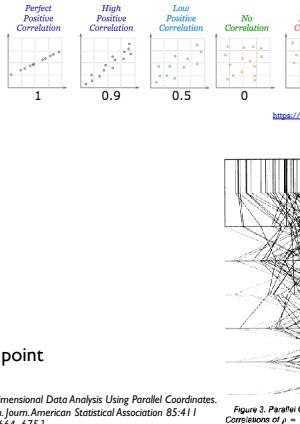


Task: Correlation

- scatterplot matrix
- positive correlation
 - diagonal low-to-high
- negative correlation
 - diagonal high-to-low
- uncorrelated: spread out



[Hyperdimensional Data Analysis Using Parallel Coordinates. Wegman, Journ. American Statistical Association 85:411 (1990), 664–673.]

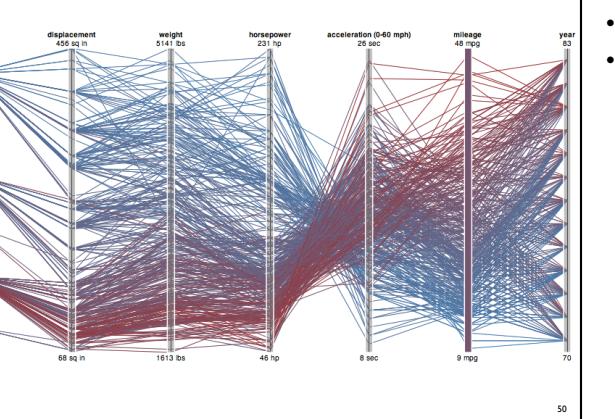
Figure 3. Parallel Coordinate Plot of Six-Dimensional Data illustrating Correlations of $\rho = 1, \pm 0.2, 0, -0.2, -0.8$, and -1 .

Parallel coordinates quiz: car data

- What correlations do you see?
- positive?
- negative?
- none?
- not sure?

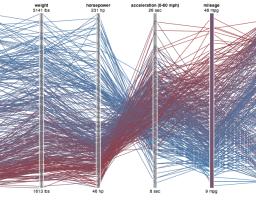
• horsepower to acceleration

• weight to mileage?



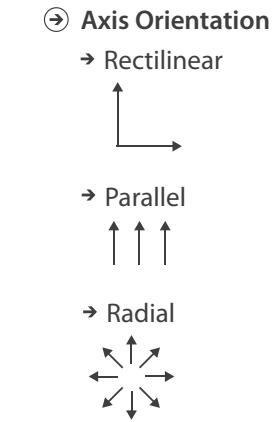
Parallel coordinates, limitations

- visible patterns only between neighboring axis pairs
- how to pick axis order?
 - usual solution: reorderable axes, interactive exploration
- same weakness as many other techniques
 - d downside of interaction: human-powered search
- some algorithms proposed, none fully solve



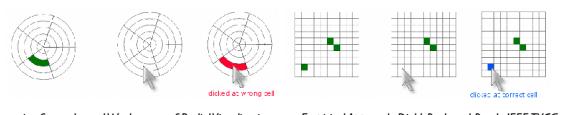
Orientation limitations

- rectilinear: scalability wrt #axes
 - 2 axes best
 - 3 problematic
 - 4+ impossible
- parallel: unfamiliarity, training time



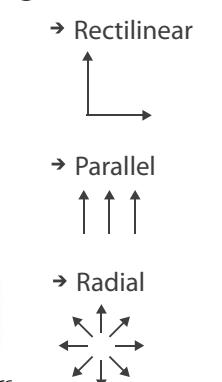
Radial orientation

- perceptual limits
 - polar coordinate asymmetry
 - angles lower precision than length
 - nonuniform sector width/size depending on radial distance
- frequently problematic
 - sometimes can be deliberately exploited!
 - for 2 attrs of very unequal importance



[Uncovering Strengths and Weaknesses of Radial Visualizations - an Empirical Approach. Diehl, Beck and Burch. IEEE TVCG (Proc. InfoVis) 16(6):935–942, 2010.]

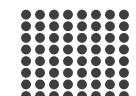
Axis Orientation



Layout density

Layout Density

→ Dense

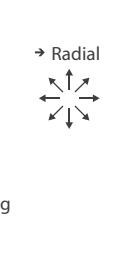
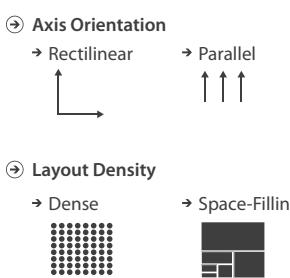


→ Space-Filling

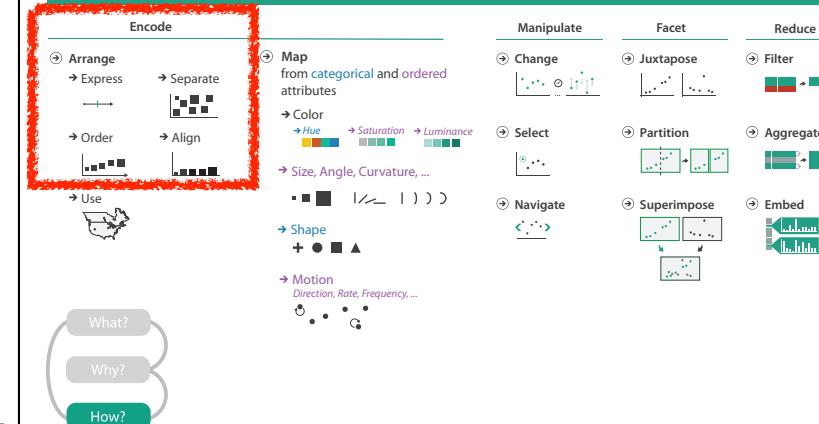


Arrange tables

- Express Values
 - 1 Key List
 - 2 Keys Matrix
 - 3 Keys Volume
 - Many Keys Recursive Subdivision
- Separate, Order, Align Regions
 - Separate → Order
 - Align



How?

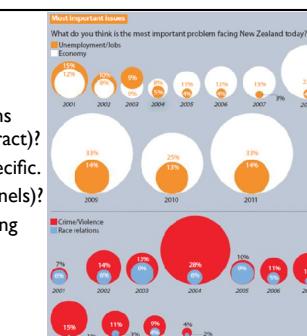


Upcoming

- D3 videos week 3
 - Making a Bar Chart with D3 and SVG [30 min]
- Quiz 3, due by Fri Jan 24, 8am
- Programming Exercise 1, due Wed Jan 29
- Foundations 3, out Thu Jan 30
- D3 videos/readings week 4
 - The General Update Pattern of D3.js [60 min]
 - Interaction with Unidirectional Data Flow [16 min]
 - Read: Reusable D3 Components

Design critique & redesign: NZ

- Consider the following questions:
 - 1 What could be the goals of the designer for questions that this visualization answers (domain-specific & abstract)?
 - 2 What data is represented in this visualization? Be specific.
 - 3 How is each data type visually encoded (marks/channels)?
 - 4 Can you read the data precisely? Is the visual encoding appropriately chosen?
 - Hint: how would this work without numeric labels?
- Develop two alternative designs to visualize this data.
 - fine to discuss with your peers, but draw your own solution.
 - mark your best design, briefly note why you think it's better.



Credits

- Visualization Analysis and Design (Ch 7)
- Alex Lex & Miriah Meyer, <http://dataviscourse.net/>
- Ben Jones, UW/Tableau