Topic Notes

Course Review

CS 7450 - Information Visualization
December 4, 2013
John Stasko

Syllabus Review

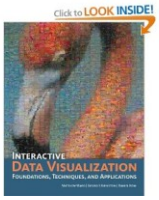
Overview

Week	Dates	Topic	Topic	HW
1	Aug 19, 21	Introduction	InfoVis overview	HW 1
2	Aug 26, 28	Visual perception	Value/Benefits of visualization	
3	Sep 2, 4	No Class -- Labor Day	Multivariate data & table/graph design	HW 2
4	Sep 9, 11	Few's design guidance	Multivariate visual representations 1	
5	Sep 16, 18	Multivariate visual representations 2	Tasks and analysis	HW 3a HW 3b
6	Sep 23, 25	InfoVis systems & toolkits	Commercial systems demos	HW 4
7	Sep 30, Oct 2	Storytelling	Tufte's design principles	
8	Oct 7, 9	Poster session	Casual InfoVis	HW 5
9	Oct 14, 16	No Class - Fall break	No Class - VIS Conference	
10	Oct 21, 23	Graphs and networks 1	Graphs and networks 2	
11	Oct 28, 30	Hierarchies & trees 1	Hierarchies & trees 2	HW 6
12	Nov 4, 6	Interaction	Overview & detail	
13	Nov 11, 13	Text & documents 1	Text & documents 2	
14	Nov 18, 20	Visual analytics 1	Visual analytics 2	HW 7
15	Nov 25, 27	Time series data	Project work day	
16	Dec 2, 4	Evaluation	Review	

Your Reflections

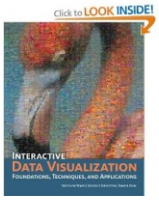
- What were most interesting topics?
- What are key research challenges?
- What should be done in the future?

Research Directions



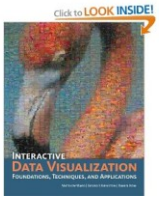
- Data issues
  - Scale
  - Static versus dynamic
  - Spatial versus nonspatial
  - Nominal versus ordinal
  - Structured versus nonstructured
  - Time
  - Varying quality

Research Directions



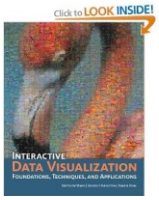
- Issues of cognition, perception, & reasoning
  - How do humans solve problems with the aid of visuals?
  - How can we leverage this knowledge to build better tools?
    - Understand analytic tasks better
  - How can visualization assist learning?

Research Directions



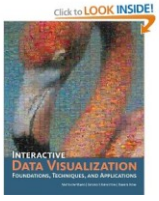
- Issues of system design
  - How to integrate computational analysis with visualization better
  - Develop powerful new interaction paradigms
  - Make visualizations engaging and easier to use/create (for the masses)
  - Holy Grail: Automatic visualization design

Research Directions



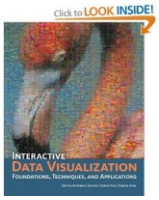
- Issues of evaluation
  - What is the importance of aesthetics?
  - Understand human perceptual and cognitive limitations
  - How to measure the benefits compared to other analysis methods?
  - What quantitative and qualitative measures of usability are important?
  - How do we measure the information content, distortion, and loss in a visualization?
  - What are the trade-offs between long, longitudinal studies and limited tests with more subjects?
  - What mixture of domain knowledge and visualization knowledge is needed to design and develop effective tools?

Research Directions



- Hardware issues
  - Handhelds to display walls
  - GPU benefits
  - New interaction devices

Research Directions



- Issues of applications
  - How to best collaborate with domain experts to help solve their problems?
  - What new domains can be addressed?

Promising Trends

- Built-in best practices
  - Banking to 45°, Tableau
- Integrated support for geo-spatial analysis
  - Learn from cartographers, Google maps
- Integrated support for network analysis
  - Vizster, Social Action, Ploceus
- Integrated support for collaborative analysis
  - Many Eyes, sense.us

Promising Trends

- Custom analytical applications
  - Spotfire, Qlikview
- Illuminating predictive models
  - Risk, uncertainty, opening the black box
- Integrated data mining
  - Friend not foe
- Improved HCI devices
  - Large, multi-touch displays

Visualization Zoo

Time series data
Index line chart
Stacked graph
Small multiples
Horizon graph

Statistical distributions
Stem-and-leaf plots
Q-Q plots
Scatter plot matrix
Parallel coordinates

Maps
Flow map
Choropleth map
Graduated symbol map
Cartograms

Hierarchies
Node-link diagrams
  Cartesian
  Radial (dendogram)
  Indented tree layout
Adjacency diagrams
  Icicle plot
  SunBurst
Enclosure diagrams
  Treemap
  Circle packing

Networks
Force-directed
Arc diagram
Matrix views

Heer, Bostock & Ogievetsky *CACM* '10

http://queue.acm.org/detail.cfm?id=1805128

Final Exam

- Monday, this room, 2:50pm
- Short answer
  - Explain something
  - Identify something
  - Critique something
  - …

Final Project

Visitor from AJC

- Demos tomorrow at my lab
  - Be on time, respect the 15 minutes
  - Bring 2 copies of a summary sheet (member names, paragraph overview, image)
- Video due on Tuesday @ 5pm
  - Do a nice job
  - Give me the file (thumbdrive, web, …)
  - Will put them all on a t-square page
- Questions?

Team Survey

- Include yourself being rated
- 1 (bad) – 5 (good)
- Only I will read these

Grades

- HWs
- Project
- Participation
- Final exam

- Items will be posted in t-square later next week

Course Survey

- Take a few minutes to complete

- Please remember to complete GT one too!
  - Link from homepage of t-square

Potential Projects

- If you're interested in pursuing research in this area, let me know
  - CiteVis++
  - Sports data vis
  - Emory AIDS project
  - …

InfoVis Gospel

- Hopefully, course has increased your awareness of topic and you can become an advocate
- Keep me posted as your use these ideas in your career