

Space/Order

Lecture 7 CPSC 533C, Spring 2004

2 Feb 2003

Space and Order

small multiples

- side by side better than comparing to memory

Table Lens

- focus+context display (later)
- exploratory reordering by sorting columns

Trellis

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

VisDB

- choice of spacefilling pixel pattern

parallel coordinates

- number of parallel axes scalable (vs. perpendicular axes)

narratives of space and time

- using spatial position to encode temporal data
- derived spaces

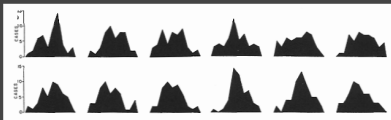
Small Multiples For Comparison

bad: temporal, if many items

- intermediate ones "overload mental buffer"
- good: temporal blinking if two items

good: side by side

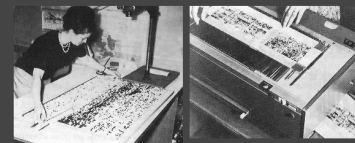
- array of small multiples
- creates overview



[Tufto I, p 172]

Reordering: Bertin

reorderable matrices – manually!

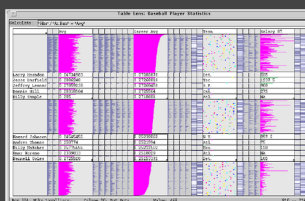


[Bertin, Graphics and Graphic Information Processing, p 34]

Reordering: Table Lens

select column to sort

demos available at www.tablelens.com

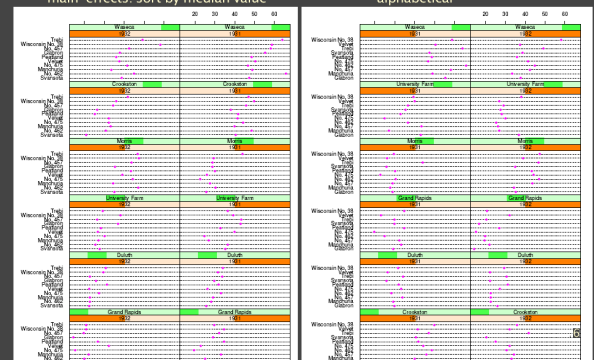


we'll discuss focus+context aspects later

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

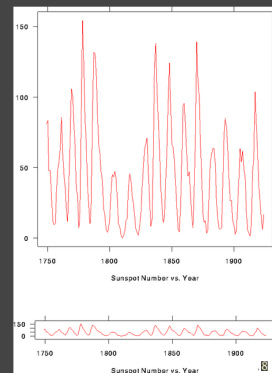
- take psychophysics into account

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Banking to 45 Degrees

principle: most accurate judgement at 45 degrees

pick aspect ratio (height/width) accordingly



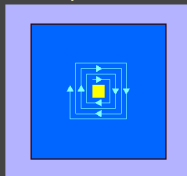
Spacefilling Pixels: VisDB

how to draw pixels?

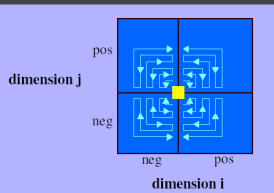
- sort, color by relevance

local ordering

spiral



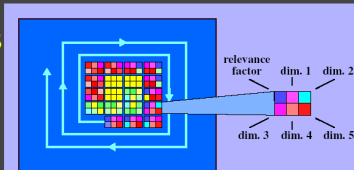
2D



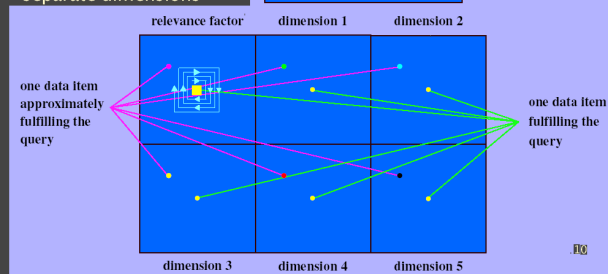
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VisDB Windows

group dimensions



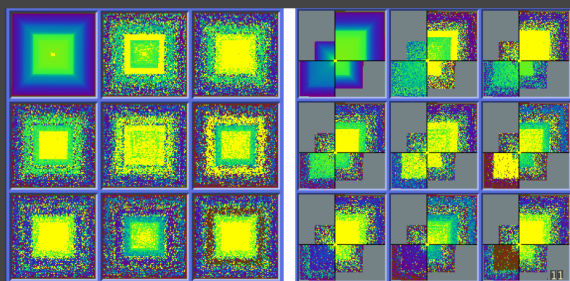
separate dimensions



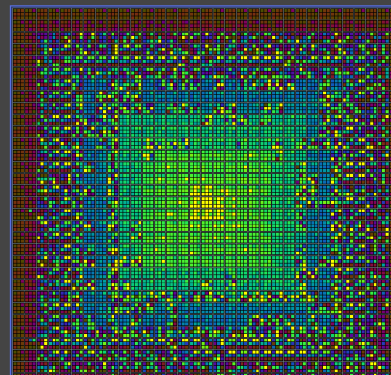
VisDB Results: Separate Dimensions

spiral

2D



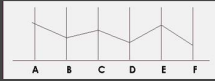
VisDB Results: Grouped Dimensions



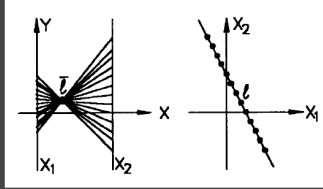
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Parallel Coordinates

only 2 orthogonal axes in the plane
instead, use parallel axes!



point-line duality



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Parallel Coords: Axis Ordering

geometric interpretations

- hyperplane, hypersphere: points do have intrinsic order

infovis

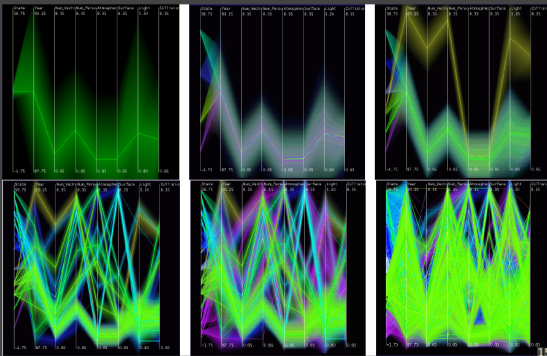
- no intrinsic order, what to do?
- indeterminate/arbitrary order
- weakness of many techniques
- downside: human-powered search
- upside: powerful interaction technique
- most implementations
- user can interactively swap axes

Automated Multidimensional Detective

- [Inselberg 99]
- machine learning approach

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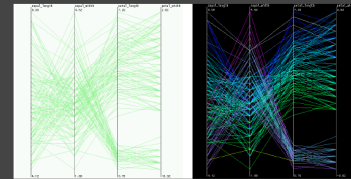
Hierarchical Parallel Coords: LOD



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Hierarchical Clustering

proximity-based coloring



interaction lecture later:

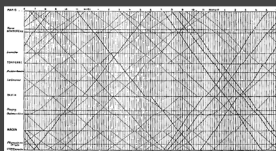
- structure-based brushing
- extent scaling

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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



[Tuft e | 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

- [video]

infovis vs. scivis

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Ordering

space for time

LifeLines

· [video]

Dynamic Timelines

· [video]

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Ordering

time for time

space for space

Superscalar Processes

· [video]