

Course Review

Dr. Michele C. Weigle

<http://www.cs.odu.edu/~mweigle/CS795-F11/>

Resources and References

- ▶ John Stasko's CS slides

- ▶ Stasko's references
 - ▶ Ward text
 - ▶ *Few, Now You See It*

Your Reflections

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

Research Directions

Ward text

- ▶ Data issues
 - ▶ Scale
 - ▶ Static versus dynamic
 - ▶ Spatial versus non-spatial
 - ▶ Nominal versus ordinal
 - ▶ Structured versus non-structured
 - ▶ Time
 - ▶ Varying quality

Research Directions

Ward text

- ▶ 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

Ward text

- ▶ 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

Ward text

► 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

Ward text

► Hardware issues

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

Research Directions

Ward text

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

Promising Trends

*Few, Now
You See It*

- ▶ 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
- ▶ Integrated support for collaborative analysis
 - ▶ Many Eyes, sense.us

Promising Trends

*Few, Now
You See It*

- ▶ 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

Heer, Bostock & Ogievetsky
CACM'10

- | | |
|--|---|
| <ul style="list-style-type: none">▶ Time series data<ul style="list-style-type: none">▶ Index line chart▶ Stacked graph▶ Small multiples▶ Horizon graph▶ Statistical distributions<ul style="list-style-type: none">▶ Stem-and-leaf plots▶ Q-Q plots▶ Scatter plot matrix▶ Parallel coordinates▶ Maps<ul style="list-style-type: none">▶ Flow map▶ Choropleth map▶ Graduated symbol map | <ul style="list-style-type: none">▶ Hierarchies<ul style="list-style-type: none">▶ Node-link diagrams▶ Cartesian▶ Radial (dendogram)▶ Indented tree layout▶ Adjacency diagrams▶ Icicle plot▶ SunBurst▶ Enclosure diagrams▶ Treemap▶ Circle packing▶ Networks<ul style="list-style-type: none">▶ Force-directed▶ Arc diagram▶ Matrix views |
|--|---|