InfoVis Group Research

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CPSC 344 Outro
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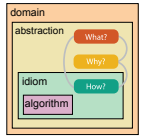
www.cs.ubc.ca/~tmm/talks.html#344-outro23

Visualization defined & motivated

- computer-based visualization systems
  - provide visual representations of datasets
  - designed to help people carry out tasks more effectively.
- suitable when
  - there is a need to augment human capabilities
  - rather than replace people with computational decision-making methods

Nested model: Four levels of visualization design

- *domain situation*
  - who are the target users?
- *abstraction*
  - translate from specifics of domain to vocabulary of vis
    - **what** is shown? **data** abstraction
    - **why** is the user looking at it? **task** abstraction
- *idiom*
  - **how** is it shown?
    - **visual encoding** idiom: how to draw
    - **interaction** idiom: how to manipulate
- *algorithm*
  - efficient computation



[A Nested Model of Visualization Design and Validation. Munzner. IEEE TVCG 15(6):921-928, 2009 (Proc. InfoVis 2009).]

[A Multi-Level Typology of Abstract Visualization Tasks. Brehmer and Munzner. IEEE TVCG. 19(12):2376-2385, 2013 (Proc. InfoVis 2013).]

Why is validation difficult?

- different ways to get it wrong at each level

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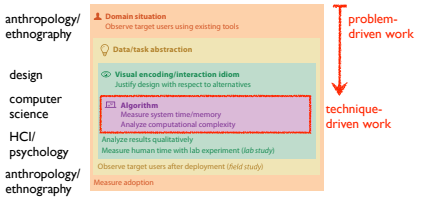
Evaluation: broadly interpreted

- methods from many fields, qualitative & quantitative
  - controlled experiments in lab, field studies of deployed systems



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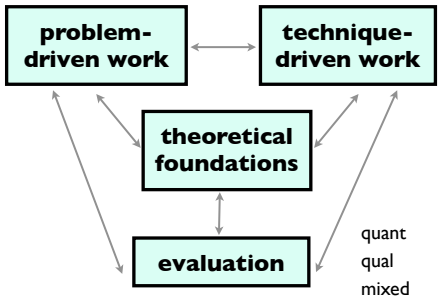
Tamara Munzner, UBC CS, InfoVis Research



Problem-driven work

- design studies
  - in collaboration with target users
    - real data, real tasks
    - intensive requirements analysis
  - iterative refinement
    - deploy tools/systems
  - typical evaluation: field studies
    - pre-design & post-deployment, often qualitative
  - opportunistic collaboration
    - many domains, industry & academia

Design studies: domains

- many domains
  - fisheries, in-car networks, journalism, ...
- genomics
  - Harvard Med School, BC Cancer, UBC Biodiversity, Agilent, ...
- log analysis
  - Google web search, AT&T web hosting, Mobify e-commerce
  - building & energy usage

Ocupado design study

Ocupado: Visualizing Location-Based Counts Over Time Across Buildings

Michael Oppermann
Tamara Munzner

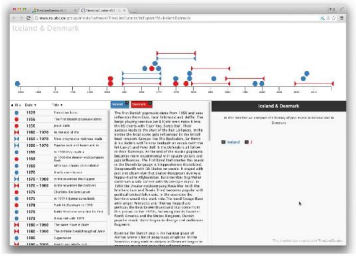
THE UNIVERSITY OF BRITISH COLUMBIA | DESIGNING for PEOPLE | Project partner: Sensible Building Science

https://youtu.be/KcwjVK8eUdw

Technique-driven work

- scalable algorithms & systems
  - typical evaluation: computational benchmarks
- new visual encoding & interaction techniques
  - typical evaluation: controlled experiments with people (quant)
  - typical evaluation: qualitative assessment
- areas
  - graph drawing, dimensionality reduction
  - human-in-the-loop curation/assessment of ML results

TimelineCurator



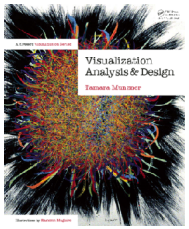
https://youtu.be/Lff398EEswM

Courses

- grad course CPSC 547: next offering Sep 2025
- new-ish ugrad course: CPSC 447
  - (first three years was CPSC 436V)
  - current offering https://www.students.cs.ubc.ca/~cs-447/23Jan/
  - next offering Sep 2023, then Jan 2025
  - 4th year majors course
    - theory: visualization foundations
    - tooling: D3.js
    - prereq: CPSC 310
    - HCI not required, but very helpful

More info

- book (free through UBC library) http://www.cs.ubc.ca/~tmm/vadbook
- papers, videos, software, talks, courses http://www.cs.ubc.ca/group/infovis http://www.cs.ubc.ca/~tmm



Visualization Analysis & Design