Space/Order

Lecture 8 CPSC 533C, Fall 2004
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Reading

The Visual Design and Control of Trellis Display
R. A. Becker, W. J. Cleveland, and M.J. Shyu
http://cm.bell-labs.com/usr/doc/trellis_jcss.cola.ps

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 CDGA, 1994
http://www.dbis.informatik.uni-muenchen.de/dbis/projekt/papers/visdb.ps

More Reading

The Table Lens: Merging Graphical and Symbolic Representations in an Interactive Focus + Context Visualization for Tabular Information
http://citeseer.ist.psu.edu/154133.html


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

Reordering: Bertin

reorderable matrices – manually!

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

Reordering: Table Lens

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

we’ll discuss focus+context aspects later

Interactive Ordering: Rivet

performance analysis of parallel system

overview zoom reorder

(Booth, Performance Analysis and Visualization of Parallel Systems Using DEVS and Rivet: A Case Study, HPC'00)
Automatic Ordering Support: Trellis

- main-effects: sort by median value
- alphabetical

Statistically-Based Techniques

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

Banking to 45 Degrees

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

Spacefilling Pixels: VisDB

- how to draw pixels?
  - sort, color by relevance
- local ordering
  - spiral
  - 2D

VisDB Windows

- group dimensions
- separate dimensions

VisDB Results: Separate Dimensions

- spiral
- 2D
VisDB Results: Grouped Dimensions

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

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  - bad: compare between many things

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interference from intermediate frames

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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
Derived Spaces: Slope

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

Linked Derived Spaces

Feature Detection in Linked Derived Spaces
- [video]

infovis vs. scivis

Ordering

space for time

LifeLines
- [video]

Dynamic Timelines
- [video]

Ordering

time for time
space for space

Superscalar Processes
- [video]