheral vision used

Critique

- Innovative method of combining display techniques to make focus + context
- Tasks intelligently chosen and strong results supporting focus + context
- Are results useful in the future when it will be easier to have full screen at high res?

Evaluation of Semantic Fisheye Zooming to Provide Focus + Context.



Visual Understanding Environment (VUE)

- Concept map application for the classroom
- Digital Library Objects connected by user defined relations
- Canvas for drawing and creating objects

Problems

- Difficult to view concept maps larger than dozens of nodes
- Using geometric zooming…
  - Removes context
  - Nothing added by zooming, nodes just get larger (not semantic)
  - Must instead look at detail in another window

Solution

- Semantic Fisheye Zoom
- Activated by mouse over, gives detail that would otherwise be in a popup window
- Justified by earlier work:
  - An evaluation of semantic fisheye views for opportunistic search in an annotated image collection. Paul Janecek and Pearl Pu. International Journal on Digital Libraries, 2005. p.42-56.

Study

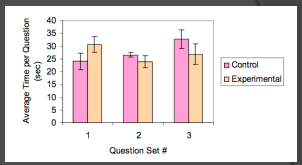
- Compared semantic fisheye zoom to control interface (normal zoom)
- Expected new zoom to…
  - Be faster to use
  - Be preferred
  - Allow for remembering more information
- Did not expect higher accuracy

Setup

- Students answered 3 question sets while using interface:
  1. Questions involving a single node
  2. …two or more nodes
  3. …an overall understanding of the concept map
- 4th question set answered without interface (by memory)

Results

- Significant: Control faster in set 1



- Accuracy in Set 4 was higher for fisheye
  - Better learning of information
  - No need to integrate across displays

Critique

- Builds upon previous studies
  - Makes modest assumptions
- Study performed like real world use
- How was preference for semantic fisheye zoom reported?
- How many nodes were in the graph?

An Improved Fisheye Zoom Algorithm for Visualizing and Editing Hierarchical Models

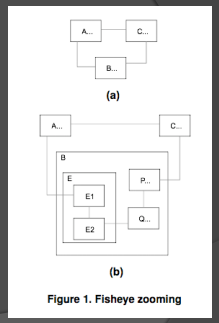


Figure 1. Fisheye zooming

ADORA

- Eclipse plugin
- Analysis and Description of Requirements and Architecture
- Object oriented modeling method, display as nested hierarchy
- Demo

http://www.ifi.uzh.ch/rerg/research/projects/adora/

Algorithm Properties

- Commutative zoom operations
- Preserve the mental map
  - Orthogonality ordering
  - Proximity relations
  - Topology

Layout Adjustment and the Mental Map. Kazuo Misue, Peter Eades, Wei Lai, and Kozo Sugiyama. Journal of Visual Languages and Computing, 6(2), 1995. p.183–210.

Interval Structure

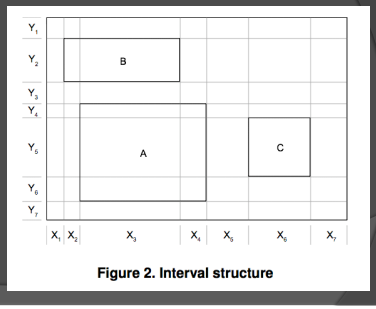


Figure 2. Interval structure

Commutative

- Intervals remembered and have minimum size

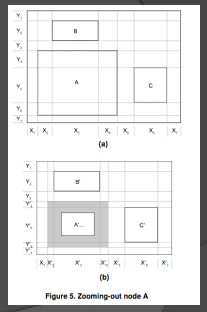


Figure 5. Zooming-out node A

Multipurpose

- Add and remove done using algorithm
  - Add as large as possible, then expand
  - Zoom out to pixel, then remove
- Resize and move done using remove and then add
- Filtering (Show/Hide) remember position

Critique

- Flexible and powerful, but could collect large amounts of intervals over time
- Moving multiple nodes - weird behavior
  - Demo
- Has Table Lens like reaction to zooming when many nodes are lined up
  - Demo

QUESTIONS?