Course Review

CS 7450 - Information Visualization
December 4, 2013
John Stasko

Syllabus Review

Overview

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topic</th>
<th>HW</th>
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<tr>
<td>1</td>
<td>Aug 19, 21</td>
<td>Introduction</td>
<td>HW 1</td>
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<td>2</td>
<td>Aug 26, 28</td>
<td>Visual perception</td>
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<td>3</td>
<td>Sep 2, 4</td>
<td>No Class – Labor Day</td>
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<td>4</td>
<td>Sep 9, 11</td>
<td>Pew’s design guidance</td>
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<td>5</td>
<td>Sep 16, 18</td>
<td>Multivariate visual representations 2</td>
<td>HW 2</td>
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<td>6</td>
<td>Sep 23, 25</td>
<td>InfoVis systems &amp; toolkits</td>
<td>HW 3a, HW 3b</td>
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<td>7</td>
<td>Sep 30, Oct 2</td>
<td>Storytelling</td>
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<td>8</td>
<td>Oct 7, 9</td>
<td>Poster session</td>
<td>HW 4</td>
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<td>9</td>
<td>Oct 14, 16</td>
<td>No Class - Fall break</td>
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<td>10</td>
<td>Oct 21, 23</td>
<td>Graphs and networks 1</td>
<td>HW 5</td>
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<td>11</td>
<td>Oct 28, 30</td>
<td>Hierarchies &amp; trends 1</td>
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<td>12</td>
<td>Nov 4, 6</td>
<td>Interaction</td>
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<td>13</td>
<td>Nov 11, 13</td>
<td>Text &amp; documents 1</td>
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<td>14</td>
<td>Nov 18, 20</td>
<td>Visual analytics 1</td>
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<td>15</td>
<td>Nov 25, 27</td>
<td>Time series data</td>
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<td>16</td>
<td>Dec 2, 4</td>
<td>Evaluation</td>
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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?

• 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?

• 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

<table>
<thead>
<tr>
<th>Time series data</th>
<th>Hierarchies</th>
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<tbody>
<tr>
<td>Index line chart</td>
<td>Node-link diagrams</td>
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<tr>
<td>Stacked graph</td>
<td>Cartesian</td>
</tr>
<tr>
<td>Small multiples</td>
<td>Radial (dendogram)</td>
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<tr>
<td>Horizon graph</td>
<td>Indented tree layout</td>
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<thead>
<tr>
<th>Statistical distributions</th>
<th>Adjacency diagrams</th>
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<tr>
<td>Stem-and-leaf plots</td>
<td>Icicle plot</td>
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<td>Q-Q plots</td>
<td>SunBurst</td>
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<td>Scatter plot matrix</td>
<td>Enclosure diagrams</td>
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<tr>
<td>Parallel coordinates</td>
<td>Treemap</td>
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<td>Circle packing</td>
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<tr>
<th>Maps</th>
<th>Networks</th>
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<tr>
<td>Flow map</td>
<td>Force-directed</td>
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<tr>
<td>Choropleth map</td>
<td>Arc diagram</td>
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<tr>
<td>Graduated symbol map</td>
<td>Matrix views</td>
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<tr>
<td>Cartograms</td>
<td>Heer, Bostock &amp; Ogievetsky</td>
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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

• 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
  – ...

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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