CSE 512 - Data Visualization

Design Review & Critique

Jeffrey Heer  University of Washington
Final Project
Possible Project Approaches

Advance your **existing research**.

Pick an **open problem** of interest.

Work in a domain with **real stakeholders**.
Final Project

Create a visualization system, technique, or study.

Many options…
New system for a chosen domain + data set
Novel visualization / interaction technique
Design study or experiment

Deliverables
Share milestone progress
Video demonstration (max. 2 min)
Project results (software, study results, etc.)
# Final Project Schedule

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposal</td>
<td>Fri May 10</td>
</tr>
<tr>
<td>Prototype</td>
<td>Wed May 22</td>
</tr>
<tr>
<td>Demo Video</td>
<td>Wed May 29</td>
</tr>
<tr>
<td>Video Showcase</td>
<td>Thu May 30 (in class)</td>
</tr>
<tr>
<td>Deliverables</td>
<td>Mon June 3</td>
</tr>
</tbody>
</table>

## Logistics

Final project description posted online
Work in groups of up to 4 people
Start determining your project topic!
Inspiration...
Visualizing Galaxy Merger Trees

S. Loebman, J. Ortiz, L. Orr, M. Balazinska, T. Quinn et al. [SIGMOD '14]
A browser-based tool for visualization and analysis of diffusion MRI data

Jason D. Yeatman, Adam Richie-Halford, Josh K. Smith, Anisha Keshavan, Ariel Rokem
Bias?

Inadequate Representation?

Latent Space Cartography
Visual Analysis of Vector Space Embeddings
Yang Liu, Eunice Jun, Qisheng Li (CSE 512, Spring '18)
Protovis: A Graphical Toolkit for Visualization

Mike Bostock
var army = pd.nest(napoleon.army, "dir", "group");
var vis = new pv.Panel();

var lines = vis.add(pv.Panel).data(army);
lines.add(pv.Line)
  .data(function() army[this.idx])
  .left(lon).top(lat).size(function(d) d.size/8000)
  .strokeStyle(function() color[army[paneIndex][0].dir]);

vis.add(pv.Rule).data([0,-10,-20,-30])
  .top(function(d) 300 - 2*d - 0.5).left(200).right(150)
  .lineWidth(1).strokeStyle("#ccc")
  .anchor("right").add(pv.Label)
  .text(function(d) d.temp+"°").textBaseline("center");

vis.add(pv.Label).data(napoleon.cities)
  .left(lon).top(lat)
  .text(function(d) d.city).font("italic 10px Georgia")
  .textAlign("center").textBaseline("middle");

vis.add(pv.Label).data(napoleon.temp)
  .left(lon).top(tmp).strokeStyle("#0")
  .add(pv.Label)
  .top(function(d) 5 + tmp(d))
  .text(function(d) d.temp+"°"+d.date.substr(0,6))
KEYBOARD WALKING

Passwords with a “keyboard walking” pattern start at an arbitrary key, then move in a direction (usually right or down) while continuing to hit keys. Sometimes this is combined with holding down the `shift` key, so that some characters are uppercase or symbols to improve complexity.

While the generated password may seem to be random and unhackable, password crackers check for these keyboard patterns and guess them early on.

Many passwords in the leaked passwords dataset have a spatial pattern. Other than the numeric passwords like 123456, common keyboard walking offenders include qwerty and 1qaz@wsx.

Semantic Passwords

Vishal Devireddy (CSE 512, Spring '21)
Visualizing the Republic of Letters

Daniel Chang, Yuankai Ge, Shiwei Song

Republic of Letters

1700

FILTER BY AUTHOR
- Damien Desormes
- Daniel Corns
- Daniel de Pury
- Daniel Defoe
- Daniel Mathus
- Daniel Marc Antoine Chardon
- Daniel Muller

TOP CITIES AND AUTHORS

<table>
<thead>
<tr>
<th>Letters received</th>
<th>Letters sent</th>
</tr>
</thead>
<tbody>
<tr>
<td>London (England)</td>
<td>346</td>
</tr>
<tr>
<td>Oates (England)</td>
<td>304</td>
</tr>
<tr>
<td>Dublin (Ireland)</td>
<td>208</td>
</tr>
<tr>
<td>Paris (France)</td>
<td>238</td>
</tr>
<tr>
<td>Twickenham (England)</td>
<td>191</td>
</tr>
<tr>
<td>John Locke</td>
<td>350</td>
</tr>
<tr>
<td>Joseph Addison</td>
<td>244</td>
</tr>
<tr>
<td>Voltaire</td>
<td>253</td>
</tr>
<tr>
<td>Jonathan Swift</td>
<td>159</td>
</tr>
<tr>
<td>Alexander Pope</td>
<td>150</td>
</tr>
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Tips for a Successful Project

Focus on a compelling **real-world problem**. How will you gauge success?

Consider **multiple design alternatives**. Prototype quickly (use Tableau, R, etc…).

**Seek feedback** (representative users, peers, …). Even informal usage can provide insights.

Choose **appropriate team roles**.

**Start early** (and read the suggested paper!)
A3 Prototype Peer Reviews
Critique Questions

What is the purpose of the visualization?
Does it serve its purpose well?
Does it convey the data honestly?
Does it show the appropriate level of detail?
Are expressive & effective visual encodings used?
Do the interactions aid understanding of the data?
Is the design well-organized? Is it innovative?
What would like to change or refine?
How might things be done differently?
I Like… / I Wish… / What If?

I LIKE…
Praise for design ideas and/or well-executed implementation details. Example: "I like the navigation through time via the slider; the patterns observed as one moves forward are compelling!"

I WISH…
Constructive statements on how the design might be improved or further refined. Example: "I wish moving the slider caused the visualization to update immediately, rather than the current lag."

WHAT IF?
Suggest alternative design directions, or even wacky half-baked ideas. Example: "What if we got rid of the slider and enabled direct manipulation navigation by dragging data points directly?"
I Like… / I Wish… / What If?

I LIKE…
The goal of supporting developers to improve decoupling. The “cut-line” interaction to isolate links of interest. The use of gradients to show edge directionality.

I WISH…
I could author multiple cut-lines for compound queries. More details on demand were shown upon mouse-hover.

WHAT IF?
You could incorporate information from applications that use this code? How often are different modules used?
I Like... / I Wish... / What If?

I LIKE...
The 1D histograms on the parallel coordinates display. The use of brushing and linking between components. Attention to small details, such as white masks for axis labels.

I WISH...
Data fields were configured to focus on the most relevant features. The interaction was faster (lower latency). A color-blind friendly color palette had been used.

WHAT IF?
One tried to visualize the data using a technique other than parallel coordinates? What encodings work best for the intended audience?
Critique Categories

Visualization Design
Choice of visual encodings (expressive, effective?)
Is the appropriate information visible by default?

Interaction Design
Choice of interaction techniques
Do they enhance understanding of the data?
Usability, discoverability, performance

Overall Design Quality
Organization, legibility, fitness for chosen goals
A3 Peer Reviews

Review three A3 submissions (assignment will be posted on the A3 Peer Review page on Canvas)

Submit three critique forms by Wed 5/15, 11:59

Follow I like / I wish / What if? format for critiques

Be positive! Be constructive! Share wild ideas!
Reminders!

Final Project Proposal Due **Fri 5/10, 11:59pm**
[https://courses.cs.washington.edu/courses/cse512/24sp/fp.html](https://courses.cs.washington.edu/courses/cse512/24sp/fp.html)

Three Peer Evaluations Due **Wed 5/15, 11:59pm**
[https://courses.cs.washington.edu/courses/cse512/24sp/a3-review.html](https://courses.cs.washington.edu/courses/cse512/24sp/a3-review.html)