

CSE 512 - Data Visualization

Design Review & Critique



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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

<i>Proposal</i>	Fri May 10
<i>Prototype</i>	Wed May 22
<i>Demo Video</i>	Wed May 29
<i>Video Showcase</i>	Thu May 30 (in class)
<i>Deliverables</i>	Mon June 3

Logistics

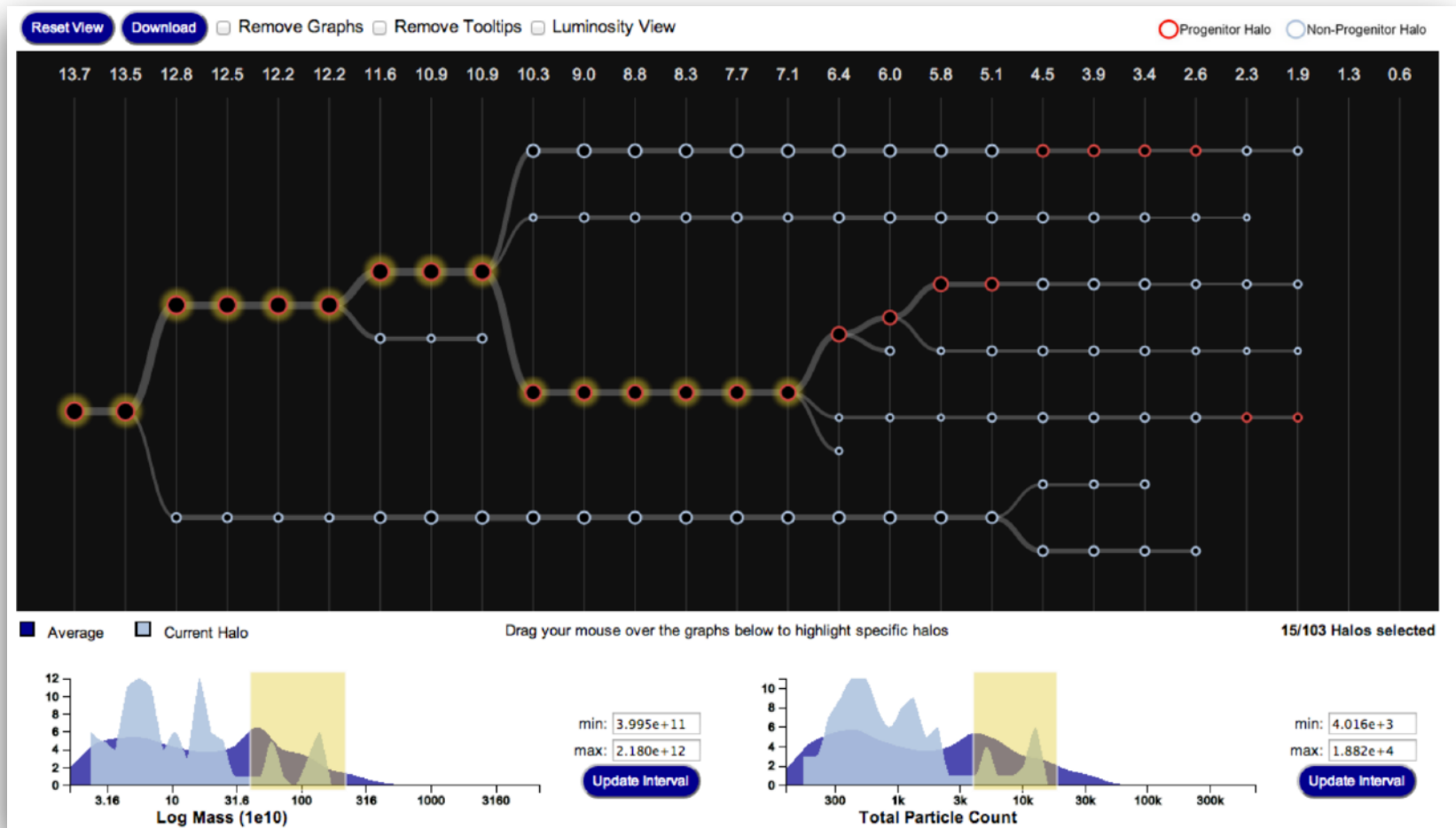
Final project description posted online

Work in groups of up to 4 people

Start determining your project topic!

Inspiration...

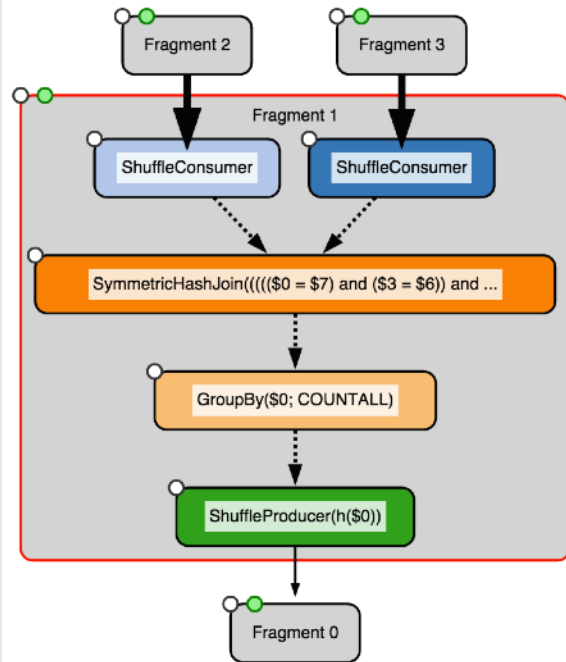
Visualizing Galaxy Merger Trees



S. Loebman, J. Ortiz, L. Orr, M. Balazinska, T. Quinn et al. [SIGMOD '14]

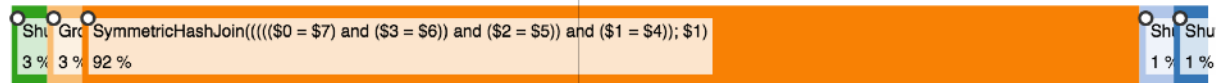
Perfopticon Distributed Query Performance

Physical Query Plan:

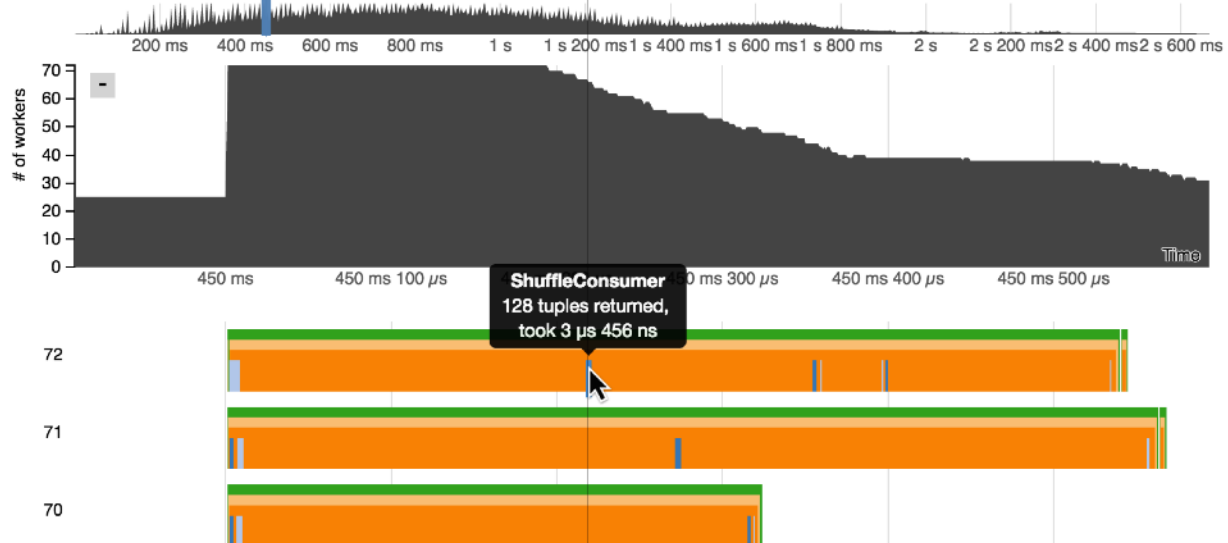


Overview / Operators inside fragment 1

Query time contribution collapse/expand



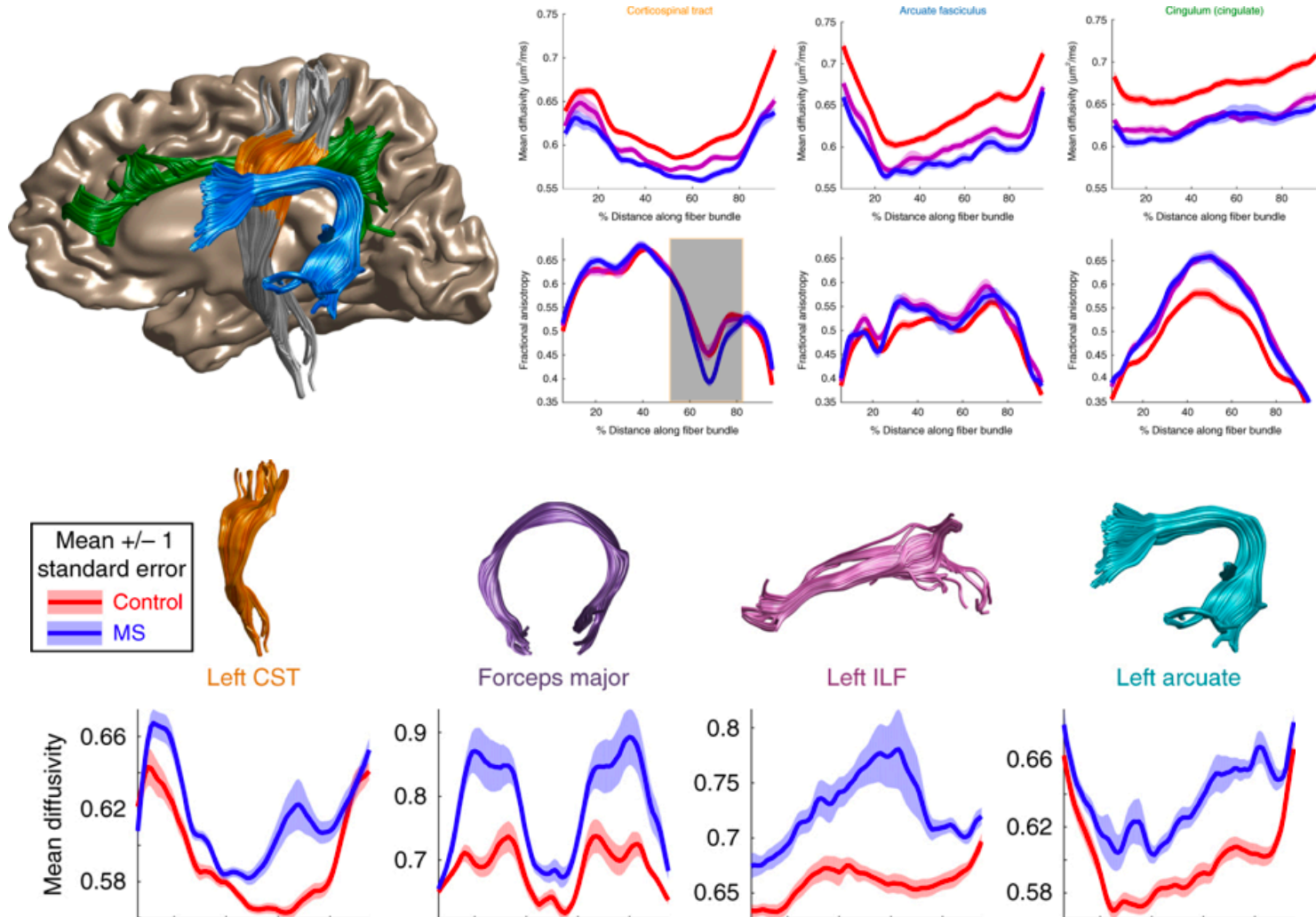
Detailed execution



A browser-based tool for visualization and analysis of diffusion MRI data

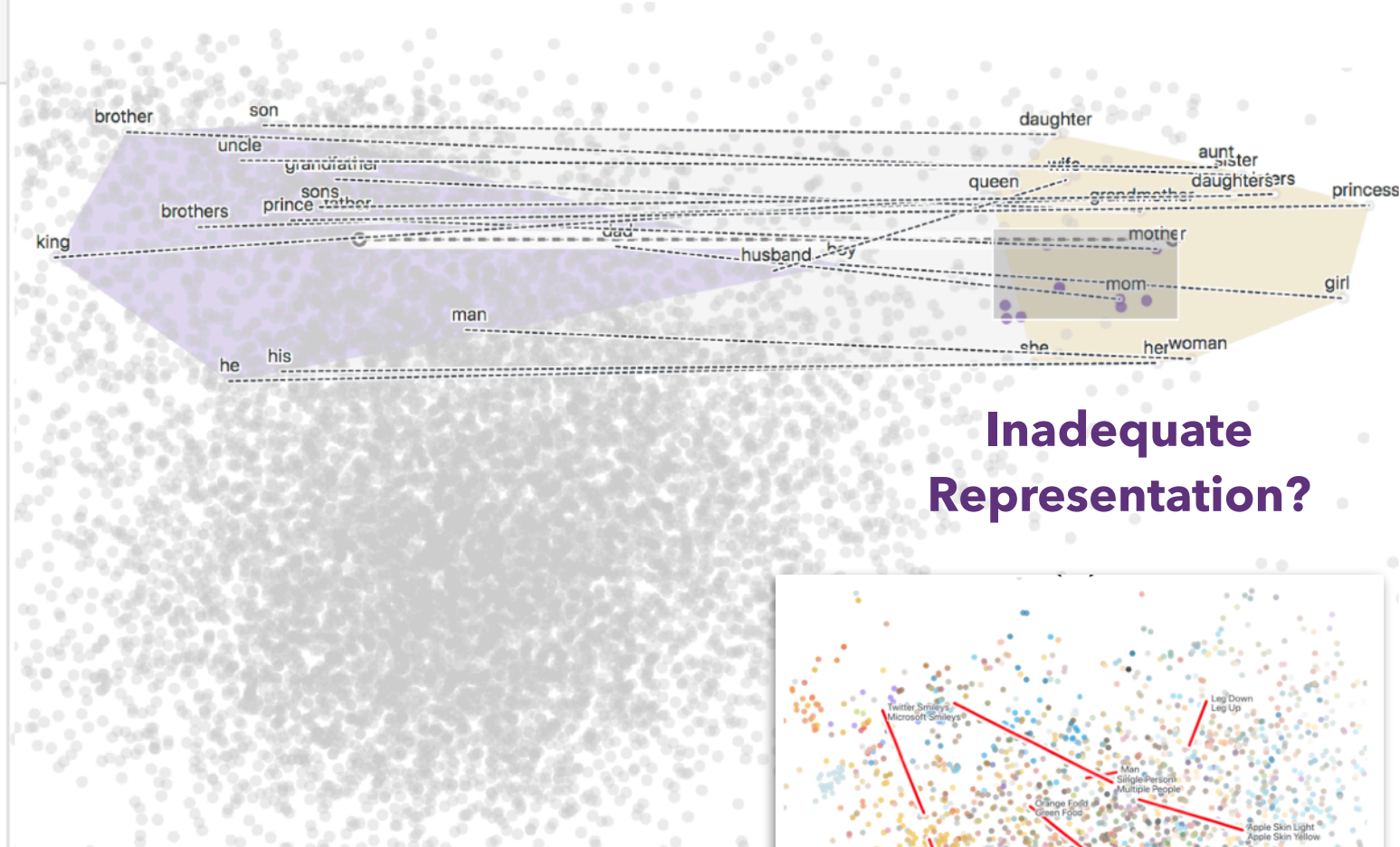
Article | OPEN | Published: 05 March 2018

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

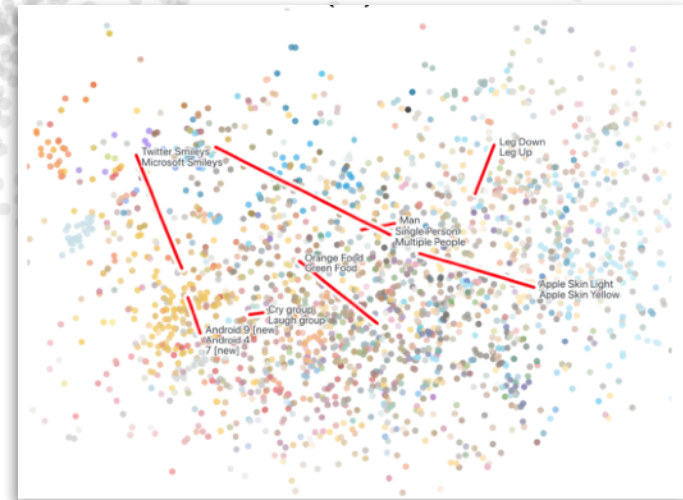


Brushed

- mother +
- ms. +
- wedding +
- pink **Bias?** +
- mom +
- nurse +
- bedroom +
- ladies +
- householder +
- butterfly +



Inadequate Representation?



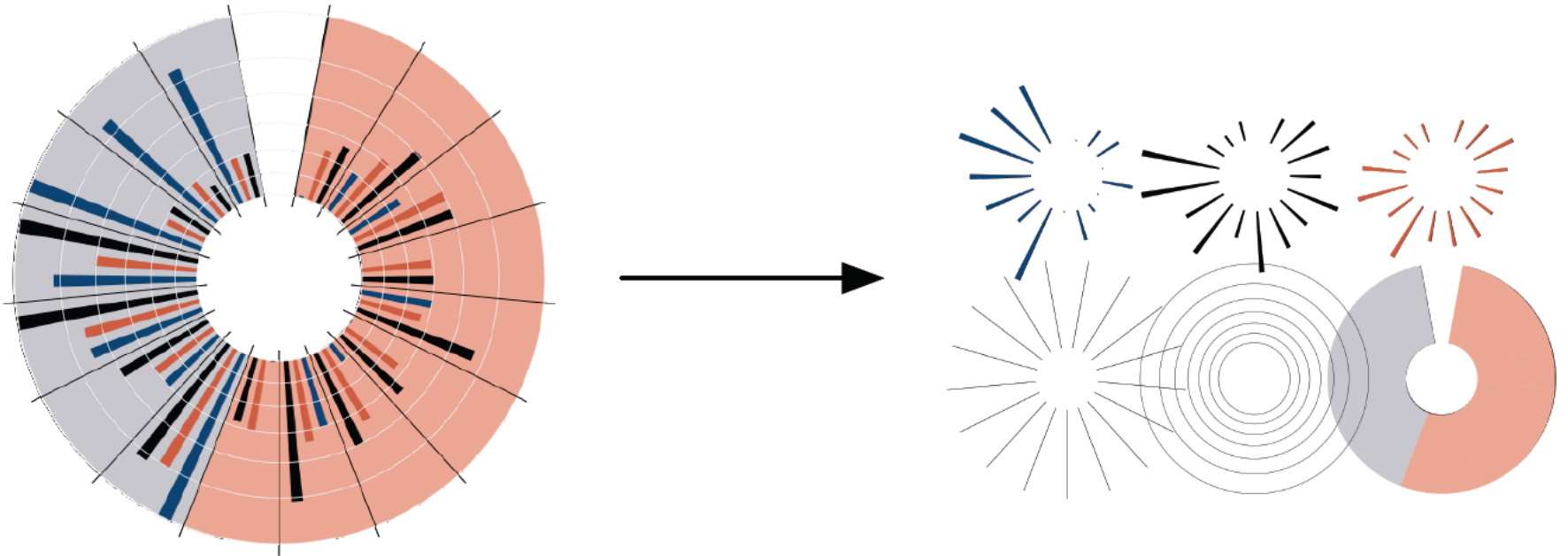
Latent Space Cartography

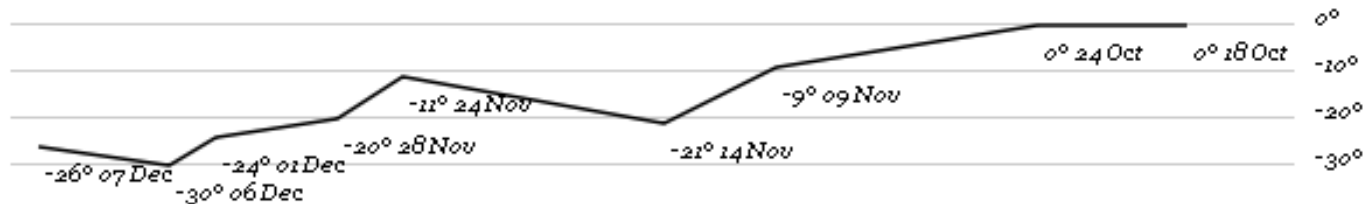
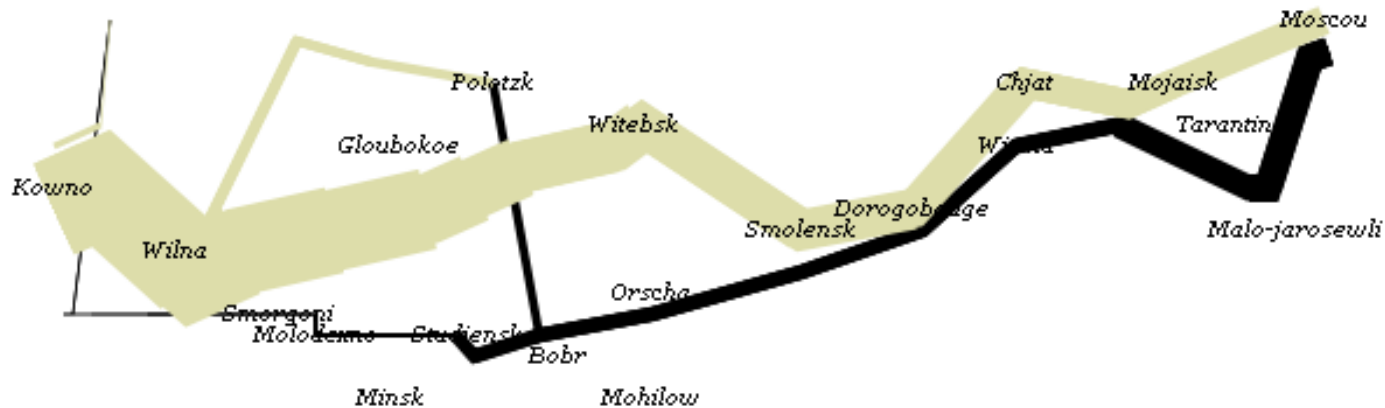
Visual Analysis of Vector Space Embeddings

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[panelIndex][0].dir]);

```

```

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.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)
  .font("italic 10px Georgia")
  .text(function(d) d+"°").textBaseline("center");

```

```

vis.add(pv.Line).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



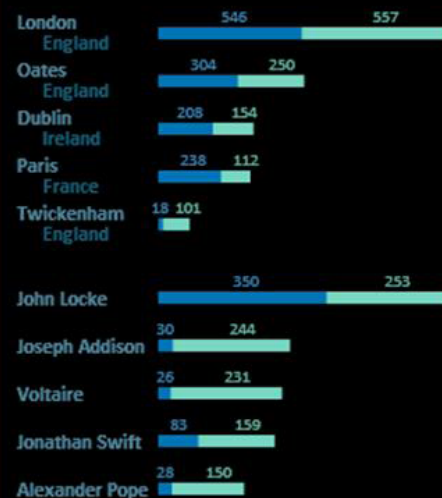
FILTER BY AUTHOR

Clear All

Damien Desormes
Daniel Cornabs
Daniel de Pury
Daniel Defoe
Daniel Malthus
Daniel Marc Antoine Chardon
Daniel Muller

TOP CITIES AND AUTHORS

Letters received Letters sent



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...

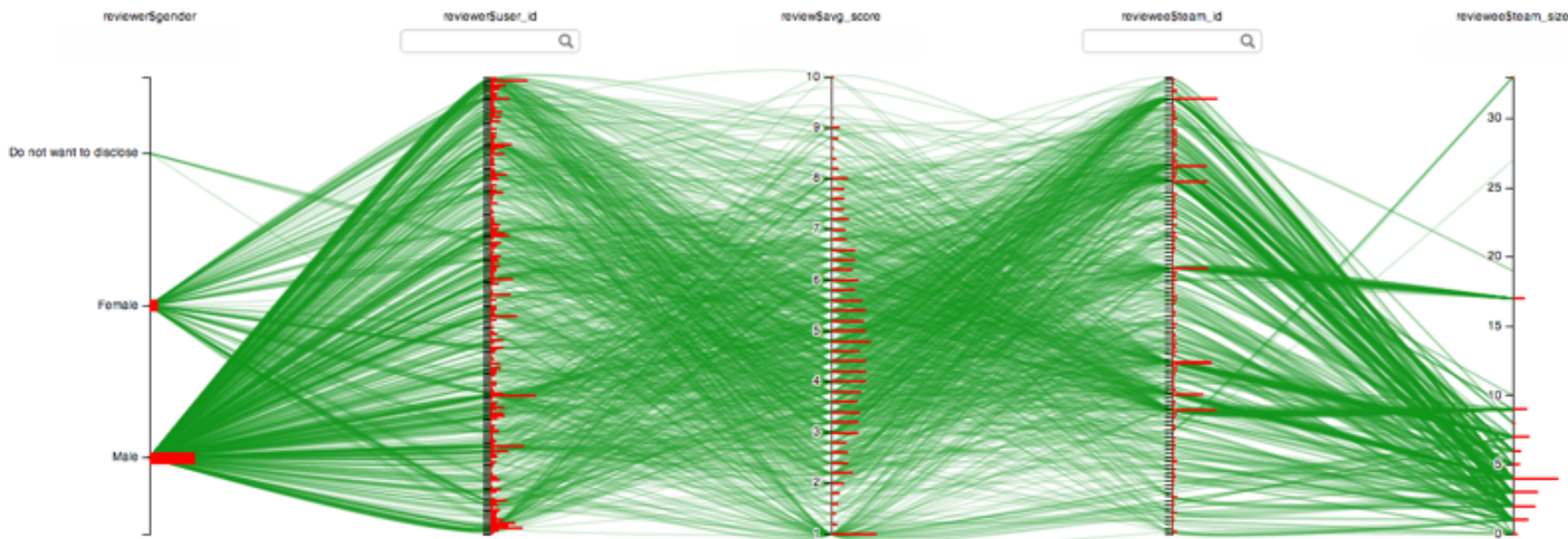
I could author multiple cut-lines for compound queries.

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?

REVIEWER gpa academic_major age_range location gender signin_count user_id
 REVIEW avg_score score1 score2 score3 score4 score5
 REVIEWEE team_id team_size



reviewer\$gpa	reviewer\$acad...	reviewer\$age...	reviewer\$locat...	reviewer\$gender	reviewer\$signi...	reviewer\$user_id	review\$avg_s...	review\$score1	review\$score2	review\$score3	review\$score4	review\$score5	reviewee\$tea...	reviewee\$tea...
NULL	NULL	NULL	NULL	NULL	21	37212	4	4	5	6	4	1	5069	4
NULL	NULL	NULL	NULL	NULL	21	37212	7.4	8	7	7	6	9	5470	17
Does not ...	Science	26-30	Netherlands	Male	124	2230	6.8	7	7	8	7	5	5693	7
Does not ...	Science	26-30	Netherlands	Male	124	2230	2.2	2	1	3	4	1	5836	4
Do not w...	Business	31-35	Spain	Male	80	2848	4.4	4	1	7	9	1	5069	4
3-3.49	Other	21-25	Spain	Female	75	2826	5	5	5	5	5	5	5215	4
3-3.49	Engineering	over 50	United St...	Male	110	19502	3.6	5	5	2	3	3	5215	4
3.5-4.00	Science	36-40	Greece	Male	125	27386	3.6	3	6	5	3	1	5250	3
3-3.49	Engineering	over 50	United St...	Male	110	19502	7	9	5	9	6	6	5693	7

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>

Three Peer Evaluations Due **Wed 5/15, 11:59pm**

<https://courses.cs.washington.edu/courses/cse512/24sp/a3-review.html>