Few’s Design Guidance

CS 4460 – Intro. to Information Visualization
September 9, 2014
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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
Add Reference Lines

(Image shown in class)

More Reference Lines

(Image shown in class)
Trellis Display

Typically varies on one variable

(Image shown in class)

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Crosstab

Varies across more than one variable

(Image shown in class)
Crosstab

(Image shown in class)

Multiple Concurrent Views

Vintage infovis

(Image shown in class)
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

(Image shown in class)

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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**

(Image shown in class)

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

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**Bar Graphs**

(Image shown in class)

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

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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

(Image shown in class)

When to use:
When you want to display a large quantity of cyclical data (too much for radar) p. 157

Box Plots

(Image shown in class)

When to use:
You want to show how values are distributed across a range and how that distribution changes over time p. 157
Animated Scatterplots

(Image shown in class)

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

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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

(Image shown in class)

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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

(Image shown in class)

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Cycle Plot

Combines visualizations from two prior graphs

(Image shown in class)

A Story

How much wine of different varieties is produced?

(Image shown in class)

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**Pareto Chart**

(Image shown in class)

Shows individual contributors and increasing total

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

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**Bump Chart**

(Image shown in class)

Shows how ranking relationships change over time

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Deviation Analysis

(Image shown in class)

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
Histogram

(Image shown in class)

Frequency Plot

(Image shown in class)
Strip Plot

(Image shown in class)

Stem-and-leaf Plot

(Image shown in class)
Comparisons

(Image shown in class)

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

Correlation Analysis

(Image shown in class)

Bleah. How can we clean this up?
Crosstab

(Image shown in class)

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

(Image shown in class)

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HW 2

- Table and graph design
- Given two (Excel) data sets, design a table and graph for the data, respectively
- Due next Tuesday
Project

- Proposals due next Tuesday
- More ideas...
- Discuss your proposed topic
- Teams...

Quick Survey

- Knowledge of?
  - HTML
  - CSS
  - Javascript
  - DOM
  - SVG
  - CSV
  - JSON
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
    Munzner chapter 7

- Multivariate Visual Representations 2
  - Reading
    Munzner chapter 12