Few’s Design Guidance

CS 7450 - Information Visualization
September 9, 2013
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Today’s Agenda

Stephen Few & Perceptual Edge
Stephen Few’s Guidance

• Excellent advice for the design of tables and graphs

• Page references are from *Now You See It*

• Let’s review some of his recommendations
  – We explored chapters 1-4 earlier
  – Today we examine chapters 5-12

Analytic Techniques & Practices

• Some examples he has highlighted
  – Optimal quantitative scales
  – Reference lines and regions
  – Trellises and crosstabs
  – Multiple concurrent views and brushing
  – Focus and context together
  – Details on demand
  – Over-plotting reduction
Trellis Display
Typically varies on one variable

Crosstab
Varies across more than one variable
Crosstab

Multiple Concurrent Views

Vintage
infovis
Concurrent Views

- He calls such things *faceted analytical displays*
  - Sometimes that term is used in other ways in infovis
- As opposed to *dashboards*
  - They are for monitoring, not analysis

Overplotting

Too many data points
Overplotting Solutions

- Reducing size of data objects
- Removing all fill color from data objects
- Changing the shape of data objects
- Jittering data objects
- Making data objects transparent
- Encoding the density of values
- Reducing the number of values
  - Aggregating the data
  - Filtering the data
  - Breaking the data into a series of separate graphs
  - Statistically sampling the data

Quantitative Data

- Fundamental visualization techniques
Time Series Data

• Patterns to be shown
  − Trend
  − Variability
  − Rate of change
  − Co-variation
  − Cycles
  − Exceptions

Time Series Visualizations

• Effective visualization techniques include...
Line Graphs

When to use:
When quantitative values change during a continuous period of time

Bar Graphs

When to use:
When you want to support the comparison of individual values
Dot Plots

When to use:
When analyzing values that are spaced at irregular intervals of time

Radar Graphs

When to use:
When you want to represent data across the cyclical nature of time
Heatmaps

When to use:
When you want to display a large quantity of cyclical data (too much for radar)  

Box Plots

When to use:
You want to show how values are distributed across a range and how that distribution changes over time
Animated Scatterplots

When to use:
To compare how two quantitative variables change over time

Banking to 45°
Same diagram, just drawn at different aspect ratios
People interpret the diagrams better when lines are around 45°, not too flat, not too steep

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Question

Which is increasing at a faster rate, hardware sales or software sales?

Both at same rate, 10%

Log scale shows this

Patterns

Daily sales               Average per day

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Cycle Plot

Combines visualizations from two prior graphs

A Story

How much wine of different varieties is produced?

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Pareto Chart

Shows individual contributors and increasing total

80/20 rule – 80% of effect comes from 20%

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Bump Chart

Shows how ranking relationships change over time

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Deviation Analysis

Do you show the two values in question or the difference of the two?

Distribution Analysis Views

- Histogram
- Frequency polygon
- Strip plot
- Stem-and-leaf plot
Strip Plot

Stem-and-leaf Plot
Comparisons

Note how first one’s curve is smooth (not such a noticeable difference). Second one is more noticeable. Same data.

Correlation Analysis

Bleah. How can we clean this up?
Color Choice in Heatmaps

Argues that black should not be used as a middle value because of its saliency (visual prominence)

Some people are red-green color blind too

p. 285-7
Critique It

Tracking the plunge
The sharp decline in home values has left many homeowners “under water”—owing more on their homes than their property is worth. This means that, in spite of low interest rates that would normally lead people to refinance their mortgages, many homeowners no longer have sufficient equity to qualify for refinancing.

Reminder

- HW 2 due Wednesday
  - Design a table and a graph
  - Submit 2 copies
Project

- Proposals due next Monday
- More ideas
- Looking for teammates?

What are you Listening to?

- Represent music listening histories
- What would you want to show?
- How might you visualize it?

Nice example of a project
LastHistory

- Visualizing a person’s listening history from last.fm
- Want to support
  - Analysis
  - Reminiscing

- Potential to synchronize with photos and calendar entries from that time

Baur et al
TVCG (InfoVis) ’10
Upcoming

• Multivariate Visual Representations 1
  – Reading
    Inselberg ’97

• Multivariate Visual Representations 2
  – Reading
    Keim et al ’02