Topic Notes

Course Review

CS 7450 - Information Visualization
December 5, 2012
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Syllabus Review

Overview

Week	Dates	Topic	Topic	HW
1	Aug 20, 22	Introduction	InfoVis overview	HW 1
2	Aug 27, 29	Multivariate data & table/graph design	Visual perception	HW 2
3	Sep 3, 5	No Class -- Labor Day	Cognitive issues	
4	Sep 10, 12	Multivariate visual representations 1	Multivariate visual representations 2	HW 3
5	Sep 17, 19	Tufte's principles	Few's design guidance	HW 4
6	Sep 24, 26	InfoVis systems & toolkits	Commercial systems demos	HW 5
7	Oct 1, 3	Interaction	Storytelling	
8	Oct 8, 10	Guest Speakers	Overview & detail	
9	Oct 15, 17	No Class - Fall break	Casual InfoVis	
10	Oct 22, 24	Poster session	Time series data	HW 6
11	Oct 29, 31	Text & documents 1	Text & documents 2	HW 7
12	Nov 5, 7	Graphs and networks 1	Graphs and networks 2	
13	Nov 12, 14	Hierarchies & trees 1	Hierarchies & trees 2	
14	Nov 19, 21	Social Visualization	Animation	HW 8
15	Nov 26, 28	Visual analytics 1	Visual analytics 2	
16	Dec 3, 5	Evaluation	Review	

Fall 2012   CS 7450   2

Your Reflections

- What were most interesting topics?

- What are key research challenges?
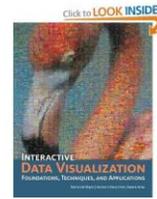
- What should be done in the future?

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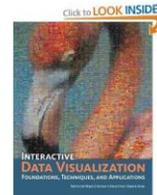
- Data issues
  - Scale
  - Static versus dynamic
  - Spatial versus nonspatial
  - Nominal versus ordinal
  - Structured versus nonstructured
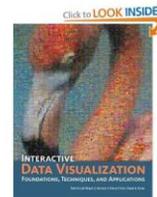 - Time
  - Varying quality

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
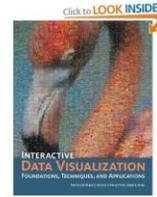 - How can visualization assist learning?

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
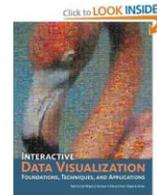
Research Directions

- 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?
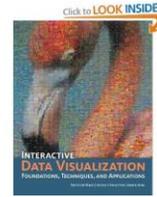
Research Directions

- 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

In-Class Final

- Some old questions

HW 8 Recap

- Solution form and quality
  - The real solution!

- Comments about Jigsaw
  - Things it already does
  - Helpful suggestions

Final Project

- Demos tomorrow
  - Be on time, respect the 15 minutes
- Video due on Monday
  - Will put them all on a t-square page
- Questions?

- Team survey

Grades

- HWs
- Project
- Participation

- 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

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