Ch 4: Validation

Tamara Munzner
Department of Computer Science
University of British Columbia

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http://www.cs.ubc.ca/~tmm/courses/547-17
In-class exercise: Abstraction
VAD Ch 4: Analysis: Four Levels for Validation

1. Domain situation
2. Data/task abstraction
3. Visual encoding/interaction idiom
4. Algorithm
Four levels of design and validation

- four levels of design problems
  - different threats to validity at each level

- **Domain situation**
  - You misunderstood their needs

- **Data/task abstraction**
  - You’re showing them the wrong thing

- **Visual encoding/interaction idiom**
  - The way you show it doesn’t work

- **Algorithm**
  - Your code is too slow
Validation by level

**Domain situation**
Observe target users using existing tools

**Data/task abstraction**

**Visual encoding/interaction idiom**
Justify design with respect to alternatives

**Algorithm**
Measure system time/memory
Analyze computational complexity

Analyze results qualitatively
Measure human time with lab experiment (lab study)
Observe target users after deployment (field study)

**Measure adoption**

- mismatch: cannot show idiom good with system timings
- mismatch: cannot show abstraction good with lab study
Directionality & scope

- Domain situation
- Data/task abstraction
- Visual encoding/interaction idiom
- Algorithm

Problem-driven work

Technique-driven work
Paper types

• each has different contributions, validation methods, structure
  – design studies
  – technique/algorithm
  – evaluation
  – model/taxonomy
  – system

Paper types: Validation

• design studies
  – qualitative discussion of result images/videos
  – abstraction & idiom validation: case studies, field studies, design justification

• technique/algorithm
  • qualitative discussion of result images/videos
  – algorithm validation for algorithm papers: computational benchmarks
  – idiom validation for technique papers: controlled experiments

• evaluation
  – (controlled experiment as primary contribution)

• theory/model/taxonomy
  – show power: descriptive, generative, evaluative, (predictive)

• system
  – show power for developer using system
Paper structures

• typical research paper vs expectations for this course final report
  – more on implementation
  – novel research contribution not required

http://www.cs.ubc.ca/~tmm/courses/547-17/projectdesc.html#outlines
Reading visualization papers

• one strategy: multiple passes
  – title
  – abstract, authors/affiliation
  – flip through, glance at figures, notice structure from section titles
  – skim intro, results/discussion (maybe conclusion)
  – fast read to get big ideas
    • if you don’t get something, just keep going
  – second pass to work through details
    • later parts may cast light on earlier parts for badly structured papers
  – third pass to dig deep
    • if it’s highly relevant, or you’re presenting it to class

• literature search
  – decide when to stop reading: is this relevant to my current concerns?
Literature search

• this course: I will give you seed papers during our 1on1 meetings

• forwards vs backwards search
  – Google Scholar forward citations!
  – only a subset of forwards & backwards citations will be what you need

• building up landscape
  – authors/affiliations will have more signal as you develop expertise
Next time

• Reading
  – VAD Ch 5: Marks and Channels
  – 39 Studies about Human Perception in 30 Minutes
    • you pick: either read blog post or watch video

• In class
  – group work: decoding visual encodings