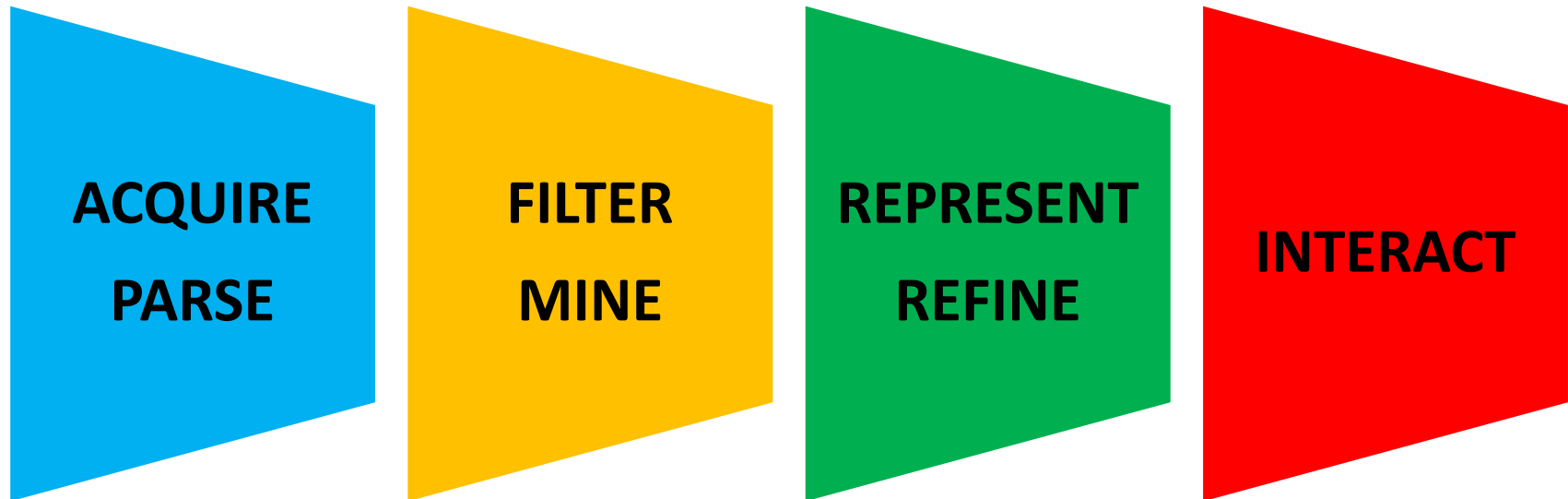# Information Visualization
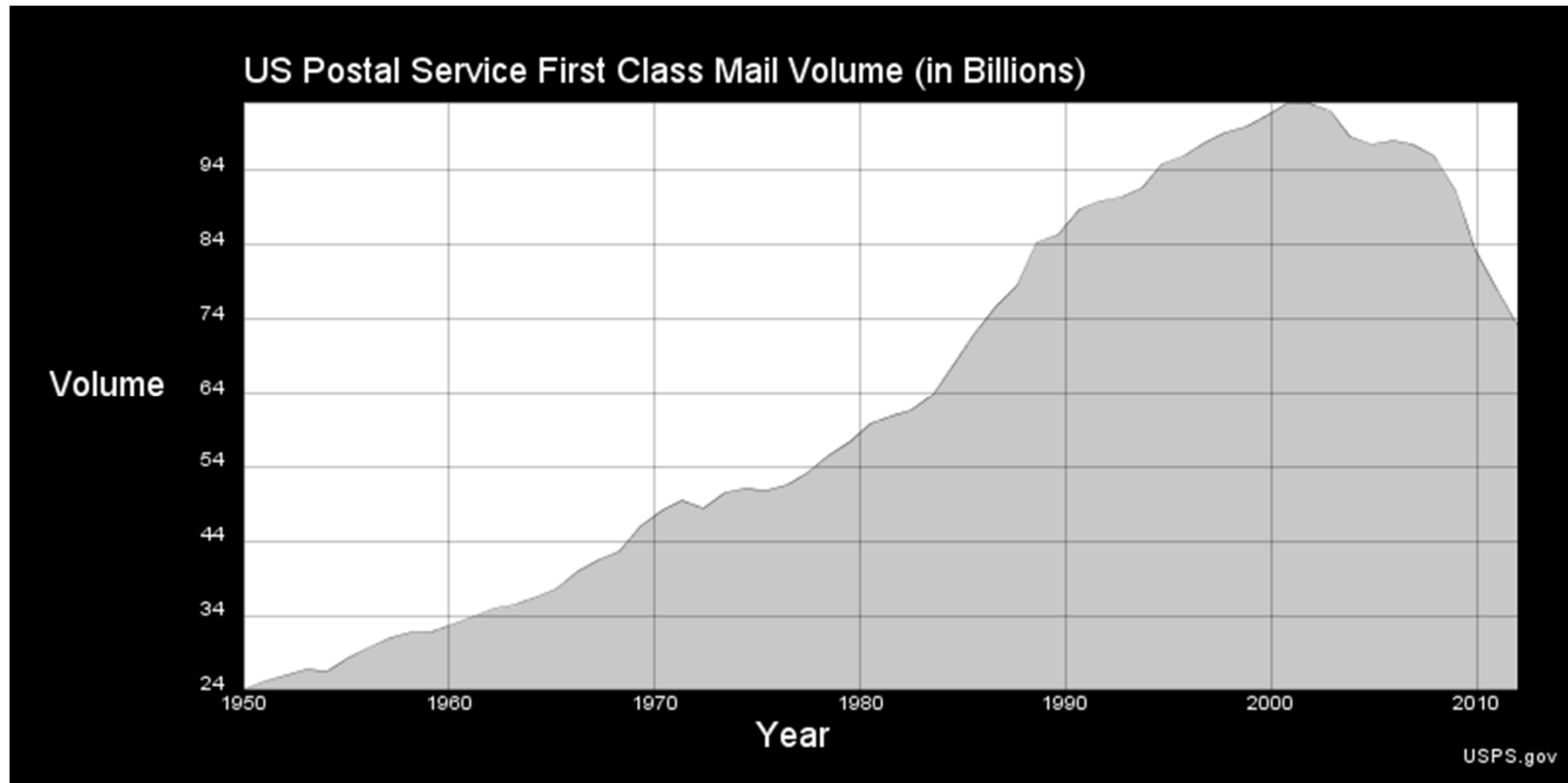# Part 2

Dianna Xu

Deepak Kumar
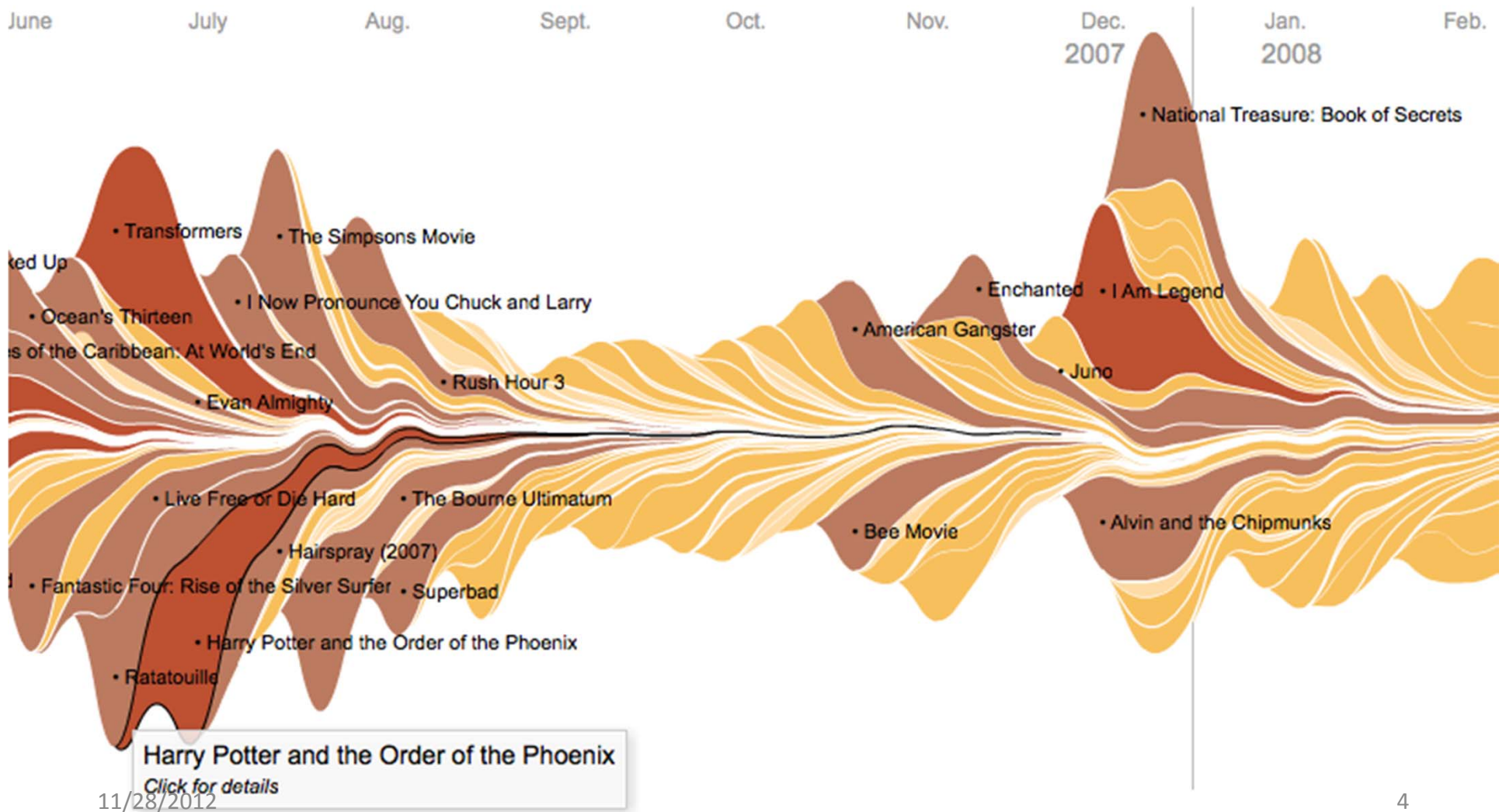
The Visualization Process

ACQUIRE PARSE

FILTER MINE

REPRESENT REFINE

INTERACT

1. Time Series
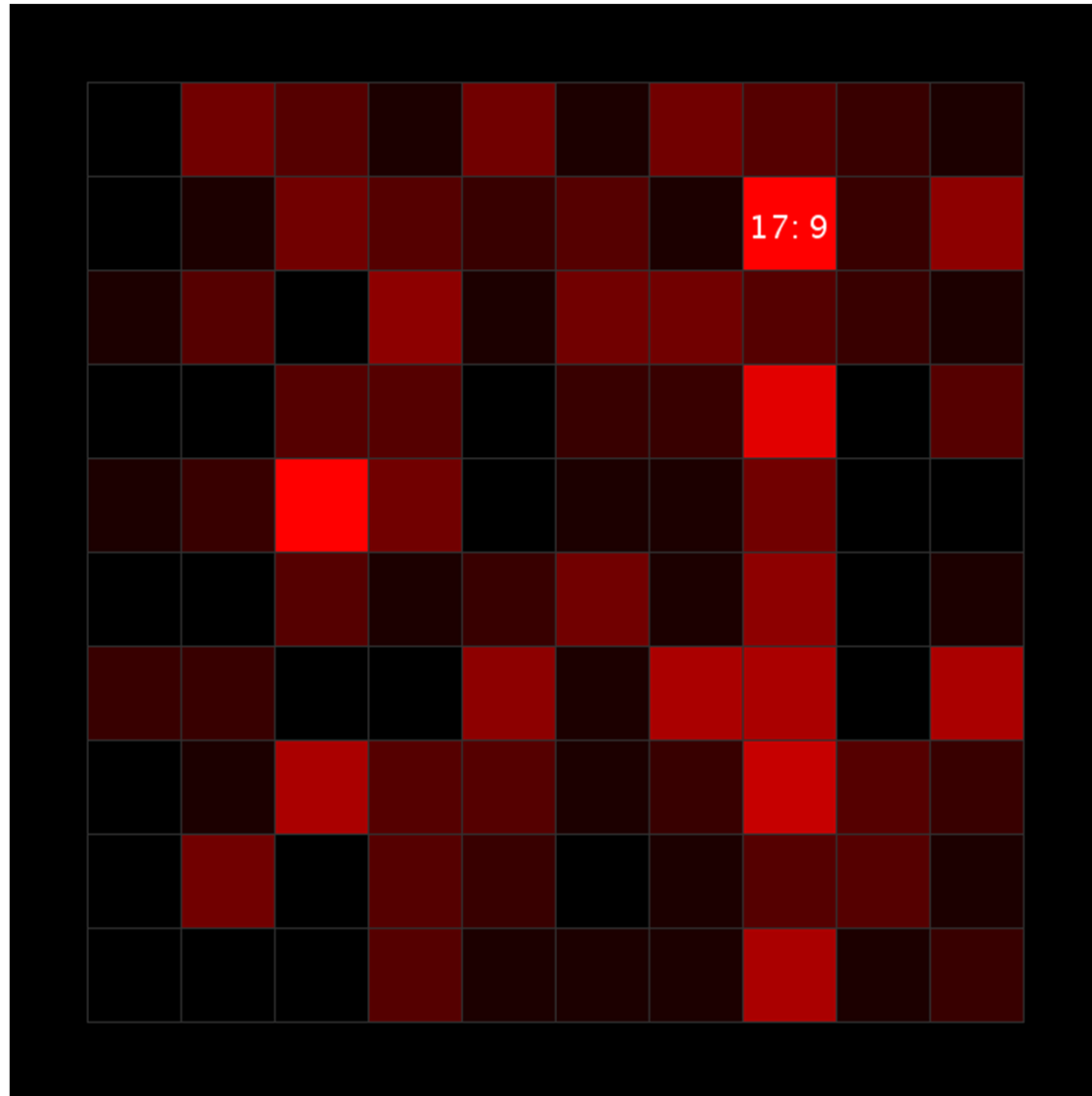

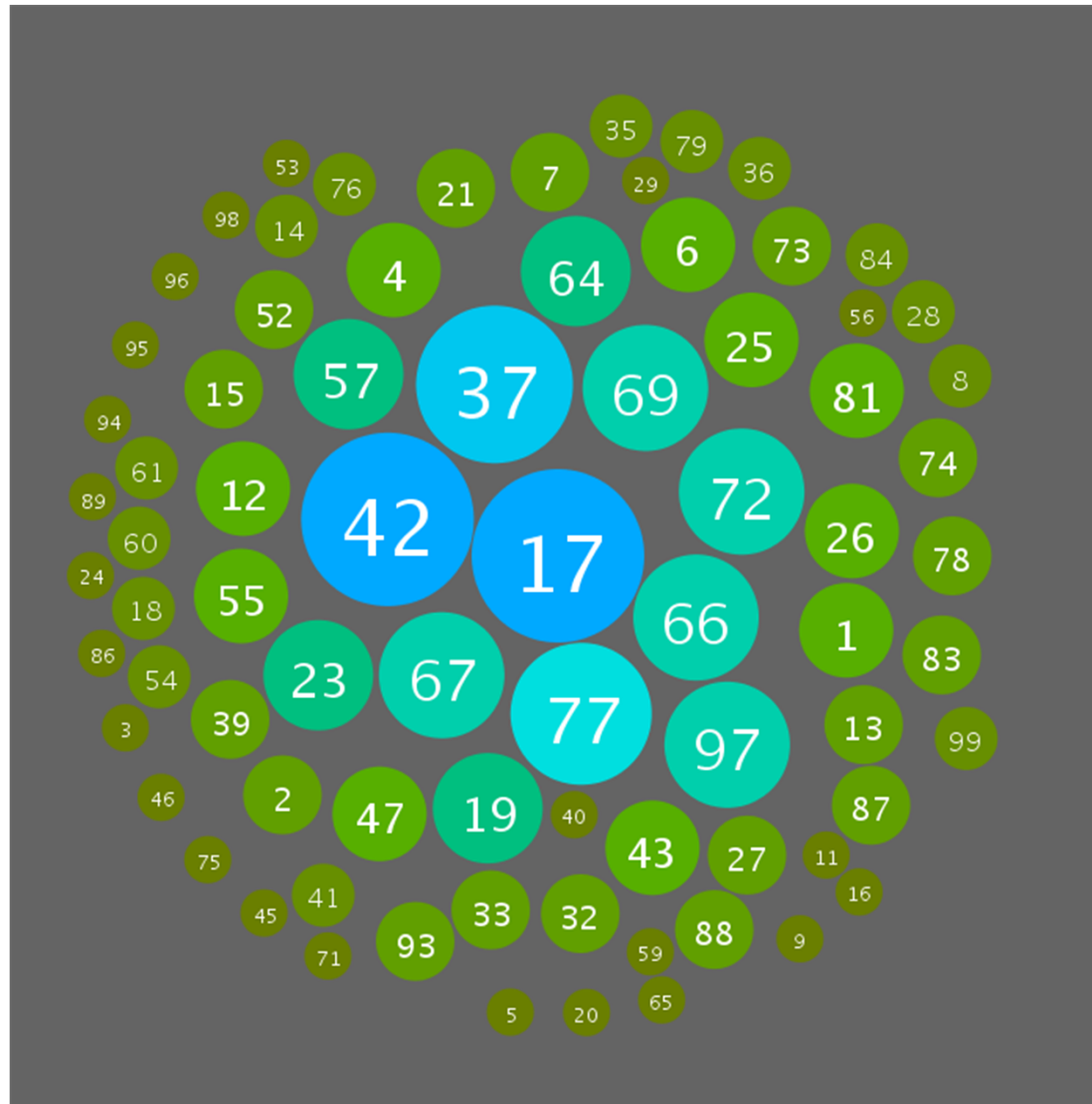US Postal Service First Class Mail Volume (in Billions)

2. Stacked Graph

3. Heat Map

4. Proportional Symbols

5. World Clouds

6. Map-based

October 30, 2012
6:59 am EST
(time of forecast download)

top speed: **39.7 mph**
average: **8.4 mph**

1 mph
3 mph
5 mph
10 mph
15 mph
30 mph

Seattle
San Jose
Los Angeles
San Diego
Phoenix
Denver
Dallas
Houston
Chicago
Columbus
New York
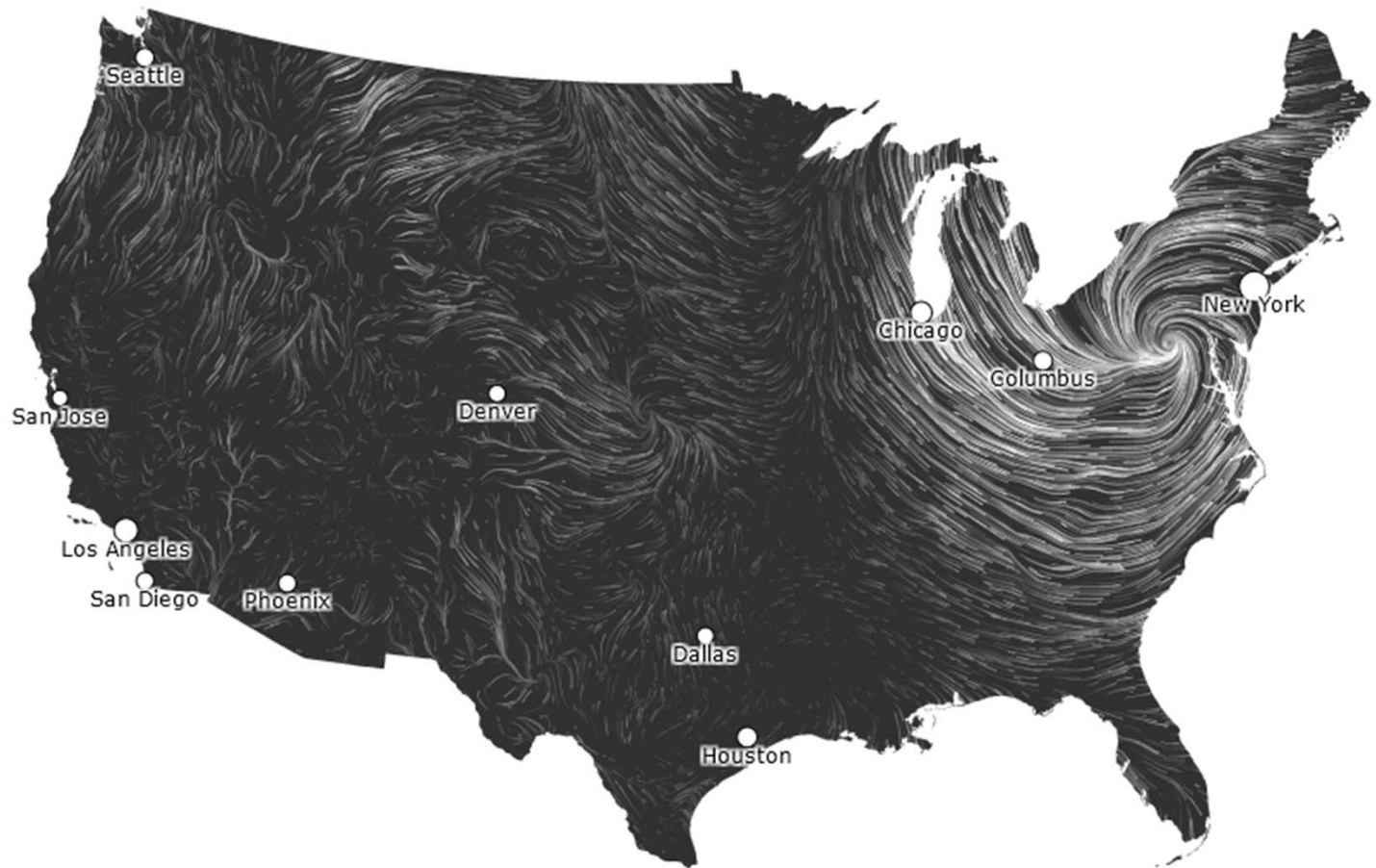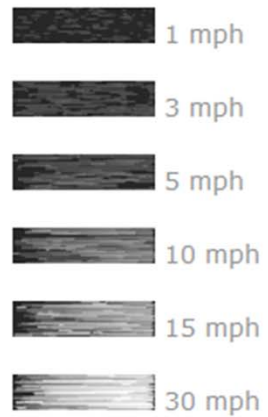
7. Choropleth Maps
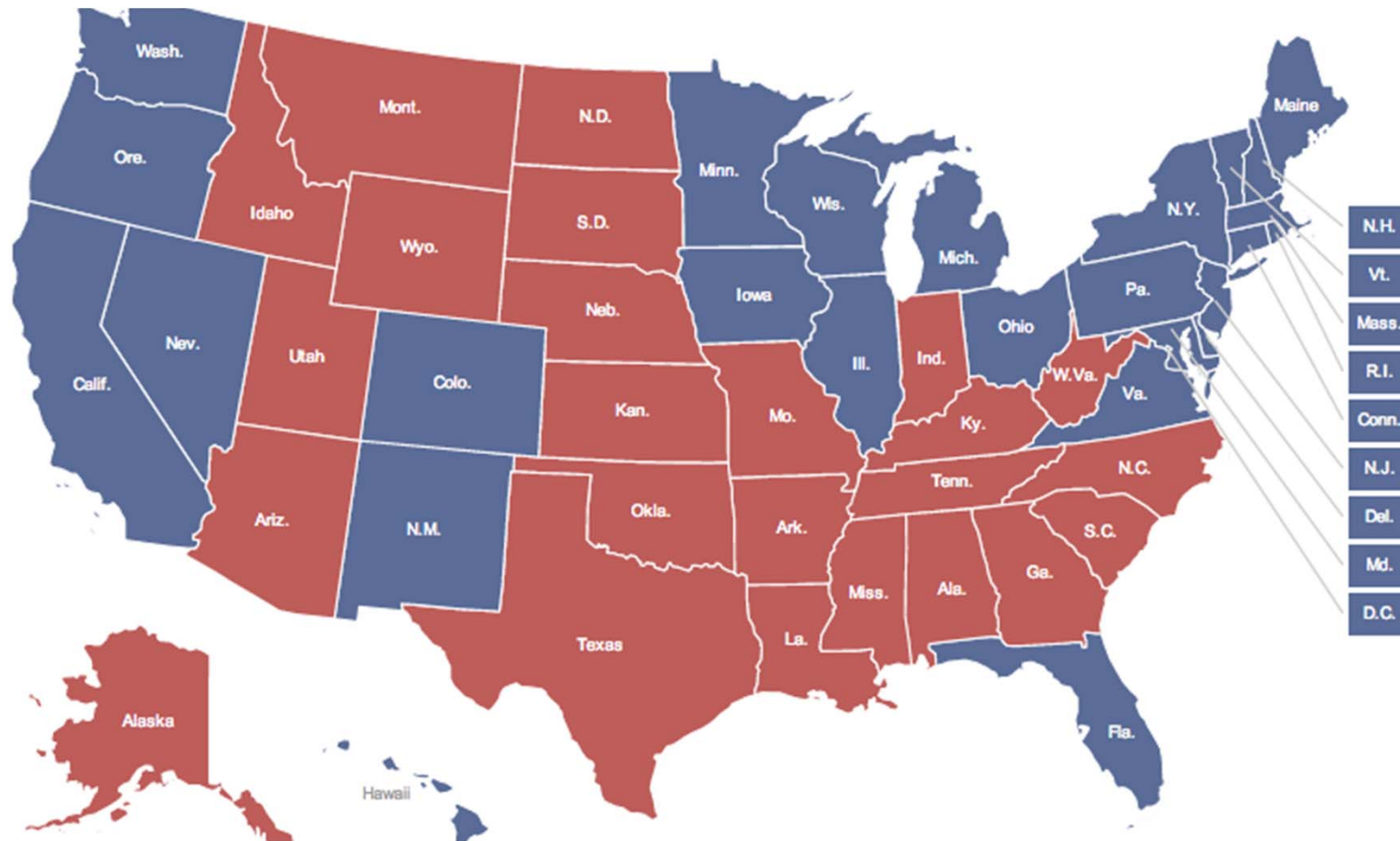
8. Parallel Coordinates

- High dimensional numerical data
- PNC Christmas Price Index

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Year	One Partridge in a Pear Tree	Two Turtle Doves	Three French Hens	Four Calling Birds	Five Gold Rings	Six Geese-a-Laying	Seven Swans-a-Swimming	Eight Maids-a-Milking	Nine Ladies Dancing	Ten Lords-a-Leaping	Eleven Pipers Piping	Twelve Drummers Drumming
2	1984	32.52	47.73	15.23	280	325	150	7000	26.8	1511.78	1679.75	770.28	834.47
3	1985	31.52	47.73	15.23	280	325	150	7000	26.8	1557	1730	793.32	859.43
4	1986	44.95	50	15	280	275	150	7000	26.8	1602	1780	814.32	882.18
5	1987	44.95	50	15	280	750	150	7000	26.8	1800	2000	842.4	912.6
6	1988	39.95	50	15	280	625	150	7000	26.8	1800	2000	863.46	935.42
7	1989	39.95	50	15	280	750	150	7000	26.8	2084.4	2316	905.58	981.05
8	1990	27.48	50	15	280	600	150	7000	30.4	2417.9	2686.56	947.7	1026.68
9	1991	27.5	50	15	280	412.5	150	7000	34	2555.72	2839.69	1003.86	1087.52
10	1992	27.5	50	15	280	300	150	7000	34	2606.83	2924.88	1053	1140.75
11	1993	34.99	50	15	280	325	150	7000	34	2606.83	3012.63	1081.08	1171.17

PNC Bank Price Index (2012)

TOTAL CHRISTMAS PRICE INDEX

| YEAR	PRICE	%CHANGE	YEAR	PRICE	%CHANGE	YEAR	PRICE	%CHANGE
2012	$25,431.18	+4.8%	2002	$14,558.05	-7.6%	1992	$15,581.96	+0.8%
2011	$24,263.18	+3.5%	2001	$15,748.81	+3.5%	1991	$15,455.79	+1.5%
2010	$23,439.38	+9.2%	2000	$15,210.22	+1.8%	1990	$15,231.72	+4.3%
2009	$21,465.56	+1.8%	1999	$14,940.17	+5.1%	1989	$14,598.78	+5.9%
2008	$21,080.10	+8.1%	1998	$14,214.90	+6.5%	1988	$13,785.63	-0.6%
2007	$19,507.25	+3.1%	1997	$13,343.86	+1.1%	1987	$13,871.75	+7.4%
2006	$18,920.59	+3.1%	1996	$13,195.86	+5.7%	1986	$12,920.25	+0.8%
2005	$18,348.87	+6.1%	1995	$12,481.65	-21.7%	1985	$12,816.03	+1.1%
2004	$17,296.91	+2.4%	1994	$15,944.20	+1.2%	1984	$12,673.56	0.0%
2003	$16,885.28	+16.0%	1993	$15,760.70	+1.1%			

8a. Parallel Coordinates
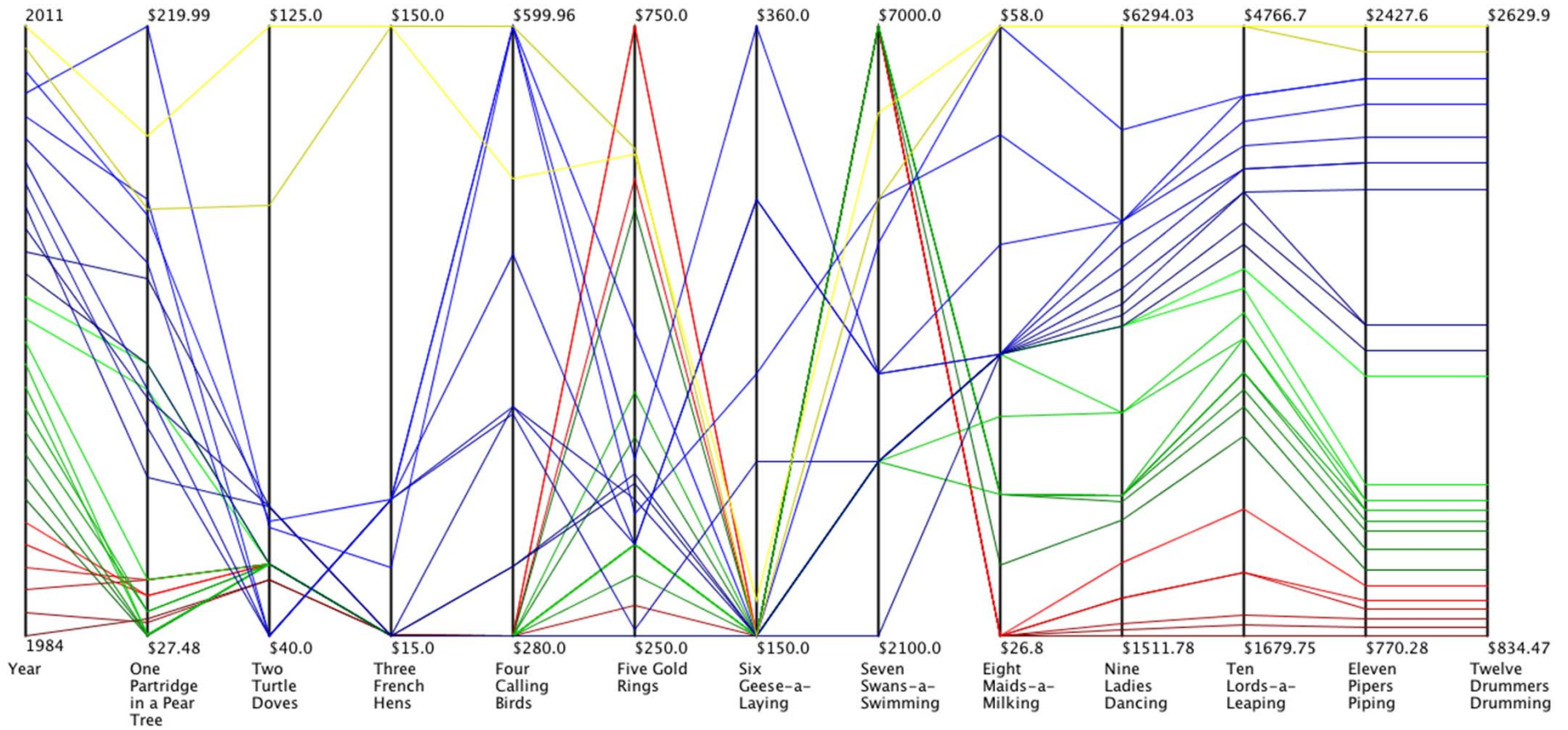
Brushing
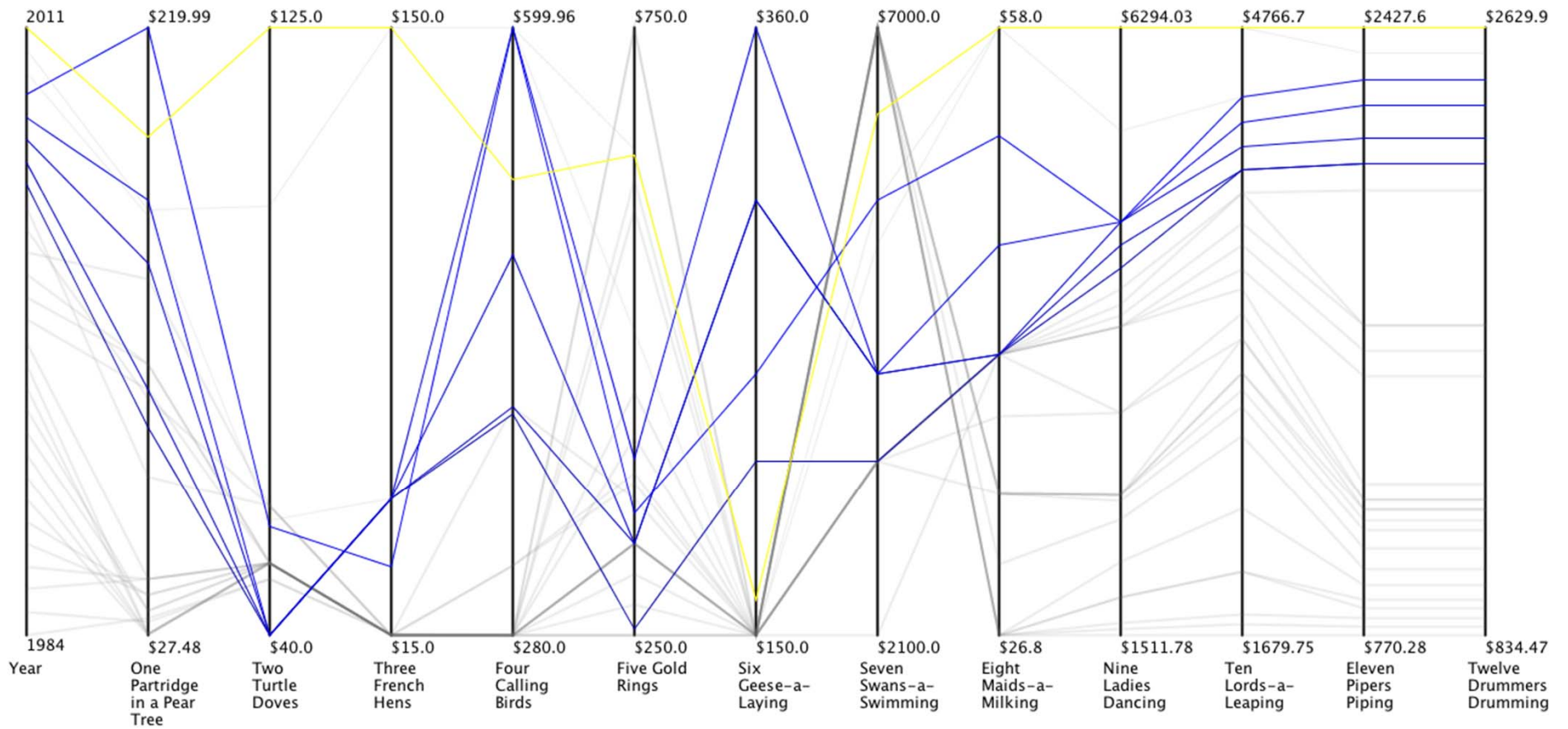
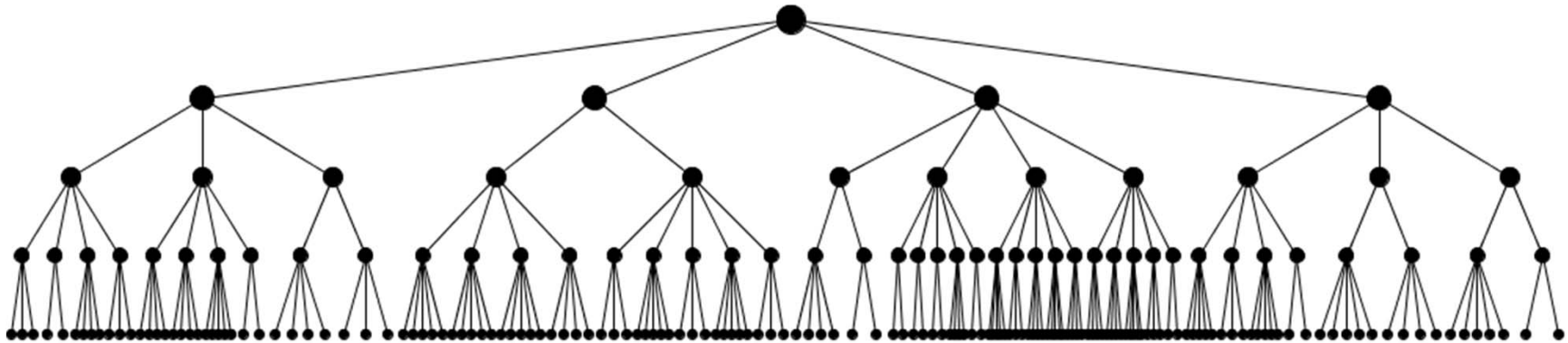# 8b. Citeology

8c. Parallel Sets

9. Tree Map
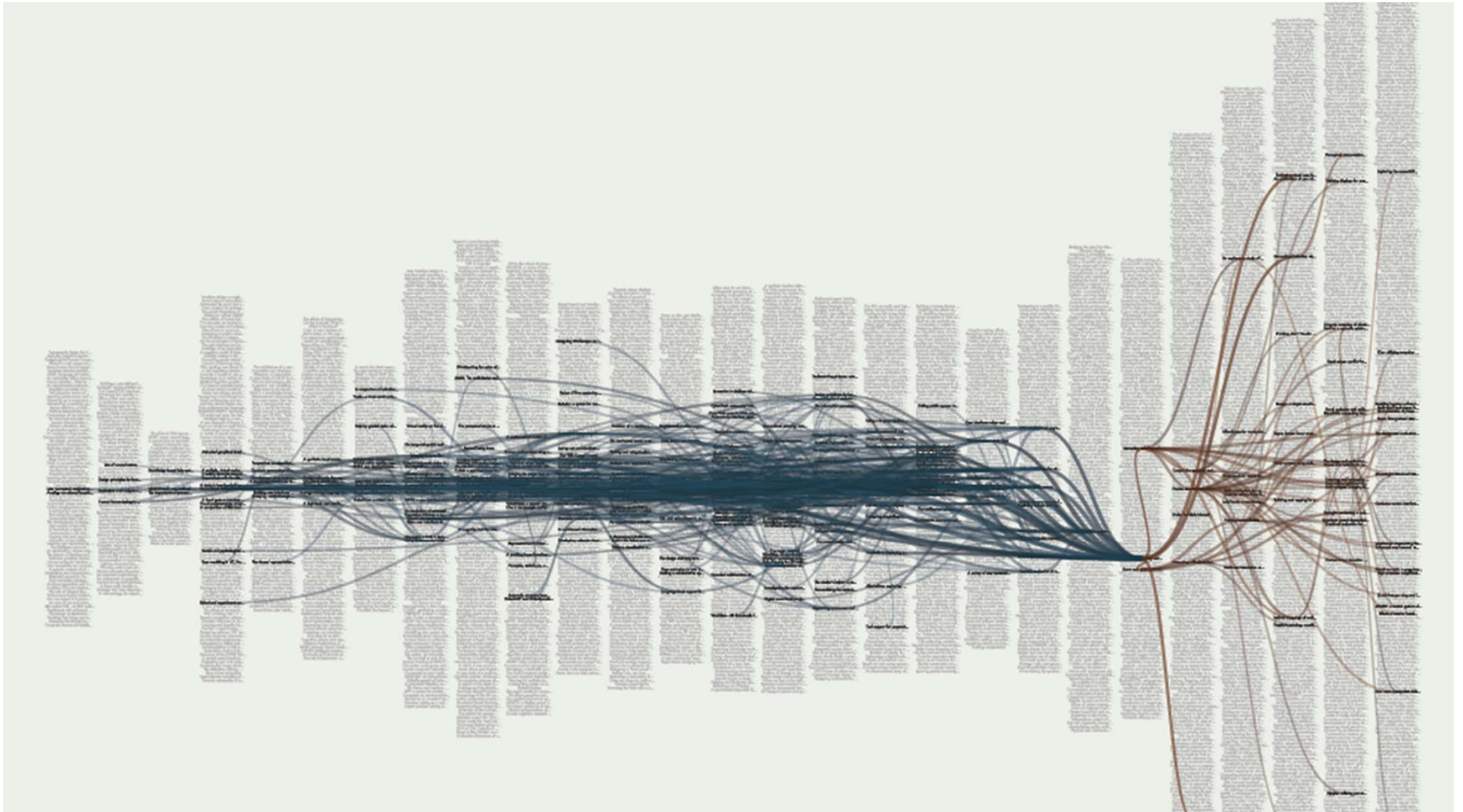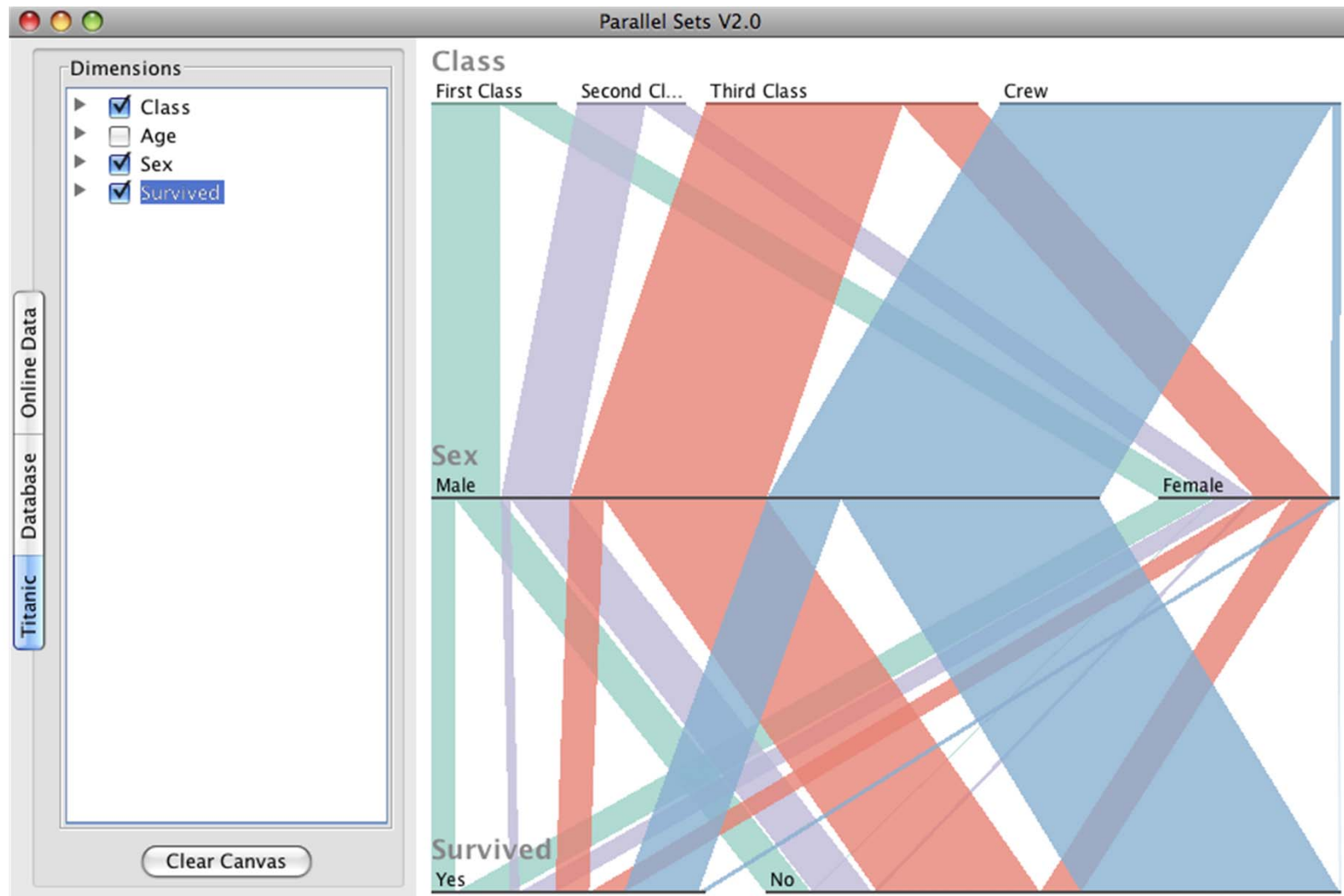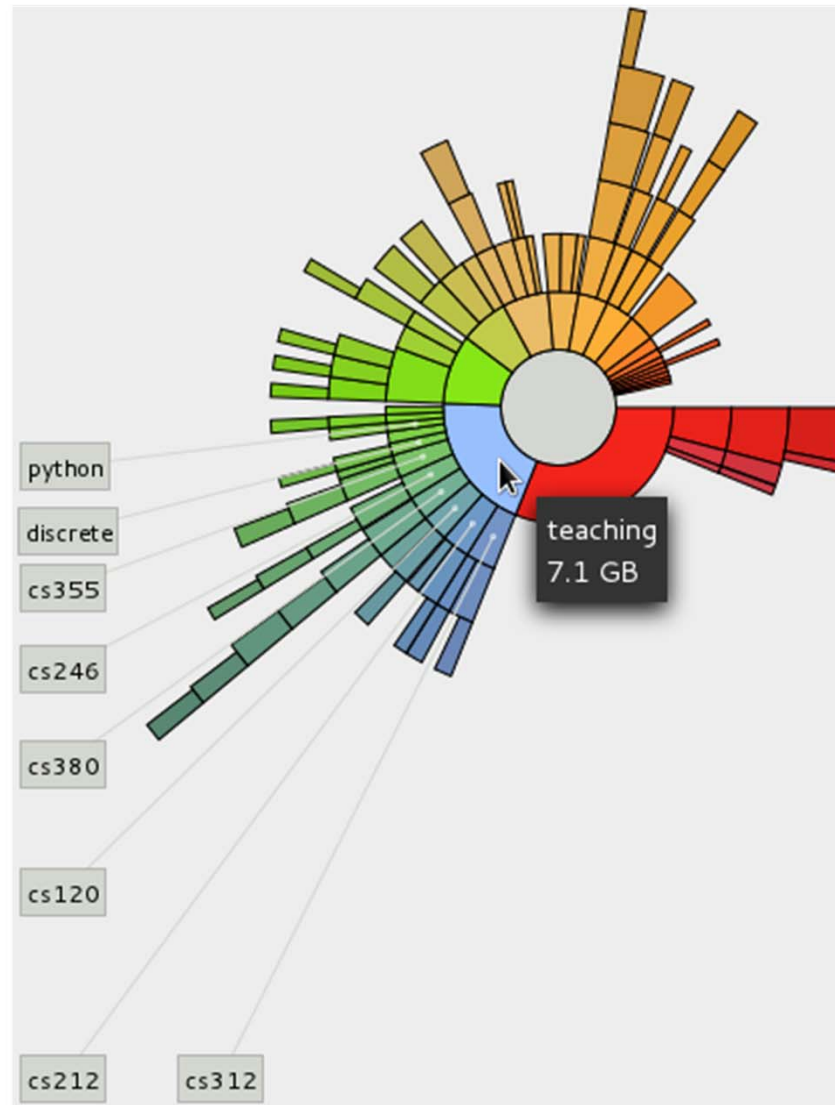
10. Radial

11a. Tree

11b. Radial Tree
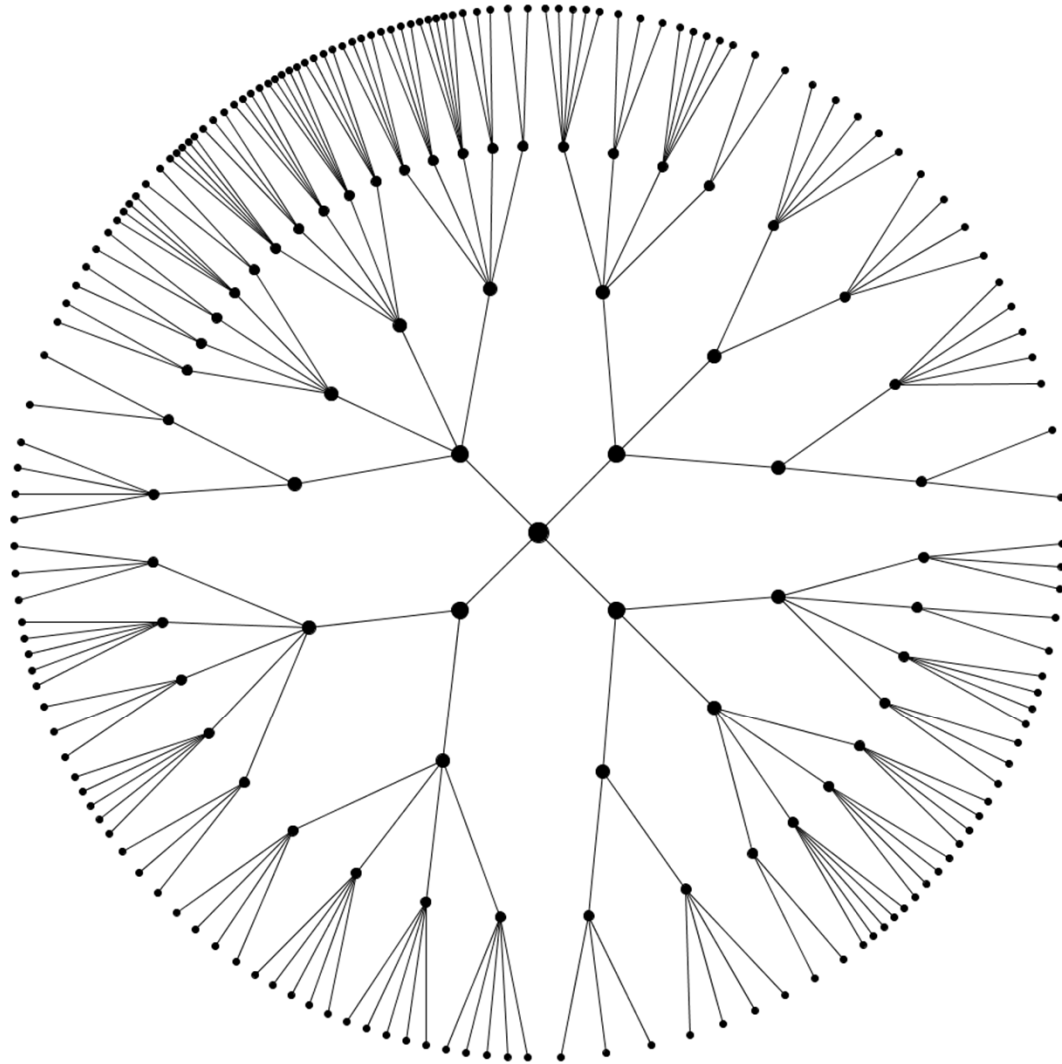
11c. Hyperbolic Tree
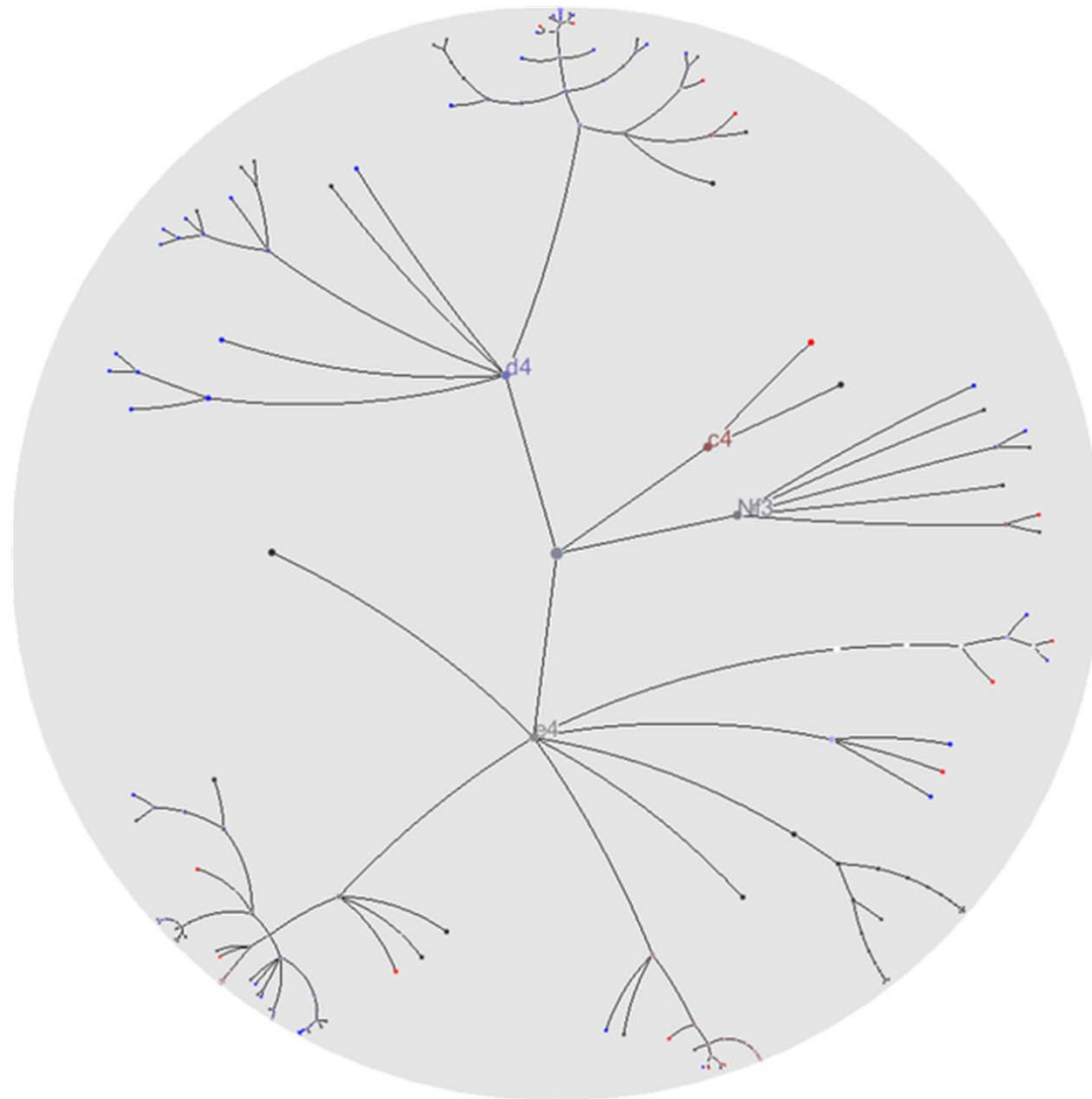
Focus+Context
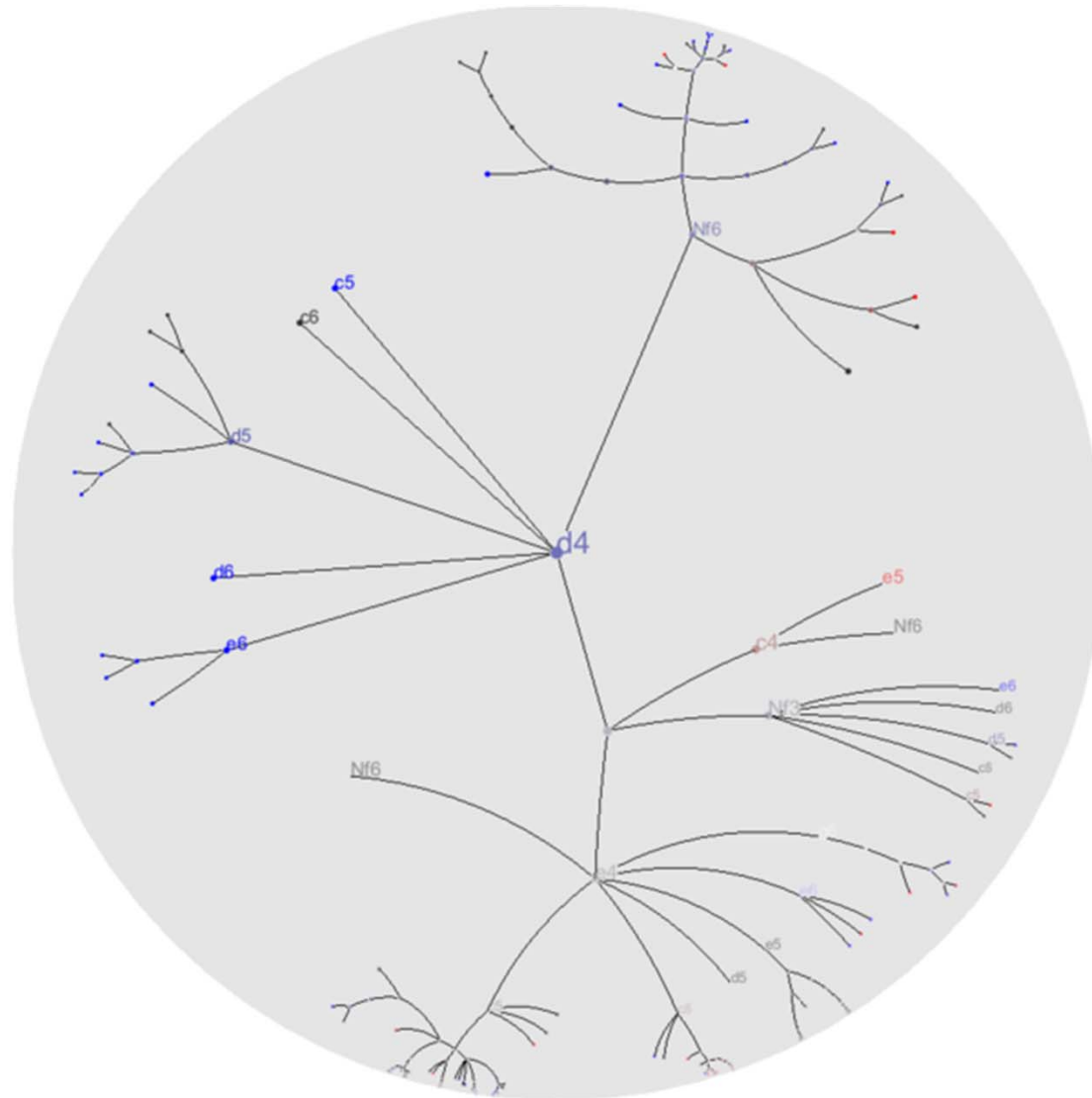
12. Network/Graph-based

13. Chord Diagrams

Flare imports
hierarchical edge bundling

tension: ▭▭▭◯▭▭
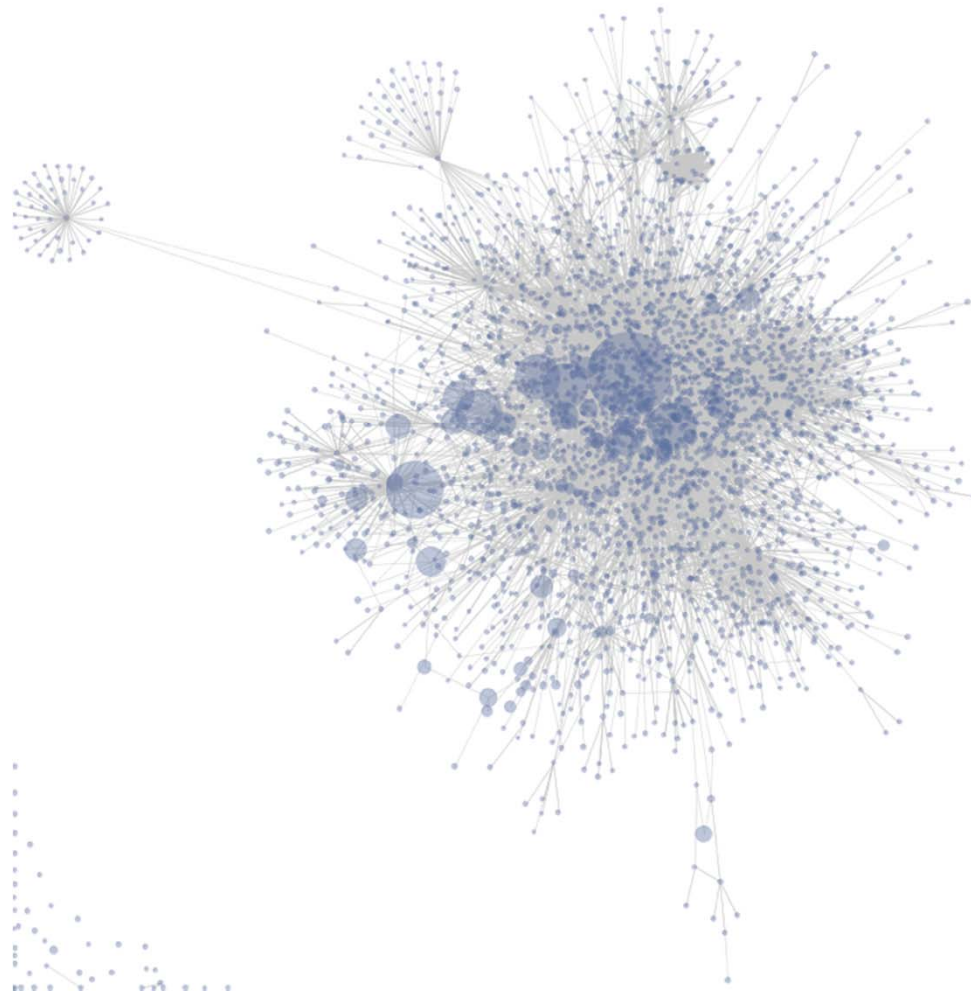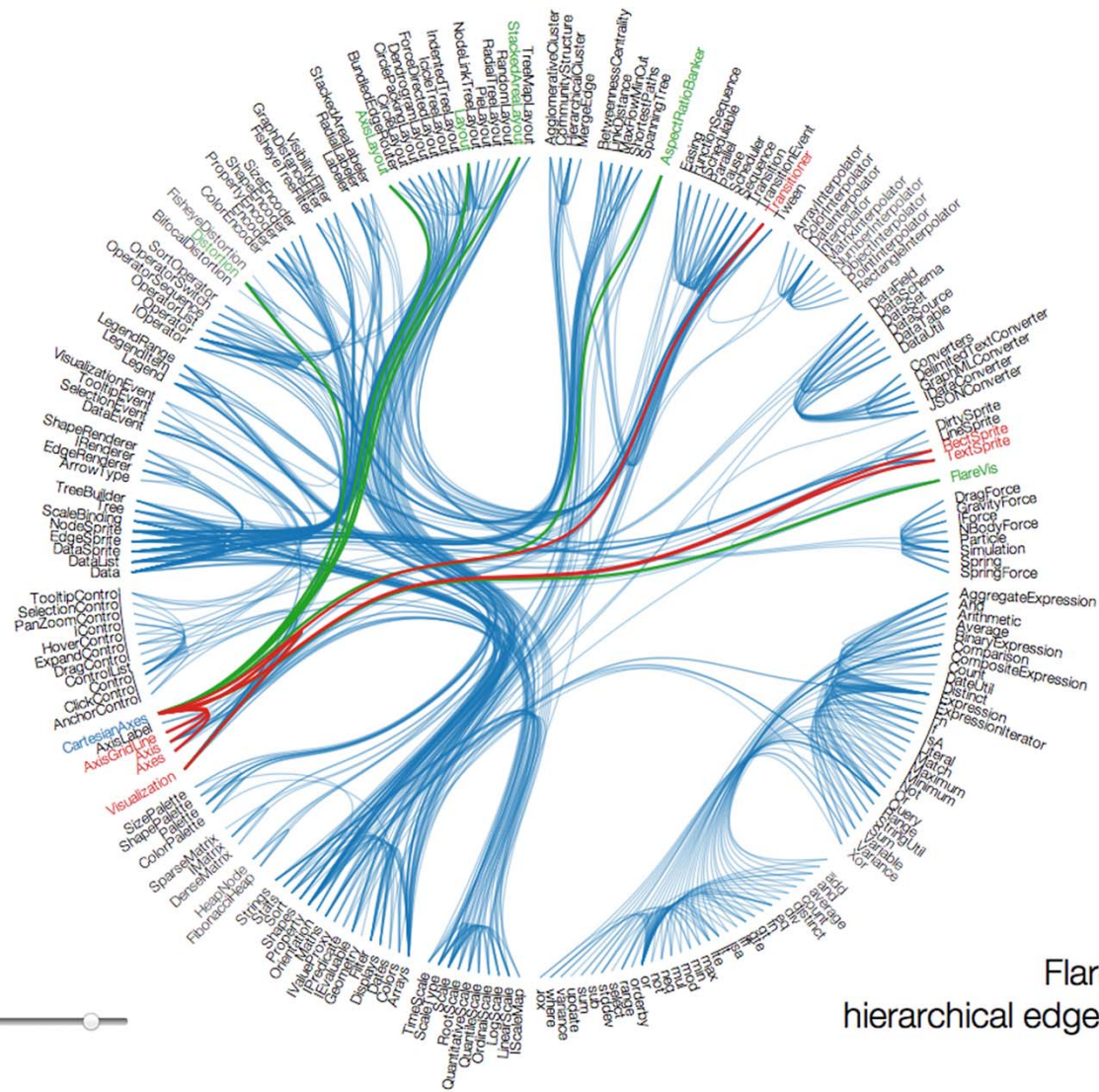
Circular Layouts

- Enjoying great popularity lately
- We are drawn to circles
  - symmetry
  - aesthetics
  - perceived novelty
- Not always justified by increased readability
- Human visual perception supports only rough comparison of areas and angles

Naming Names

Roll over any candidate's name for details.

Each thin line represents one candidate speaking the last name of another candidate.

Every line ends at an arrow, which points to the name that was spoken.

The length of each circle segment represents the total number of words spoken by the candidate during the debates. Each tick mark represents 1,000 words.

Each slice represents one debate, arranged clockwise from the first to the final debate.

Eurozone Debt Web

The circle below shows the gross external, or foreign, debt of some of the main players in the eurozone as well as other big world economies. The arrows show how much money is owed by each country to banks in other nations. The arrows point from the debtor to the creditor and are proportional to the money owed as of the end of June 2011. The colours attributed to countries are a rough guide to how much trouble each economy is in.

US: €39.8 bn

FRANCE: €23.8 bn

SPAIN

PORTUGAL

ITALY

IRELAND

GREECE

JAPAN: €15.4 bn

GERMANY: €82 bn

UK: €104.5 bn
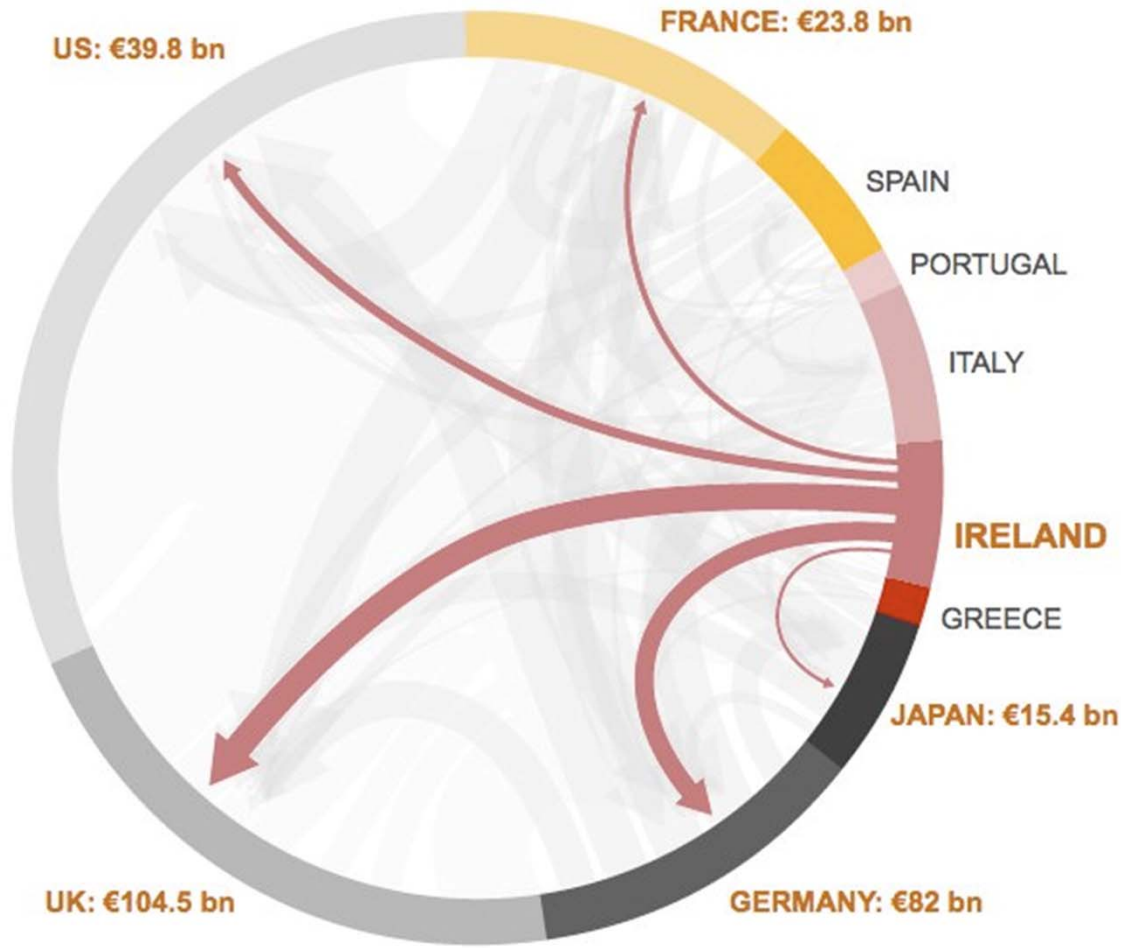
IRELAND

GDP: €0.2 tn

Foreign debt: €1.7 tn

€390,969
Foreign debt per person

1,093%   109%
Foreign debt to GDP   Govt debt to GDP

Risk Status: ▇ HIGH

One of three eurozone countries to so far receive a bail-out, Ireland has introduced a series of tough austerity budgets. Its economy is now showing a modest recovery. After the boom years leading up to 2008, the country fell into recession as a result of the global credit squeeze, which ended the supply of cheap credit that had fuelled the unsustainable growth in its housing market. It shows a very high level of gross foreign debt to GDP because, although it is a small country, it has a large financial sector. The UK is Ireland's biggest creditor.

Back to introduction

Data Analysis

- Unstructured data
- A lot of it
- Dimension reduction
- Cluster analysis
- Statistical methods
- Network models and optimization
- Graph theory

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