Visualization Analysis & Design Full-Day Tutorial Session 3

Tamara Munzner
Department of Computer Science
University of British Columbia

Outline
- Visualization Analysis Framework
  - Session I 9:30-10:45am
    - Introduction: Definitions
    - Analysis: What, Why, How
    - Marks and Channels
  - Idiom Design Choices: Part 2
    - Session 3 2:30-2:45pm
      - Manipulate: Change, Select, Navigate
      - Facet: Juxtapose, Partition, Superimpose
      - Reduce Filter-Aggregate, Embedded

Further Reading

http://www.cs.ubc.ca/~tmm/talks.html#minicourse14
**Dimensionality reduction**
- **attribute aggregation**
  - derive low-dimensional target space from high-dimensional measured space
  - use when you can't directly measure what you care about
  - true dimensionality of dataset concealed to be smaller than dimensionality of measurements
  - leave factors, hidden variables

**Superimposing limits**
- few layers, but many lines
  - up-to-a-few dozen
  - but not hundreds
- superimpose vs juxtapose: empirical study
  - superimposed for local visual, multiple for global
  - same screen space for all multiples, single superimposed
  - tools
    - local maximum, global slope, discrimination

**Dynamic visual layering**
- interactive, from selection
  - lightweight: click
  - very lightweight: hover
- ex: 1-hop neighbors

**System: Cerebral**
- **Visualization Analysis Framework**
  - Introduction: Definitions
    - Analysis: What, Why, How
    - Marks and Channels
  - **Idiom Design Choices, Part 2**
    - Guidelines and Examples
      - Session 3 1:15pm-2:30pm
        - Manipulate: Change, Select, Navigate
        - Focus: Juxtapose, Partition, Superimpose
        - Reduce: Filter, Aggregate, Embed
        - Bi/Vis Analysis Example

**Outline**
- **Visualization Analysis Framework**
  - Session 1 9:30am-10:45am
    - Introduction: Definitions
    - Analysis: What, Why, How
    - Marks and Channels
  - **Idiom Design Choices**
    - Session 2 10:45am-12:15pm
      - Arrange Tables
      - Arrange Spatial Datas
      - Arrange Networks and Trees
      - Map Color
  - **Idiom Design Choices, Part 2**
    - Guidelines and Examples
      - Session 3 1:15pm-2:30pm
        - Manipulate: Change, Select, Navigate
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**Idiom: DOSFA**
- attribute filtering
- encoding: star glyphs

**Idiom: histogram**
- static item aggregation
- task: find distribution
- data: table
- derived data
  - new table keys: bins, values are counts
  - bin size crucial
  - pattern can change dramatically depending on discretization
  - opportunity for interaction: control bin size on the fly

**Idiom: boxplot**
- static item aggregation
- task: find distribution
- data: table
- derived data
  - 5 quantiles
  - median central line
  - lower and upper quartile boxes
  - lower and upper fences, whiskers
  - values beyond which items are outliers
  - outliers beyond fence cutoffs explicitly shown

**Idiom: FilmFinder**
- item filtering
- browse through tightly coupled interaction
- alternative to queries that might return too many or too few

**Idiom: Hockey**
- augment widgets for filtering to show few layers, but many lines
- augment viewing to provide layers, but not hundreds
- cues to show whether value in drilling down further vs looking elsewhere
- derive low-dimensional target space from high-dimensional measured space

**Dimensionality reduction for documents**
- **attribute aggregation**
  - derive low-dimensional target space from high-dimensional measured space
  - use when you can't directly measure what you care about
  - true dimensionality of dataset concealed to be smaller than dimensionality of measurements
  - leave factors, hidden variables

**System: FilmFinder**
- **dynamic filtering**
  - item filtering
  - browse through tightly coupled interaction
  - alternative to queries that might return too many or too few

**Further reading**
- Introduction: Definitions
  - Analysis: What, Why, How
  - Marks and Channels
- **Idiom: Hockey**
  - augment widgets for filtering to show few layers, but many lines
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- Introduction: Definitions
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**Idiom: Hockey**
- augment widgets for filtering to show information scent
- cues to show whether value in drilling down further vs looking elsewhere
- concise, in part of screen normally considered control panel

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**Idiom: Fisheye Lens**

- **distort geometry**
  - shape: radial
  - focus: single extent
  - extent: local
  - metaphor: draggable lens

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**Idiom: Stretch and Squish Navigation**

- **distort geometry**
  - shape: rectilinear
  - foci: multiple
  - impact: global
  - metaphor: stretch and squish, borders fixed

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**Distortion costs and benefits**

- **benefits**
  - combine focus and context information in single view

- **costs**
  - length comparisons impaired
  - network/tree topology comparisons unaffected: connection, containment
  - effects of distortion unclear if original structure unfamiliar
  - object constancy/tracking impaired

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**Further reading**

  - Chap 14: Embed: Focus+Context


