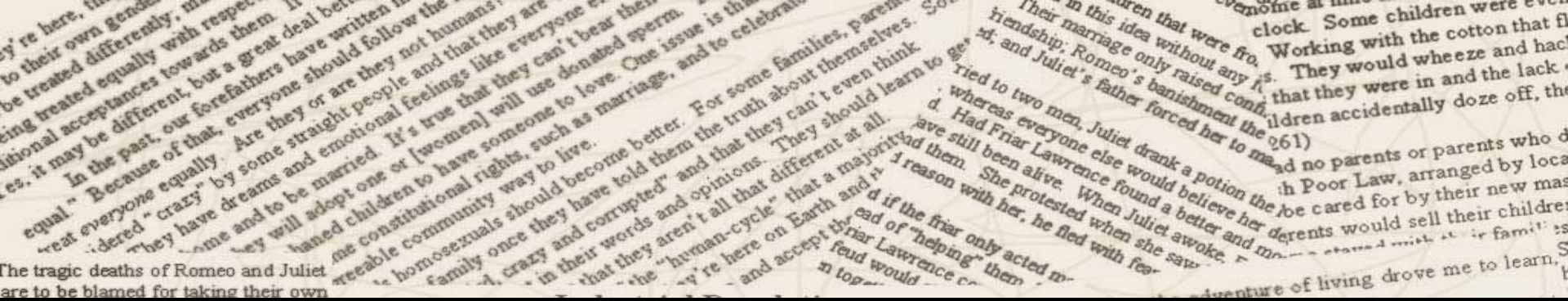


Visualizing the Hollywood Allegations

Trina Sarkar & Basel Al Sharaf

Background

Proposal

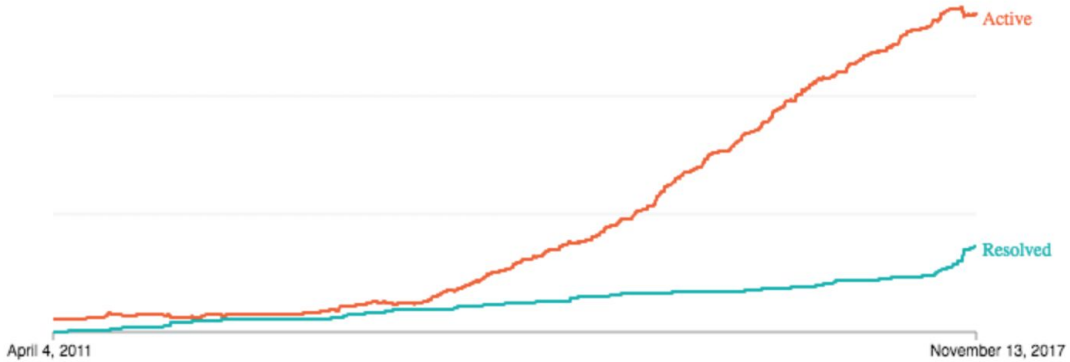
We hope to draw parallels between the timelines of individual successes and the known incidents of the allegations to raise the question of Hollywood's

complacency.

Relevant Prior Work

Title IX

Tracking Sexual Assault Investigations



In this era of enforcement, the government has conducted 450 investigations of colleges for possibly mishandling reports of sexual violence.

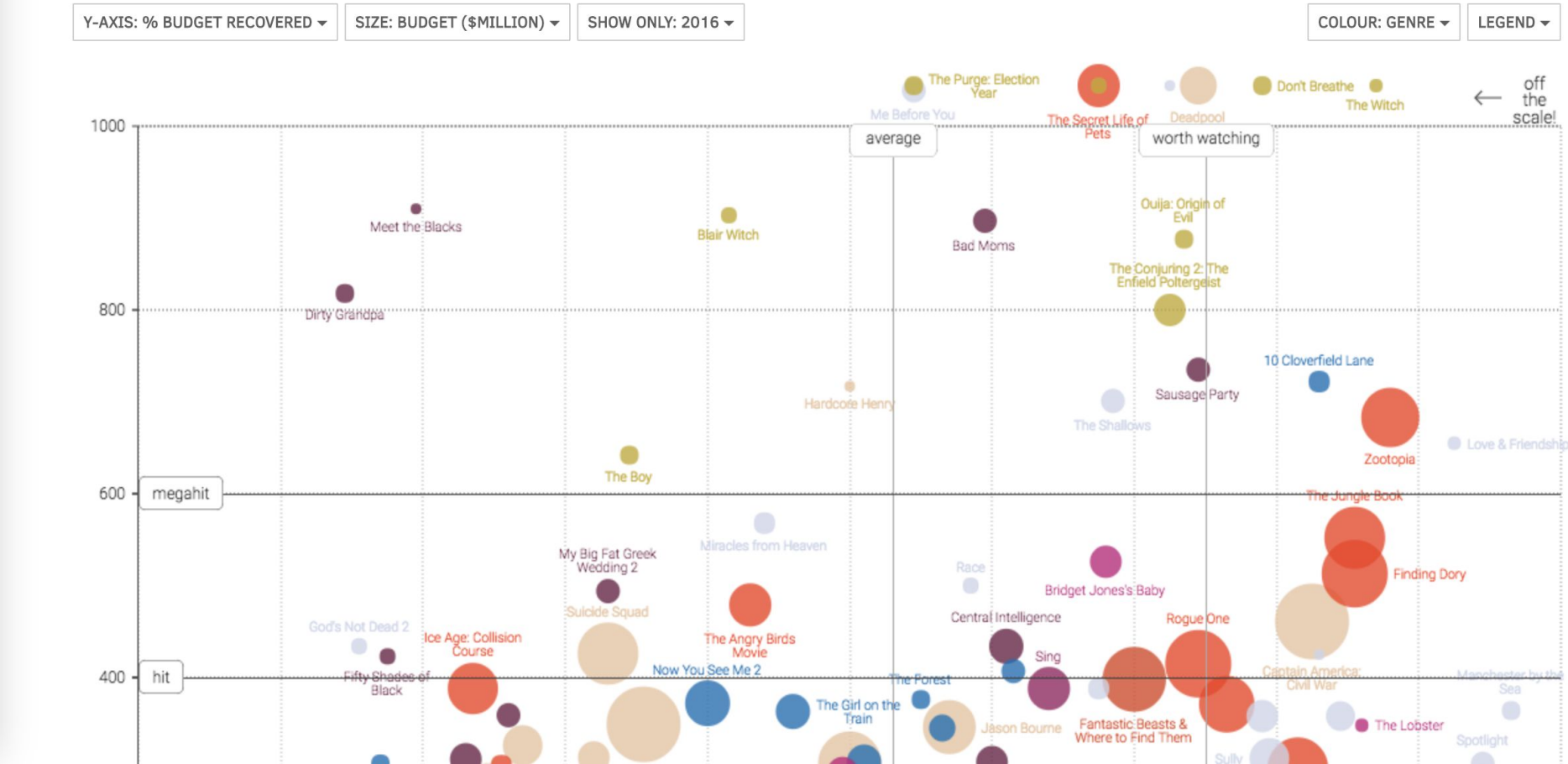
So far, 96 cases have been resolved and 354 remain open.

Seach by college or keyword... Go

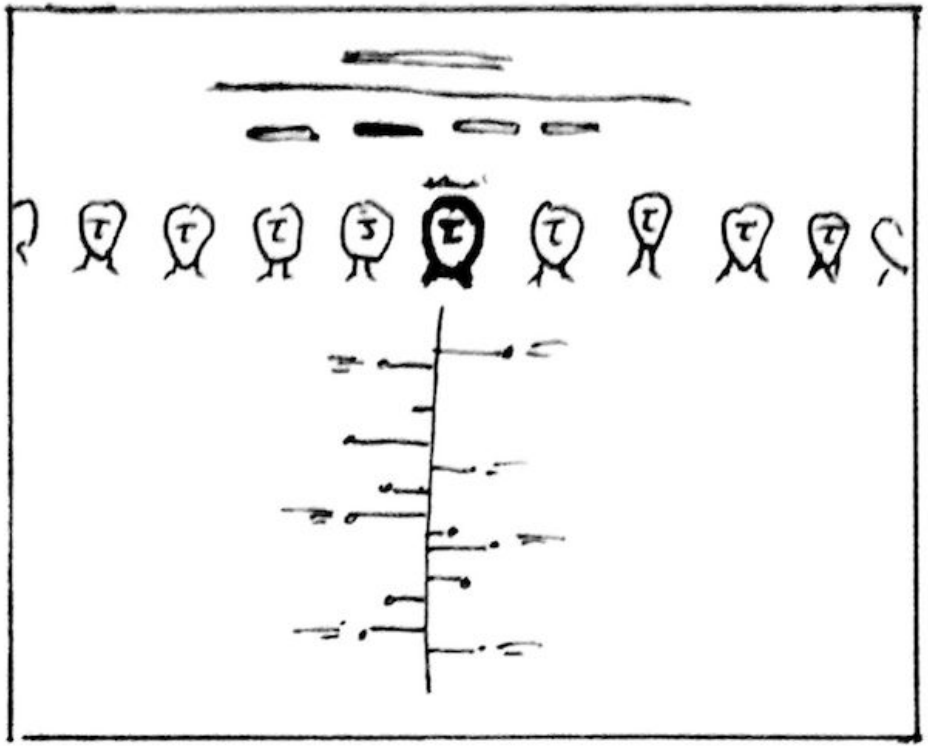
View all investigations

THE HOLLYWOOD IN$IDER

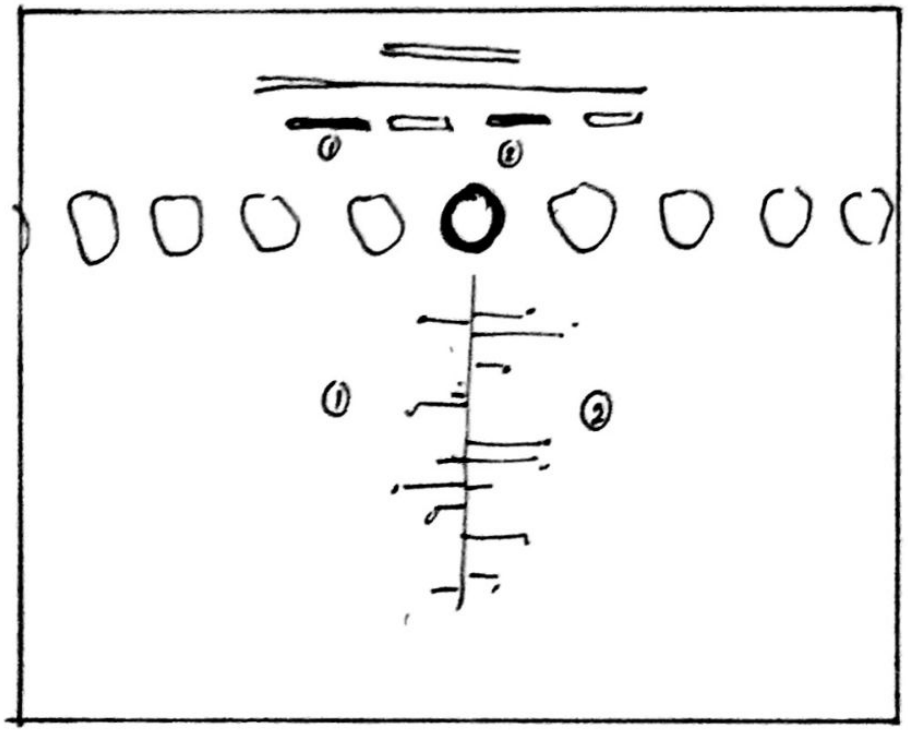
Visualization explorer for every major film 2008-2016



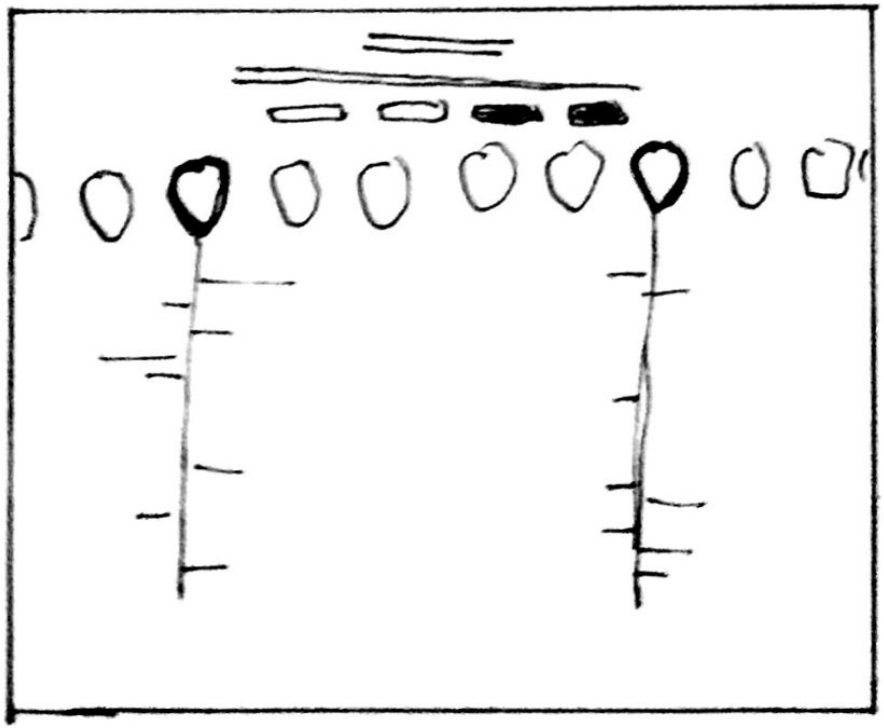
Project



Click on a celebrity's face to view their timeline



Selection using multiple filters



Selection with multiple individuals

Our Current Progress

Points for Feedback

Effectiveness of visualization designs

What else would be interesting to learn about from this data?

Sensitivity of topic

Limited data

Thank You

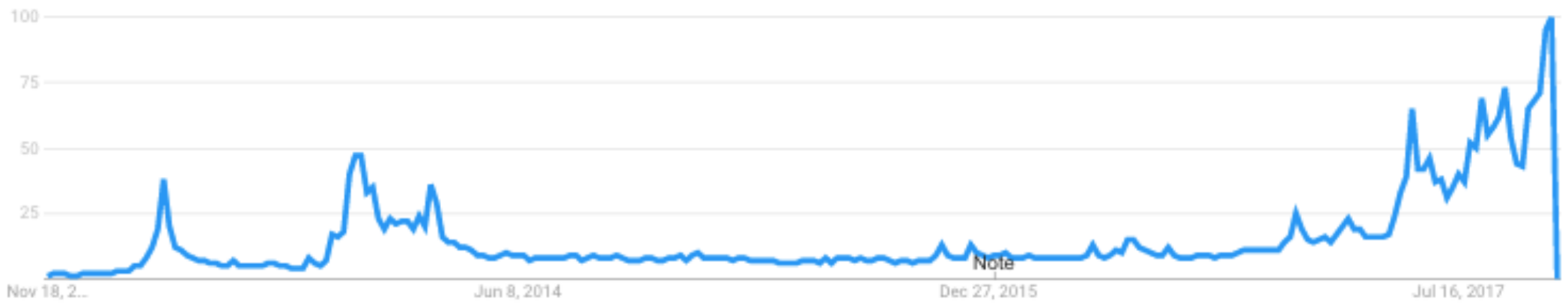
Bitcoin and Cryptocurrencies

Investigative Data Analysis

Danny Diekroeger, CS448B

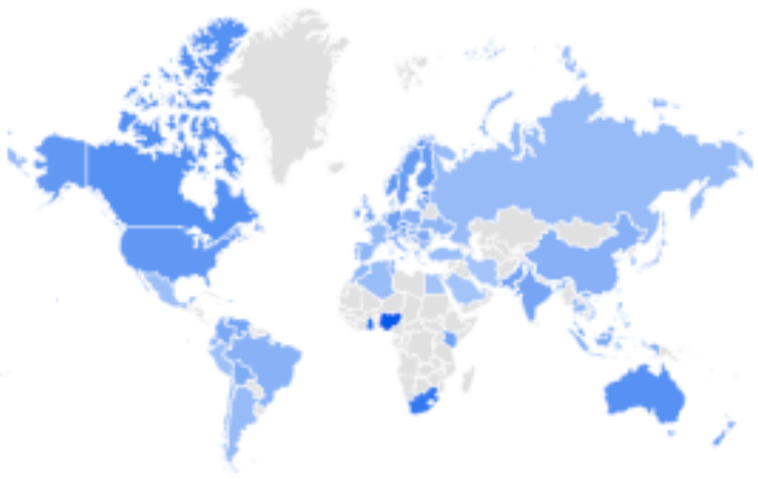
Google Trends: Bitcoin

Interest over time



Interest by region

Region

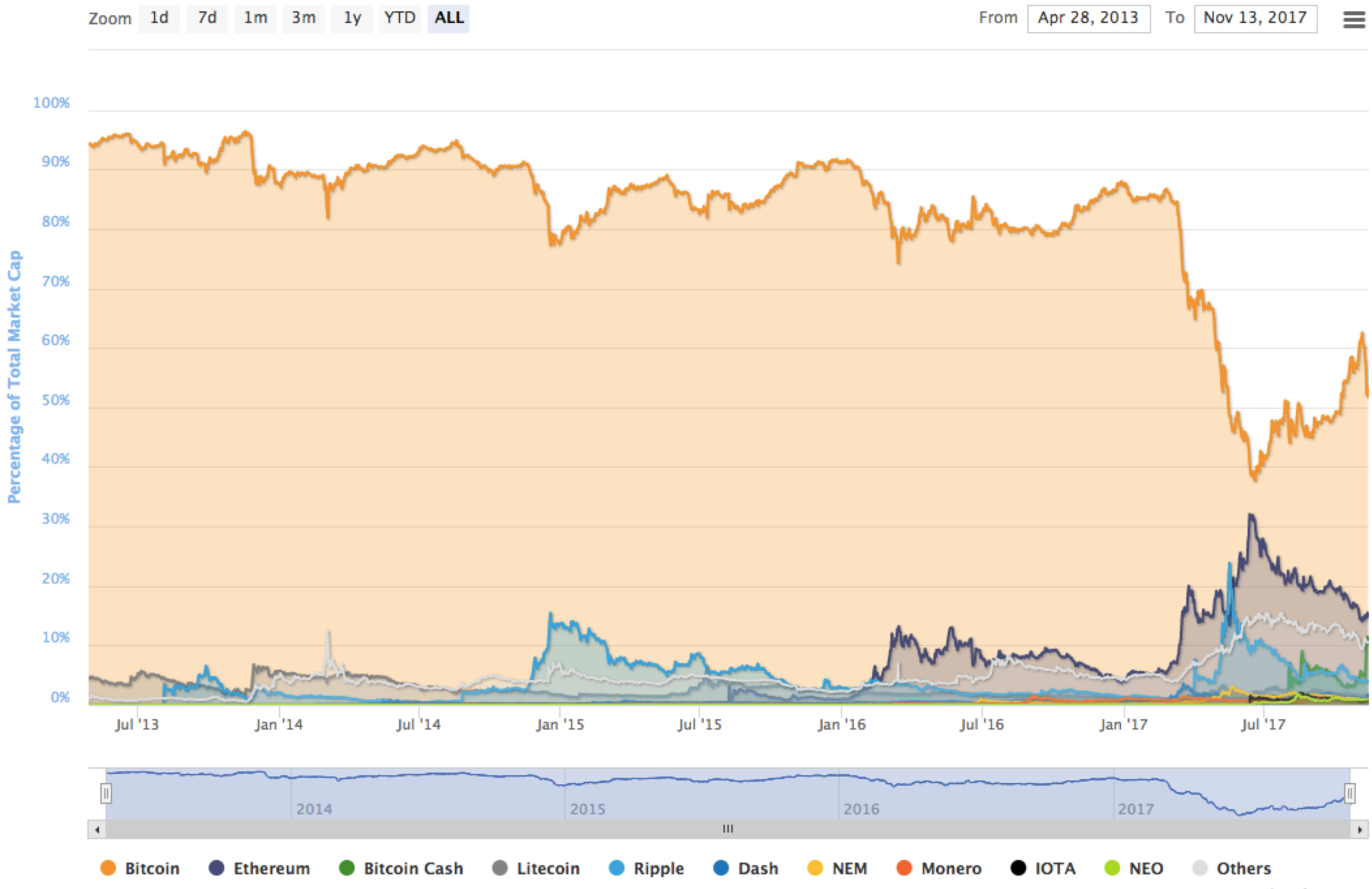


1	Nigeria	100
2	Ghana	82
3	South Africa	72
4	Slovenia	67
5	Estonia	61

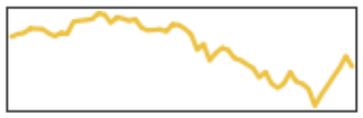
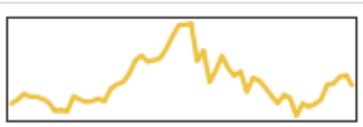
Bitcoin Price and Market Capitalization (2013-present)

Total Market Capitalization (All Cryptocurrencies, 2013-present)

Percentage of Total Market Capitalization (Dominance)



Data: CoinMarketCap.com

#	Name	Market Cap	Price	Volume (24h)	Circulating Supply	Change (24h)	Price Graph (7d)
1	Bitcoin	$107,317,807,106	$6434.77	$6,763,790,000	16,677,800 BTC	4.40%	
2	Ethereum	$29,991,447,347	$313.38	$1,220,520,000	95,704,658 ETH	-0.67%	
3	Bitcoin Cash	$23,689,112,638	$1410.04	$4,999,180,000	16,800,313 BCH	2.02%	
4	Ripple	$7,773,005,878	$0.201731	$145,955,000	38,531,538,922 XRP *	-0.17%	
5	Dash	$3,276,606,095	$426.29	$433,957,000	7,686,385 DASH	-0.30%	
6	Litecoin	$3,266,687,564	$60.70	$282,486,000	53,813,382 LTC	1.48%	
7	Monero	$1,884,745,240	$122.82	$126,474,000	15,345,839 XMR	-2.44%	
8	NEO	$1,824,186,000	$28.06	$44,945,600	65,000,000 NEO *	2.05%	
9	NEM	$1,678,617,000	$0.186513	$8,597,310	8,999,999,999 XEM *	2.04%	
10	IOTA	$1,664,229,859	$0.598745	$37,671,900	2,779,530,283 MIOTA *	2.45%	
11	Ethereum Classic	$1,523,053,194	$15.64	$389,522,000	97,407,453 ETC	-6.97%	

Relevant Previous Work

High-Frequency Jump Analysis of the Bitcoin Market

Olivier Scaillet* Adrien Treccani† Christopher Trevisan‡§

June 8, 2017

first draft: April 2017

- Tried predicting price jumps
- Old data
- Could use some of their novel metrics, like “Whale Index”

Bitcoin ecology: Quantifying and modelling the long-term dynamics of the cryptocurrency market

Abeer ElBahrawy[a], Laura Alessandretti[a], Anne Kandler[b], Romualdo Pastor-Satorras[c], and Andrea Baronchelli[a,d,*]

- Studies market from ecological lens
- Each cryptocurrency as own species
- Novel approach to studying the market

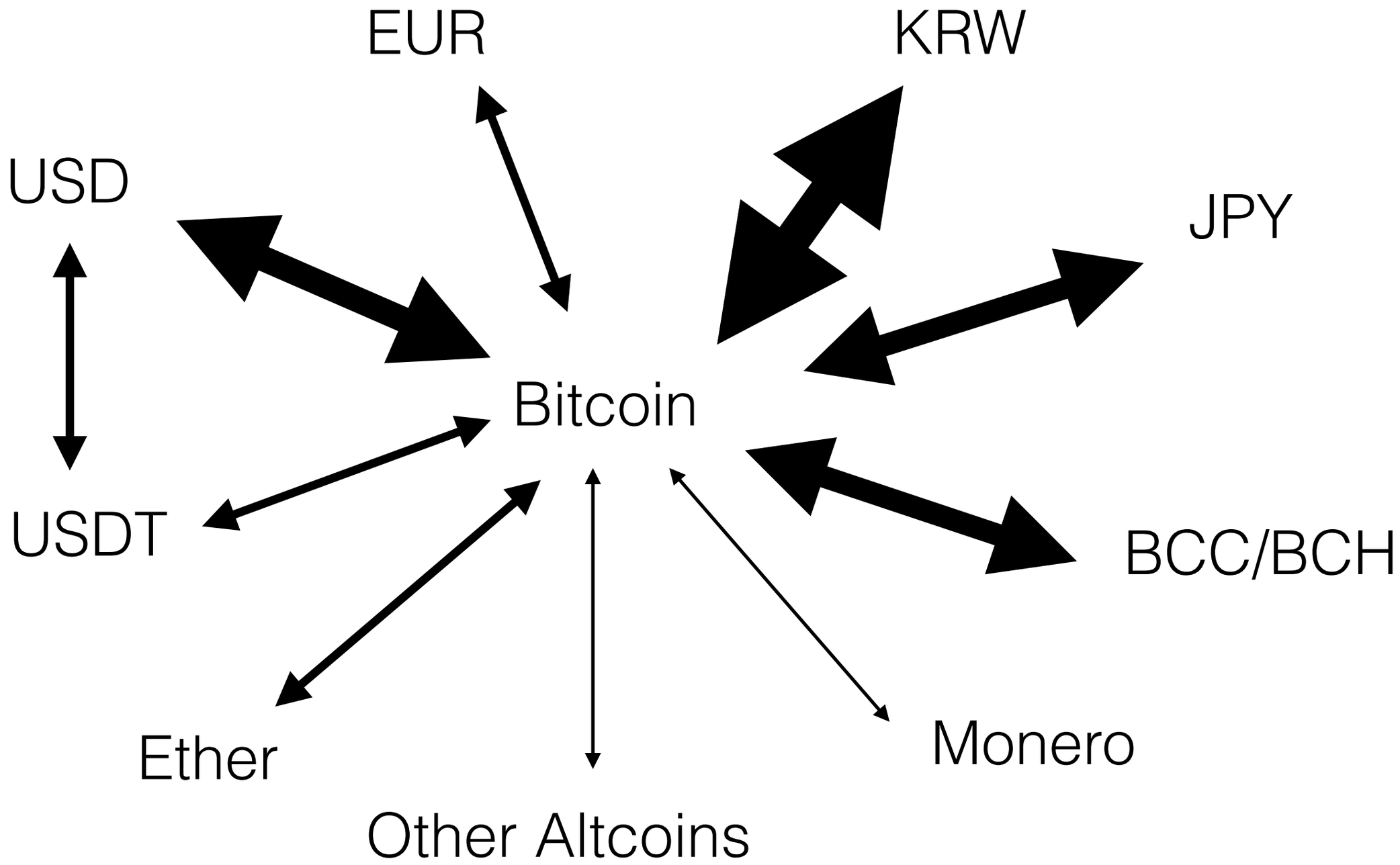
My Project

Focus: Dynamics of Trading Pairs

- Bitcoin as vehicle for international currency exchange
- KYC compliance causes bottleneck for trading fiat-BTC
- Must first buy Bitcoin (or ETH), then use that to buy Altcoins

First Step: Develop Visualization Tool for Trading Pairs and Flow of Value

Prototype: Visualization for Trading Pairs and Flow of Value



Seeking: Historical Trading Pairs Data

Bitcoin Markets

#	Source	Pair	Volume (24h)	Price	Volume (%)
1	Bitfinex	BTC/USD	$754,154,000	$6266.30	11.15%
2	Bithumb	BTC/KRW	$533,803,000	$6498.12	7.89%
3	Bittrex	BCC/BTC	$505,980,000	$6569.14	7.48%
4	Bitfinex	BCH/BTC	$403,621,000	$6549.29	5.97%
5	GDAX	BTC/USD	$328,305,000	$6401.43	4.85%
6	Poloniex	BCH/BTC	$316,045,000	$6548.30	4.67%
7	bitFlyer	BTC/JPY	$308,048,000	$6435.92	4.55%
8	Bitstamp	BTC/USD	$191,152,000	$6393.54	2.83%
9	HitBTC	BCH/BTC	$187,283,000	$6585.46	2.77%
10	Coinone	BTC/KRW	$145,635,000	$6525.82	2.15%
11	Binance	BCC/BTC	$123,122,000	$6303.65	1.82%
12	Poloniex	BTC/USDT	$121,417,000	$6285.78	1.79%
13	OKEx	BCC/BTC	$120,937,000	$6612.11	1.79%
14	Gemini	BTC/USD	$109,765,000	$6353.45	1.62%
15	Poloniex	ETH/BTC	$107,534,000	$6270.34	1.59%
16	Kraken	BTC/EUR	$92,499,200	$6363.98	1.37%
17	Bittrex	BTC/USDT	$91,107,200	$6306.69	1.35%

Help and suggestions are appreciated!

Cartograms vs. Choropleth Maps

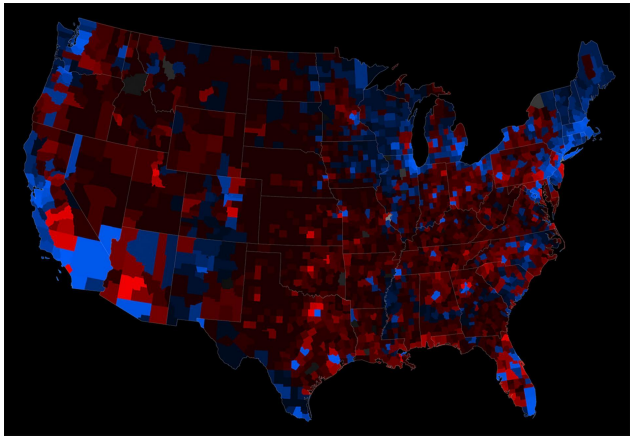
A framework for deciding which to use

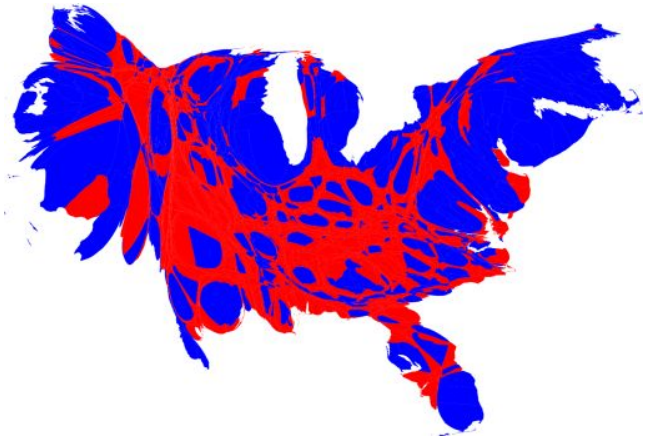
Juliette Love
Nov. 15, 2017

The Problem

When visualizing a dataset, which is a better fit?

- Which properties of the data are relevant in this decision?
- How can we create definitive guidelines?
- How do we define *better*?





Relevant Work

Cleveland & McGill (from class)

- Which marks are perceptually effective
- Includes color and area → area in maps is perceptually different

Dunn 1988, Rittschof & Kulhavy 1998

- Studies choropleths, cartograms compared to other types of maps
- Goal of seeing which is more effective
- Dependent on chosen dataset

Sun & Lee 2010

- Pros and cons of contiguous and non-contiguous cartograms
- Show which cartogram type is best
- Still dependent on dataset type

Relevant Work

Cleveland & McGill (from class)

- Which marks are perceptually effective
- Includes color and area → area in maps is perceptually different

Dunn 1988, Rittschof & Kulhavy 1998

- Studies choropleths, cartograms compared to other types of maps
- Goal of seeing which is more effective
- **Dependent on chosen dataset**

Sun & Lee 2010

- Pros and cons of contiguous and non-contiguous cartograms
- Show which cartogram type is best
- Still dependent on dataset type

Relevant Work

Cleveland & McGill (from class)

- Which marks are perceptually effective
- Includes color and area → area in maps is perceptually different

Dunn 1988, Rittschof & Kulhavy 1998

- Studies choropleths, cartograms compared to other types of maps
- Goal of seeing which is more effective
- Dependent on chosen dataset

Sun & Lee 2010

- Pros and cons of contiguous and non-contiguous cartograms
- **Show which cartogram type is best**
- Still dependent on dataset type

Progress

- Discussion of successful and unsuccessful cartograms
- Common problems with unsuccessful cartograms
- Which features of the data cause these problems?

Progress

- **Discussion of successful and unsuccessful cartograms**
- Common problems with unsuccessful cartograms
- Which features of the data cause these problems?

Successful	**Unsuccessful**
Geographically-based metrics	Non-geographically based metrics
Comparable units of area	Large differences in areas
Reasonable(?) data variation	Huge data variation
Visualizing two metrics	One metric with two normalizations

Feedback

- **How to define success?**
  Accuracy? Proportional accuracy? Recall?
  Different past studies have used different metrics

- **Are there any other types of maps that would make sense to include?**
  Dorling (non-contiguous) cartograms, Gastner-Newman (contiguous) cartograms, choropleth maps, dot maps, proportional symbol maps

- Tips for user studies?

- General suggestions for directions/improvement?

What’s your guess?

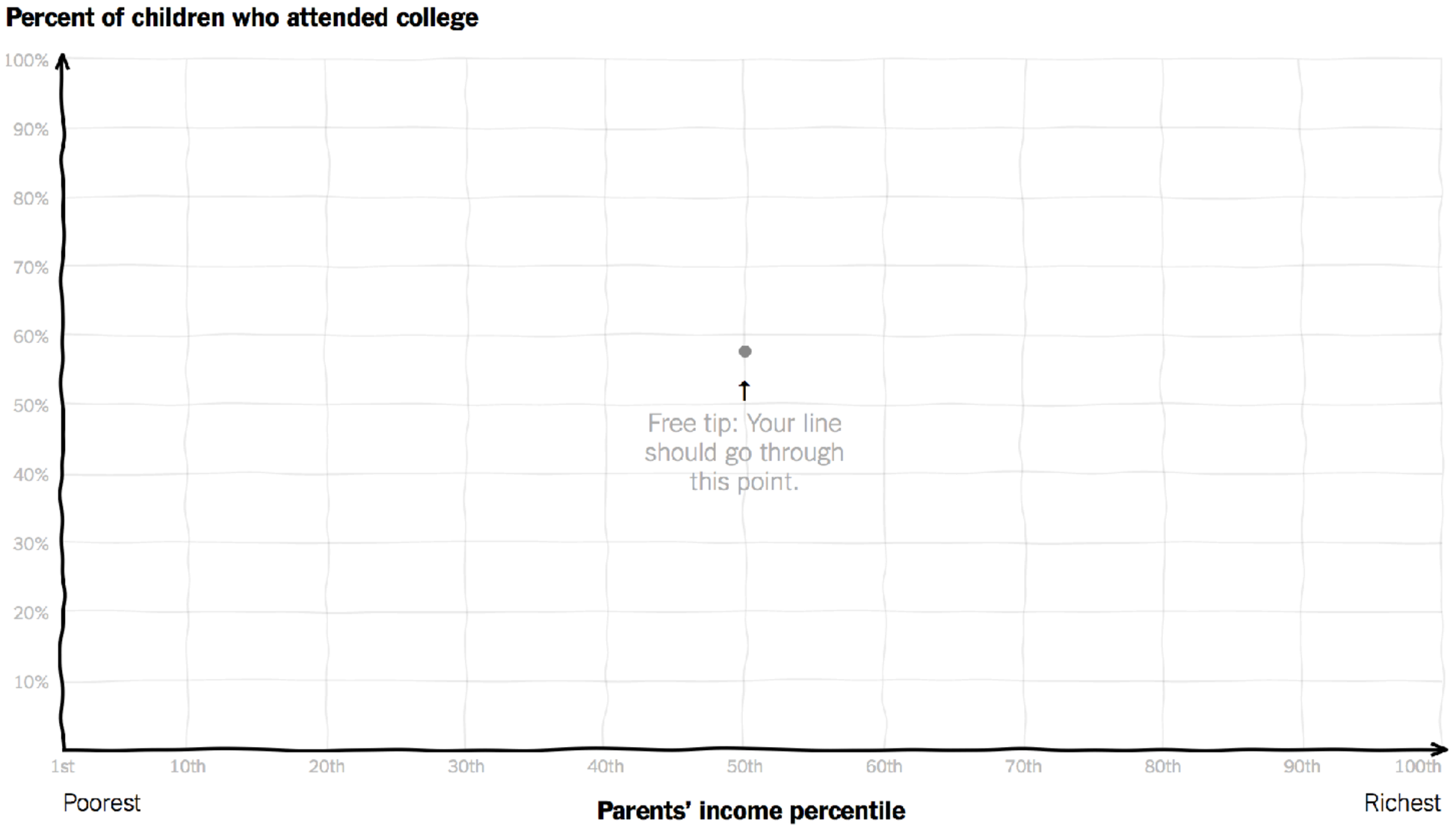
Using prediction and feedback to help people remember and trust data.

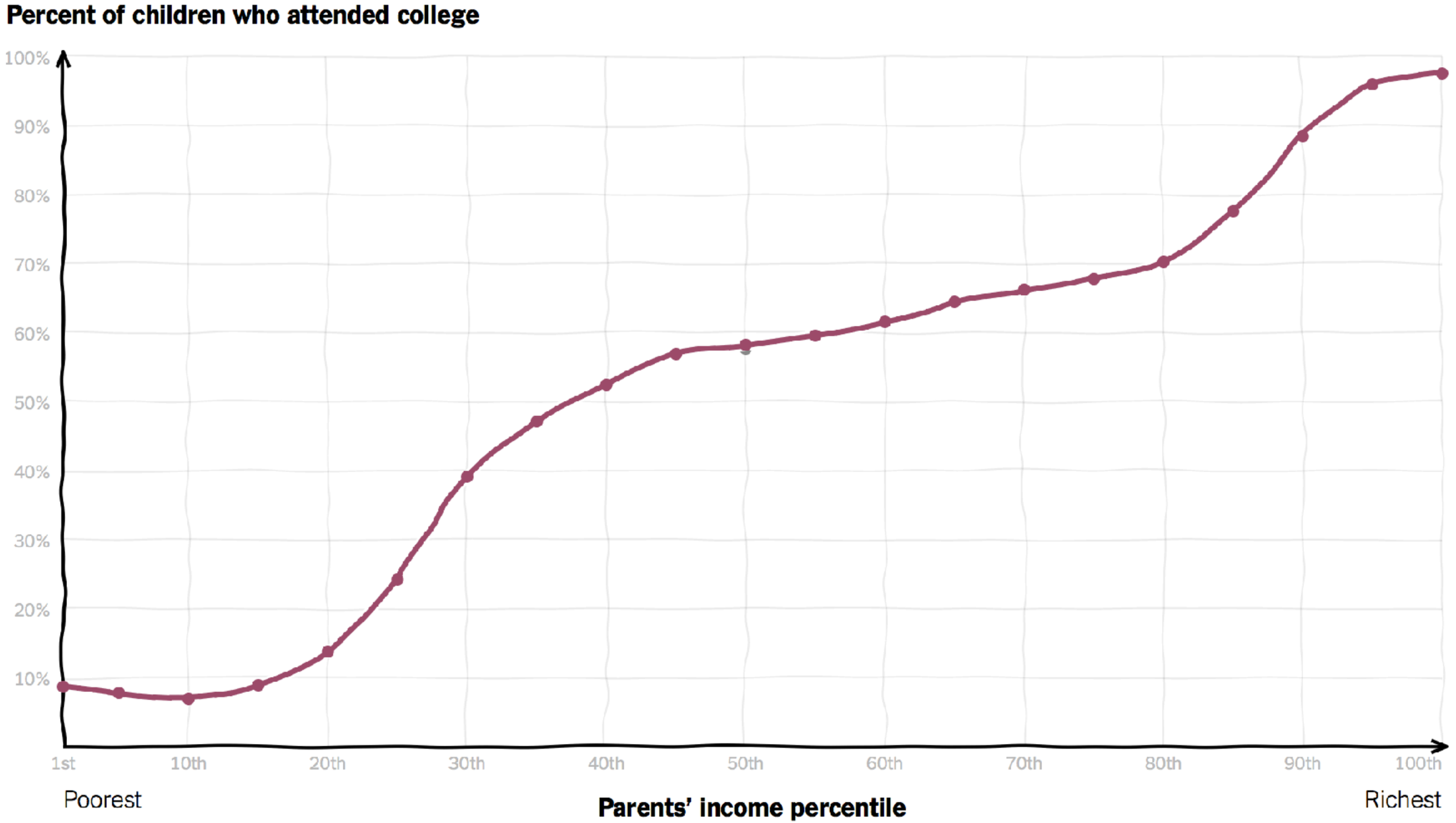
Sophia Pink

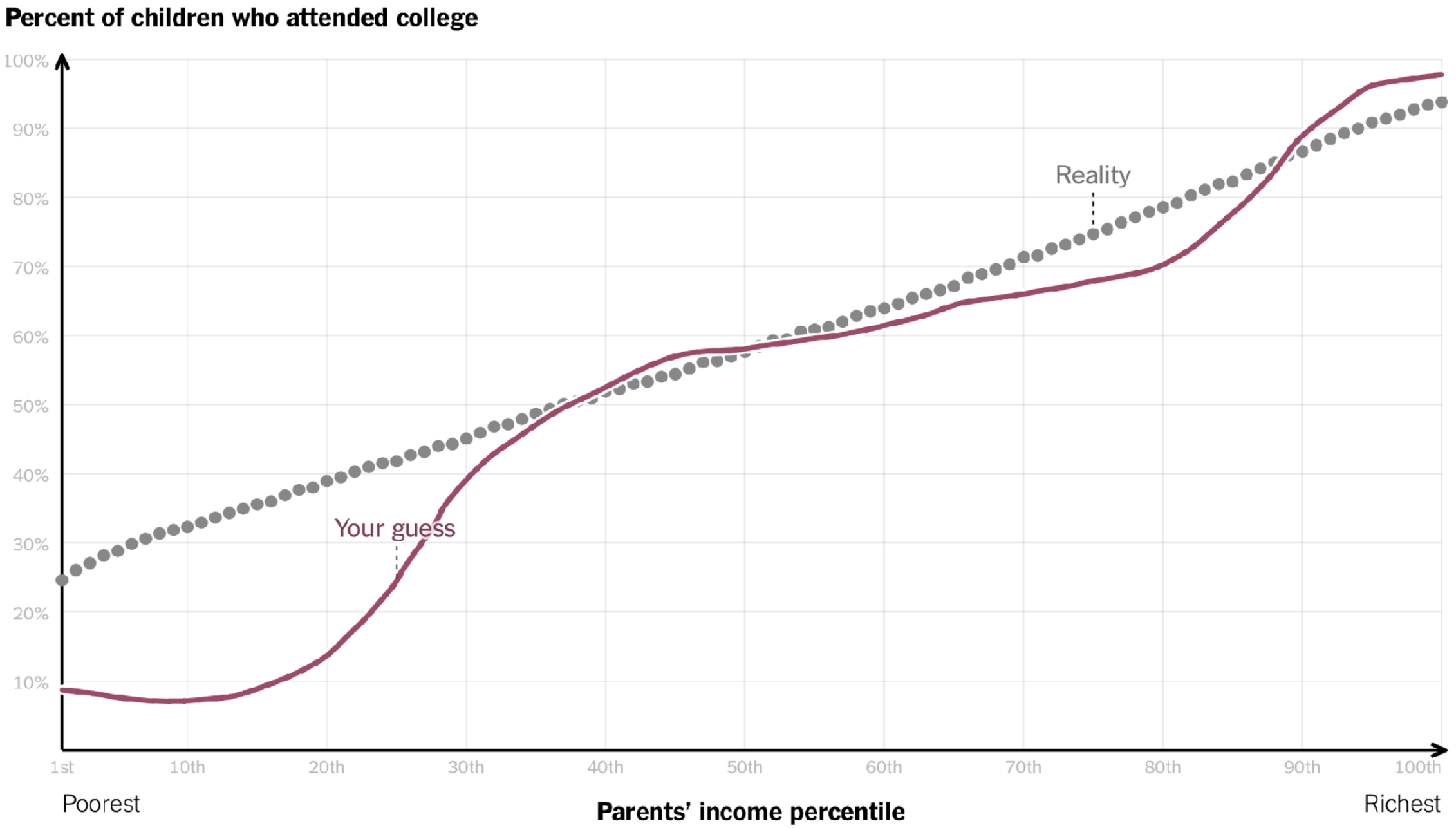
“I would’ve guessed that.”

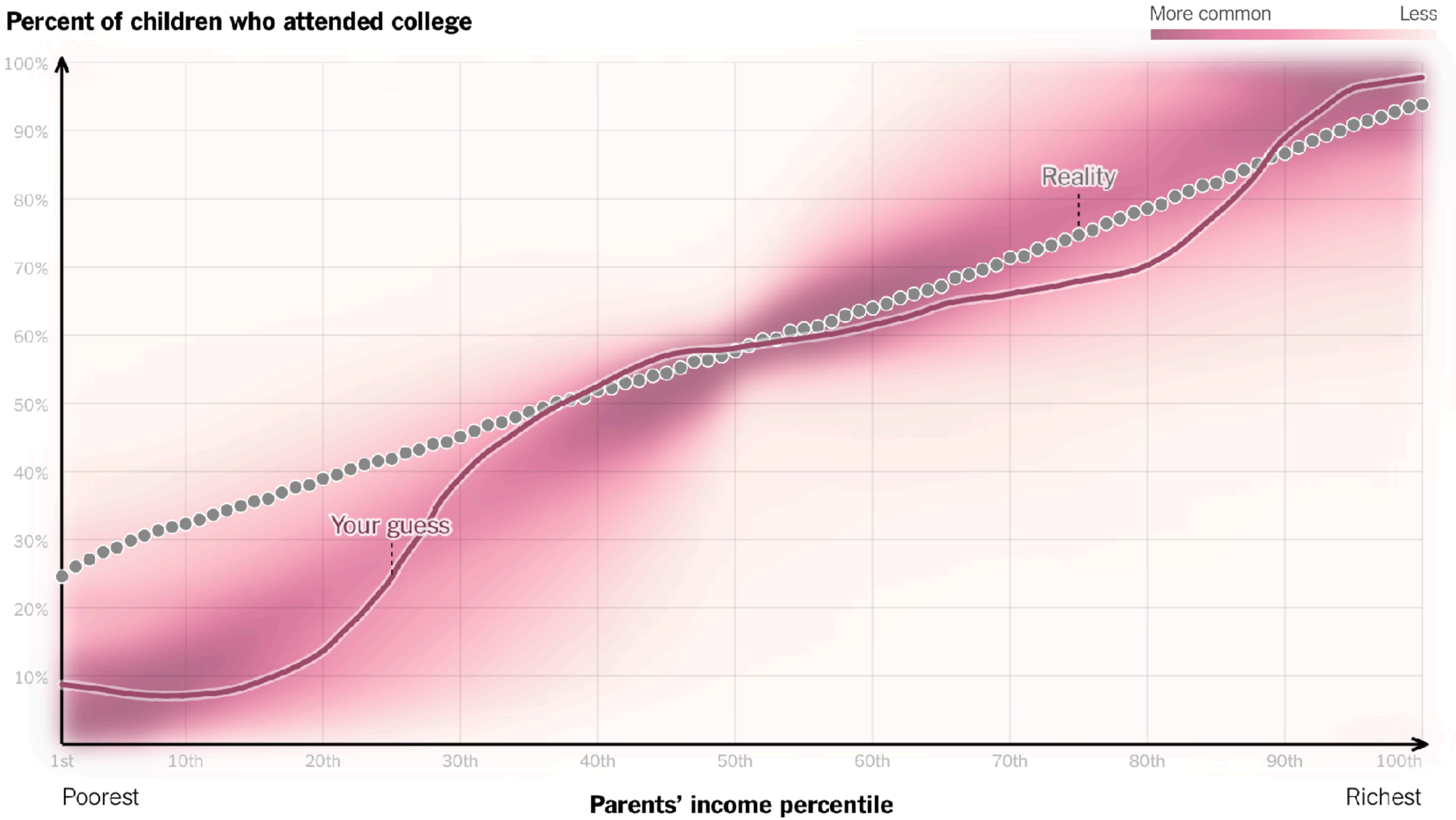
Hindsight bias

Draw your line on the chart below



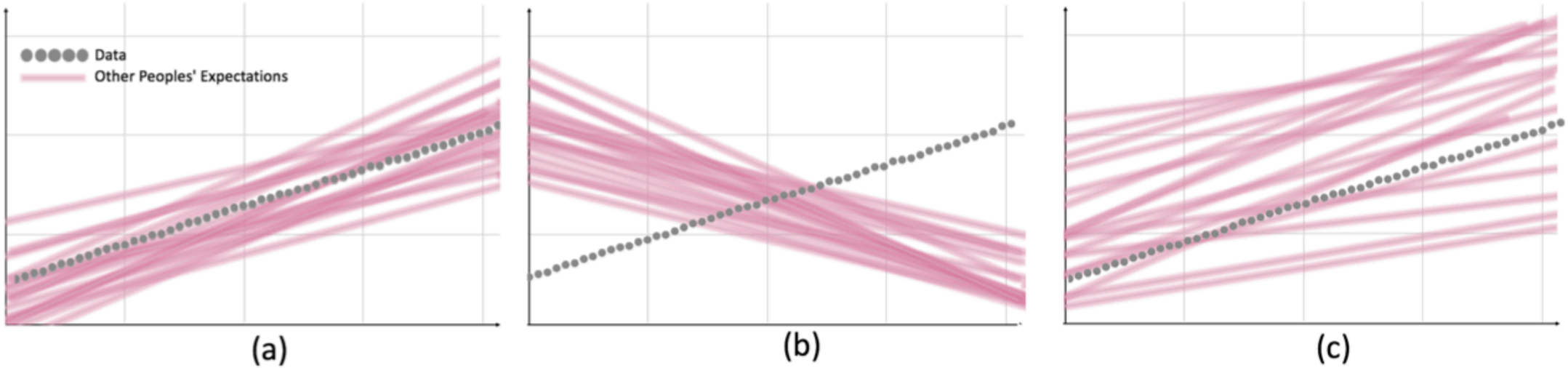

Percent of children who attended college
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
1st
10th
20th
30th
40th
50th
60th
70th
80th
90th
100th
Poorest
Parents' income percentile
Richest


Percent of children who attended college
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
Reality
Your guess
1st
10th
20th
30th
40th
50th
60th
70th
80th
90th
100th
Poorest
Parents' income percentile
Richest


Percent of children who attended college
More common
Less
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
Reality
Your guess
1st
10th
20th
30th
40th
50th
60th
70th
80th
90th
100th
Poorest
Parents' income percentile
Richest

Data Through Others' Eyes: The Impact of Visualizing Others' Expectations on Visualization Interpretation

Yea-Seul Kim, Katharina Reinecke and Jessica Hullman



Results

High, accurate social consensus:

More accurate recollection of data

Prediction and social consensus NOT aligned with data:

Less trust in actual results

Confirmation bias

How can we use prediction and feedback to design graphics that encourage people to trust data that may be misaligned with their and others’ pre-existing views?

Progress

Exploring **current solutions**

Mock-ups of other ideas

Testing mock-ups with users

Solution ideas

Go in blind: do not show which data is from which category.

Quiz: ask people to answer questions, not draw a line.

Reframe perspective: Emphasize how many people have changed their mind, not how many people got it wrong.

Selective feedback: choose how much feedback to show based on results.

Questions

Do you know of any related visualization strategies that I should look at?

Do you have suggestions for testing out a lot of different visualization ideas?

Creating a Criminal: Visualizing Juvenile Justice Data

James Lyons

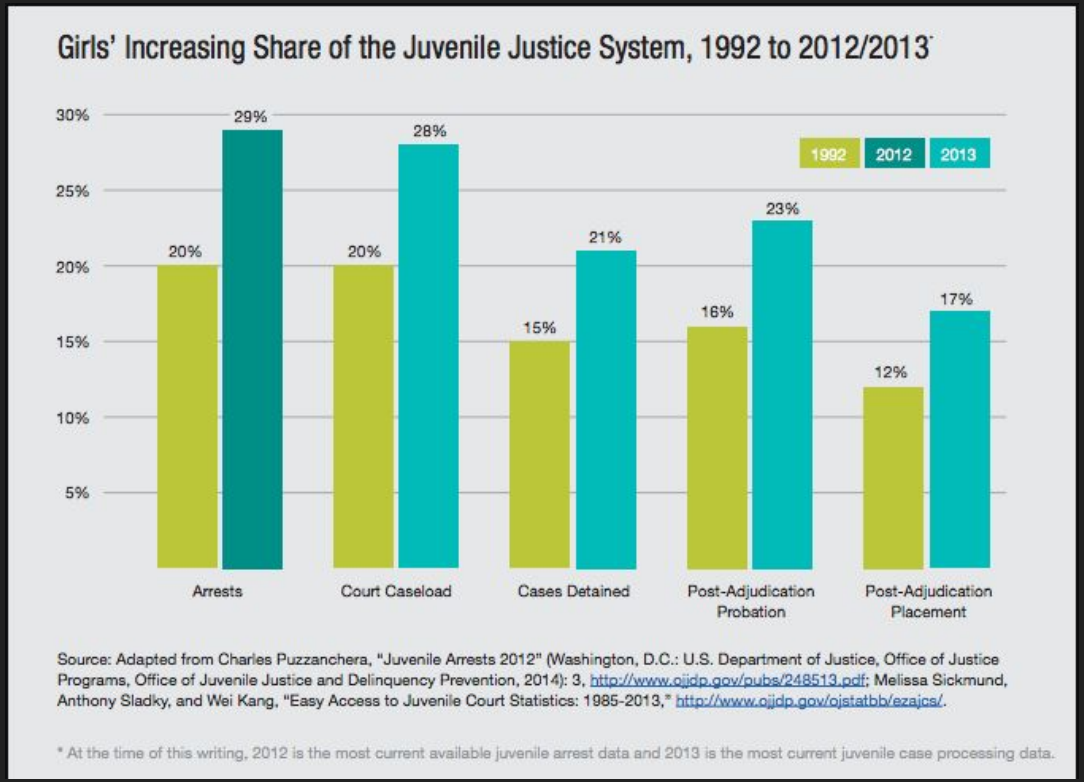
Description

- Similar to “Visualize developmental learning data” suggestion
- **Problem:** Individual risk factors increase the chance of juvenile delinquency
- **Motivation:** Identifying trends in risk factors might provide (relatively) simple solutions to reducing the risk of juvenile delinquency/recidivism. Making the data accessible allows more POV for solving that problem
- (General) -> (Specific)

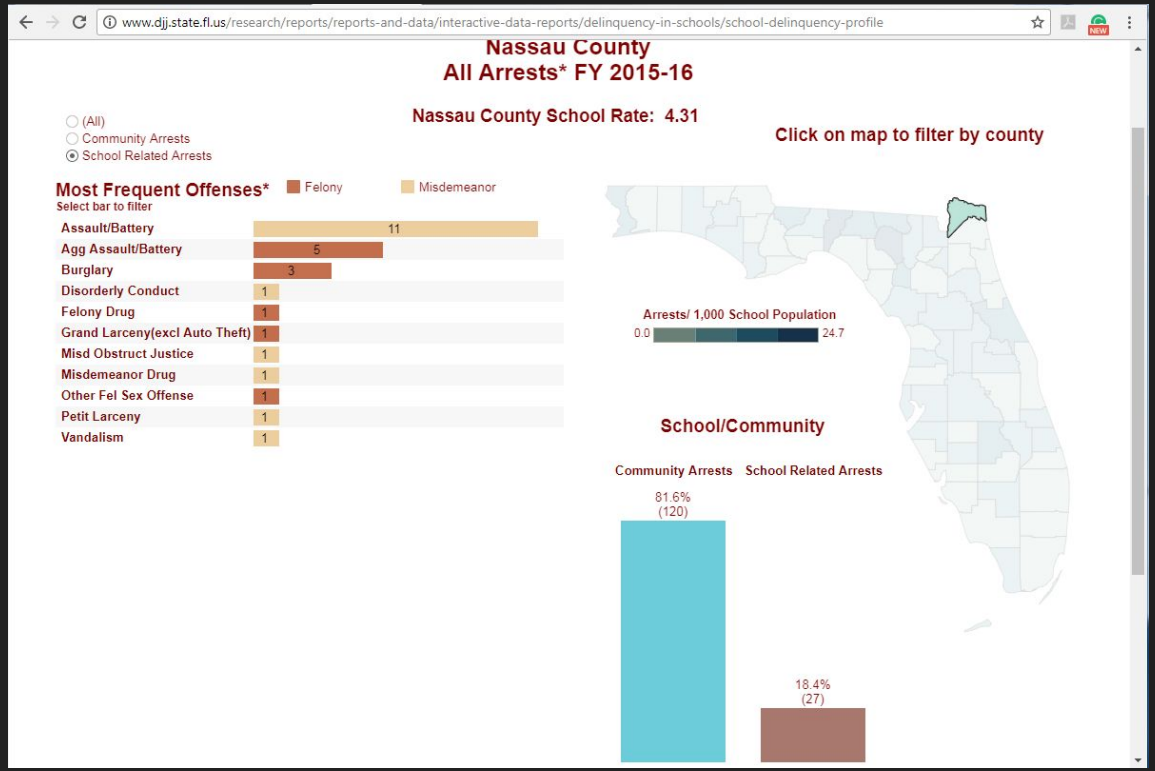
Comparison to Prior Work

- Interactivity (Dynamic vs Static)
- Focus (National, State, International)
- Accessibility

Example A (Interactivity)



Example B (Focus)



Current Progress

-Compendium of National Juvenile Justice Datasets

-R Shiny

-Cartogram/Bar chart/Line Chart/Scatter plot

-Filterable by student victimization at school, substance use, emotional characteristics

Questions

-Value and interest in a visualization like this

-Formally test for accessibility or focus more on searching for trends in the data using my completed data visualization

CS448B Final Project

Project Progress

The Billionaire Dataset

Jinglin Shan & Kristy Duong

Description of problem

Dataset: Billionaire Characteristics

Problem/Motivation: By understanding the sources and centers of wealth, we can perhaps find trends in wealth inequality and the causes of that inequality. Are certain geographic locations or businesses simply more profitable or is there something more to the story? How does wealth source pattern change through time?

Prior work

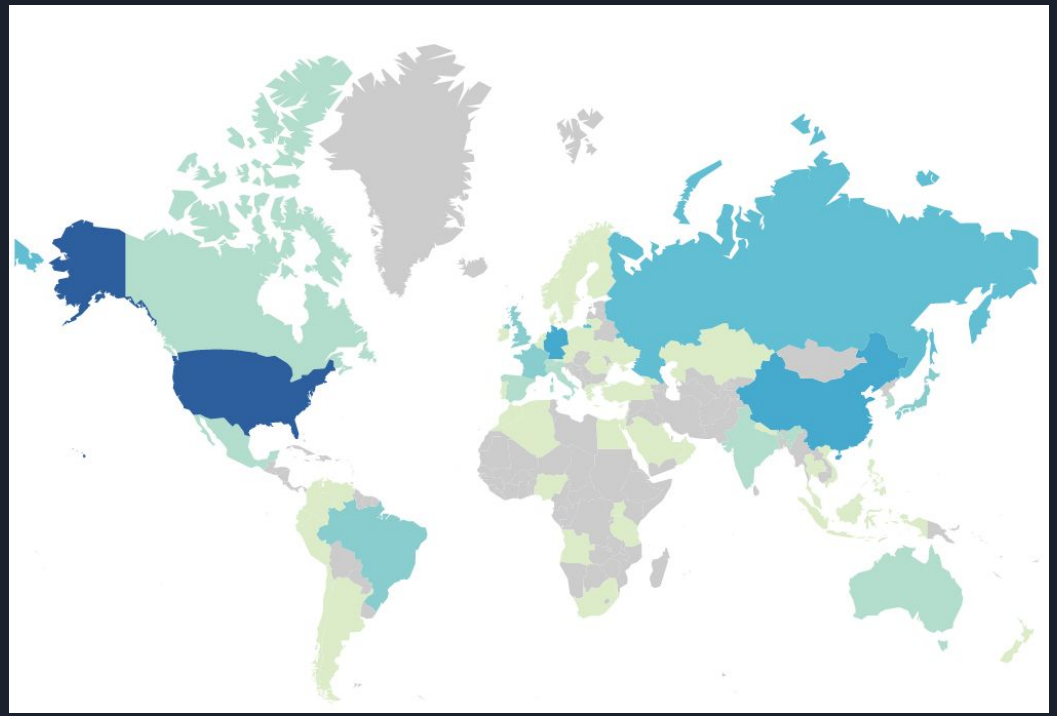
Most Of The World's Billionaires Made Their Money In These 5 Industries (Business Insider)
How Billionaires Get Rich: Which Industries Make The Most Mega-Fortunes (Forbes)

TOP 5 PRIMARY INDUSTRIES	
FINANCE, BANKING & INVESTMENT	19.3%
INDUSTRIAL CONGLOMERATES	12.1%
REAL ESTATE	7.1%
NON-PROFIT & SOCIAL ORGANISATIONS	5.0%
TEXTILES, APPAREL & LUXURY GOODS	4.9%

Difference

- Find patterns that depends on time
- Analyze data in more detailed category classification
- Explore data by region

Current Visualization



Click to demo

Current Progress

- Got familiar with dataset.
- Initially created a website
- Realized that implementing a data exploration tool is not the right goal to gear toward
- Use Tableau to quickly find the patterns of our interest from the dataset
- Redesign interactive visualization to better communicate our findings to the readers when our conclusion becomes clear

Questions

- How might we explore inequality with such a dataset? Is analyzing geographic location, business, and change over time sufficient or are there other avenues we should explore?
- What other questions would be interesting to pursue with this dataset?
- What might be a better way to visualize the data that provides clearer direction given that there are many variables included in this dataset?

Exploring the Random-Walk: An Interactive Investment Game to Teach People Not to Time the Market

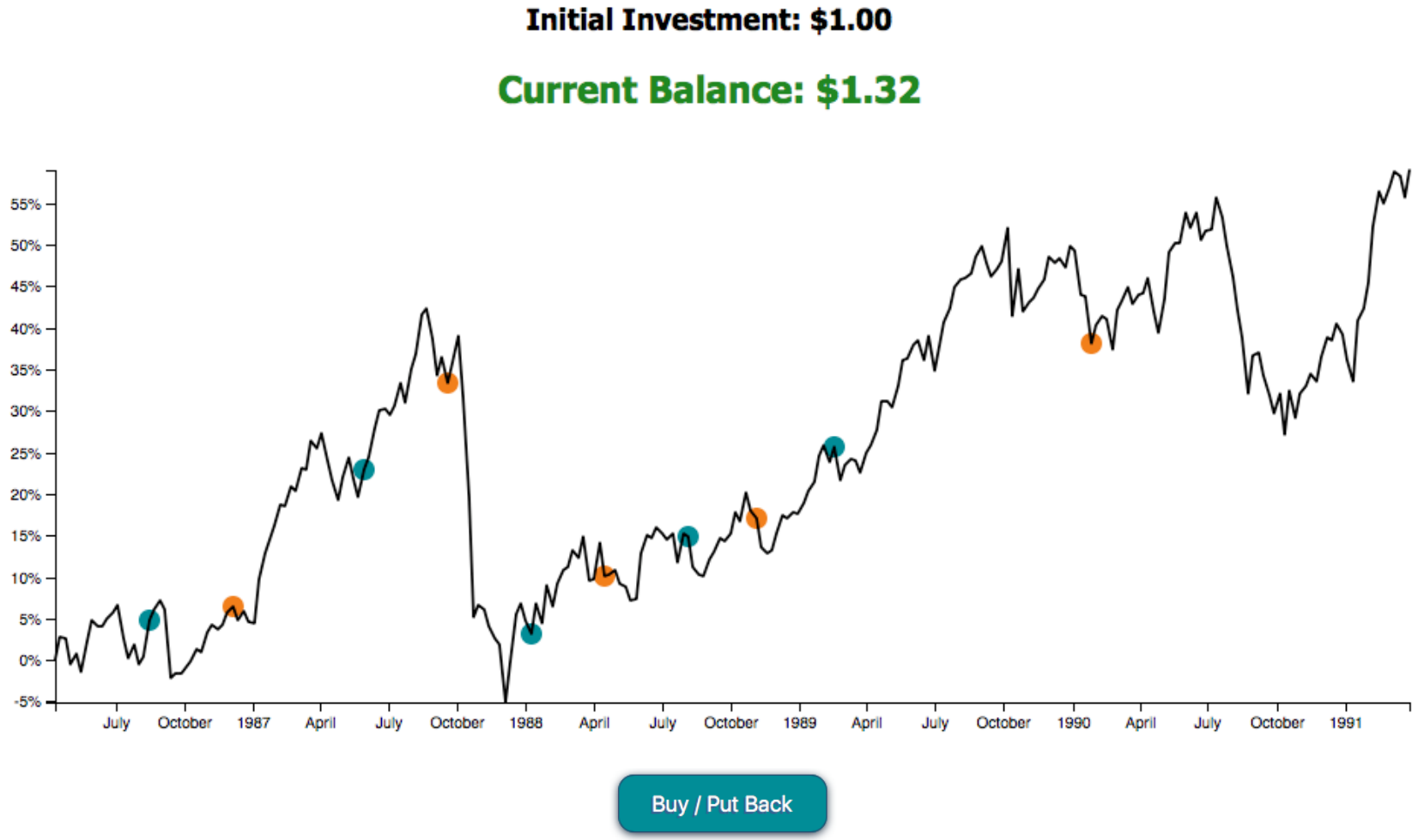
Josh Morris

CS 448B

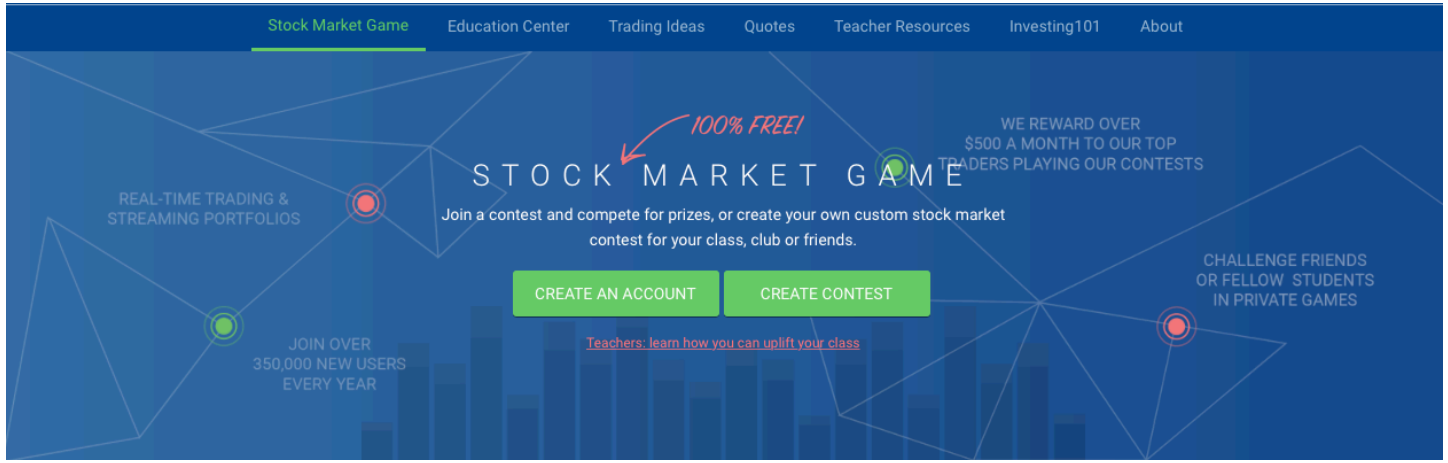
Its difficult for individuals (and experts!) to consistently outperform the stock market by timing the market *(Malkiel 1973; Barber & Odean 2000)*

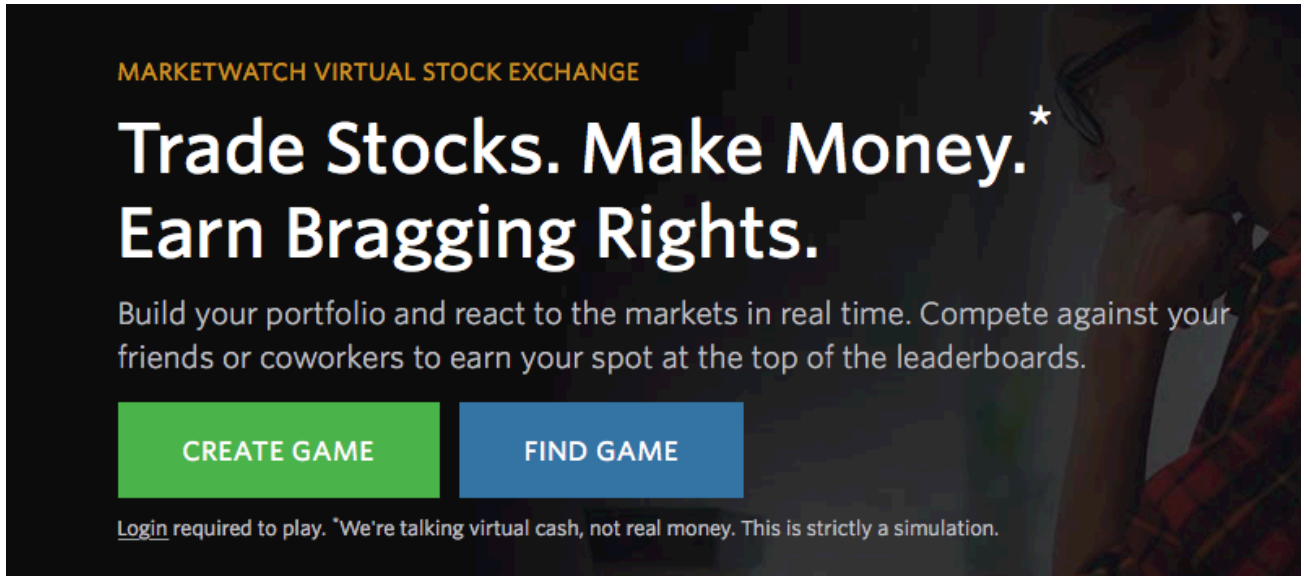
…but when you tell people that, they still don't believe you (*Fernandes et al 2014; Conversations with friends and family)*

So instead of telling them… Show them!



Too complicated and doesn't teach strategy to be passive



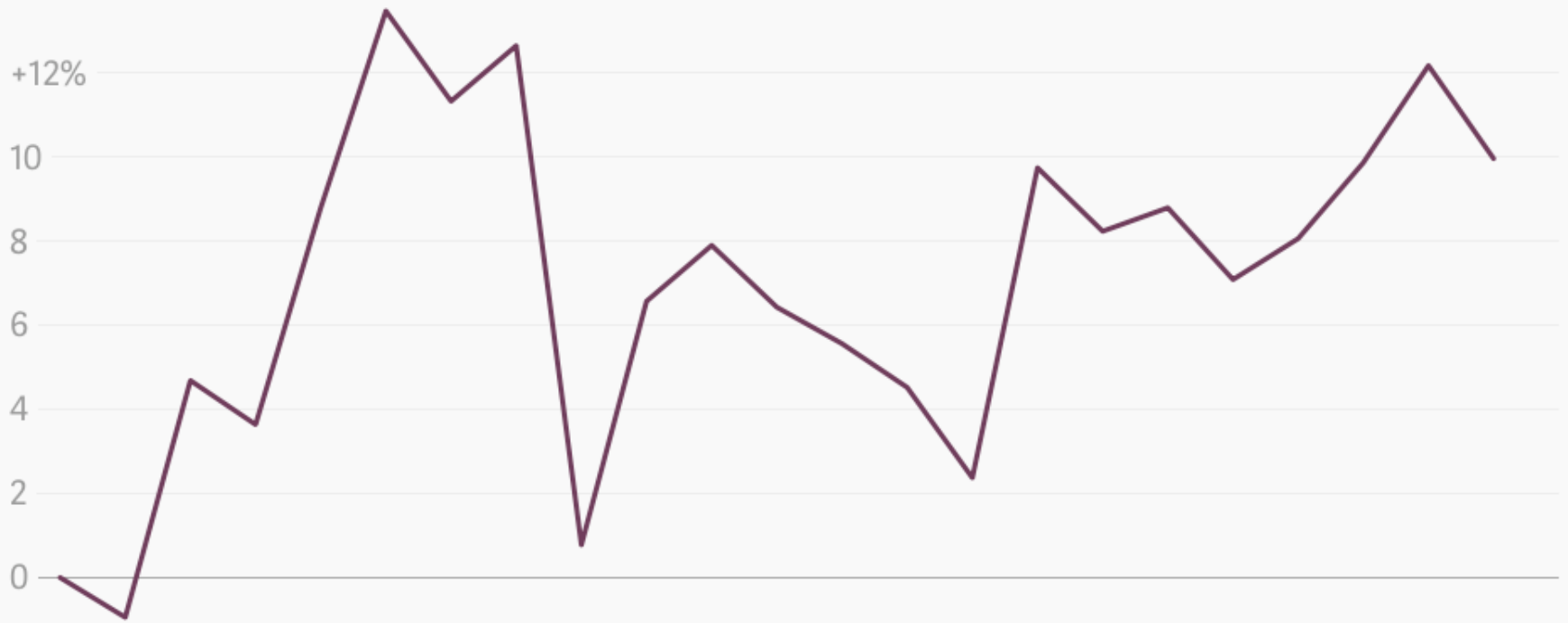


once.

Here we go!

Your account has a balance of $10,548.

Sell!



Data: Factset

Since 1978, there have only been 126 weeks where a portfolio matching the S&P 500 closed lower 10 years later. Buying and holding the S&P

Similar in concept, but doesn't allow for as much exploration

Not difficult to time market if that's all you care about

My Solution

Allow users to:

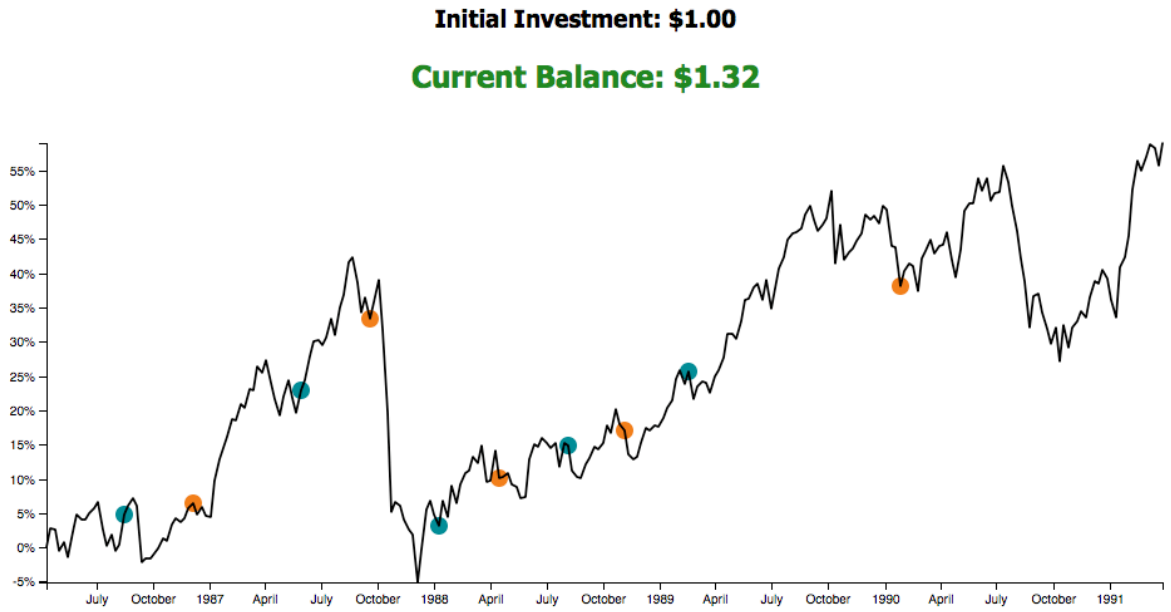
- Choose market (index, specific stock, bond fund, etc.)
- Choose length of time (1 year? 10 years?)
- Choose speed of application (1 week per sec? 10 weeks per sec?)
- Buy and sell as many times as they want

Make Goal:

- Do your best!

Present:

- Overall performance and performance relative to market for all completed ”trials” to show danger of timing in the long-run



Mockup using d3.js

Plan

Use HTML/CSS:

- To allow user input for different parameters

Use Javascript:

- To process stock data from (an API?) when a user selects it

Use d3.js:

- To make line graphs “move”
- To display buys and sells
- To display statistics at end of each “trial”

Feedback

- What parameters should I allow users to choose?
- Advice for getting stock data ”on the fly”? Alternatively, I could get data ahead of time and allow for a limited choice set.
- Should I include a dotted line to indicate current performance alongside the market performance?

THANK YOU!!!

Analyzing Hollywood's Attempts to Appeal to an International Audience with Foreign Actors

Sharon Chen & Da Eun Kim

Hollywood & Its International Audience

“Worldwide ticket sales reached a record-breaking $38.3 billion [in 2015]. More than 70% of the film industry’s box office is generated overseas.”

-LA Times

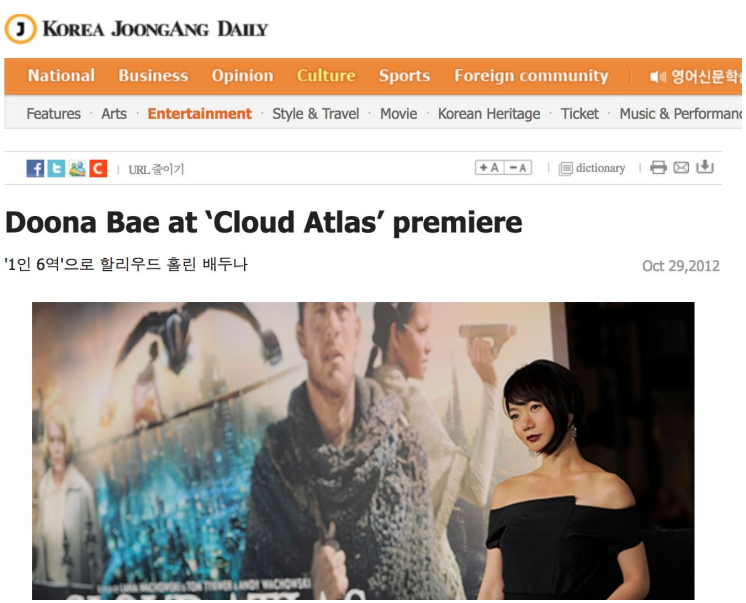

GLOBAL BOX OFFICE
ALL FILMS (US$ BILLIONS)
U.S./CANADA
INTERNATIONAL
$31.6
21
(66%)
10.6
2010
$32.6
22.4
(69%)
10.2
2011
$34.7
23.9
(69%)
10.8
2012
$35.9
25
(70%)
10.9
2013
$36.4
26
(72%)
10.4
2014
2014 TOP 10 INTERNATIONAL BOX OFFICE MARKETS
ALL FILMS (US$ BILLIONS)
1 CHINA $4.8
2 JAPAN $2
3 FRANCE $1.8
4 U.K. $1.7
5 INDIA $1.7
6 SOUTH KOREA $1.6
7 GERMANY $1.3
8 RUSSIA $1.2
9 AUSTRALIA $1
10 MEXICO $0.9
MOTION PICTURE ASSOCIATION OF AMERICA • MPAA.ORG • THECREDITS.ORG • WHERETOWATCH.COM • @MPAA

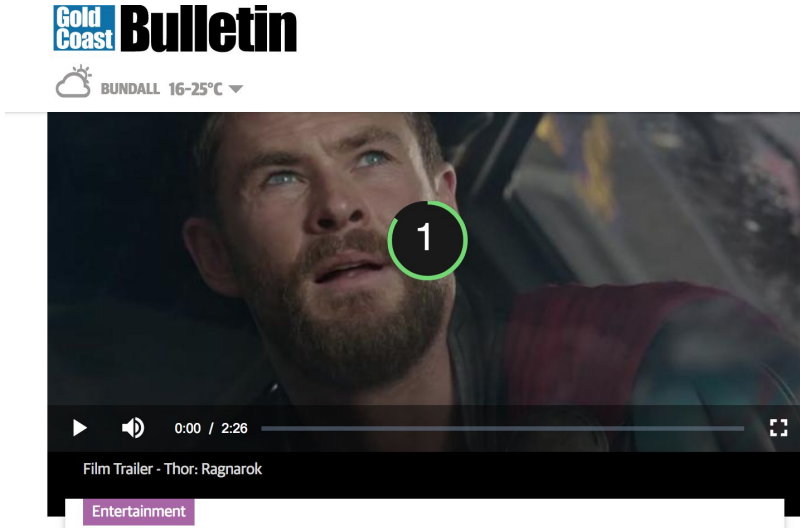
MEDIA

China is acting blatantly protectionist in an industry that's hugely important to the US

- The Hollywood blackout is implemented during limited periods of the year in China to turn the spotlight on domestically-produced films
- This year's annual summer blackout coincided with the commemoration of the founding of the People's Liberation Army on August 1

Hollywood & Its International Audience





Hollywood & Foreign Actors

Is there a significant relationship between the presence of a foreign actor in a Hollywood movie and its success in the foreign actor's nation?

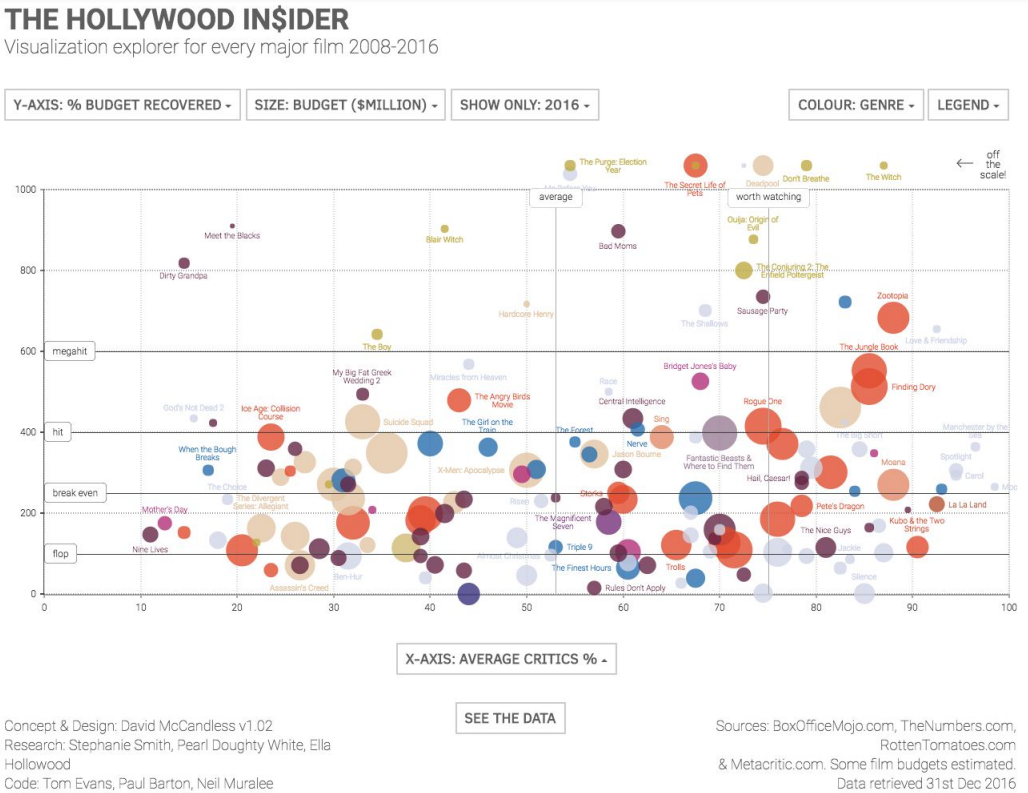
Are there thresholds such as actor's screen time/amount of lines that influence box office success?

How different is the success internationally versus domestically for Hollywood films featuring a foreign actor?

Prior Work: Movies

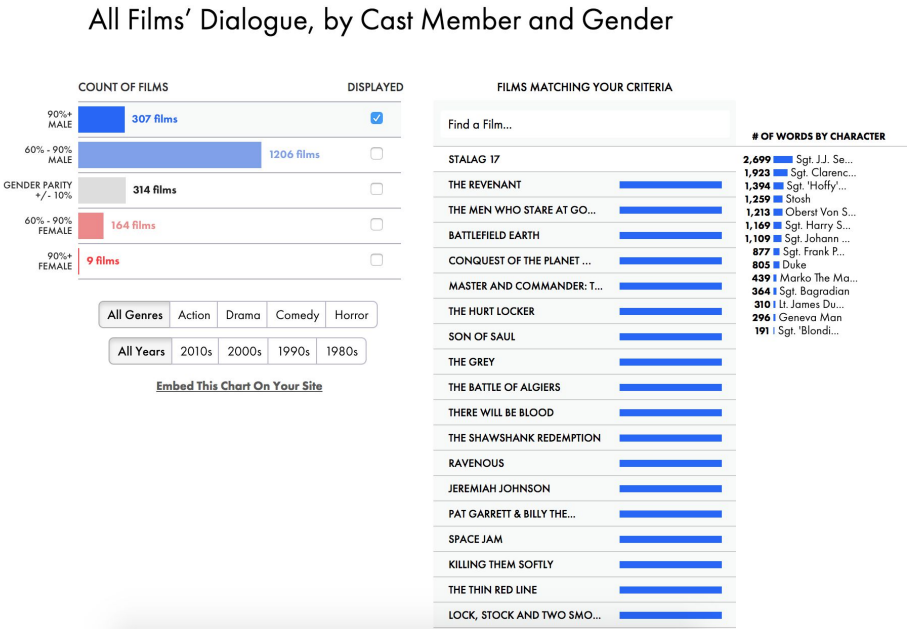
Shows us relationships between multiple dimensions such as genre, year, ratings, and budget

Doesn't delve into actor data



Prior Work: Movies and People in Them

Gender representation with great interactive elements



Prior Work: Hollywood's Gender Divide

There are interactive visualizations around movies and the effects of different factors on the box office, but those visualizations usually only look at gender

Hollywood & Foreign Actors: Data

Box office (domestic, international, actor's homeland)

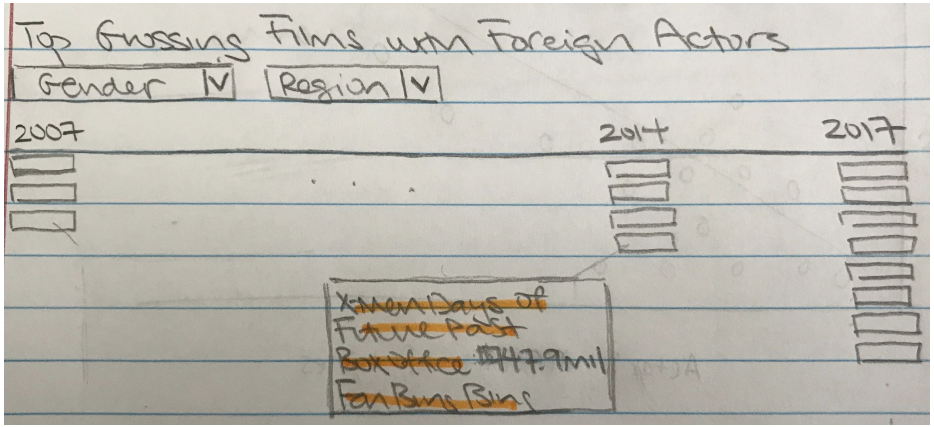
Actors and their nationalities

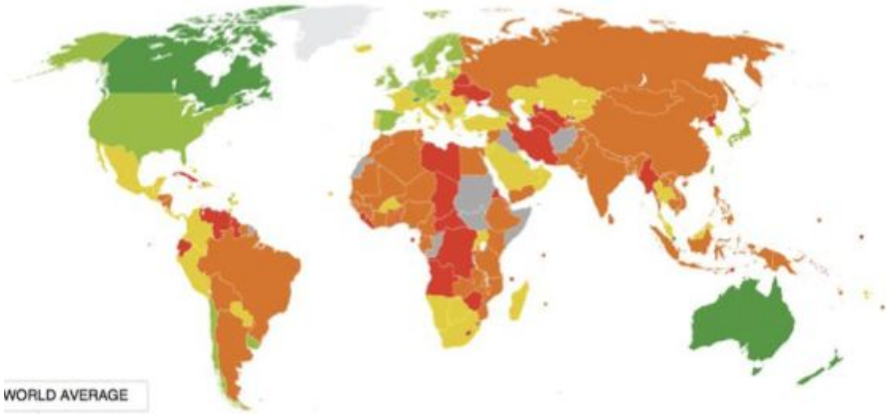
Screen time

Lines

Plot influence

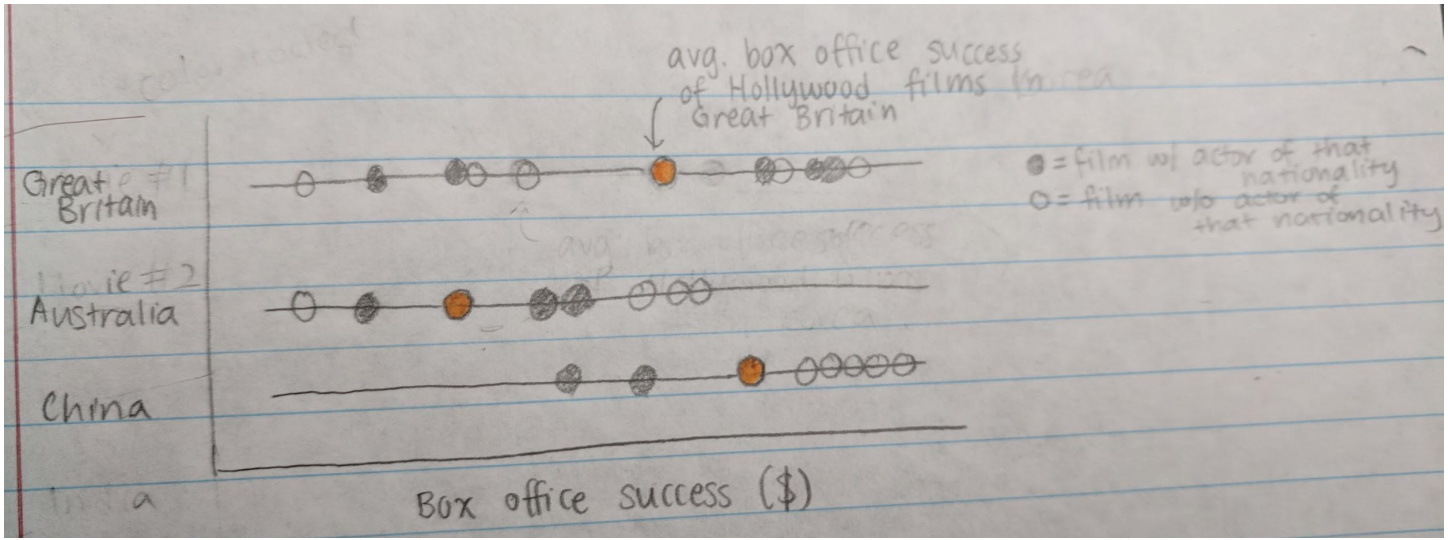
Current Progress: General Visualizations



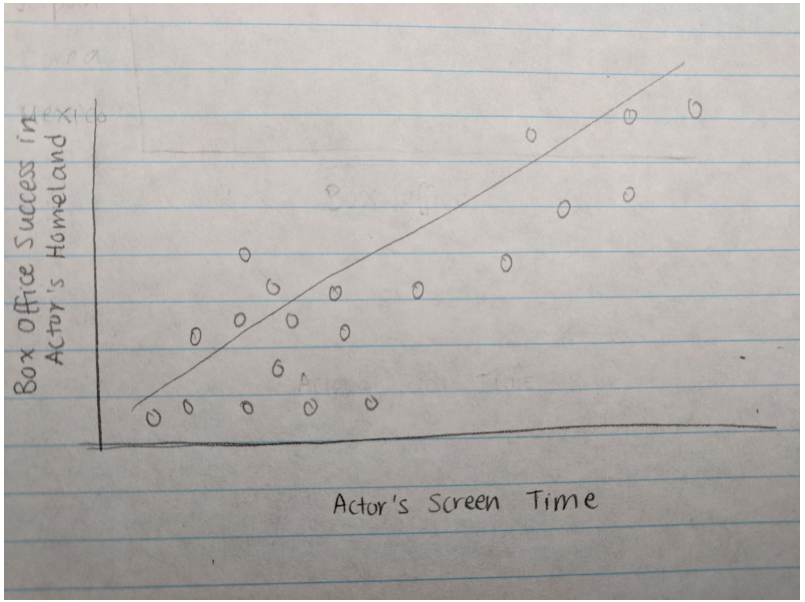


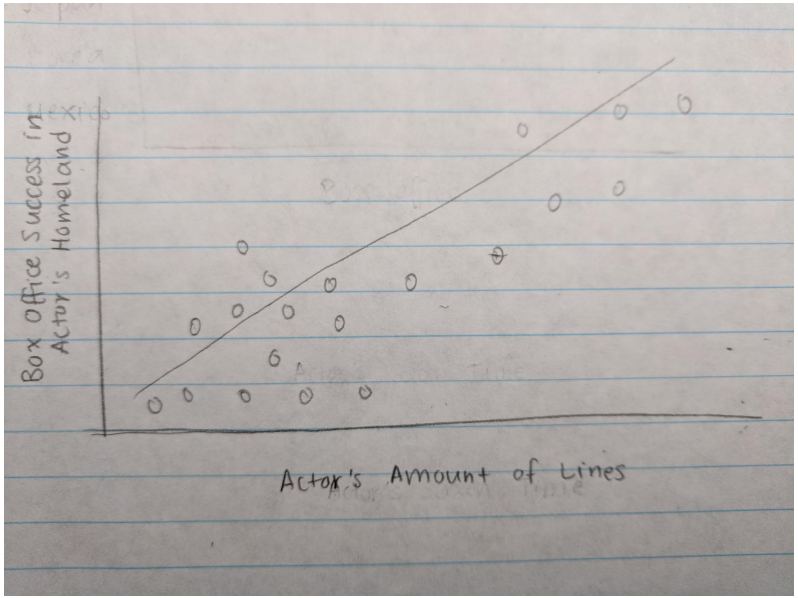
Heat map of what countries Hollywood's foreign actors and actresses are from

Is there a significant relationship between the presence of a foreign actor in a Hollywood movie and its success in the foreign actor's nation?

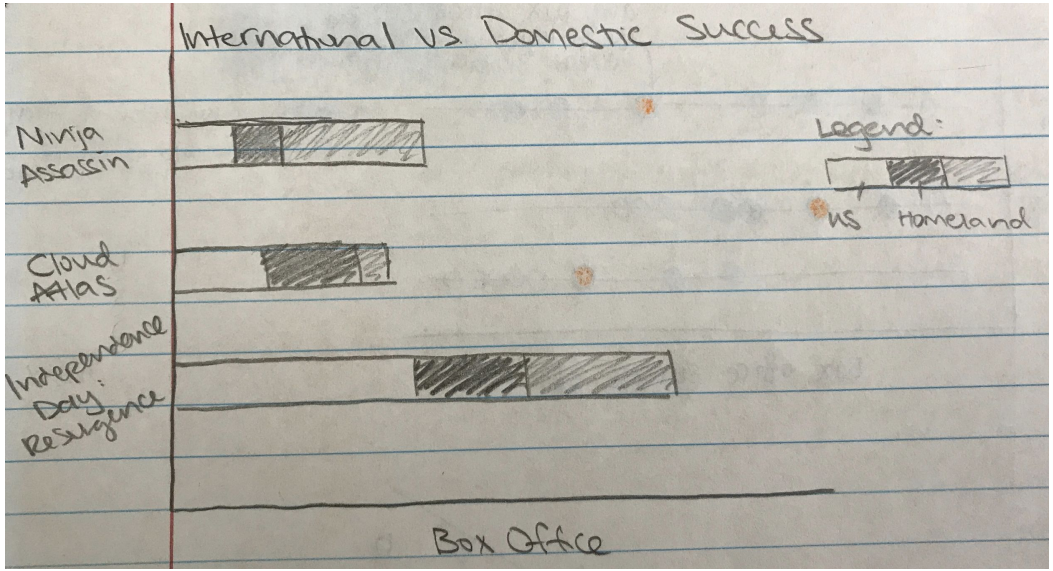


Are there thresholds such as an actor's screen time/amount of lines that influence box office success?





How different is the success internationally versus domestically for Hollywood films featuring a foreign actor?



Design & Implementation Issues

Collecting all the necessary data may be challenging: finding a tool or website that is able to count screentime and number of lines by actor/actress

Presenting and visualizing our data in a way that answers our questions

Seeking Feedback

What are other questions around this topic that we can visualize?

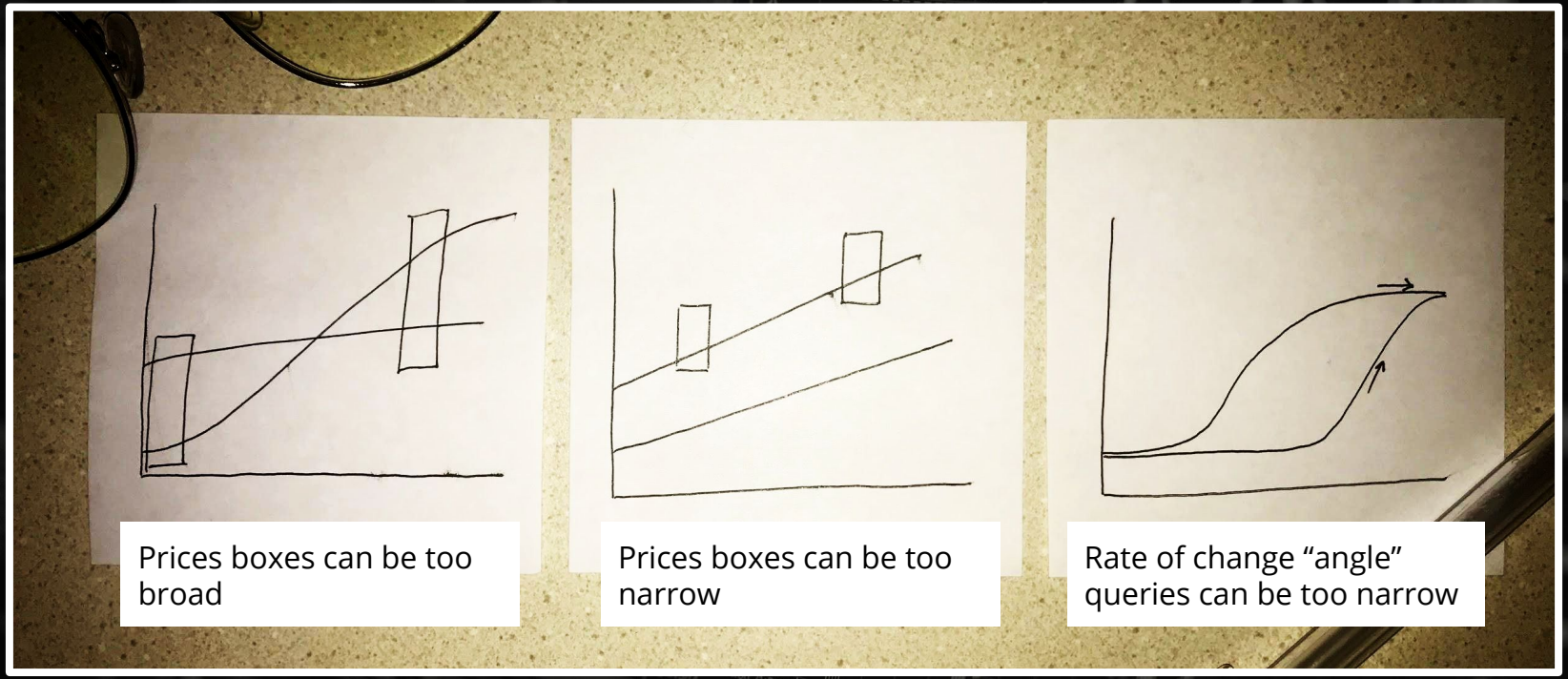
Are there any suggestions as to how we can visualization our current question differently?

Getting More from TimeSearcher:

Filtering Stocks by Price, Rate of Change, and Momentum

Amy Chen
CS 448B

The Problem: Timesearcher has Clear Limitations



Prices boxes can be too broad

Prices boxes can be too narrow

Rate of change “angle” queries can be too narrow

And momentum isn’t there at all

What problems does this pose?

PROBLEM:

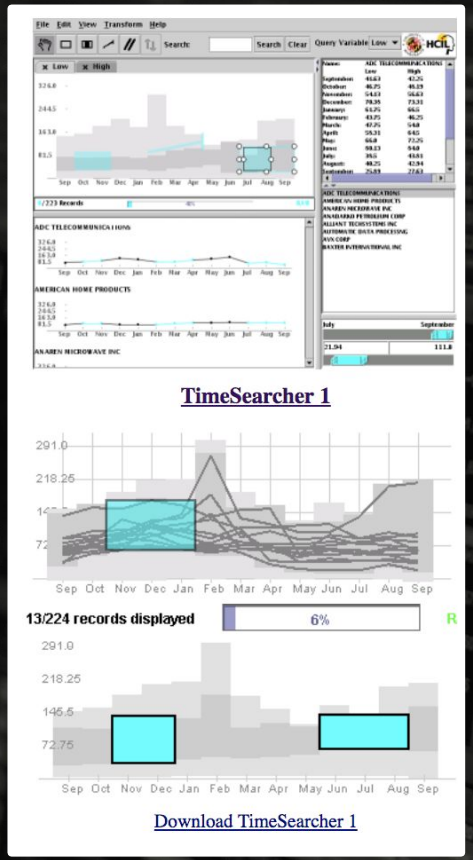
Rate of Change in TimeSearcher is by angle over a period of time. This relies on precise ROC as well as a precise time to have it over, which provides **fewer options while exploring stocks.**

PROBLEM:

According to Investopedia, **momentum “Indicates Stock Price Strength.”**

TimeSearcher has no tool for measuring by momentum.

Prior Work: TimeSearcher 1



DIFFERENCES

TimeSearcher 1
has the aforementioned issues

GOAL

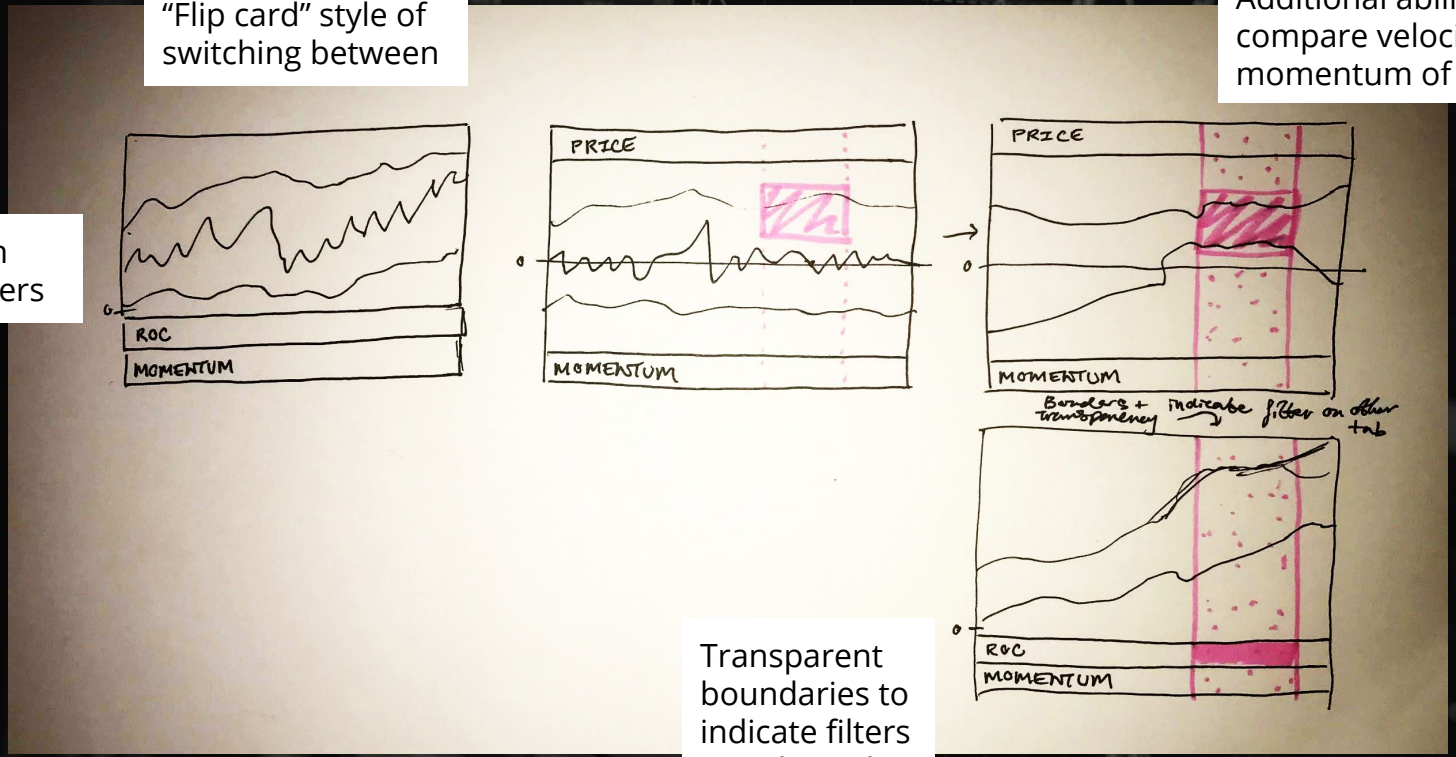
The fluidity of interaction of TimeSearcher 1 with a broader filtering for Rate of Change and Momentum for better exploration of data.

Proposed Solution

"Flip card" style of switching between

Additional ability to compare velocity and momentum of stocks

3 charts with Timebox Filters



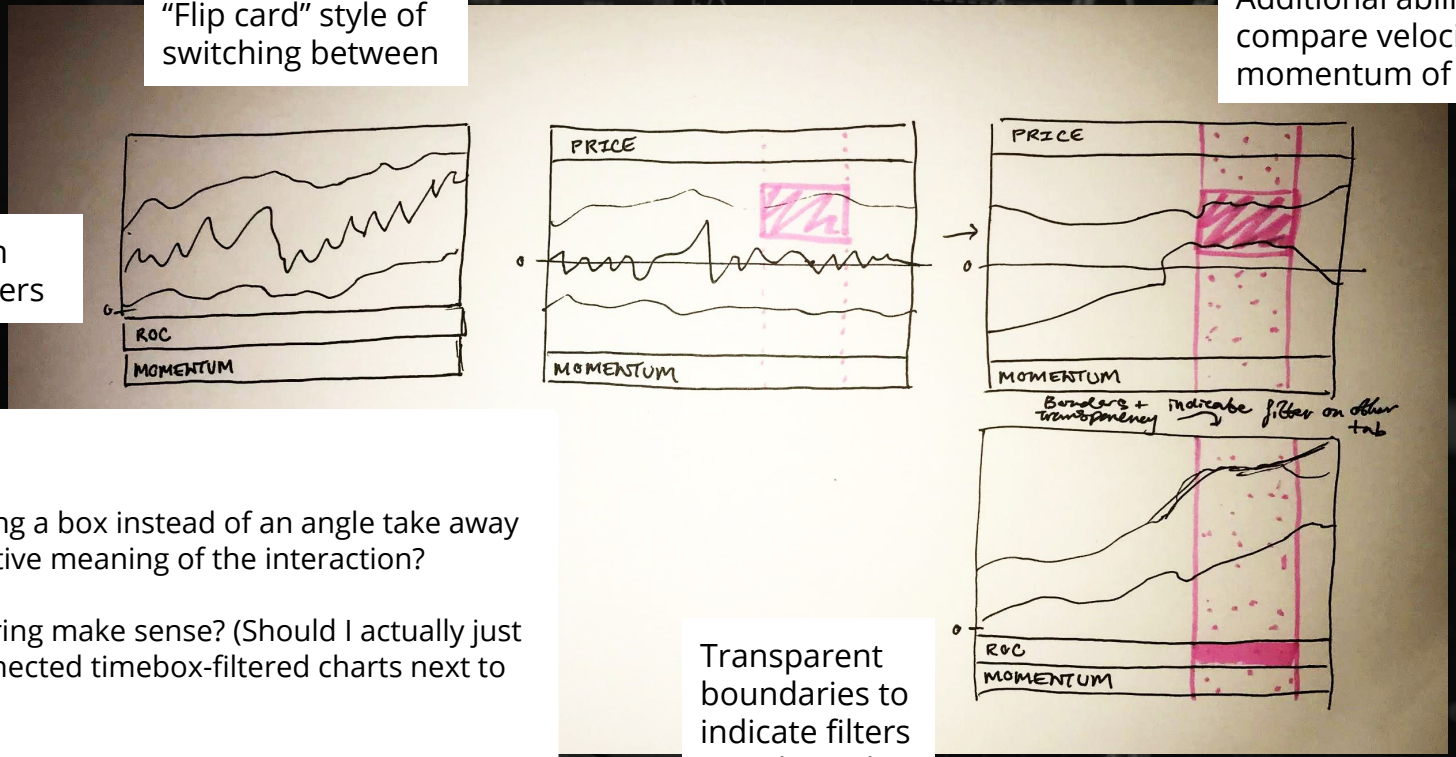
Transparent boundaries to indicate filters on other tabs

Questions / Comments

"Flip card" style of switching between

Additional ability to compare velocity and momentum of stocks

3 charts with Timebox Filters



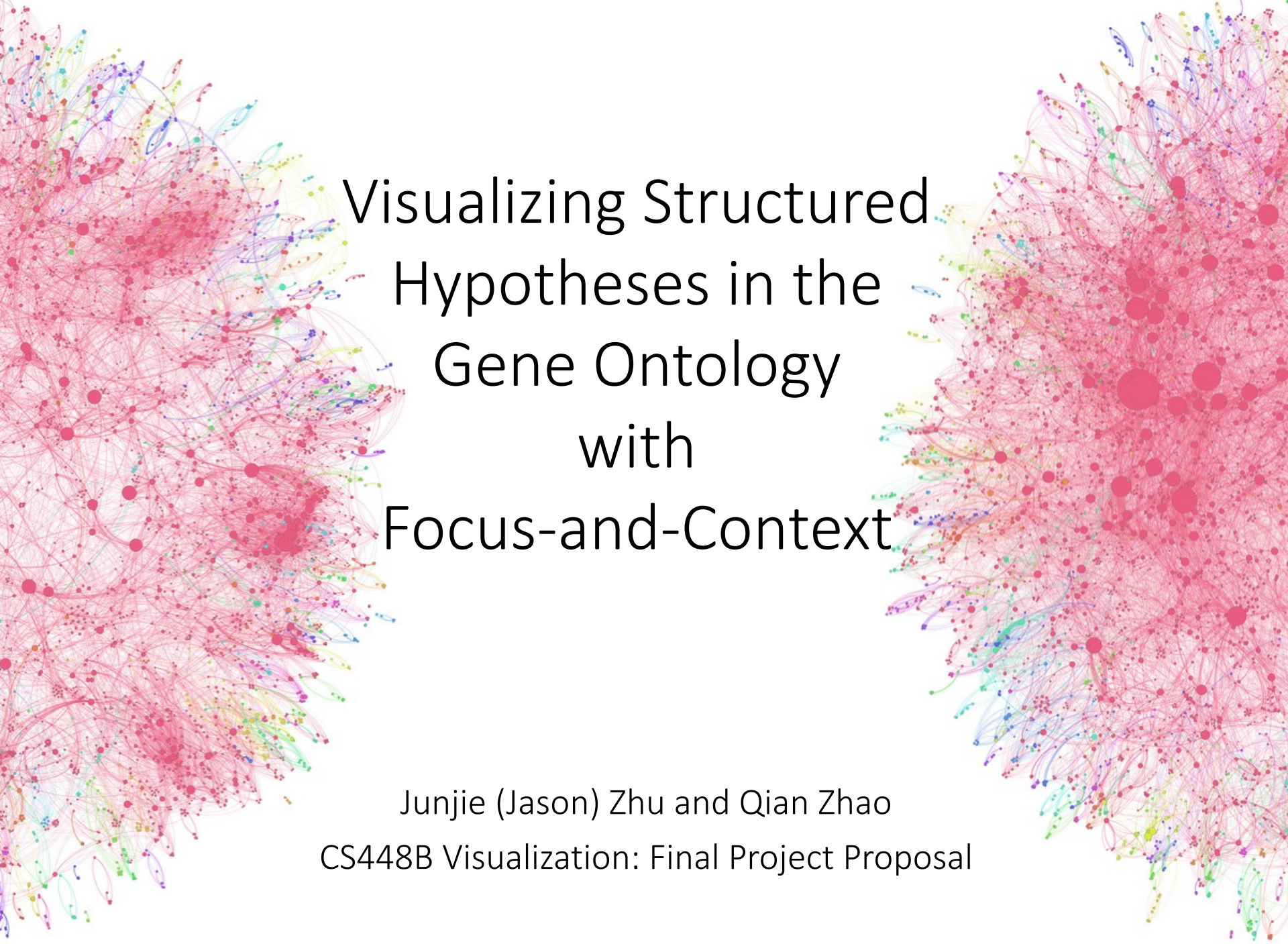
Transparent boundaries to indicate filters on other tabs

QUESTIONS

Does employing a box instead of an angle take away from the intuitive meaning of the interaction?

Does the layering make sense? (Should I actually just put three connected timebox-filtered charts next to each other?)

Concerns about design?
Additional functionality you'd like to have?



Visualizing Structured Hypotheses in the Gene Ontology with Focus-and-Context

Junjie (Jason) Zhu and Qian Zhao

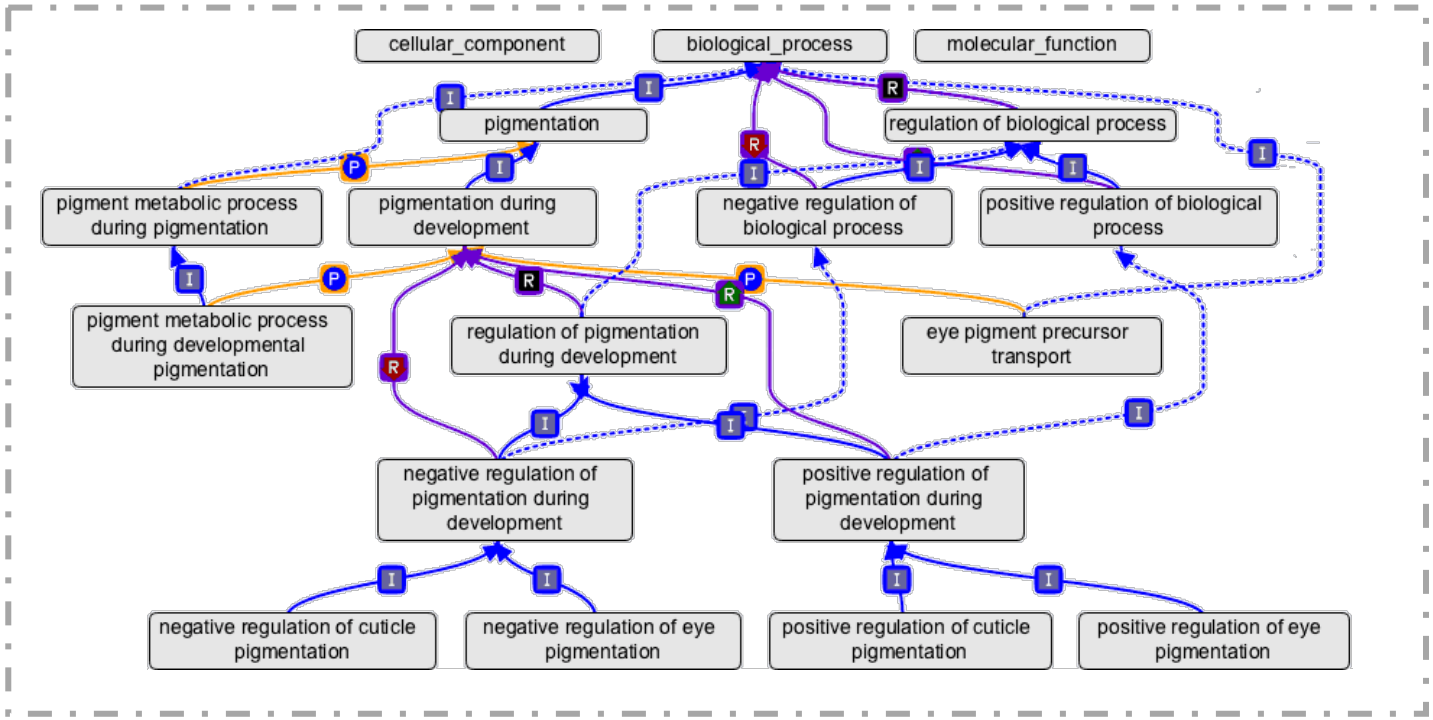
CS448B Visualization: Final Project Proposal

Gene Ontology (GO)

- Includes a collection of over 40,000 biological concepts
- Has been used to “annotate” gene functions in over 100,000 studies
- Hierarchically organizes the concepts in a directed acyclic graph (DAG)

less specific

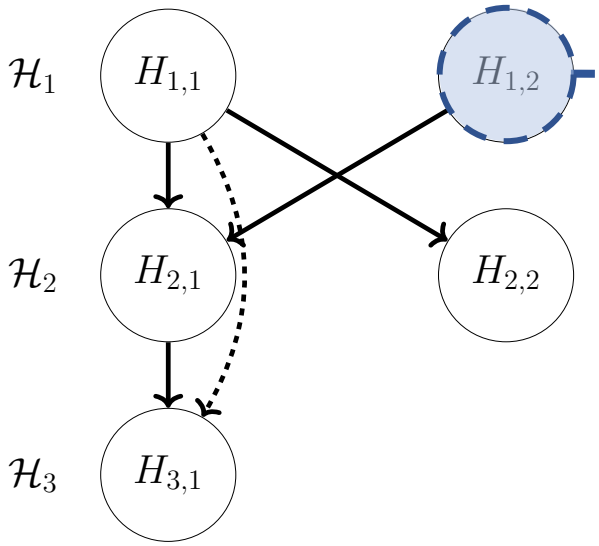
more specific



http://www.geneontology.org

Hypothesis Testing on a DAG

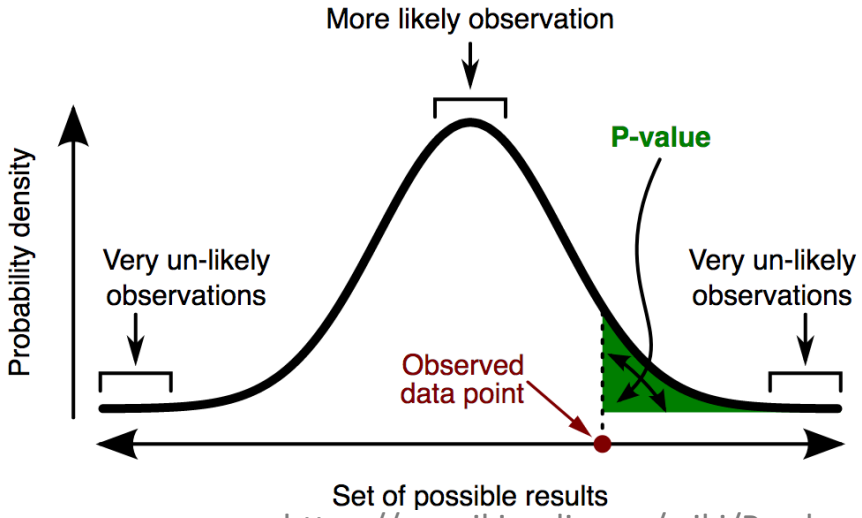
- Suppose a scientist discovers multiple disrupted genes in a cohort
- She would need to investigate every single node in the DAG



Associated genes: *GENE1*, *GENE2*, …

Test if the genes are overrepresented

Calculate a p-value for this hypothesis



[Ramdas et al, 2017]

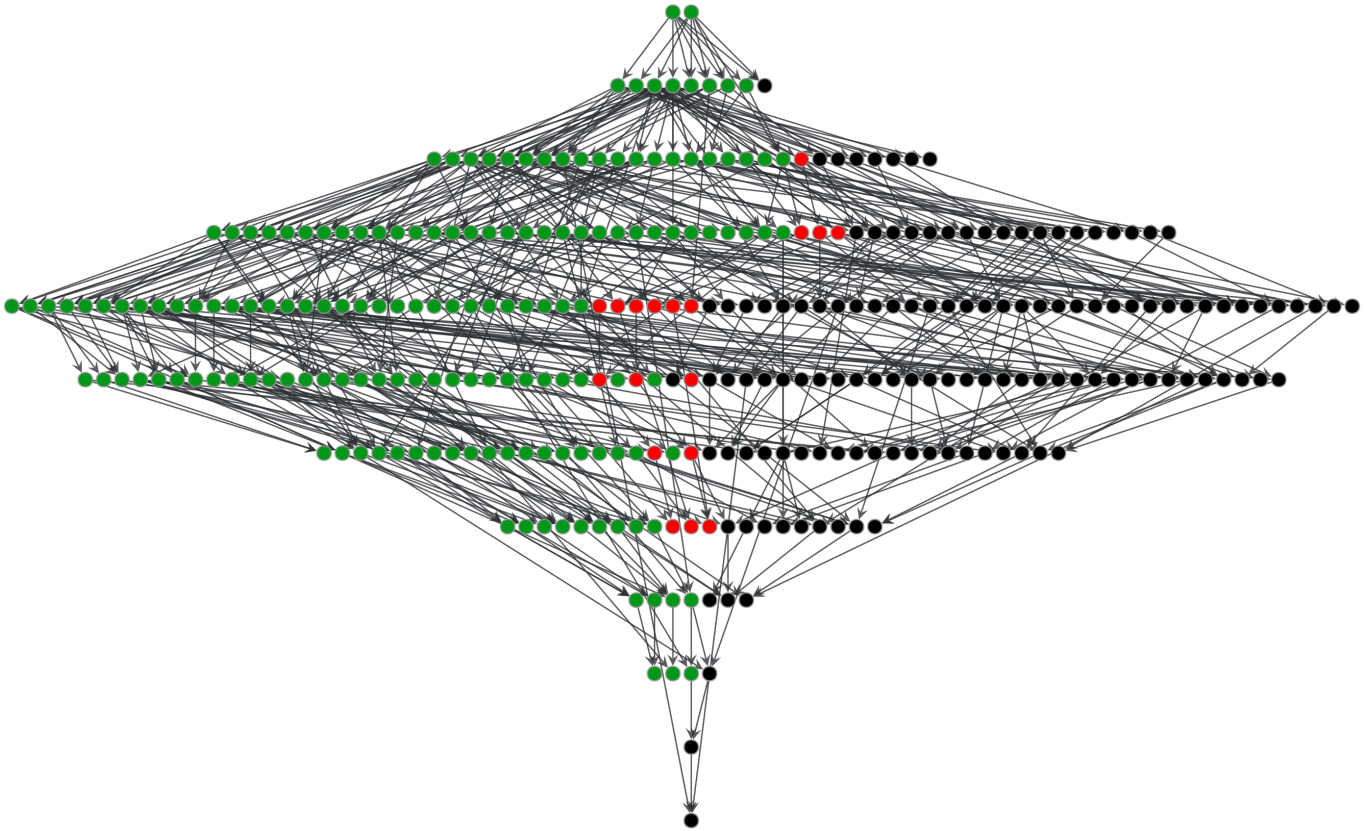
https://en.wikipedia.org/wiki/P-value

Visualization Challenge

- Multiple biological concepts may be revealed.
- Researchers are interested in understanding:
- the structures of the multiple discoveries (rejected hypothesis);
- and contexts of these discoveries (parents, children, depth…).

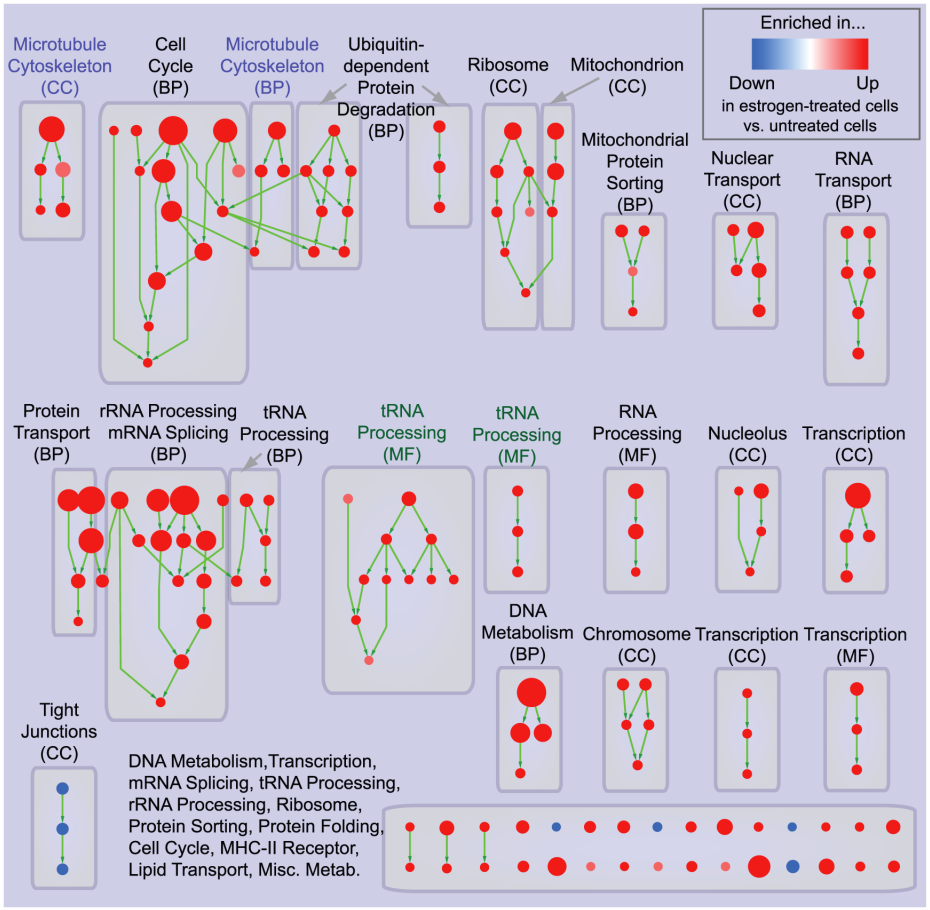
- There are ~30,000 nodes in this DAG
- We only want to look at a small set of discoveries in detail (- focus),
- but we also want to see what structures can be revealed (- context)

Prior Art and Existing Work



[Ramdas et al, 2017]

Prior Art and Existing Work



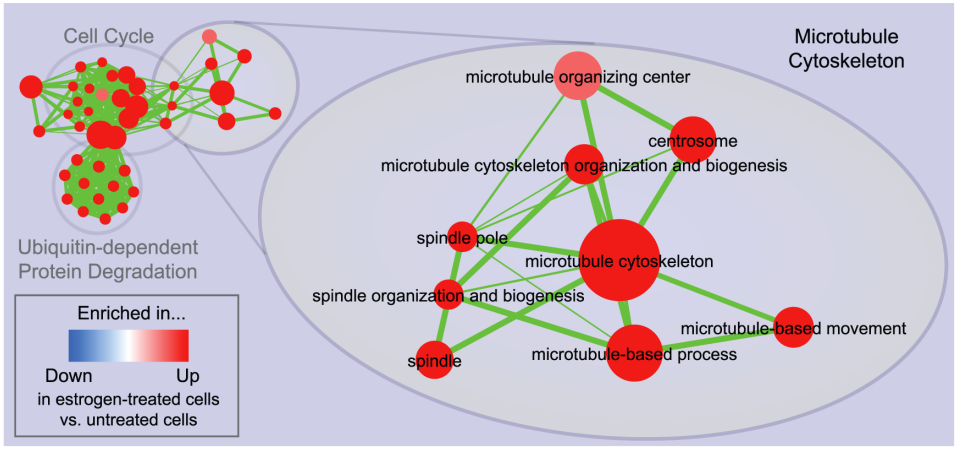
Cytoscape [Shannon et al, 2003]

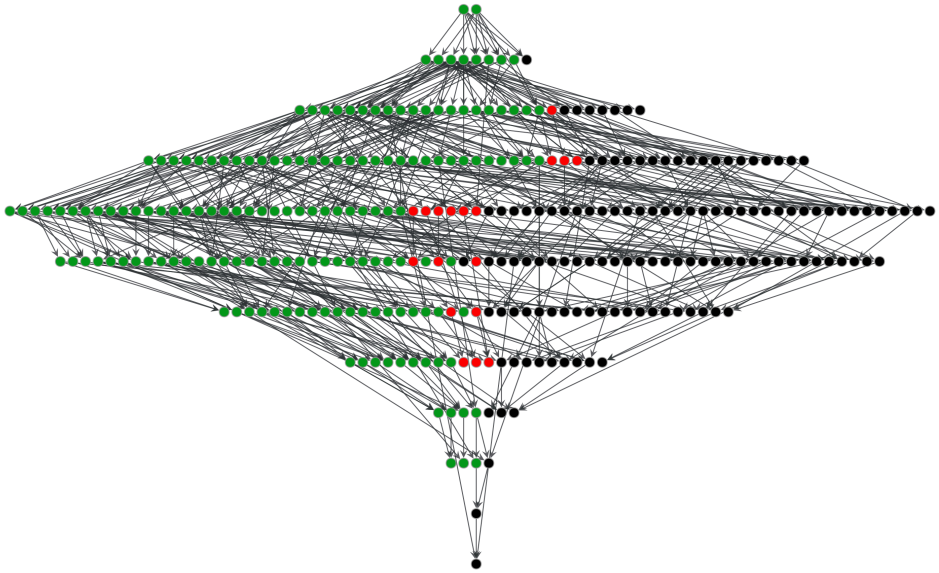
Prior Art and Existing Work

lack of context to display how concepts are discovered

balance the layout of edges and nodes

rigid display and details that are difficult to interpret



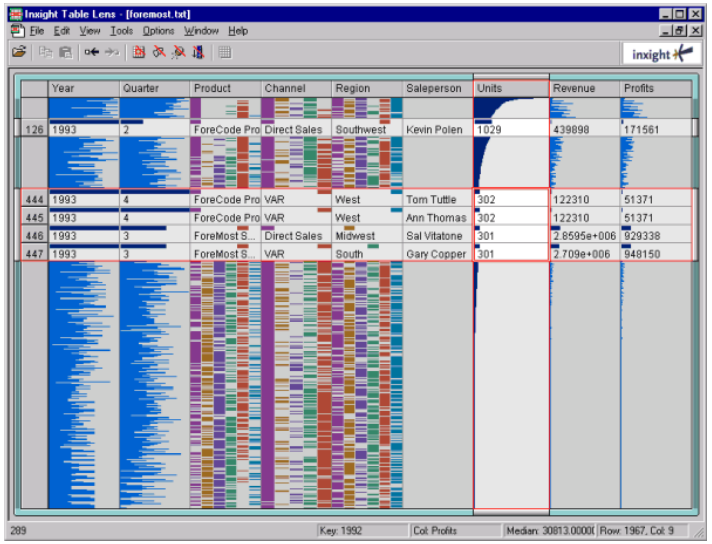


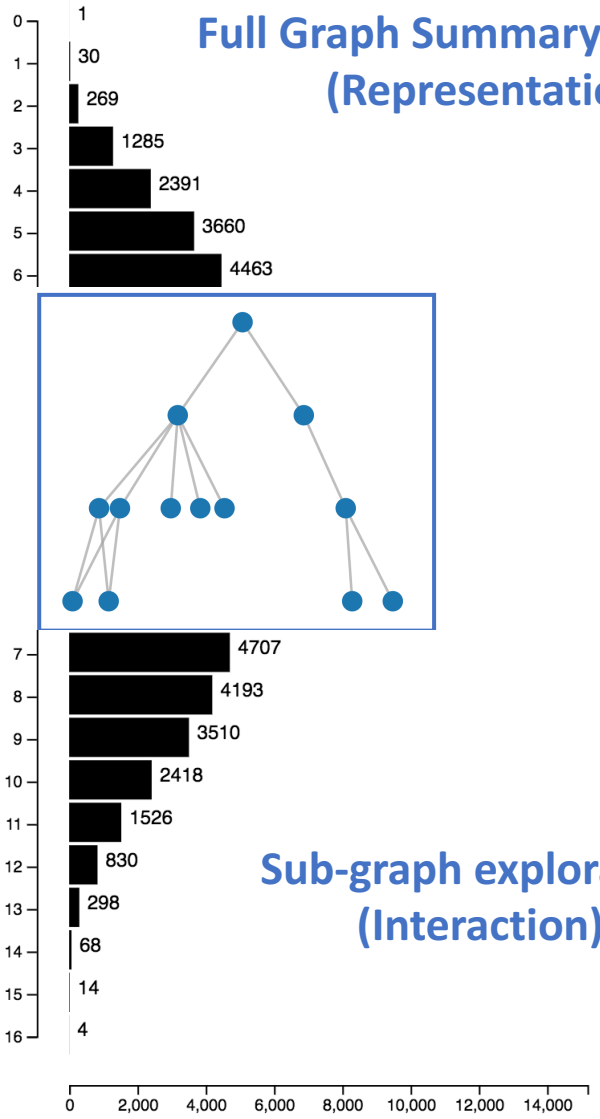
Our Proposed Solution

- Interface with hypothesis testing algorithms
- Render discoveries in hierarchical graphs (and auxiliary information)
- Interactive focus-and-context graph visualization in d3.js
- Display summary statistics/ visualizations of the remaining DAG

Our Proposed Solution

Inspiration: Table Lens





Full Graph Summary Statistics (Representation)

Sub-graph exploration (Interaction)

Current Progress

Gene Ontology Database

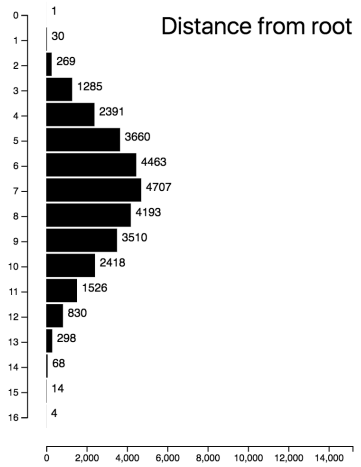
User with a Simple Query

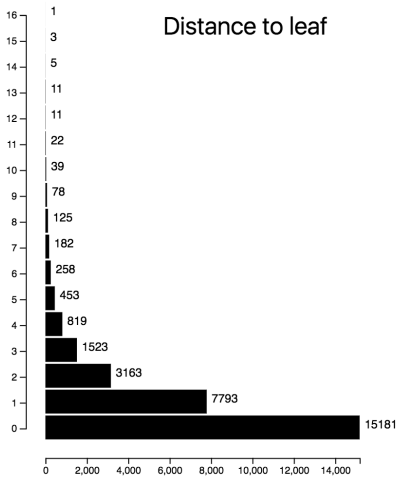
Information retrieval from database (query, download, local cache)

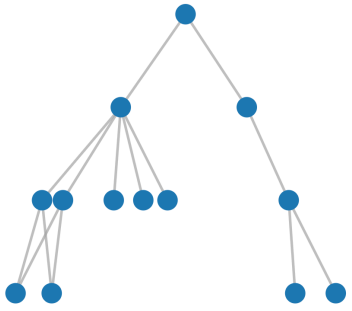
Graph-based algorithms (path search, hypothesis testing, layouts)

Flask server (data communication, cache, instructions for rendering)

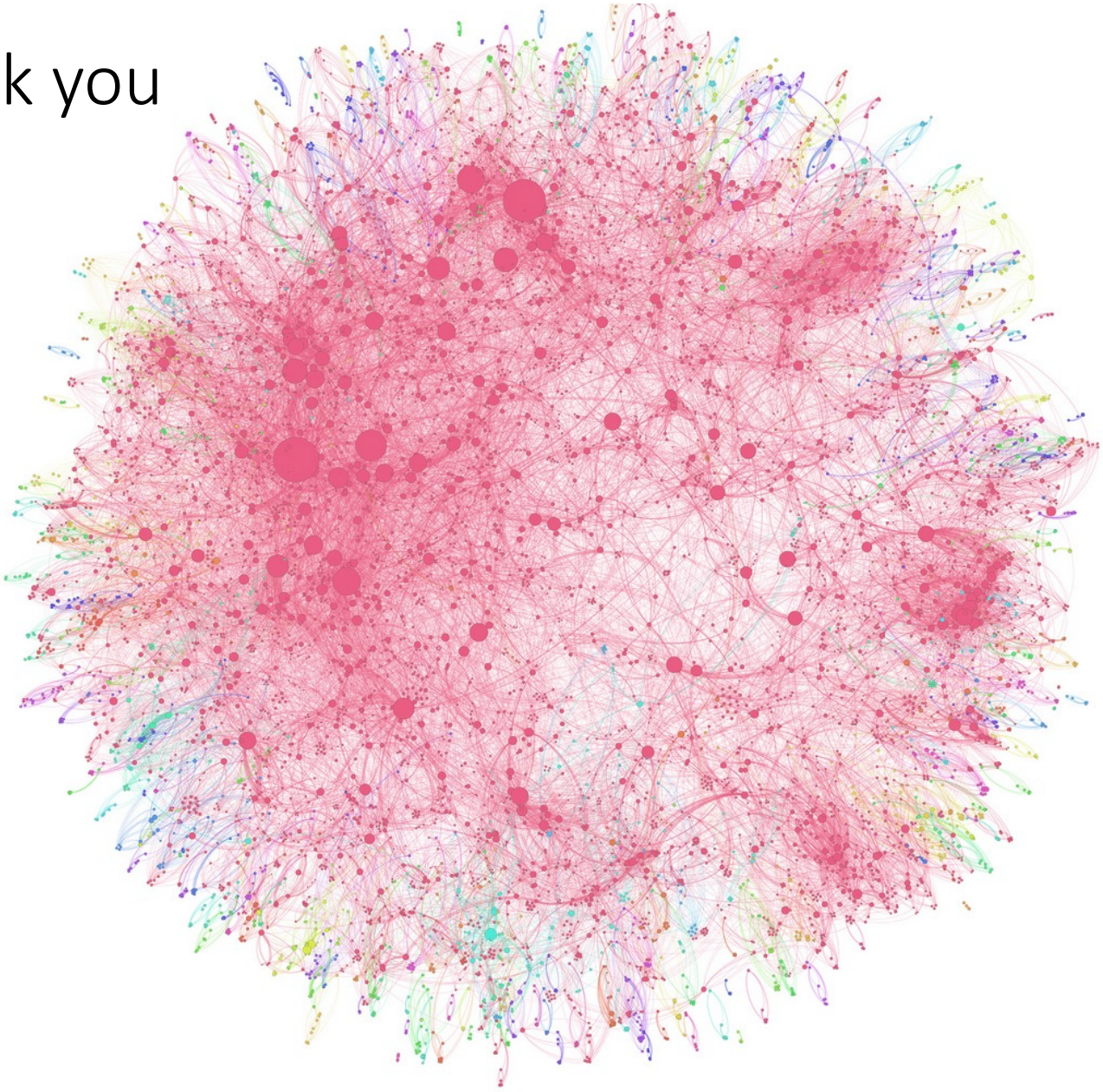
Webpage: d3, jquery (graph and statistics rendering, interaction)







Thank you



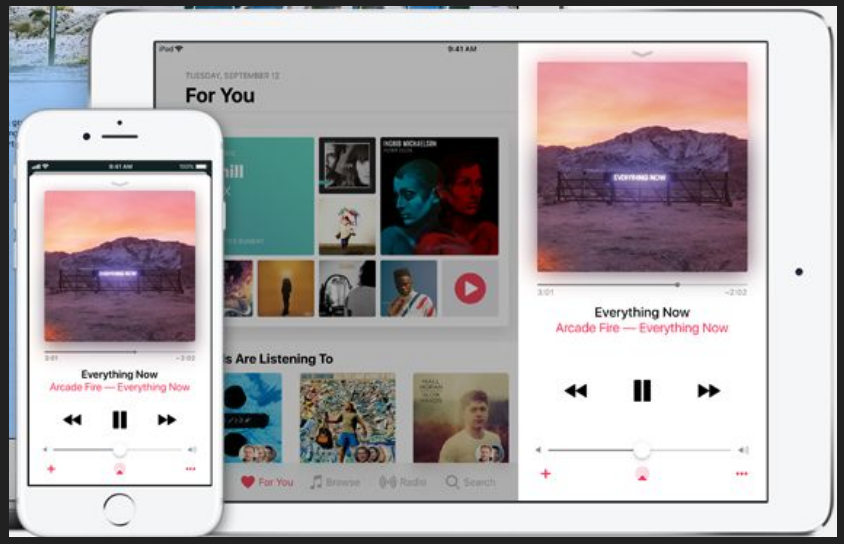
Rich Music Playback Slider

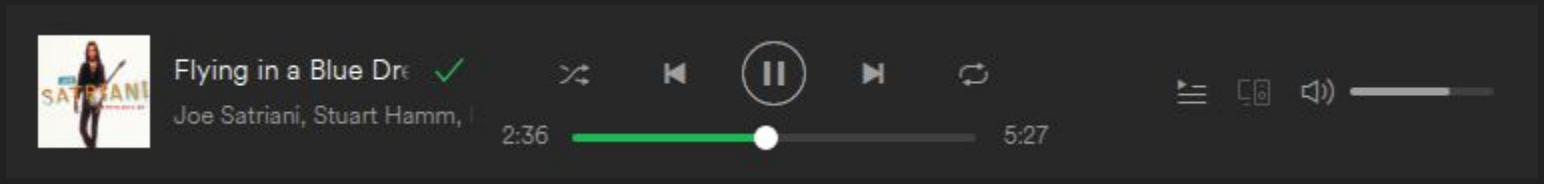
CS448B Project Progress

Jianqing Yang

Introduction

The typical music playback slider doesn't communicate much information to users:





Screenshots from Apple iTunes website (https://www.apple.com/itunes/music/), Windows Media Player, Spotify desktop

Introduction

Can we get more out of such a ubiquitous widget?

Primary use cases for general music enthusiasts:

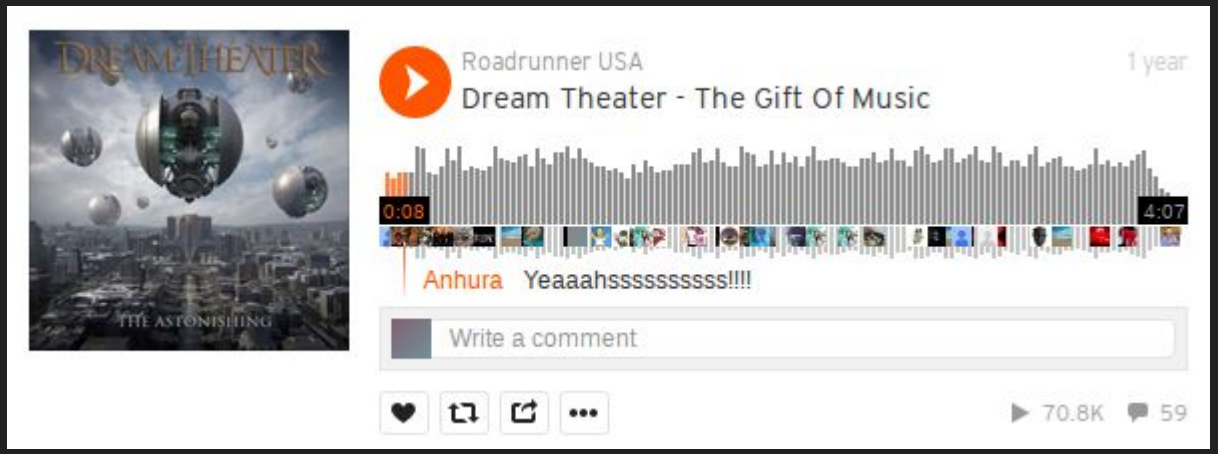
- Faster navigation to specific points of interest in a song
  - For real-life social sharing
  - For sampling of new music
- Instead of having to randomly scrub through songs

Bonus use cases:

- Music browsing and discovery
- Arranging playlists visually

Relevant Prior Work

Commercial: Soundcloud



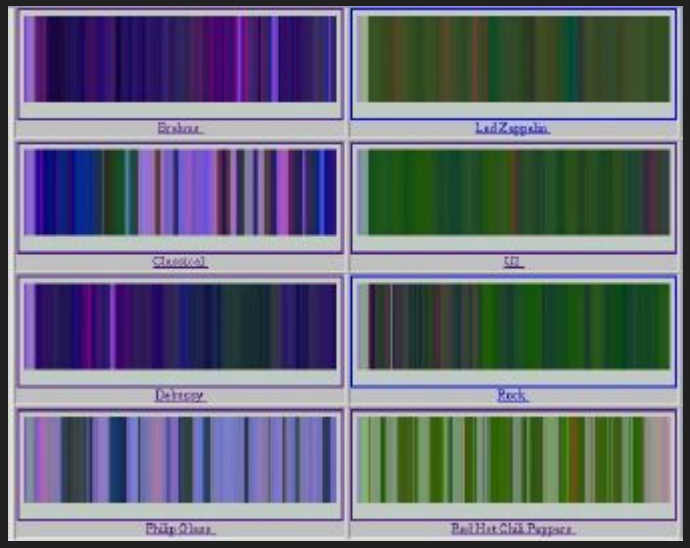
Adds binned amplitude information and time-tagged social comments

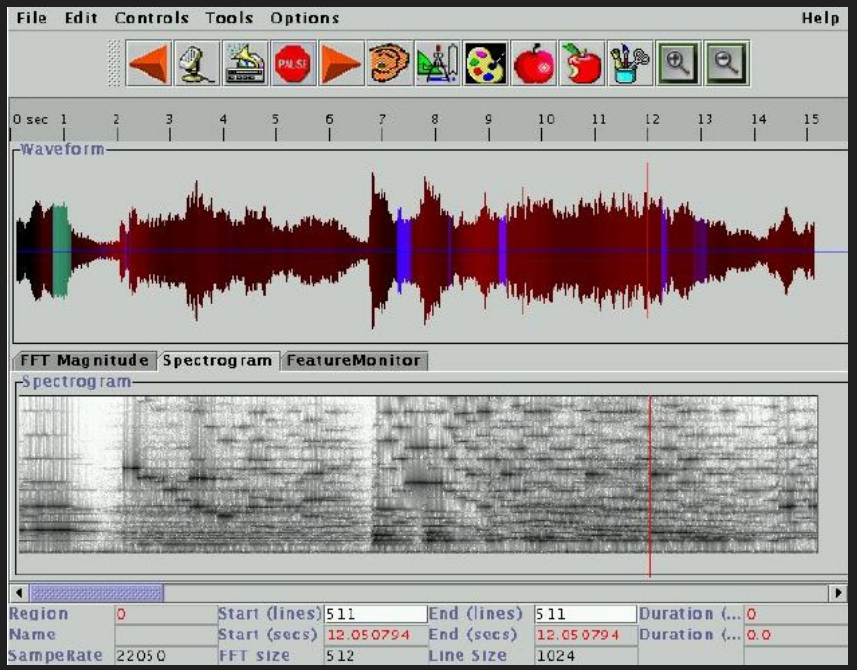
- Amplitude bins only helpful for navigation for songs with very distinct dynamics
- Most social comments not informative

Screenshots from Soundcloud website (https://soundcloud.com/)

Relevant Prior Work

Academic: Timbregrams





Color mapping based on automatic audio feature extraction

- Color band differentiation too fine to determine broad musical structures
- Color mapping is relative to collection of music processed, not independent to each song

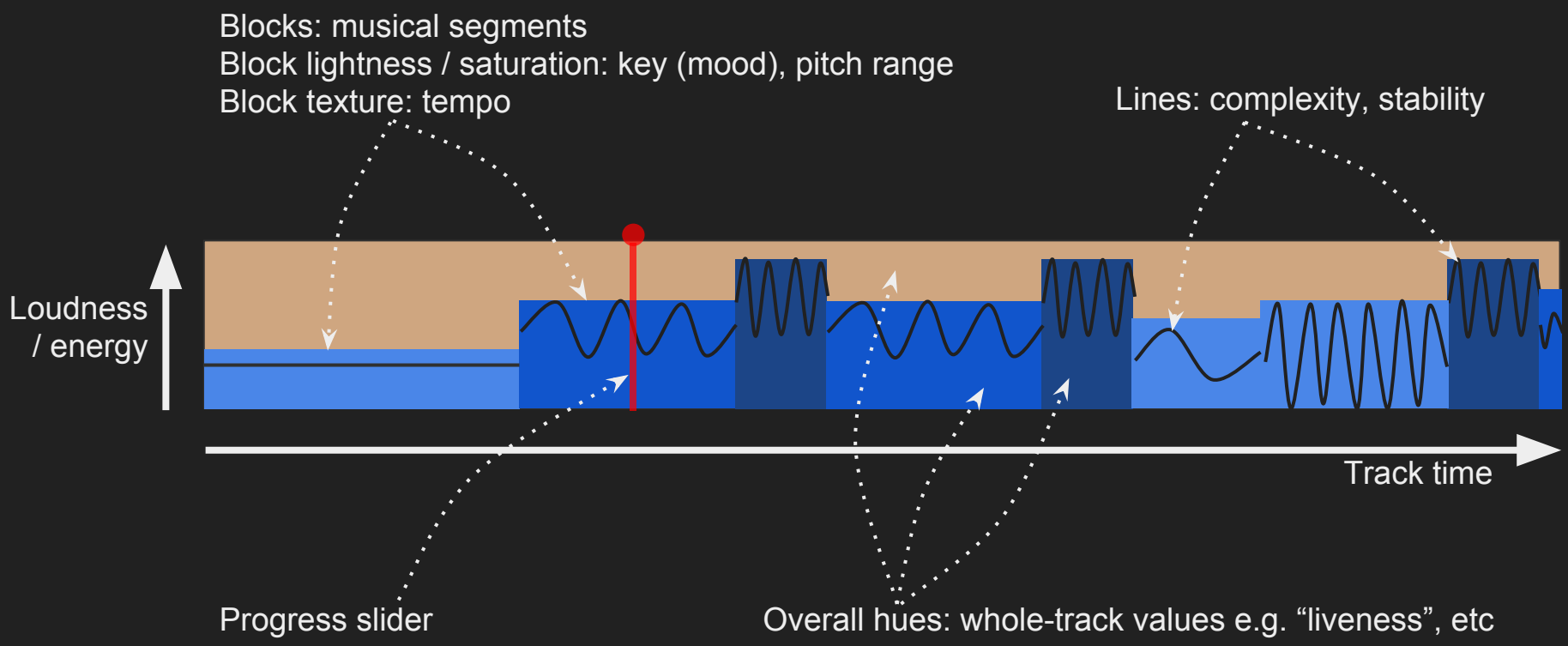
Tzanetakis, G. (2002). *Manipulation, Analysis and Retrieval Systems for Audio Signals* (Doctoral dissertation)

Progress

Using Spotify web API:

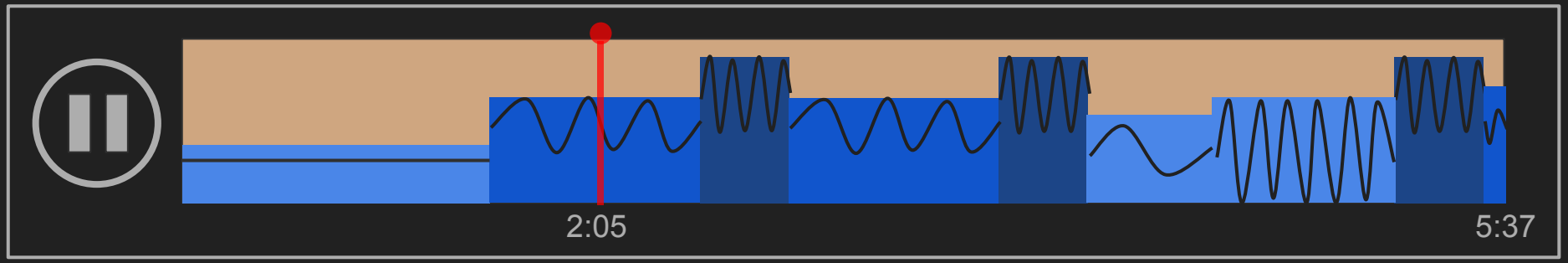
- Detailed musical features for each track, e.g.
  - Sections, tempo, key
- Overall characteristic scores for each track, e.g.
  - “Danceability”
  - “Instrumentalness”
  - “Liveness”
- Access to enormous music collection

Initial Ideas



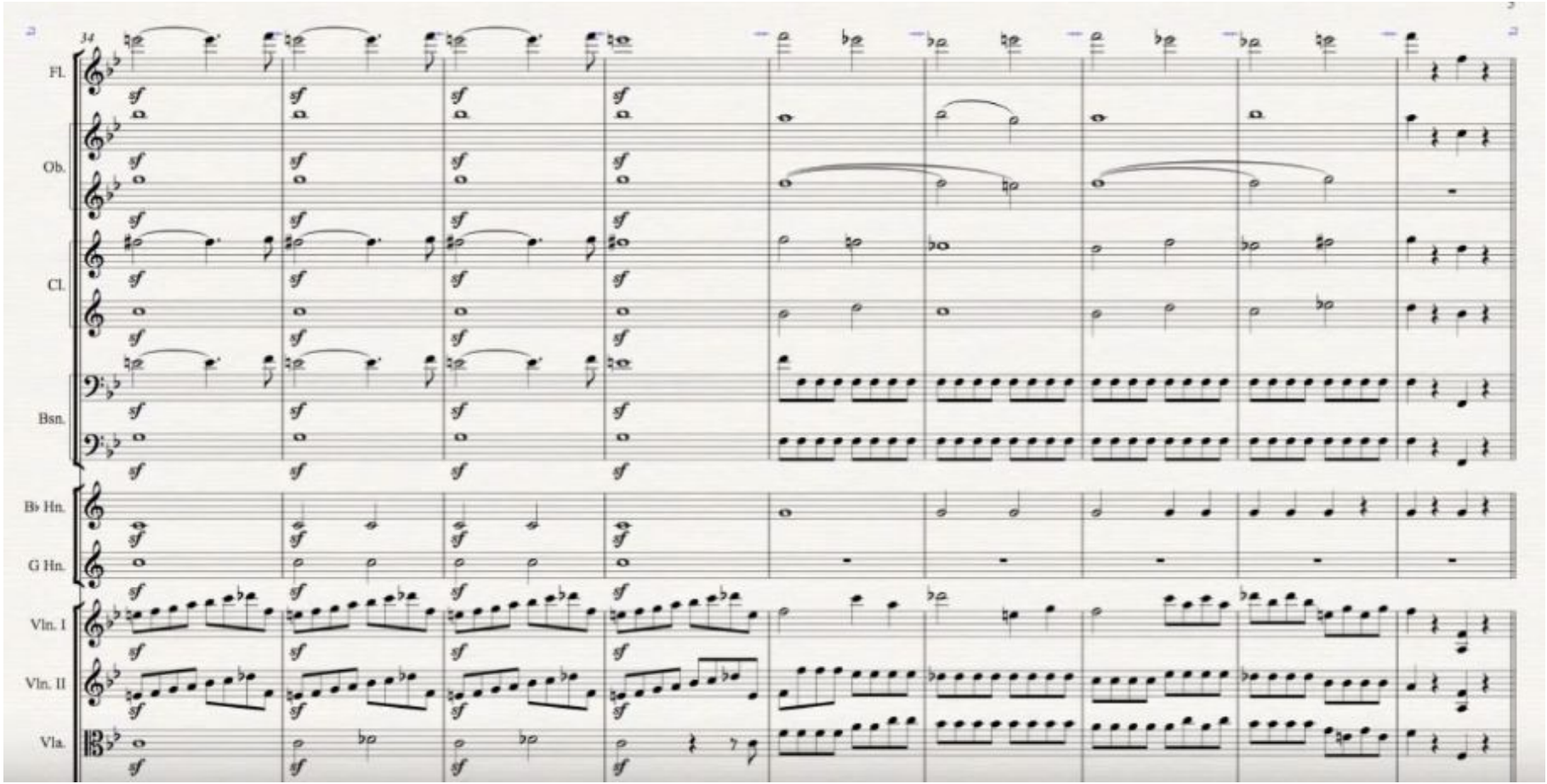
Your Feedback Please!

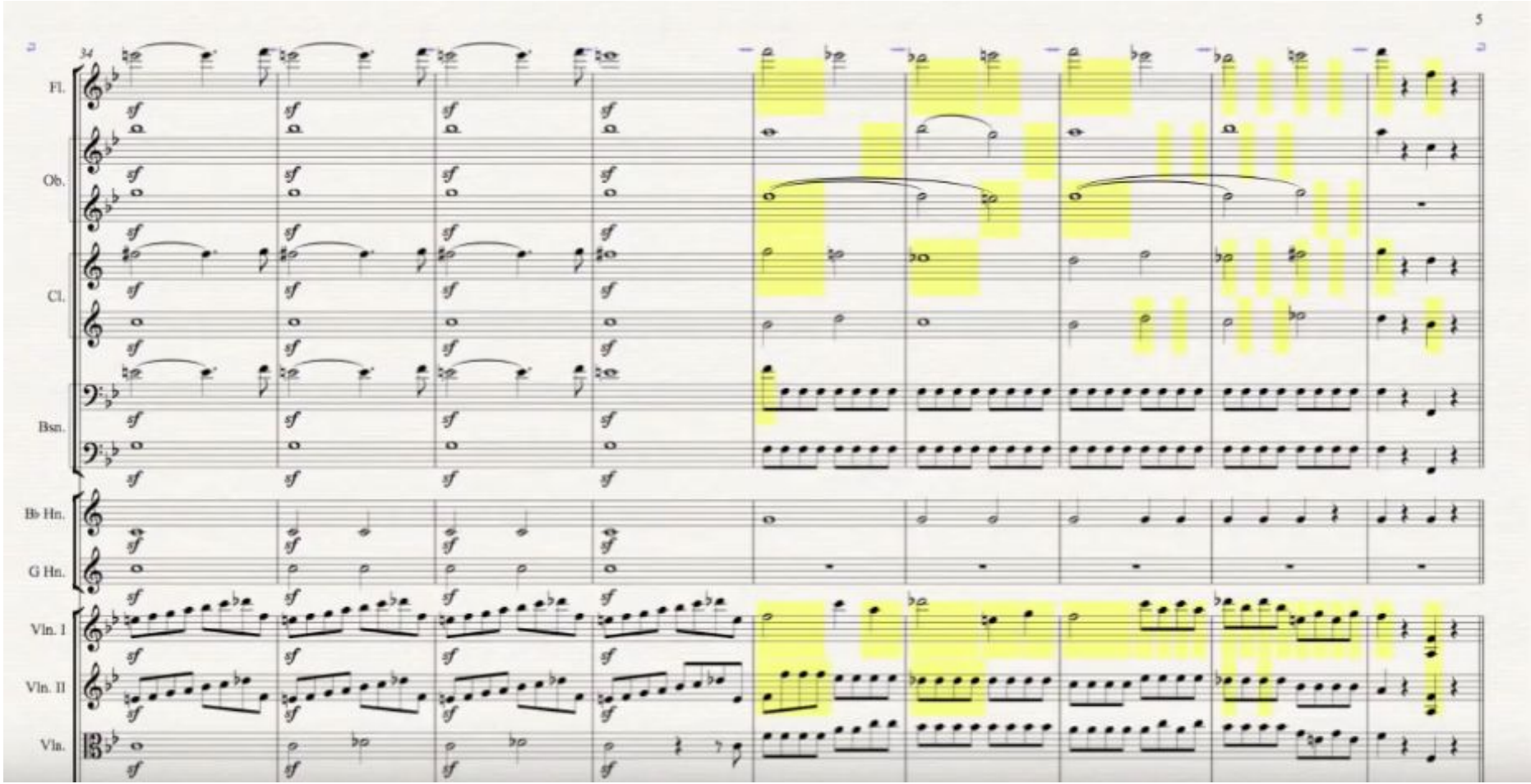
1. Do you have other ways of navigating your music tracks?
2. Balance of simplicity versus richness of encodings?
3. Importance of precision of representation (apart from time)?
4. Importance of distinctive overall look for each track?

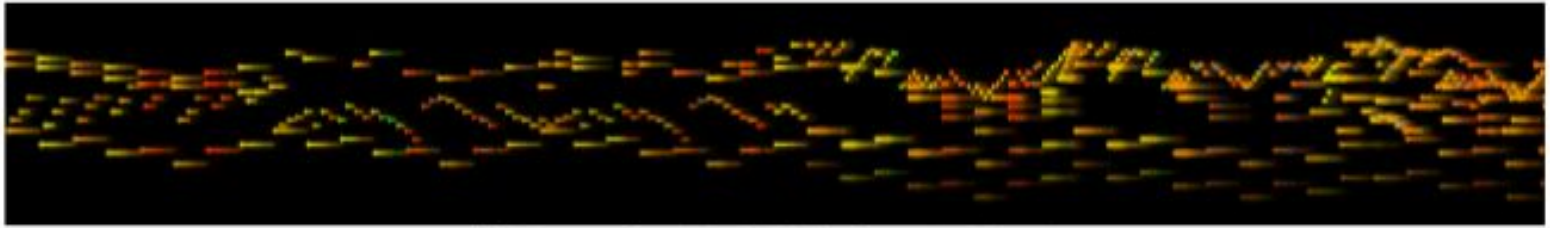


A tool for visualizing and understanding orchestral scores

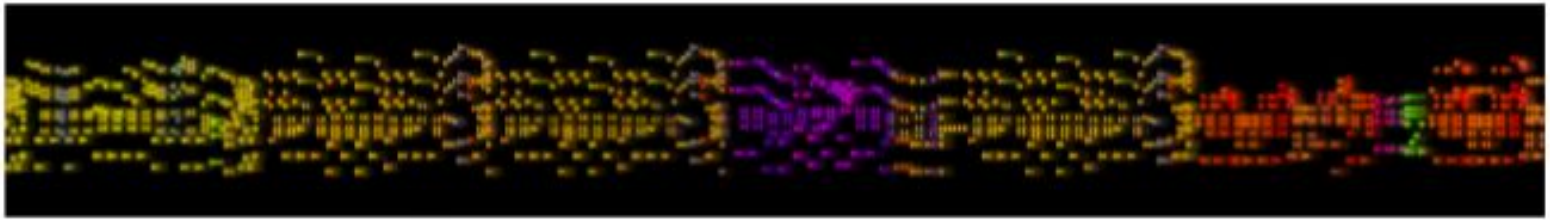
Diego Hernandez | CS448B


34
Fl.
Ob.
Cl.
Bsn.
B♭ Hn.
G Hn.
Vln. I
Vln. II
Vla.

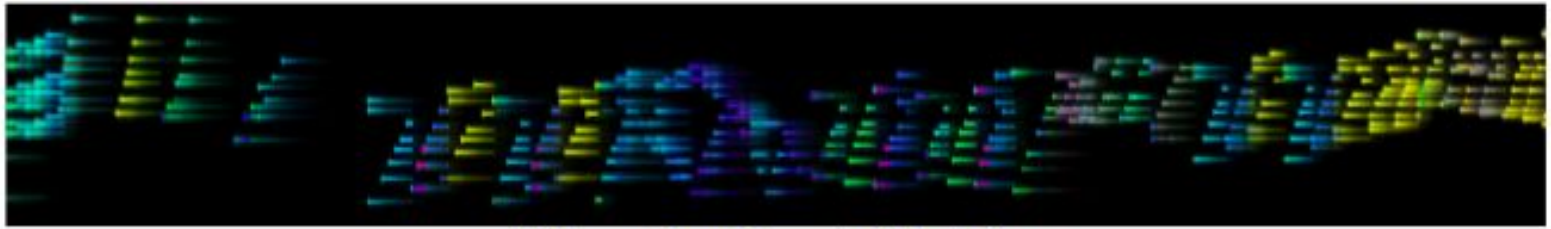

34
Fl.
Ob.
Cl.
Bsn.
B♭ Hn.
G Hn.
Vln. I
Vln. II
Vla.



(a) Excerpt from Pachelbel's Canon in D major



(b) Excerpt from Strauss's An der schönen blauen Donau

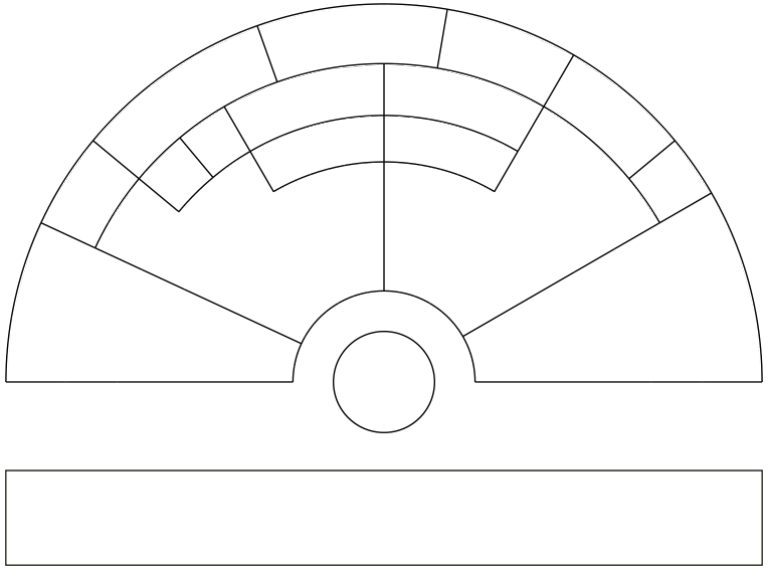


(c) Excerpt from Debussy's Clair de Lune

Figure 3: Examples of visualization of classical compositions.

Questions

- Match by instrument or by note?
- Useful to visualize the physical layout of an orchestra?



http://www.sammamishsymphony.org/Musicians/Seating.php

Interactive Visualizations of Circuit Structure

Ross Daly and Leonard Truong

“Visualization of circuits is an important research area in electronic design automation. Locating errors in a large design may require a high-quality graphical representation of a circuit that allows humans to understand it.”

Eschbach, T & Gunther, W & Becker, Bernd. (2005). Orthogonal circuit visualization improved by merging the placement and routing phases. 433-438. 10.1109/ICVD.2005.134.

Problem Description

Hardware designers use textual languages to specify circuit structure

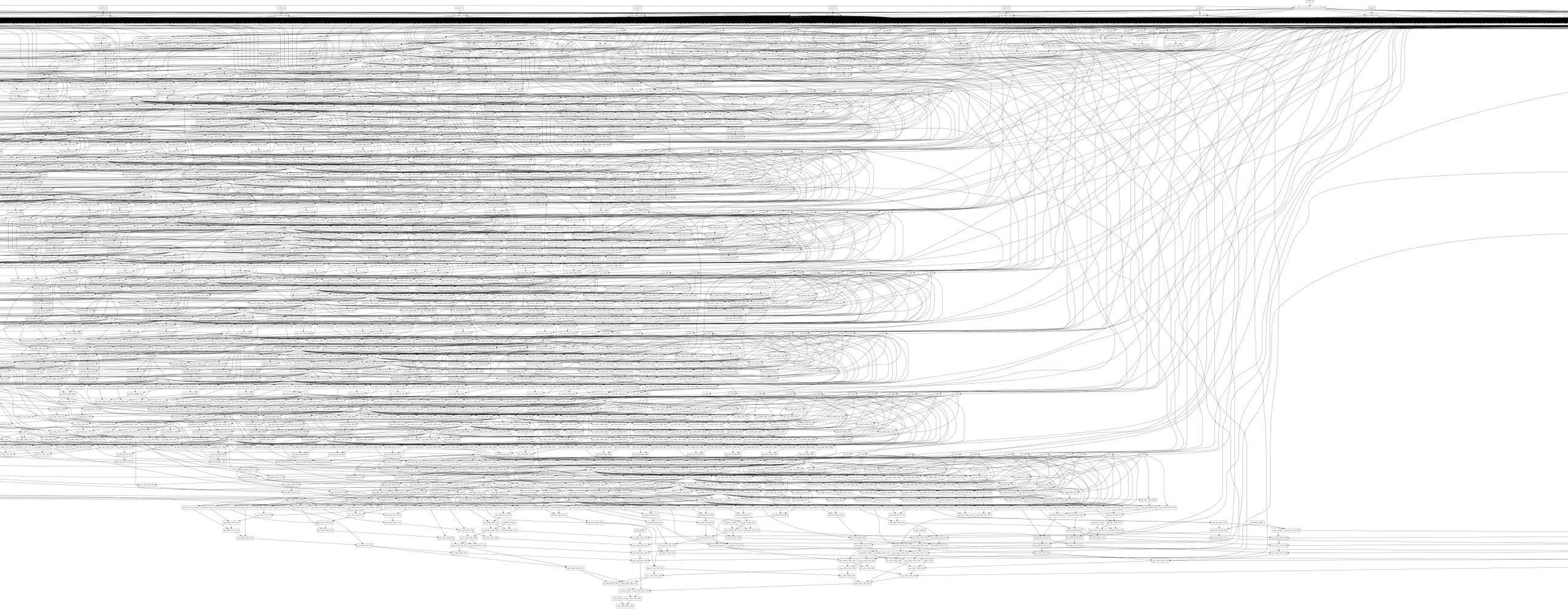
Hardware compiler writers construct, analyze, and manipulate an intermediate representation of a circuit as a graph

Visualizations of the intermediate representation, particularly of the differences across compiler transformations, would be a key productivity tool for both compiler writers and designers.

Prior work [1] has explored the placement and routing of circuits for visualization, we plan to extend this approach to support interactive recompilation of layout when switching between multiple views.

[1] Eschbach, T & Gunther, W & Becker, Bernd. (2005). Orthogonal circuit visualization improved by merging the placement and routing phases. 433- 438. 10.1109/ICVD.2005.134.

Graphviz



Visualizing the entire design becomes unmanageable as the number of nodes in the graph increases

Extending Prior Work

- Existing graph visualization systems lack support for:
  - Hierarchy
  - Multiple, domain specific views for hardware (undirected/directed graph, DAG, pipeline stages)

Design Goals

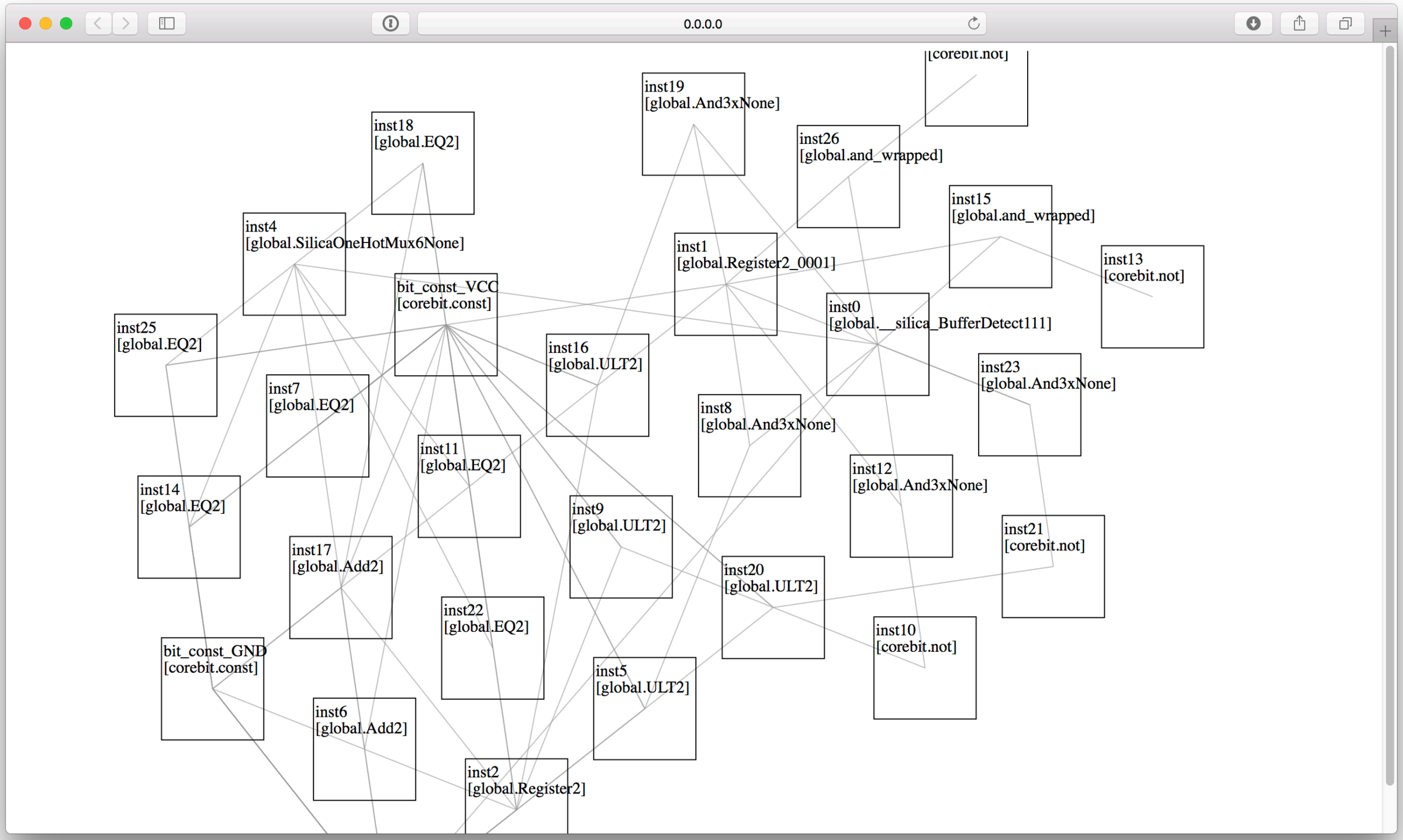
- Interactivity using D3
    - Realtime traversal of the levels of hierarchy
    - Switch between different views of the same design
        - Selection/highlighting of graph nodes and edges
- Should promote fast visual search of the design by applying visualizing techniques (e.g. legends, brushing)
- Facilitate visualization of graph transformations (compiler passes that manipulate designs)

Ideal Graph Layout Customization

- Statically constrain the placement of certain nodes
- For each node: constrain the locations of each IO port
- Optimization/tuning to explore the tradeoffs of edge routing algorithms (is there a way to formalize this tradeoff, perhaps from navigation?)
    - Number of edges crossing, total path length, distance between nodes
- Edge attributes
    - Path heuristic: align to grid, smooth curve, direct node <-> node
    - Visualizing intersections: ‘X’ vs semi-circle
    - Color, thickness, etc…

Prototype using D3's Standard Library

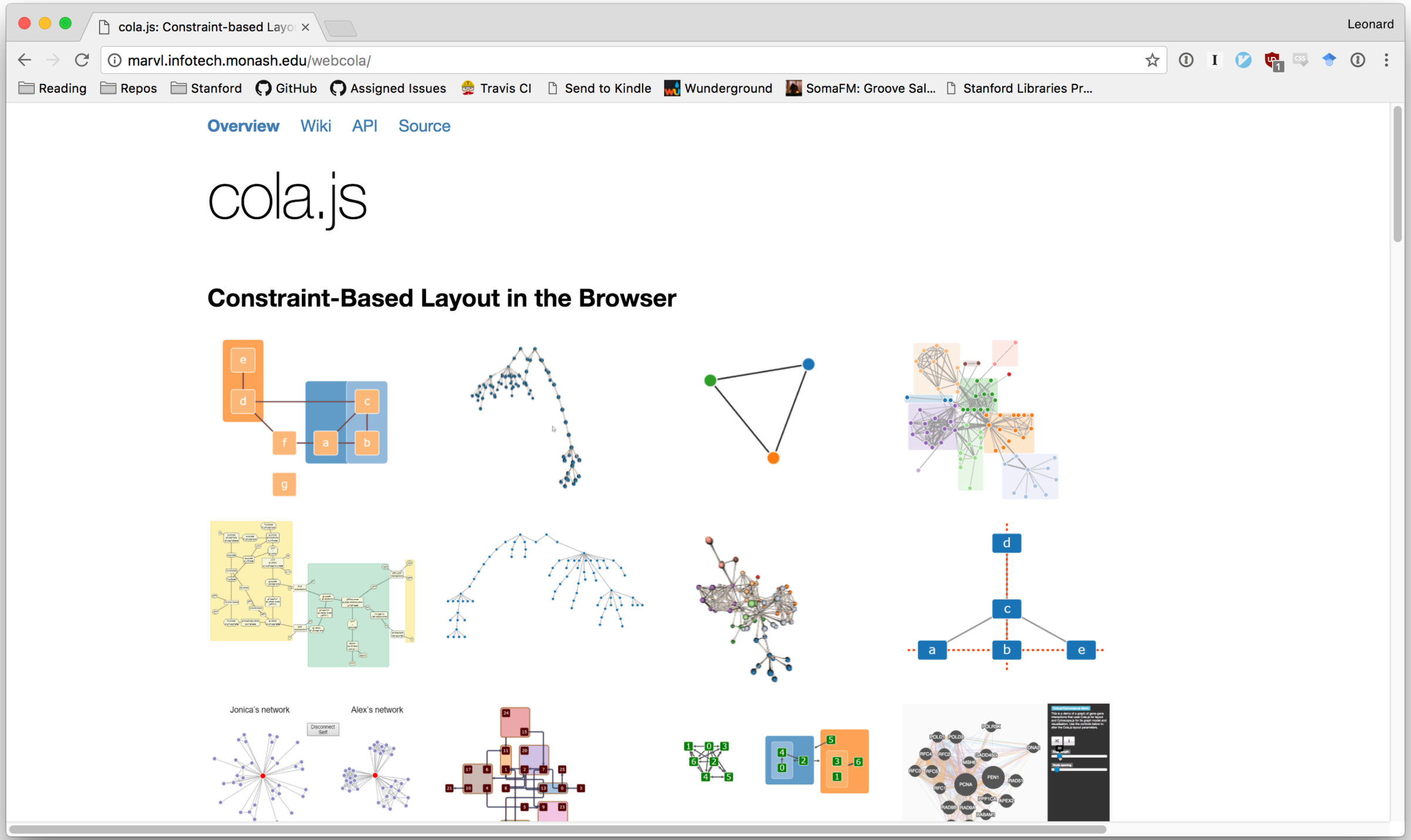
Force Graph


0.0.0.0
[corebit.not]
inst19
[global.And3xNone]
inst18
[global.EQ2]
inst26
[global.and_wrapped]
inst15
[global.and_wrapped]
inst4
[global.SilicaOneHotMux6None]
inst1
[global.Register2_0001]
inst13
[corebit.not]
bit_const_VCC
[corebit.const]
inst0
[global.__silica_BufferDetect111]
inst25
[global.EQ2]
inst16
[global.ULT2]
inst23
[global.And3xNone]
inst7
[global.EQ2]
inst8
[global.And3xNone]
inst11
[global.EQ2]
inst12
[global.And3xNone]
inst14
[global.EQ2]
inst9
[global.ULT2]
inst21
[corebit.not]
inst17
[global.Add2]
inst20
[global.ULT2]
inst22
[global.EQ2]
inst10
[corebit.not]
bit_const_GND
[corebit.const]
inst5
[global.ULT2]
inst6
[global.Add2]
inst2
[global.Register2]

Force Graph Issues

- Have to encode layout constraints as physics relationships (charge, etc…)
- Doesn’t encode direction of edges or port locations
- Hard to believe a physics based approach will yield the best results

cola.js
Constraint Based Layout for D3



cola.js
Constraint Based Layout for D3

- Pros:
    - Encode constraints based on domain knowledge of graph qualities
    - Drop in replacement for D3
- Cons:
    - Young project that lacks documentation and examples
    - Has anyone used this before?

Summary

- Placement of circuit elements and routing of connections is the key underlying problem, we hope to leverage existing graph layout and routing techniques.
- Any library suggestions?
- Is D3 the right tool for interactive graph layouts? The standard library seems to be lacking
- Anything applicable from other domains such as maps and navigation?

Ranked-Data Ribbon Visualization

Greg Ramel

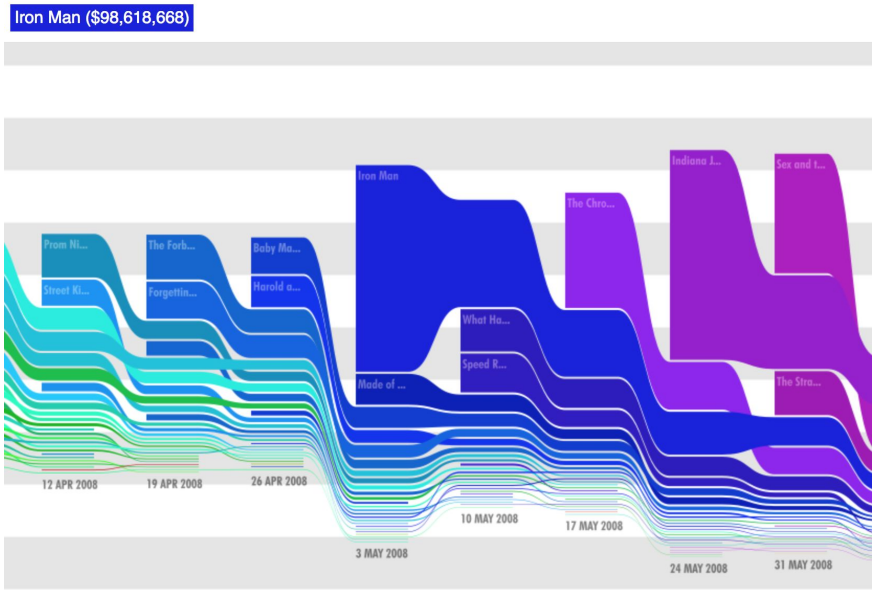
Description

- Interested in Billboard Hot 100 data and songs' paths over time
- Want to create a tool for a general time-series data visualization with stacked ribbons
  - Discrete ranked data
- Possible datasets to explore, very few of which have been visualized:
  - Music charts like Billboard (initial exploration)
  - Box office (prior work)
  - Forbes Billionaire lists
  - Sports: ATP Tennis Rankings, College Football (prior work), major league sports standings, Olympic medal counts
  - New York Times Bestseller list

Description

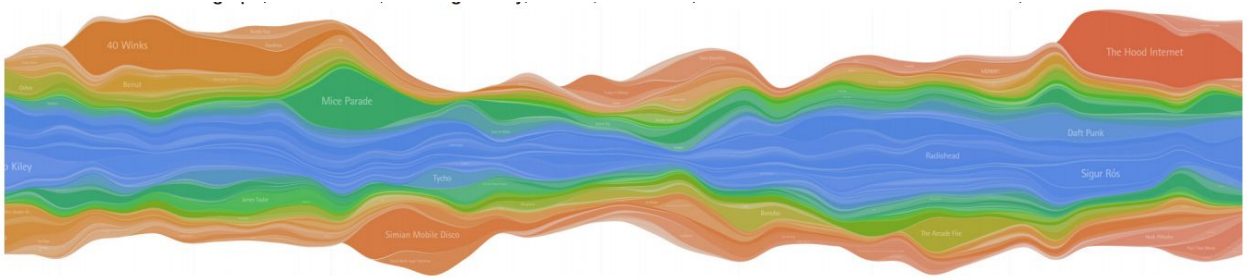
- Software artifact would seek to create a pipeline to allow people to go from ranked data file to customizable, interactive ribbon visualization
    - Customize look and feel, data subset, filtering
- Surprisingly little prior work in this space, or even to capture ranking over time of any of the datasets I outlined

Prior Work - Box Office

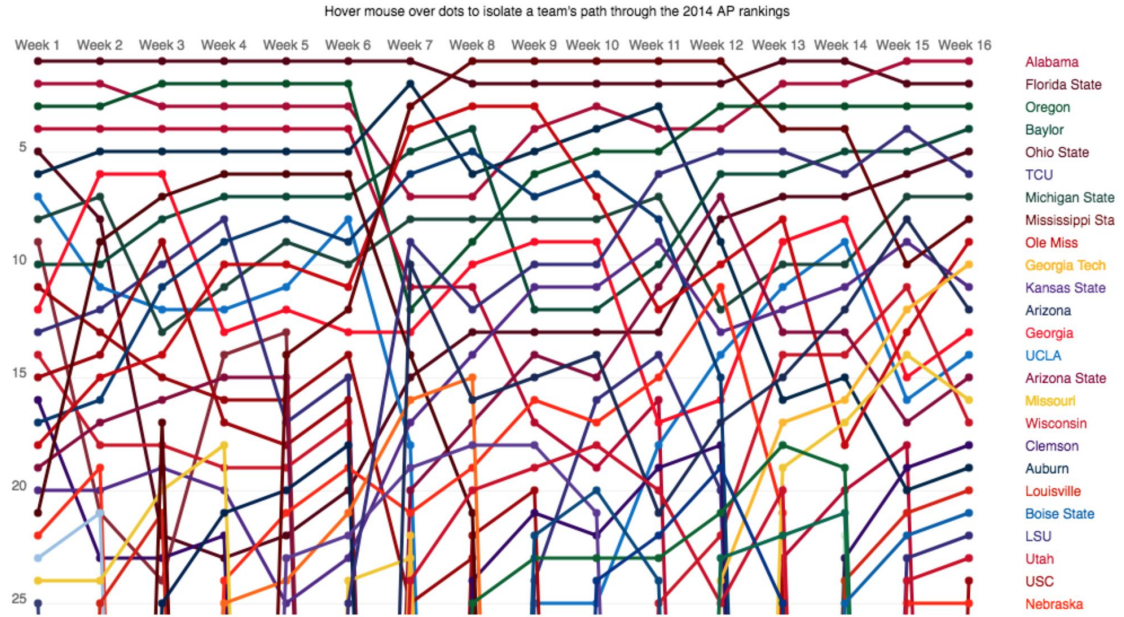


Prior Work - Box Office

- Main point of inspiration is Zach Beane's Box Office Charts
- Weighted by weekend gross; hue for entry time week-by-week
- Static aside from mouseover providing title and gross; no filtering or customization
- Rank at box office is mostly decreasing - need additional considerations for frequent and more drastic shifts, as well as late reentry
- Draws on Byron and Wattenberg's streamgraph



Prior Work - College Football Ranking

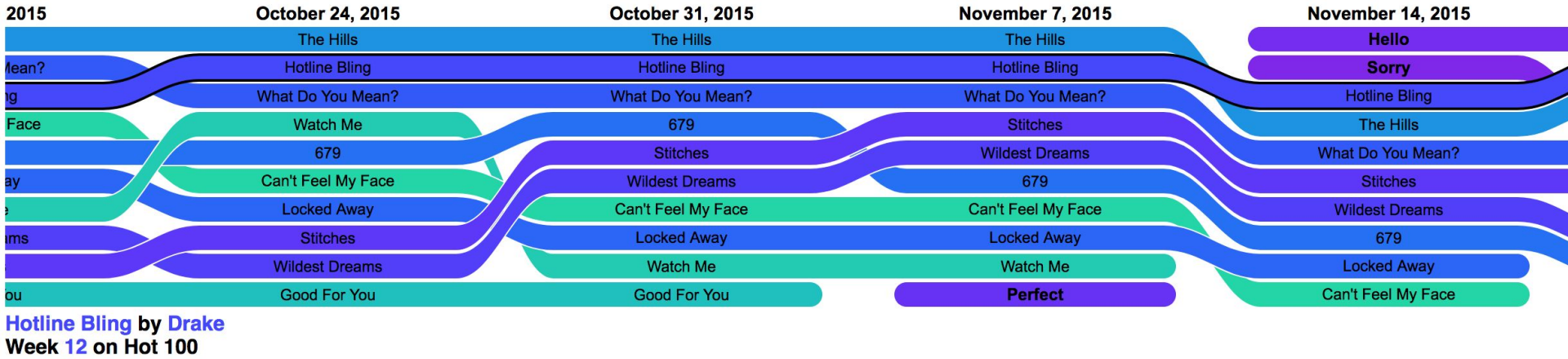


Prior Work - College Football Ranking

- Same general concept of week-over-week ranked data, presented in a more traditional line plot
- Why not just use line plots?
- Doesn’t allow you to capture relative weight and transition between different states
- Harder to track overall path in general, particularly with overlap
- Labeling not possible on path itself

Current Progress

- Have existing, rudimentary visualization of Billboard Top 10 - limited interactivity; slow to render so no filtering possible; bulky data (json)



Current Progress

- Initial time spent on project has been beginning to update old implementation with an eye toward generalized functionality - Billboard data is hardcoded
- Exploring datasets, web scraping to get a sense of how to allow users to plug in custom .csv files and column labels
- Flow:
    - Select file; select columns for axes (timesteps, rank); select columns for attached data (label, mouseover)
    - Customize look and feel (color sequence; custom icons or graphics; weighted or unweighted)
    - Customize filtering options
- Stretch goal: smart scraper to automatically pull rank data in a usable format given an initial URL and limited user pointers

Questions

- What features/filters would you want to see in a tool like this?
- What datasets come to mind that you would want to explore?
- Are there other examples of visualizations in this vein that I missed?

Tracksplore

Na He Jeon, Mathieu Rolfo, Karen Wang

Problem

- **Goal:** compare tracks in CS and SymSys
- Visualize the similarities and differences between tracks

Current State of Exploring Tracks

Track Electives: at least three additional courses selected from the Areas and lists above, general CS electives, or the following: [4]	
CS 238	Decision Making under Uncertainty
CS 275	Translational Bioinformatics
CS 326	Topics in Advanced Robotic Manipulation
CS 334A or EE 364A	Convex Optimization I Convex Optimization I
CS 428	Computation and cognition: the probabilistic approach
EE 278	Introduction to Statistical Signal Processing
EE 364B	Convex Optimization II
ECON 286	Game Theory and Economic Applications
MS&E 252	Decision Analysis I: Foundations of Decision Analysis
MS&E 352	Decision Analysis II: Professional Decision Analysis
MS&E 355	Influence Diagrams and Probabilistics Networks
PHIL 152	Computability and Logic
PSYCH 202	Cognitive Neuroscience
PSYCH 204A	Human Neuroimaging Methods
PSYCH 204B	Computational Neuroimaging: Methods & Analyses
PSYCH 209	Neural Network Models of Cognition: Principles and Applications

[4] General CS Electives: CS 108,CS 124, CS 131, CS 140 (or CS 140E), CS 142, CS 143 CS 144, CS 145, CS 147, CS 148, CS 149, CS 154, CS 155, CS 157(or PHIL 151), CS 164, CS 166, CS 167, CS 168, CS 190, CS 205A, CS 205B, CS 210A, CS 223A, CS 224N, CS 224S, CS 224U, CS 224W, CS 225A, CS 227B, CS 228, CS 229, CS 229T, CS 231A, CS 231B, CS 231M, CS 231N, CS 232, CS 233, CS 234, CS 238, CS 240, CS 240H, CS 242, CS 243, CS 244, CS 244B, CS 245, CS 246, CS 247, CS 248, CS 249A, CS 251, CS 254, CS 255, CS 261, CS 262, CS 263, CS 264, CS 265, CS 266, CS 267, CS 269I, CS 270, CS 272, CS 273A, CS 273B, CS 274, CS 276, CS 279, CS 348B, CS 348C, CS 352; CME 108; EE 180, EE 282, EE 364A.

Current State of Exploring Tracks

CS Artificial Intelligence Track Program Sheet (continued)

AI Track Core, Depth, and Senior Project *(43 units minimum)*
Be advised: no course may be listed twice; no double counting.

Dept	Course	Title	Transfer/Deviation Approval by Dept: ✓ if Transfer	Dept Initials	Date	Unit	Grade
Core (15 units minimum)							
CS	107 or 107E	Computer Organization and Systems					
CS	110	Principles of Computer Systems					
CS	161	Design and Analysis of Algorithms					
Depth; Track and Electives (25 units and seven courses minimum)							
CS	221	AI: Principles and Techniques (Track Requirement A)					
CS		Track Requirement B (see note 6)					
CS		Track Requirement B (see note 6)					
		Track Requirement C (see note 7)					
		Elective (see note 8)					
		Elective (see note 8)					
		Elective (see note 8)					
		Optional Elective					
Senior Project (1 course required)							
CS		At least 3 units of 191, 191W, 194, 194H, 194W, 210B, 294 or 294W *(see note 10)*					
		Computer Science Core, Depth and Senior Project Total (43 units minimum)					

NOTES (continued from page 1)

(6) Track Requirement B: Two courses, each from a different area:
Area I) AI Methods [CS 228, 229, 234, 238]; Area II) Natural Language Processing: [CS 124, 224N, 224S, 224U];
Area III) Vision: [CS131, 231A, 231N]; Area IV) Robotics: [223A]

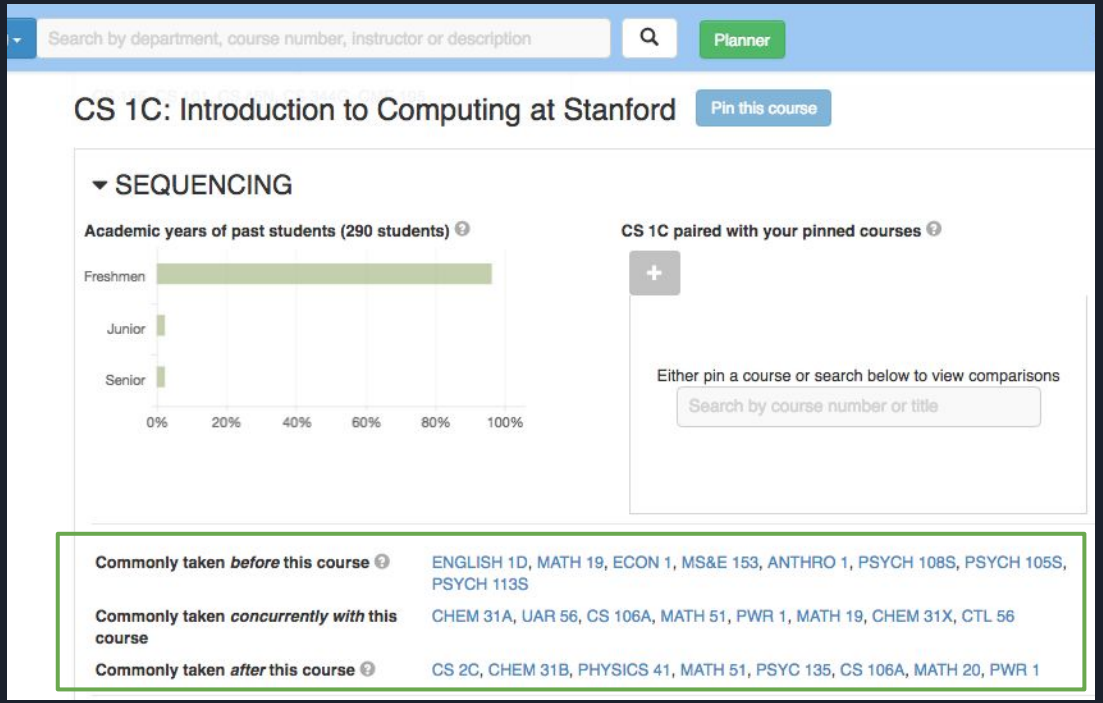
(7) Track Requirement C: One additional course from the Track Requirement B list, or from the following:
AI Methods: [157, 205A, Stats 315A, Stats 315B]; Vision: [231B, 231M, 331A];
Comp Bio: [262, 279, 371, 374]; Information and the Web: [276, 224W]; Other: [227B, 277, 379]
Robotics and Control: [327A, 329 (with advisor approval), ENGR 205, EE 209, MS&E 251, MS&E 351];

(8) Track Electives: At least three add'l courses selected from the Track Req't B list, C list, the General CS Electives list (see Note 9) or the following: CS 238, 275, 326, CS334A or EE 364A; CS 428; EE 278, EE 364B; ECON 286; MS&E 252, 352, 355; PHIL 152;
PSYCH 202, 204A, 204B, 209; STATS 200, 202, 205

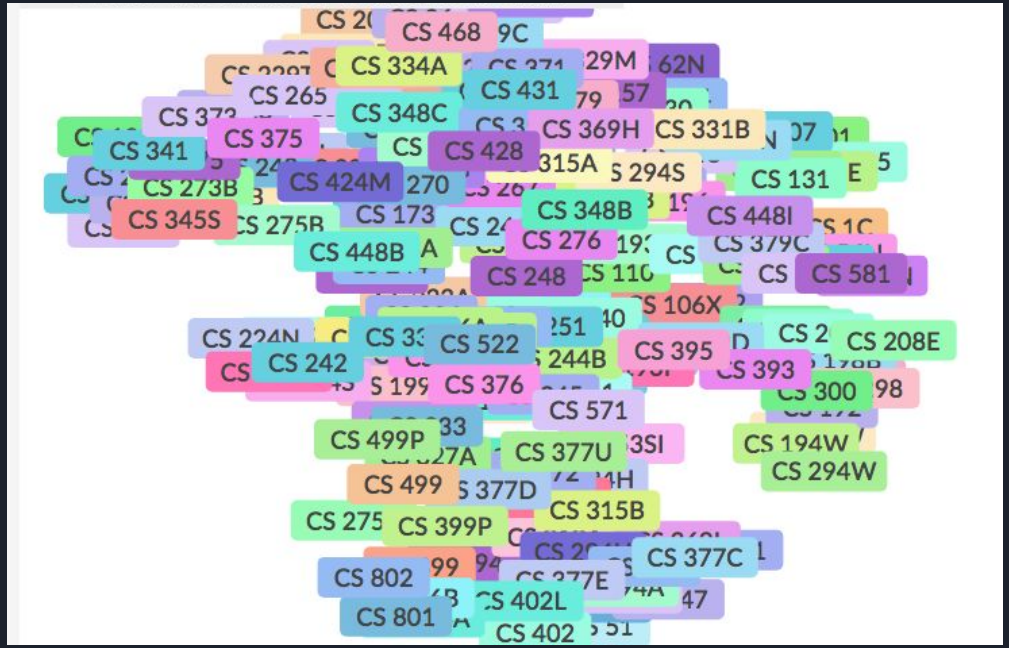
(9) General CS Electives: CS 108, 124, 131, 140 or 140E, 142, 143, 144, 145, 147, 148, 149, 154, 155, 157 (or PHIL 151), 164, 166, 167, 168, 190, 205A, 205B, 210A, 223A, 224N, 224S, 224U, 224W, 225A, 227B, 228, 229, 229T, 231A, 231B, 231M, 231N, 232, 233, 234, 238, 240, 240H, 242, 243, 244, 244B, 245, 246, 247, 248, 249A, 251, 254, 255, 261, 262, 263, 264, 265, 266, 267, 269I, 270, 272, 273A, 273B, 274, 276, 279, 348B, 348C, 352; CME 108; EE 180, 282, 364A

(10) The WIM requirement may be met by taking CS 181W as a Technology in Society course or through the Senior Project course (CS 191W, 194W, 210B, or 294W only).

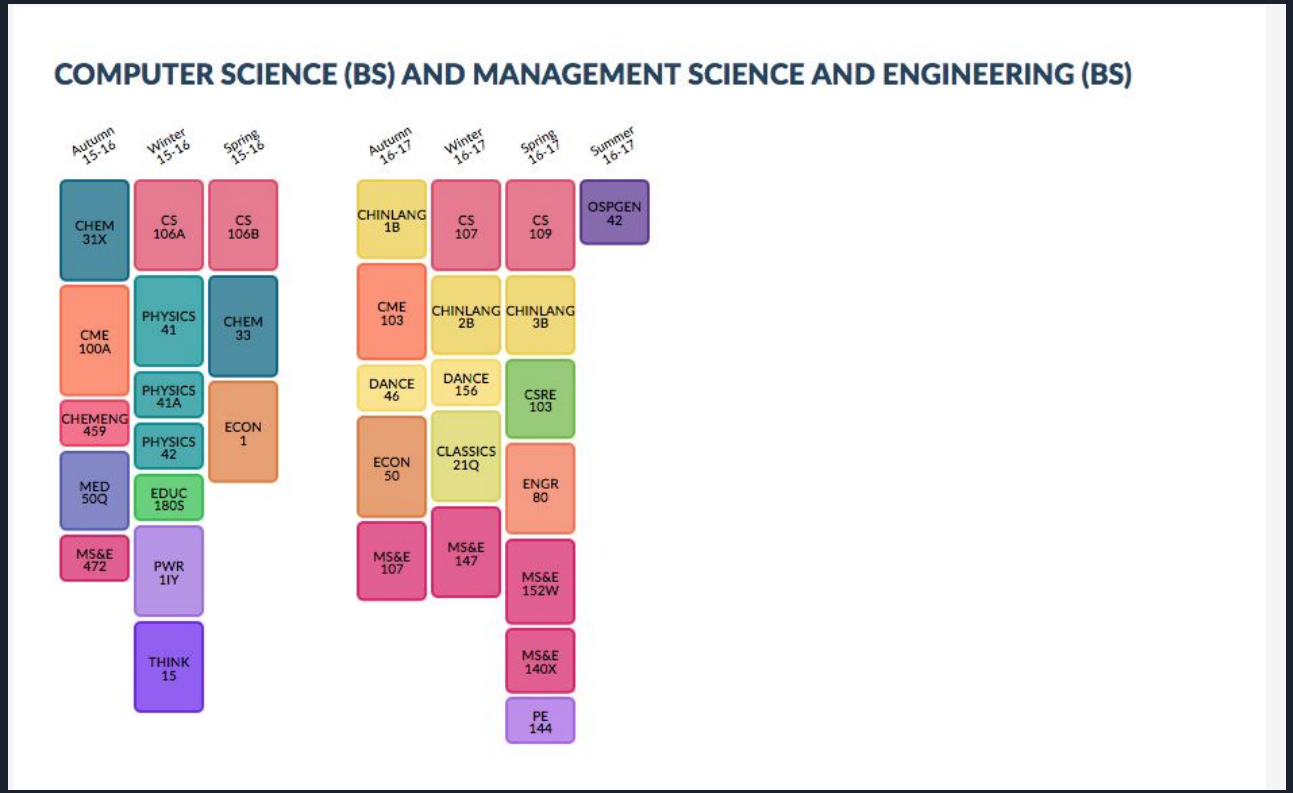
Prior Work: Carta



Prior Work: Edusalsa Explore



Prior Work: Edusalsa Journeys



Improvements Needed

- Program sheets and ExploreDegrees list requirements for each track, but lack features to compare them across tracks.
- Third-party software tools don’t provide any information on tracks.

Idea: Forward-Sampling Track Permutations

AI

Biocomp

Comp.
Engineering

AI

CS 221

Biocomp

Comp.
Engineering

Open Questions

Do you think the issue of comparing tracks is a compelling one?

If not, are there related questions students (you) want the answer to?

Do you have any suggestions for computing similarity between tracks?

Do you have any suggestions for visualizing similarity between tracks?

The Effect of Animation and Small Multiples in Dynamic Graphs Surfaced on Mobile Devices

Albert Feng
Pakapark Bhumiwat

Mobile Devices are **small**…

…but Visualizations for Time Dependent Data **Takes Up Space.**

Mobile Visualization Research

Time Dependent Data Visualization Research

Visualization Technique Comparison Research


9:41
Mobile Viz Experiments
Animation Question 1/5
Title
X
Y
00:23
How does X relate to Y?
A
B
C
D
Next Question

Feedback and Questions

How can we make sure the test visualizations we create as “good visualizations” so that the test results we get from them are actually valid?

What other techniques should we explore in showing time dependent data?

What are some interesting time dependent data sets that we should consider?

Interactive Bayesian Network Visualization with D3 for Non-domain experts

Jesik Min

Bayesian Network

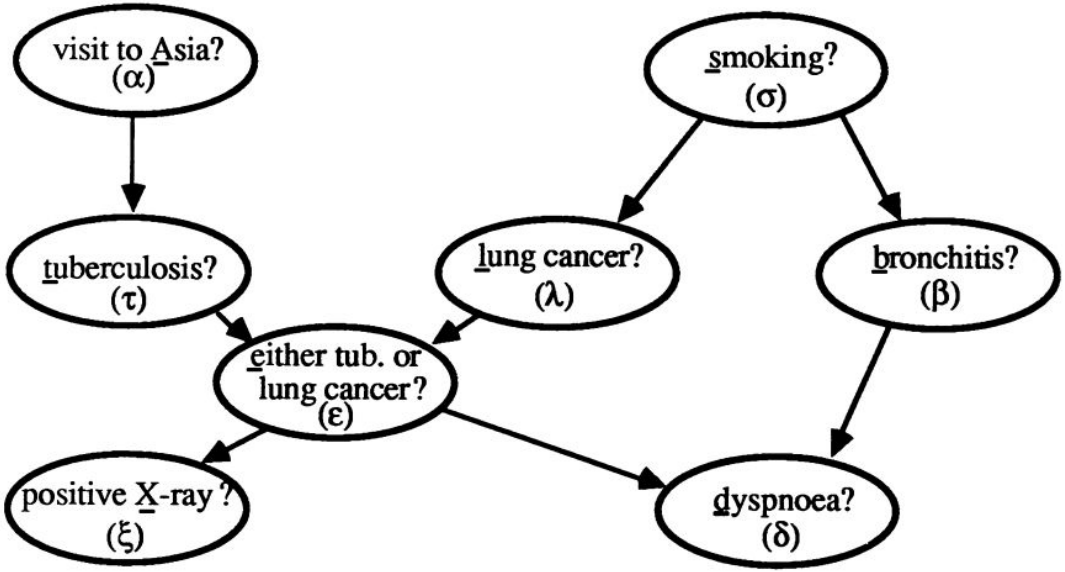


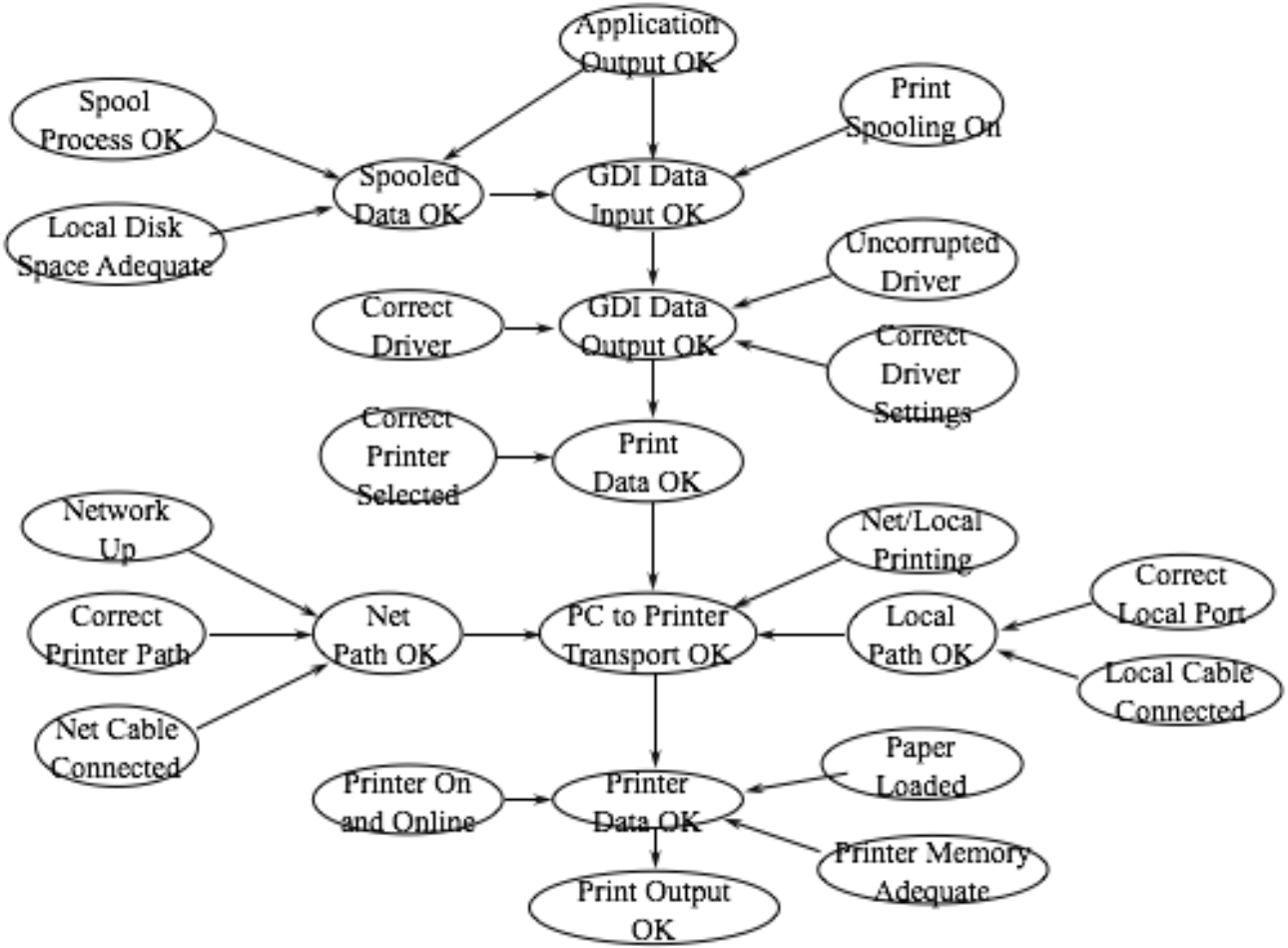
Fig. 2. Causal network in our fictitious example with short node names (greek letters) to be used in the text. Each node has two possible states representing responses 'yes' and 'no'. Direction of causality is from top to bottom.

[Lauritzen and Spiegelhalter, 88]

Why Bayesian Network?

1. Graphical models
2. Causal relationships
3. Handle uncertainty

[Margaritis, 03]



[Heckerman, 95]

Problem

People without domain knowledge should also be able to construct a reasonable Bayesian network.

Previous Work

Lisa Li, Omar Ramadan, and Phoebe Schmidt, Improving Visual Cues for the Interactive Learning of Bayesian Networks. UC Berkeley, CS294-10-fa14.

Chih-Hung Chiang, Patrick Shaughnessy, Gary Livingston, and Georges Grinstein, Clifford Champion and Charles Elkan, Visualizing the Consequences of Evidence, in Bayesian Networks, arXiv:1707.00791 [cs.AI], 2017

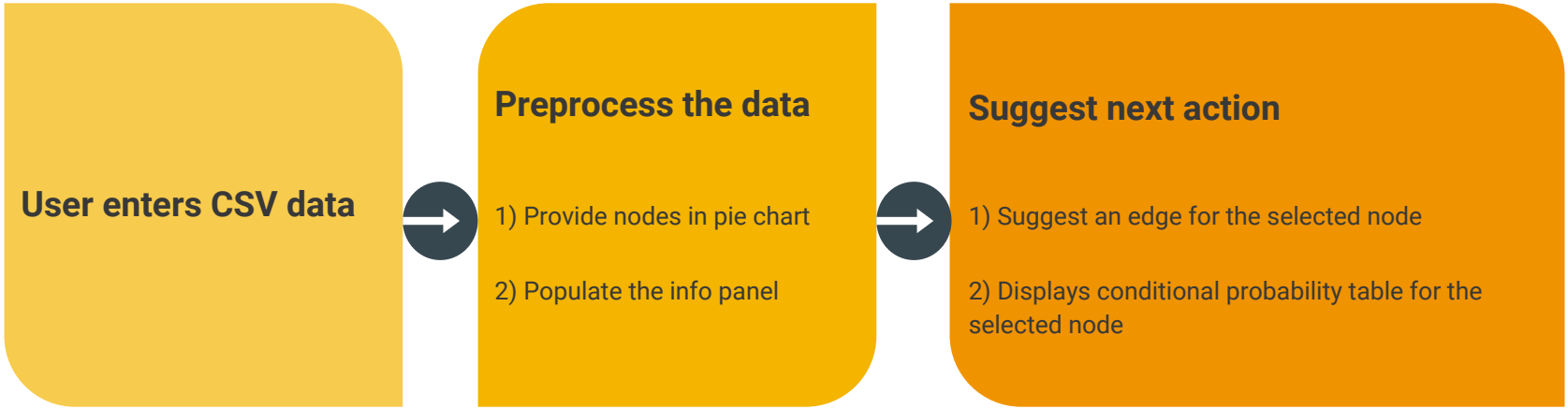
Cossalter, M., Mengshoel, O., and Selker, T., “Visualizing and Understanding Large-Scale Bayesian Networks,” in [Proc. of the AAAI’11 Workshop on Scalable Integration of Analytics and Visualization], 12–20 (Aug 2011).

- Standalone application
- No integration

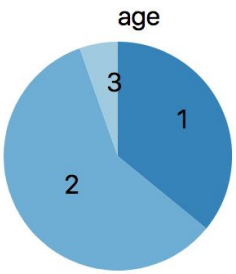
Solution

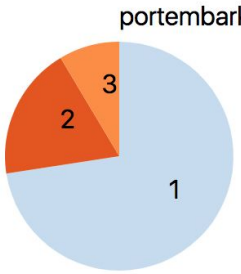
Implement a D3 application that helps non-domain experts construct and visualize Bayesian networks.

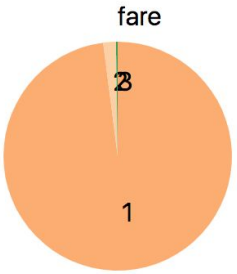
Workflow

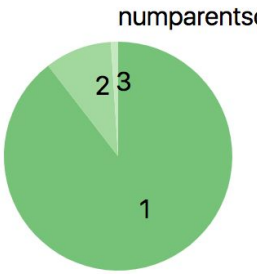

User enters CSV data
Preprocess the data
1) Provide nodes in pie chart
2) Populate the info panel
Suggest next action
1) Suggest an edge for the selected node
2) Displays conditional probability table for the selected node

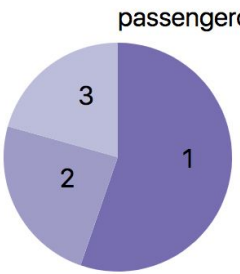
Feature Implemented

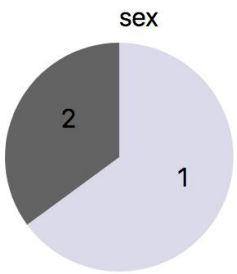


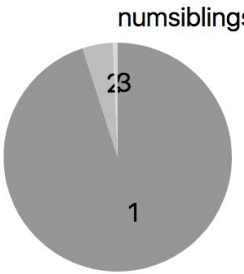


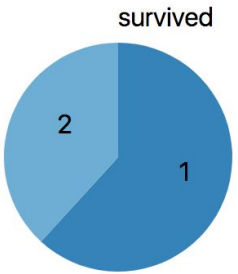












Project Plan

Date	Features to implement
11/7~11/10	Make each node clickable. Enable user to add edges between nodes.
11/11~11/18	Suggest the conditional probability table for the selected set of nodes.
11/19~11/22	Suggest an edge from the selected node based on the dataset (e.g. by computing Bayesian score).
11/23~11/27	Implement information panel on the side. Enable user to upload the any CSV file.
11/27~11/30	Improve encoding schemes (e.g. color scheme, shape, text position).
12/1~12/5	Finish up code and make poster. Make demo for the live presentation.

Questions?