Visualization Design Process

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Munzner’s Nested Model

Problem: task, in domain terms
Understand effects of clearcutting on moth species diversity

Operation: task, in abstract terms
characterize distributions, cluster, correlate

Task: aspects that crosscut these levels
Create a rank-abundance curve
Munzner’s Nested Model

Domain Problem + Data Characterization

• detailed questions the target users ask
• actions the target users undertake
• identification of the data of interest

Ethnographic Methods

• interviews
• observation
Munzner’s Nested Model

Data/Operation Abstraction Design

• domain vocabulary -> generic, abstract descriptions
• output: operations and data types
  • e.g. nominal, ordinal quantitative
  • e.g. sort, filter, compute derived values, etc.

Method: translate the higher level problems to generic tasks
Munzner’s Nested Model

Encoding / Interaction Design

- choose encodings
- design interactions
  - e.g. most important data value maps to highest priority encoding available

Method: Employ perception guidelines and rankings
What can go wrong?
Validity Threats

Stage 1: Assume a problem that isn’t there!
Do the ethnographic work

Stage 2: Abstractions/operations don’t match the problems
Have target user try it
Observe use in real-world

Stage 3: Wrong encodings
Draw upon perceptual principles
Controlled lab study
Applying the Model

Iterate

Rapid Prototyping

• Lo – Fi Prototypes

• Formative Evaluation
  • Cognitive Dimensions Analysis
  • Wizard-of-Oz study
Design Mind Map

1. Get good/interesting data to work with!
2. Process/Steps
3. Perception Considerations
4. Tufte Design Considerations
5. Interaction Considerations
6. Consider Audience Engagement