

Space/Order

Lecture 8 CPSC 533C, Fall 2005
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5 Oct 2005

Reading

The Visual Design and Control of Trellis Display
R. A. Becker, W. S. Cleveland, and M. J. Shyu
Journal of Computational and Statistical Graphics, 5:123–155, (1996).
<http://cmi.bell-labs.com/stat/doc/trellis/rcgs.col.ps>

Envisioning Information. Edward Tufte. Graphics Press, 1990.
Chapter 4: Small Multiples, Chapter 6: Narratives of Space and Time
VisDB: Database Exploration using Multidimensional Visualization,
Daniel A. Keim and Hans-Peter Kriegel. IEEE CG&A, 1994
<http://www.dbs.informatik.uni-muenchen.de/dbs/projekt/papers/visdb.ps>

More Reading

The Table Lens: Merging Graphical and Symbolic Representations in an Interactive Focus
Context Sensitive Information System
Ramona Rao, Scott Card, USC CH 94, Pp. 318–322.
<http://citeseer.ist.psu.edu/545353.html>

The Elements of Graphing Data. William S. Cleveland, Hobart Press 1994.

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Space and Order

Trellis

- find order automatically: main-effects
- dot plots, matrices of small multiples

VisDB

- choice of spacefilling pixel pattern
- small multiples
- side by side better than comparing to memory
- narratives of space and time
- using spatial position to encode temporal data
- derived spaces

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Reordering: Bertin

reorderable matrices – manually!

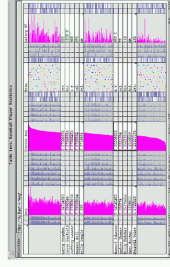


[Bertin, Graphics and Graphic Information Processing, p 34]

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Reordering: Table Lens

select column to sort
demos available at www.tablelens.com

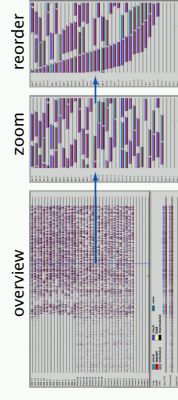


we'll discuss focus+context aspects later

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Interactive Ordering: Rivet

performance analysis of parallel system

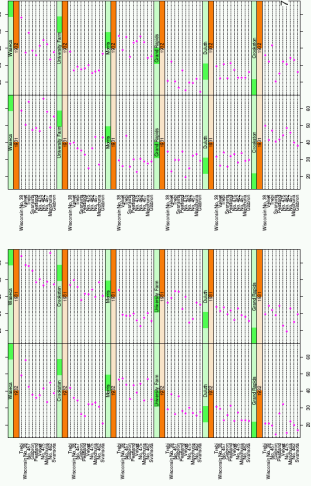


[Becker, Performance Analysis and Visualization of Parallel Systems Using Table Lens and Rivet: A Case Study, HPCL66, 2000.
graphics.stanford.edu/papers/rivet_large/]

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Automatic Ordering Support: Trellis

main-effects: sort by median value



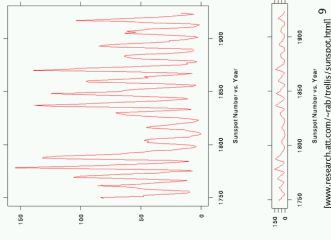
Statistically-Based Techniques

- derived spaces
- partial residuals
 - differencing taking means into account
- conditioning intervals
 - shingles (overlapping windows) not bins
- banking to 45 degrees
 - take psychophysics into account

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Banking to 45 Degrees

- principle: most accurate judgement at 45 degrees
- pick aspect ratio (height/width) accordingly

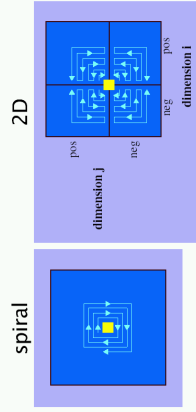


[www.research.att.com/~atb/trellis/sumspod.html] 9

Spacefilling Pixels: VisDB

- how to draw pixels?
 - sort, color by relevance

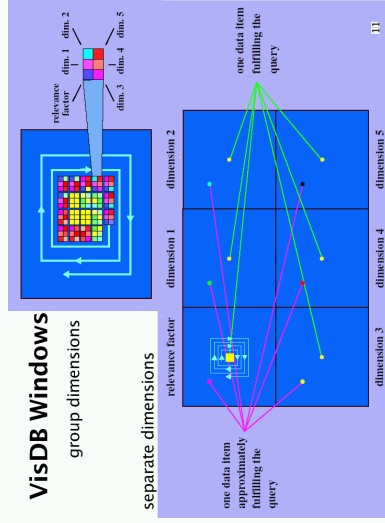
local ordering



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VisDB Windows

group dimensions

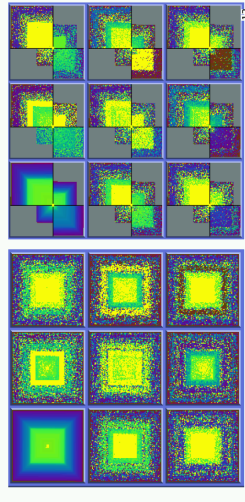


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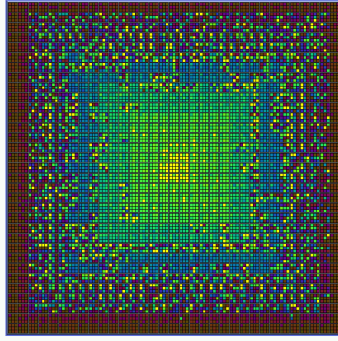
VisDB Results: Separate Dimensions

spiral

2D



VisDB Results: Grouped Dimensions



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Space vs. Time: Showing Change

literal
time for time
abstract
space for time

animation: show time using temporal change
· good: show process



www.gom.ac.uk/files/counteract/01/ever-empj

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Space vs. Time: Showing Change

literal
time for time
abstract
space for time

animation: show time using temporal change
· good: show process
· good: compare by flipping between two things



www.gom.ac.uk/files/counteract/01/ever-empj

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Space vs. Time: Showing Change

literal
time for time
abstract
space for time

animation: show time using temporal change
· good: show process
· good: compare by flipping between two things
· bad: compare between many things



www.gom.ac.uk/files/counteract/01/ever-empj

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Space vs. Time: Showing Change

literal
time for time
abstract
space for time

animation: show time using temporal change
· good: show process
· good: compare by flipping between two things
· bad: compare between many things
interference from intermediate frames



www.gom.ac.uk/files/counteract/01/ever-empj

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Space vs. Time: Showing Change

literal
time for time
abstract
space for time

small multiples: show time using space
· overview: show each time step in array
· compare: side-by-side easier than temporal external cognition instead of internal memory
· general technique, not just for temporal changes

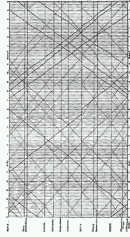


[Edward Tufte: The Visual Display of Quantitative Information, p 172]

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Derived Spaces: Slope

- narrative of space and time
- Marey train schedule, 1885
 - horizontal line length: stop length
 - slope: speed
 - intersection: time/place of crossing



[Tuftex | p. 31, www.nap.edu/html/hs_math/images/tl_f8.gif]

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Linked Derived Spaces

- Feature Detection in Linked Derived Spaces
 - infovius vs. scivis

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Ordering

- space for time
- LifeLines
 - Dynamic Timelines

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Ordering

- time for time
- space for space
- Superscalar Processes
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