## Lecture 16: Writing InfoVis Papers

Information Visualization
CPSC 533C, Fall 2007

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### Paper Types: Design Study
- Design in Technique’s Clothing
  - if no major algorithm contrib, probably design study
- Application Bingo
  - don’t just pick random technique-problem combinations
  - must justify why technique solves problem
- Middle Pitfalls: Visual Encoding
  - unjustified visual encoding
  - design justification from task analysis
  - visual encoding justification from theoretical principles
- Middle Pitfalls: Paper Strategy, Tactics, Results
  - Generality

### InfoVis Validation Approaches
- algorithm complexity analysis
- implementation performance (speed, memory)
- quantitative metrics
- qualitative discussion of result pictures
- user anecdotes (insights found)
- user community size (adoption)
- informal usability study
- laboratory user study
- field study with target user population
- design justification from task analysis
- visual encoding justification from theoretical principles

### Paper Types: Technique
- paper types as guide through validation choices
- technique/algorithm
  - most common: here’s new algorithm to do X
  - do first, or do better
- validation
  - complexity, performance
  - quant metrics, qual discussion of pix

### Middle Stage: Visual Encoding
- Unjustified Visual Encoding
  - should justify why visual encoding design choices appropriate for problem
  - requires clear statement of problem and encoding, of course
  - Hammer In Search Of Nail
    - characterize capabilities of new technique before submitting paper
    - even if start from technique-driven place
  - 2D Good, 3D Better
    - must justify when benefits 3D outweigh cost of occlusion
    - abstract visual encoding allows choice over mapping variables to spatial position

### Middle Stage: Visual Encoding 2
- Color Cautionary
  - blatant disregard for basic color perception facts
  - huge areas of highly saturated color
  - color coding intended for regions too small for distinguishability
  - nominal color coding for too many (15+) categories
  - red/green with no luminance difference
  - encode 3 separate variables with RGB

### Overview
- Initial Stage: Paper Types
- Middle Pitfalls: Visual Encoding
- Late Pitfalls: Paper Strategy, Tactics, Results
- Final Pitfalls: Style and Submission
- Generality

### Type Pitfalls
- systems
  - design study for library/toolkit architectural choices
  - not for application-level visual encoding
  - lessons learned: why does anybody else care?
- summative evaluation / user studies
  - lab studies of abstracted tasks
  - field studies with target users
- model
  - taxonomies: aid to thinking, finding gaps
  - formalism: new models/definitions (ex: space-scale)
  - commentary: advocate (ex: fish-eye follows you)
  - design in technique’s clothing
  - if no major algorithm contrib, probably design study
- Middle Stage: Visual Encoding
  - unjustified visual encoding
  - design justification from task analysis
  - visual encoding justification from theoretical principles
  - secondary: user studies
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Avoid where you can, define before using.

Don't use passive voice.

Tiny Toy Datasets

Grammar Is Optional

Nonspecific Use Of Large

Straw Man Comparison

Fear and Loathing of Complexity

Mistakes Were Made

Resubmit Unchanged

User study tasks should be ecologically valid.

Convincing abstraction of real-world tasks of target users.

Small datasets may be acceptable for user studies.

Choose level of detail for performance numbers.

Detailed graphs for technique, high-level for design/eval.

Fear and Loathing of Complexity.

Present the complexity analysis for technique papers.

Full proof not required.

Straw Man Comparison.

Compare against state-of-the-art algorithms.

Head-to-head hardware best.

Tiny Toy Datasets.

Compare against state-of-the-art dataset sizes for technique.

Small datasets may be acceptable for user studies.

But My Friends Liked It.

Asking labmates not convincing when targets different.

Unjustified Tasks.

User study tasks should be ecologically valid.

Convincing abstraction of real-world tasks of target users.

Deadly Detail Dump.

How allowed only after what and why.

Story-Free Captions.

Optimize for flip-through-pictures skimming.

My Picture Speaks For Itself.

Explicitly walk them through images with discussion.

My native speaker check if you’re ESL.

Grammar Is Optional.

Low-level flow is necessary (albeit not sufficient).

Have native speaker check if you’re ESL.

Mistakes Were Made.

Don’t use passive voice.

Ambiguity about actor: your research contrib, or done by others?

Jargon Attack.

Avoid where you can, define before using.

Nonspecific Use Of Large.

Hundreds, 10K, 100K, millions, billions?
Generality

- type: infovis
- encoding: color is general vis, others more infovis
- strategy: all research
- tactics: all research
- results: general vis
- style: all research, except
  - Story-Free Captions: general vis and graphics
  - My Picture Speaks For Itself: more infovis