

Course Review



CS 7450 - Information Visualization
December 8, 2011
John Stasko

Syllabus Review



Overview

Week	Dates	Topic	Topic	HW
1	Aug 23, 25	Introduction	InfoVis overview	HW 1
2	Aug 30, Sep 1	Multivariate data & table/graph design	Visual perception	HW 2
3	Sep 6, 8	Cognitive issues	Storytelling	HW 3
4	Sep 13, 15	Multivariate visual representations 1	Multivariate visual representations 2	
5	Sep 20, 22	Tufte's principles	Few's design guidance	HW 4
6	Sep 27, 29	InfoVis systems & toolkits	Commercial systems demos	HW 5
7	Oct 4, 6	Text & documents 1	Text & documents 2	
8	Oct 11, 13	Interaction 1	Interaction 2	
9	Oct 18, 20	Fall break	Overview & detail	HW 6
10	Oct 25, 27	No Class	Time series data	
11	Nov 1, 3	Graphs and networks 1	Graphs and networks 2	HW 7
12	Nov 8, 10	Hierarchies & trees 1	Hierarchies & trees 2	
13	Nov 15, 17	Casual InfoVis	Social Visualization	
14	Nov 22, 24	Evaluation	No Class -- Thanksgiving	HW 8
15	Nov 29, Dec 1	Visual analytics 1	Visual analytics 2	
16	Dec 6, 8	Animation	Review	

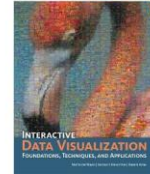
Your Reflections



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

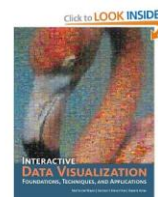
Research Directions

Click to LOOK INSIDE!



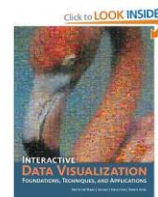
- Data issues
 - Scale
 - Static versus dynamic
 - Spatial versus nonspatial
 - Nominal versus ordinal
 - Structured versus nonstructured
 - Time
 - Varying quality

Research Directions



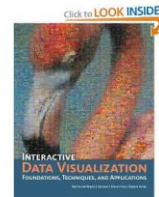
- Issues of cognition, perception, & reasoning
 - How do humans solve problems with the aid of visuals?
 - How can we leverage this knowledge to build better tools?
 - Understand analytic tasks better
 - How can visualization assist learning?

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



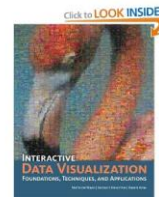
- Issues of evaluation
 - What is the importance of aesthetics?
 - Understand human perceptual and cognitive limitations
 - How to measure the benefits compared to other analysis methods?
 - What quantitative and qualitative measures of usability are important?
 - How do we measure the information content, 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?

Fall 2011

CS 7450

7

Research Directions



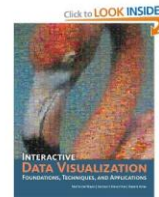
- Hardware issues
 - Handhelds to display walls
 - GPU benefits
 - New interaction devices

Fall 2011

CS 7450

8

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

Fall 2011

CS 7450

11

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>

Fall 2011

CS 7450

12

In-Class Final



- Some old questions

Final Project



- Tuesday demos
 - sign-up sheet
- Bring your video
- Questions?
- Survey

My Own Survey



- Take a few minutes to complete
- Please remember to do GT one too!

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