Visualization Analysis & Design

Why is validation difficult?
- different ways to get it wrong at each level

Why is validation difficult?
- solution use methods from different fields at each level

Actions: Analyze, Query, Explore
- analyze: consume, produce, consume, analyze, query, produce, consume
- independent choices: analyze, query, search

Derive: Crucial Design Choice
- don’t just draw what you’re given!
- decide what the right thing to show is
- create it with a series of transformations from the original dataset

How to encode: Arrange space, map channels
- marks: geometric primitives - one per item
- channels: control appearance of marks

Analysis framework: Four levels, three questions
- domain situation: who are the target users?
- abstraction: transfer from specifics of domain to vocabulary of visualization
- what is shown: data abstraction
- why is the user looking at it? task abstraction
- how is it shown? interaction idioms: how to manipulate inputs
- algorithm: efficient computation

Why?
- What? Why? How?
- Encode Manipulate Reduce Arrange Map Change Search
- Select Navigate Explore

Types: Datasets and data
- Dataset Types
  - Tables
  - Networks
  - Spatial
    - Fields (Continuous)
    - Geometry (Spatial)

Visualization Analysis and Design.
Tamara Munzner
Department of Computer Science
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UBC Alumni/Industry Lecture
Feb 27 2020, Vancouver BC

www.cs.ubc.ca/~tmm/talks.html#vad20alum

What?
- Why analyze?
- How?
- What?

Analysis example: Derive one attribute
- Stratified number
  - evenly spaced for treemaps
  - derived quantitative
  - draw top 5K of 50K for good skeleton

Domain abstraction
- Don’t waste effort on things you can’t change
- Focus on the parts you can control

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What?
- Why analyze?
- How?
- What?
A quick taste of my own work!

Idiom: Dimensionality reduction for documents
- attribute aggregation
  - derive low-dimensional target space from high-dimensional measured space

Technique-driven: Graph/network drawing
- theoretical foundations
  - evaluation

Technique-driven: Tree drawing
- theoretical foundations
  - evaluation

Technique-driven: Dimensionality reduction
- theoretical foundations
  - evaluation

Evaluation experiments: Dimensionality reduction
- theoretical foundations
  - evaluation

Evaluation in the field: Dimensionality reduction
- theoretical foundations
  - evaluation

Problem-driven: Genomics
- theoretical foundations
  - evaluation