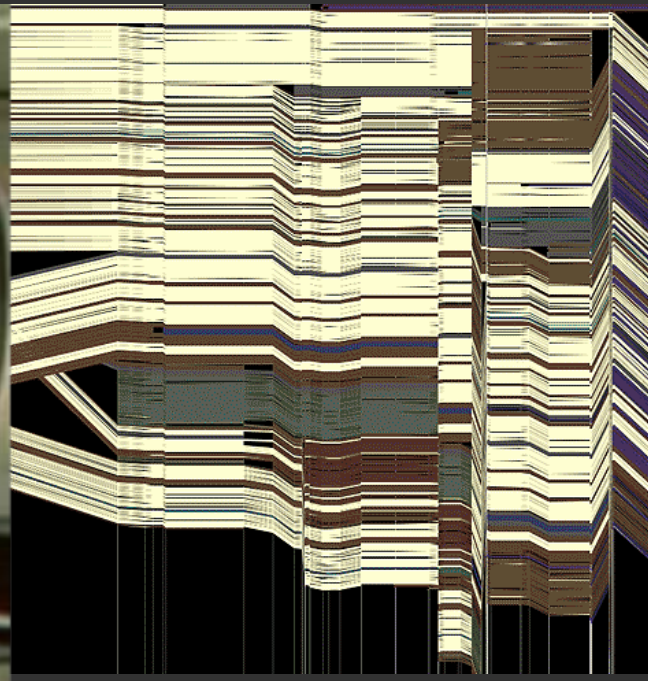
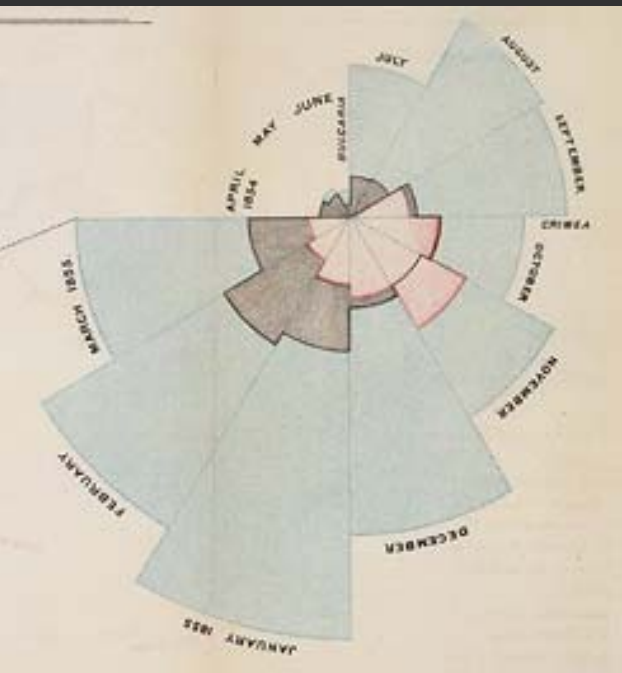


research topics in

Data Visualization



Jeffrey Heer **Stanford University**

Set A

X	Y
10	8.04
8	6.95
13	7.58
9	8.81
11	8.33
14	9.96
6	7.24
4	4.26
12	10.84
7	4.82
5	5.68

Set B

X	Y
10	9.14
8	8.14
13	8.74
9	8.77
11	9.26
14	8.1
6	6.13
4	3.1
12	9.11
7	7.26
5	4.74

Set C

X	Y
10	7.46
8	6.77
13	12.74
9	7.11
11	7.81
14	8.84
6	6.08
4	5.39
12	8.15
7	6.42
5	5.73

Set D

X	Y
8	6.58
8	5.76
8	7.71
8	8.84
8	8.47
8	7.04
8	5.25
19	12.5
8	5.56
8	7.91
8	6.89

Summary Statistics

$$u_X = 9.0 \sigma_X = 3.317$$

$$u_Y = 7.5 \sigma_Y = 2.03$$

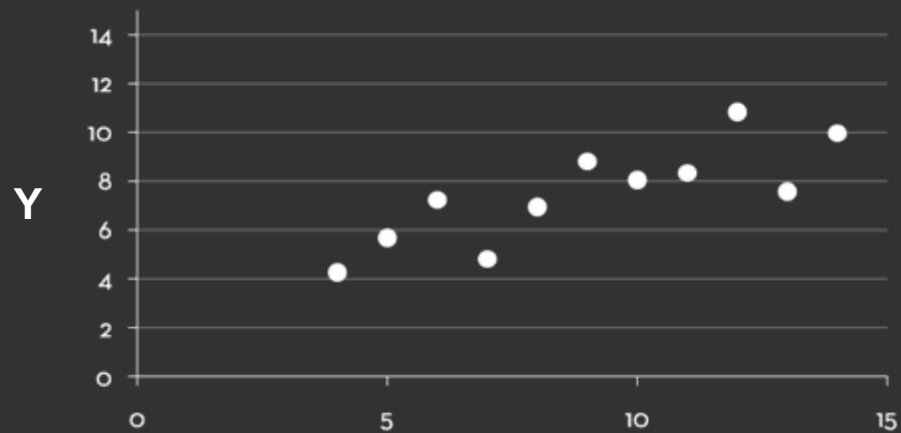
Linear Regression

$$Y^2 = 3 + 0.5 X$$

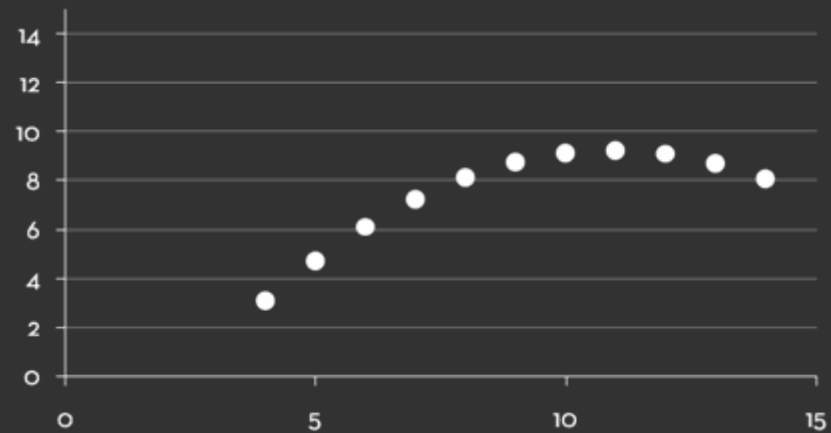
$$R^2 = 0.67$$

[Anscombe 73]

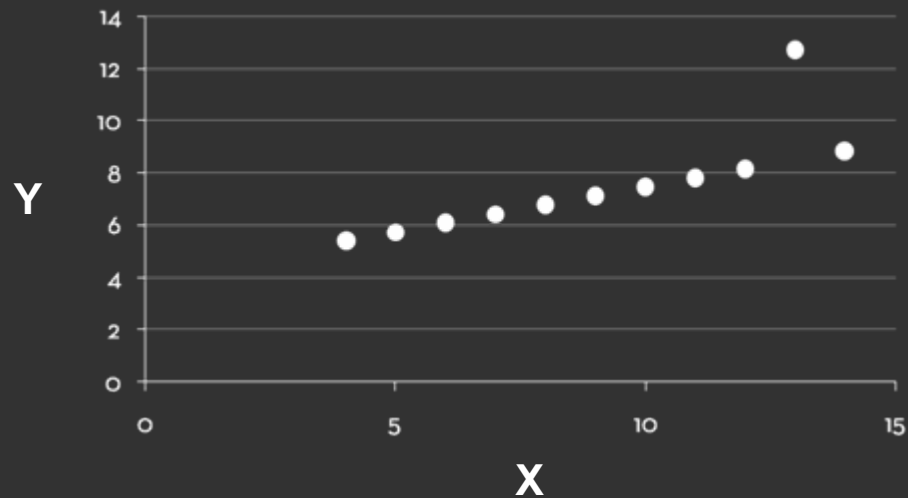
Set A



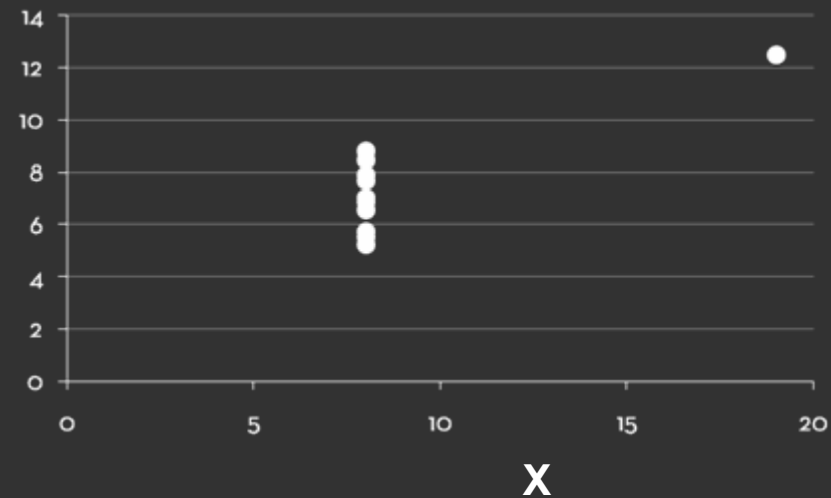
Set B

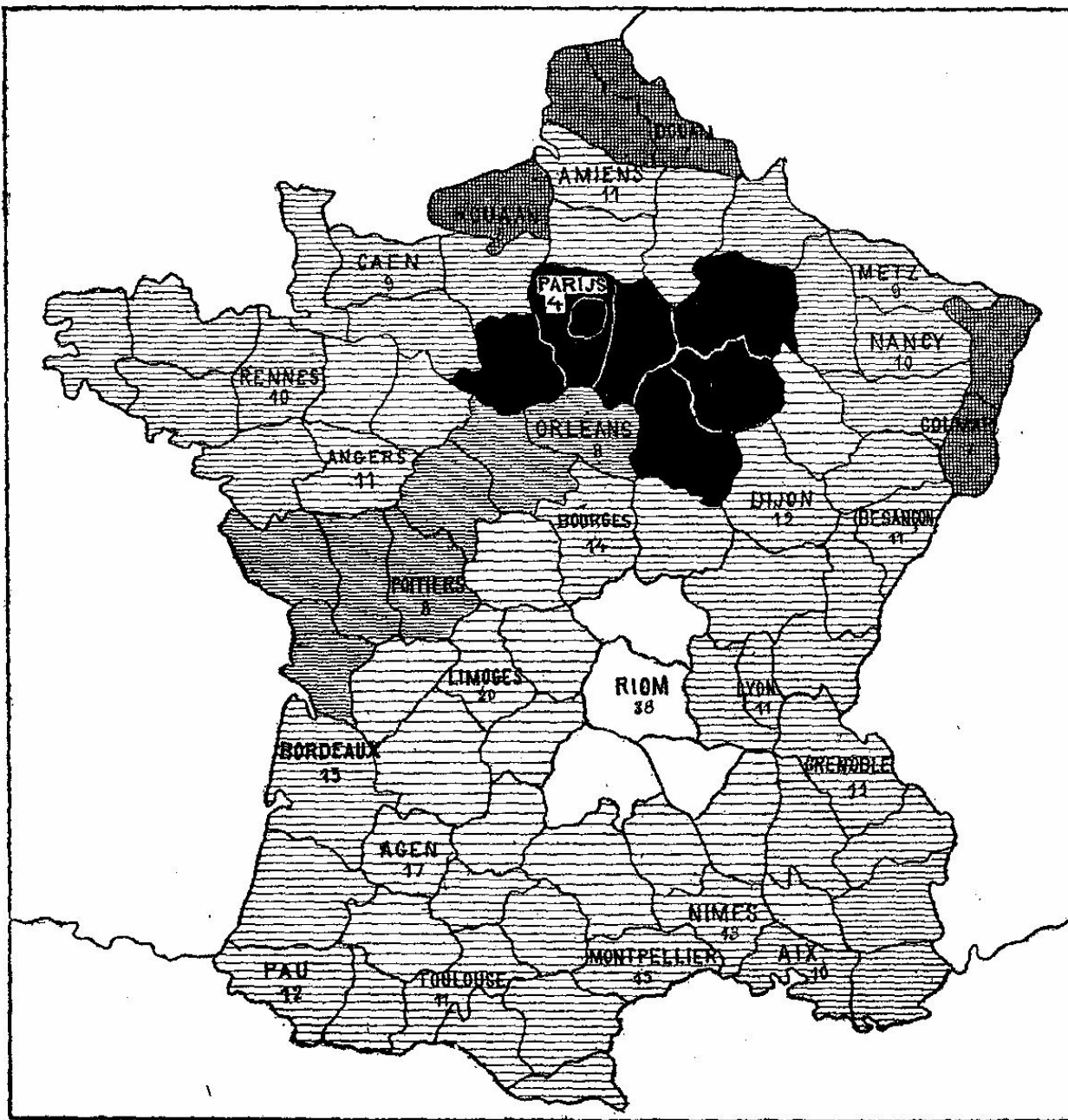


Set C



Set D





1826(?) Illiteracy in France, Pierre Charles Dupin



Zundark	1
The Cunctator	1
The Epop	1
Conversion script	1
RK	1
Freob	1
B4hand	1
KamikazeAnchov	1
Stephen Gilbert	1
Skrubenstein	8
Mimccorn	5
Isis	1
Derek Ross	1
Dante Alighieri	2
Maverick149	3
Jazzbug	2
Jtdrl	8
Theanthrope	1
Wesley	2
Dreemword	1
Stevetigo	4
Camembert	1
Hephaestus	2
Zoe	1
MyRedDice	1
G-Man	2
Kingturtle	1
Montrealais	1
120	1

Abortion

(Revision as of 22:56 4 Jun 2003)

"**Abortion**," in its most commonly used sense, refers to the deliberate early termination of a **pregnancy**, resulting in the death of the **fetus**. [1] Medically, the term also refers to early termination of a pregnancy by nature ("spontaneous abortion" or **miscarriage**). 1 in 5 of all pregnancies, usually within 12 weeks) or to the cessation of normal growth of a body part or organ. What follows is a discussion of the issues related to deliberate or "induced" abortion.

Methods

Depending on the stage of pregnancy an abortion is performed by a number of different methods. The earliest terminations (before nine weeks) are **chemical abortion** is the usual method, though **mifepristone** is usually the only legal method, although research has uncovered similar effects from **methotrexate** and **misoprostol**. Concurrent with chemical abortion and extending up to around the fifteenth week **suction-aspiration** vacuum abortion is the most common approach, replacing the more risky **dilation and curettage** (D & C). From the fifteenth week up until around the eighteenth week a surgical **dilation and evacuation** (D & E) is used.

As the fetus size increases other techniques may be used to secure abortion in the third trimester. premature expulsion of the fetus can be induced with prostaglandin, this can be coupled with injecting the amniotic fluid with saline or urea solution. Very late abortions can be brought about by the controversial **intact dilation and extraction** (D & X) or a **hysterotomy abortion**, similar to **caesarian section**.

The controversy

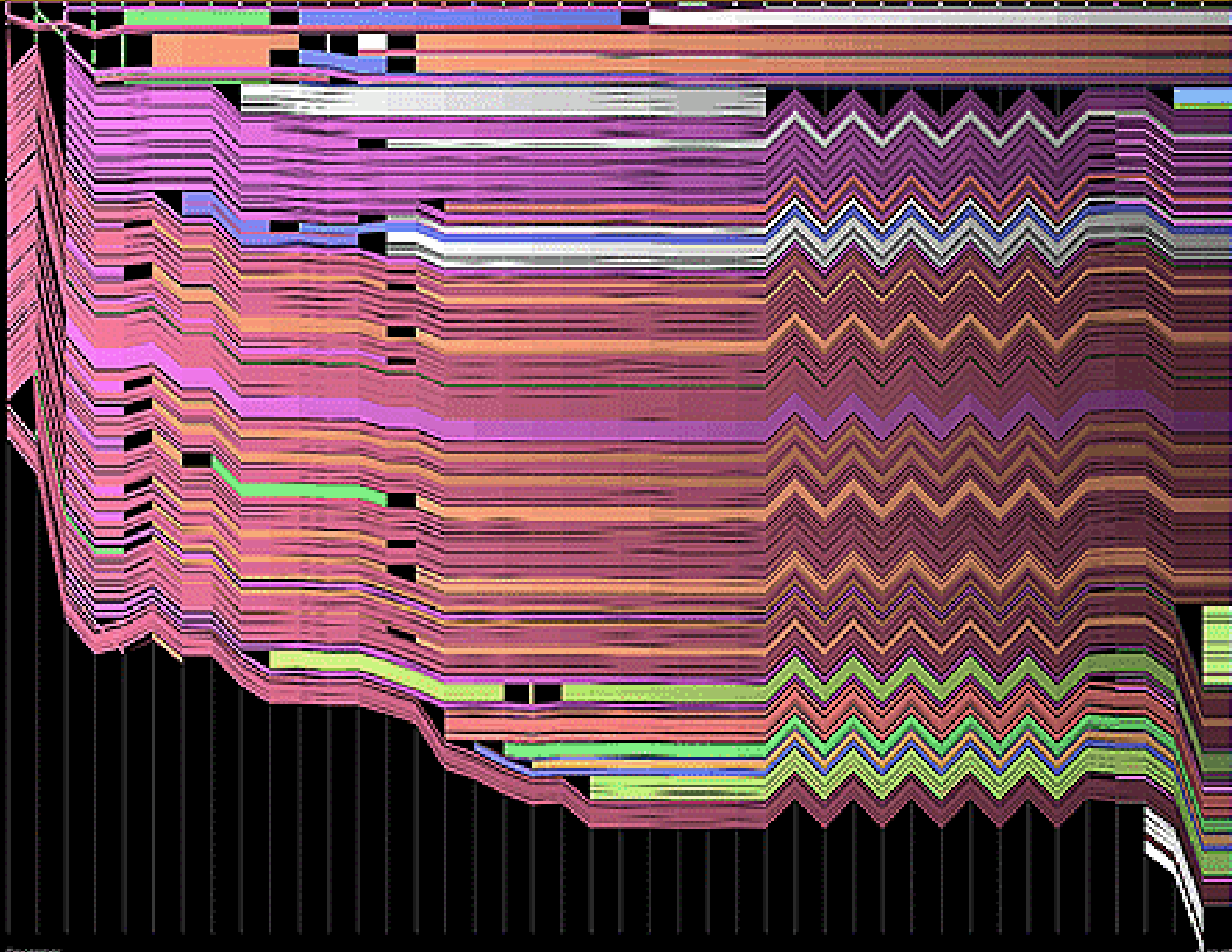
The morality and legality of abortion is a highly important topic in **applied ethics** and is also discussed by **legal scholars** and **religious scholars**. Important facts about abortion are also recorded by **sociologists** and **historians**.

Abortion has been common in most societies, although it has often been opposed by some institutionalized religions and government. **century politics in the United States** and **European politics** became commonly accepted by the 20th century. Additionally, abortion is accepted in **China**, **India** and other populous countries. The **Catholic Church** remains opposed to the procedure, however, and in other countries notably the **United States** and the (predominantly Catholic) **Republic of Ireland**, the controversy is extremely active, to the extent that even of the respective positions are subject to debate. While those on both sides of the debate are generally peaceful, if heated, in their positions, the debate is sometimes characterized by violence. Though true of both sides, this is more marked on the side of those opposed to abortion, because of what they see as the gravity and urgency of their views.

The central question

The central question in the abortion debate is a clash of presumed or perceived rights. On the one hand, is a fetus (sometimes called the "unborn" by **pro-life/anti-abortion** advocates) a human being with a right to life, and if so, at what point in pregnancy does the fetus become human? On the other hand, is a fetus part of a woman's body?

Wikipedia History Flow (IBM)



The ability to take data—to be able to **understand** it, to **process** it, to **extract value** from it, to **visualize** it, to **communicate** it—that's going to be a hugely important skill in the next decades, ... because now we really do have **essentially free and ubiquitous data**. So the complimentary scarce factor is the ability to understand that data and extract value from it.

Hal Varian, *The McKinsey Quarterly*, Jan 2009

Goals of Visualization Research

- 1 **Understand** how people use visualizations to gain insight
- 2 **Design** principles and techniques for effective visual analysis systems

1 Visualization Techniques

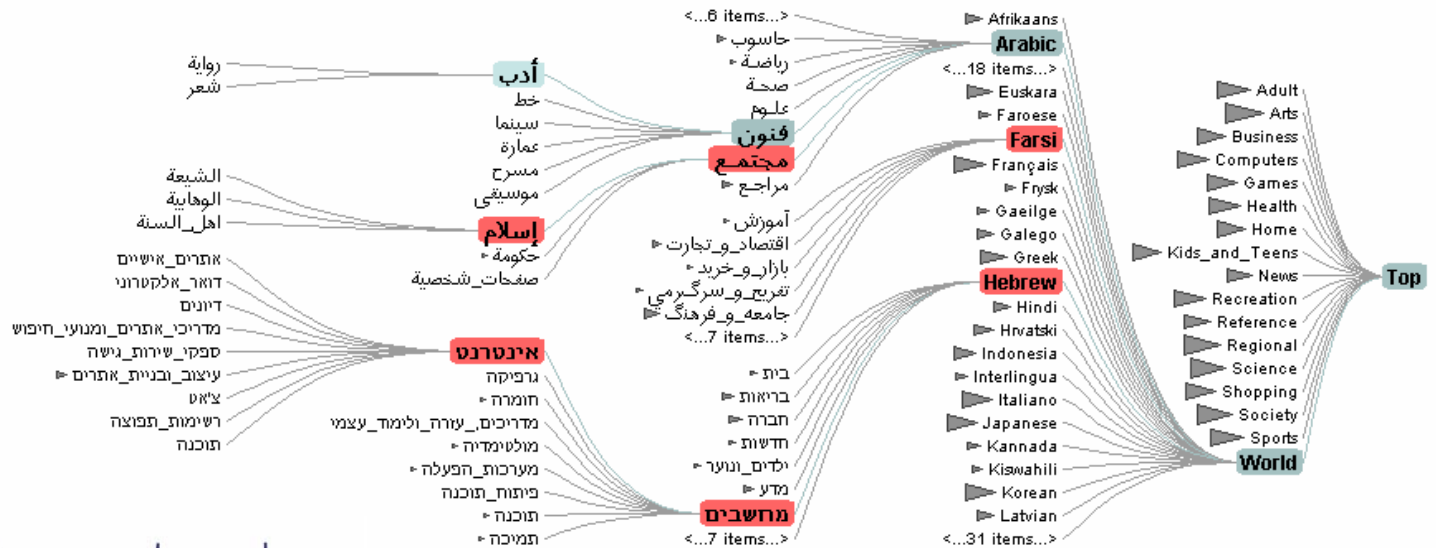
2 Visualization Tools

3 Visual Analysis

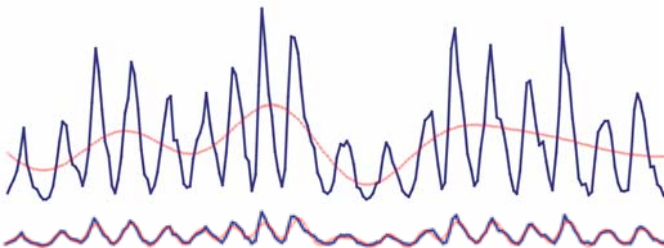
Environments

Visualization Techniques

Improve visual analysis and communication via novel algorithms, encodings, and interact'

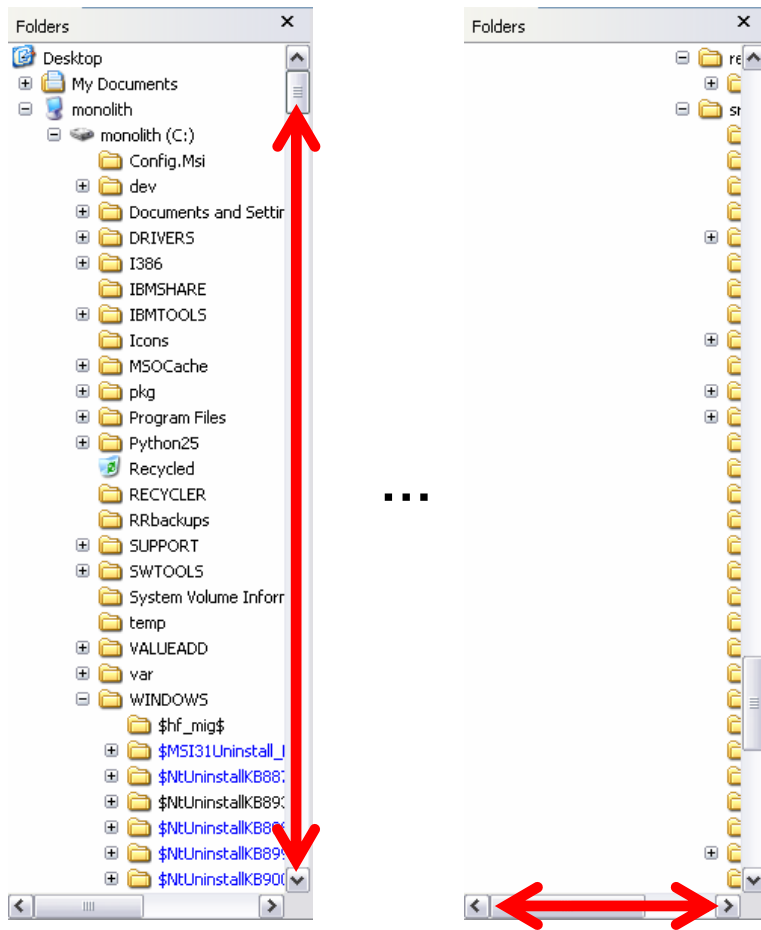


Degree-of-Interest Trees

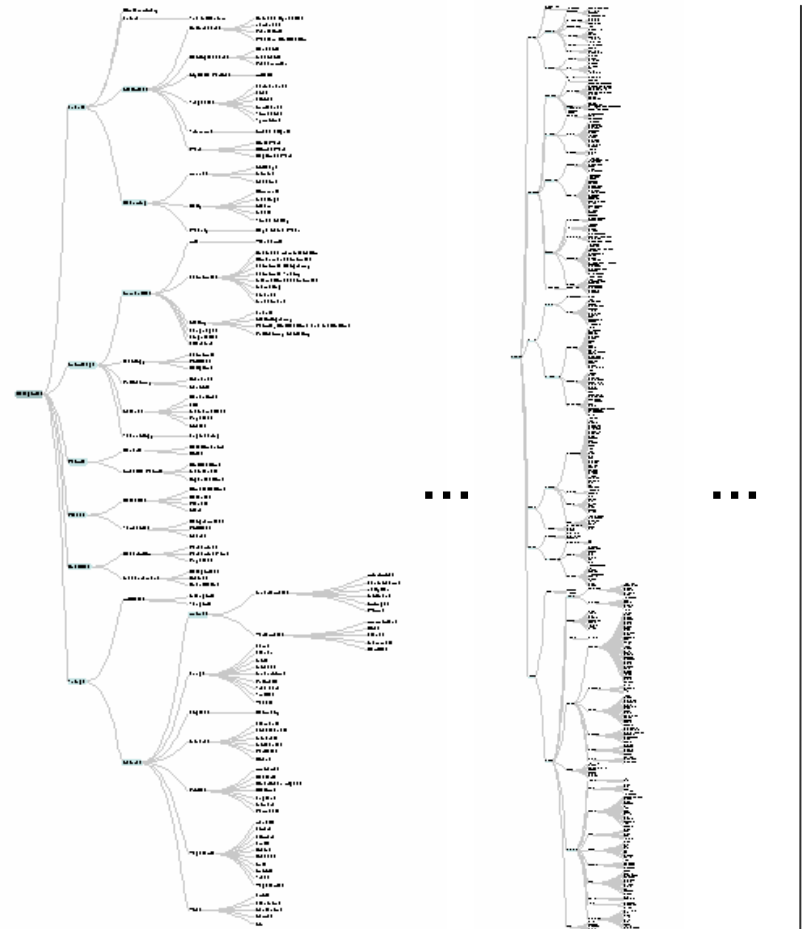


Aspect Ratio Optimization

Visualizing Large Hierarchies

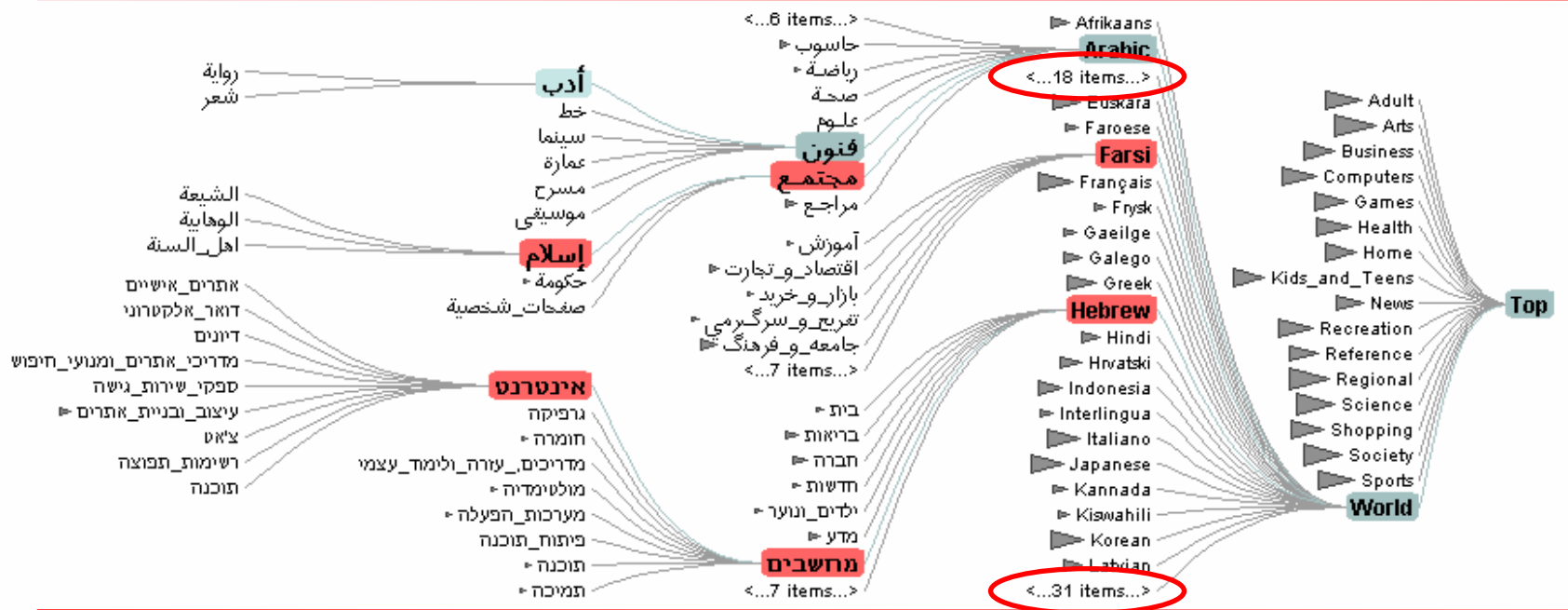


Indented Layout



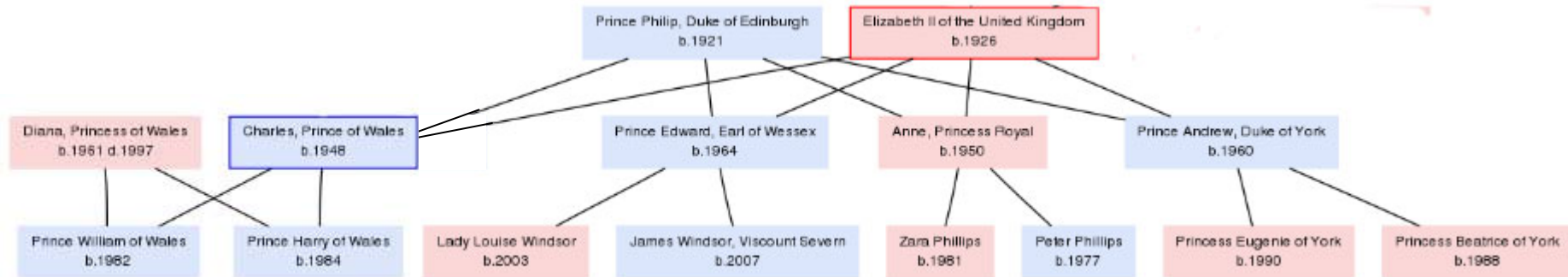
Reingold-Tilford Layout

Degree-of-Interest Trees



Space-constrained, multi-focal tree layout

Visualizing Genealogical Graphs



Prince Philip, Duke of Edinburgh

Elizabeth II of the United Kingdom

Prince Edward, Earl of Wessex

Sophie, The Countess of Wessex

Lady ...

Prince Andrew, Duke of York

Sarah, Duchess of York

Princess Eugenie of York

Princess Beatrice of York

Anne, Princess Royal

Mark Phillips

Timothy Laurence

Zara Phillips

Peter Mark Andrew Phillips

Autumn Kelly

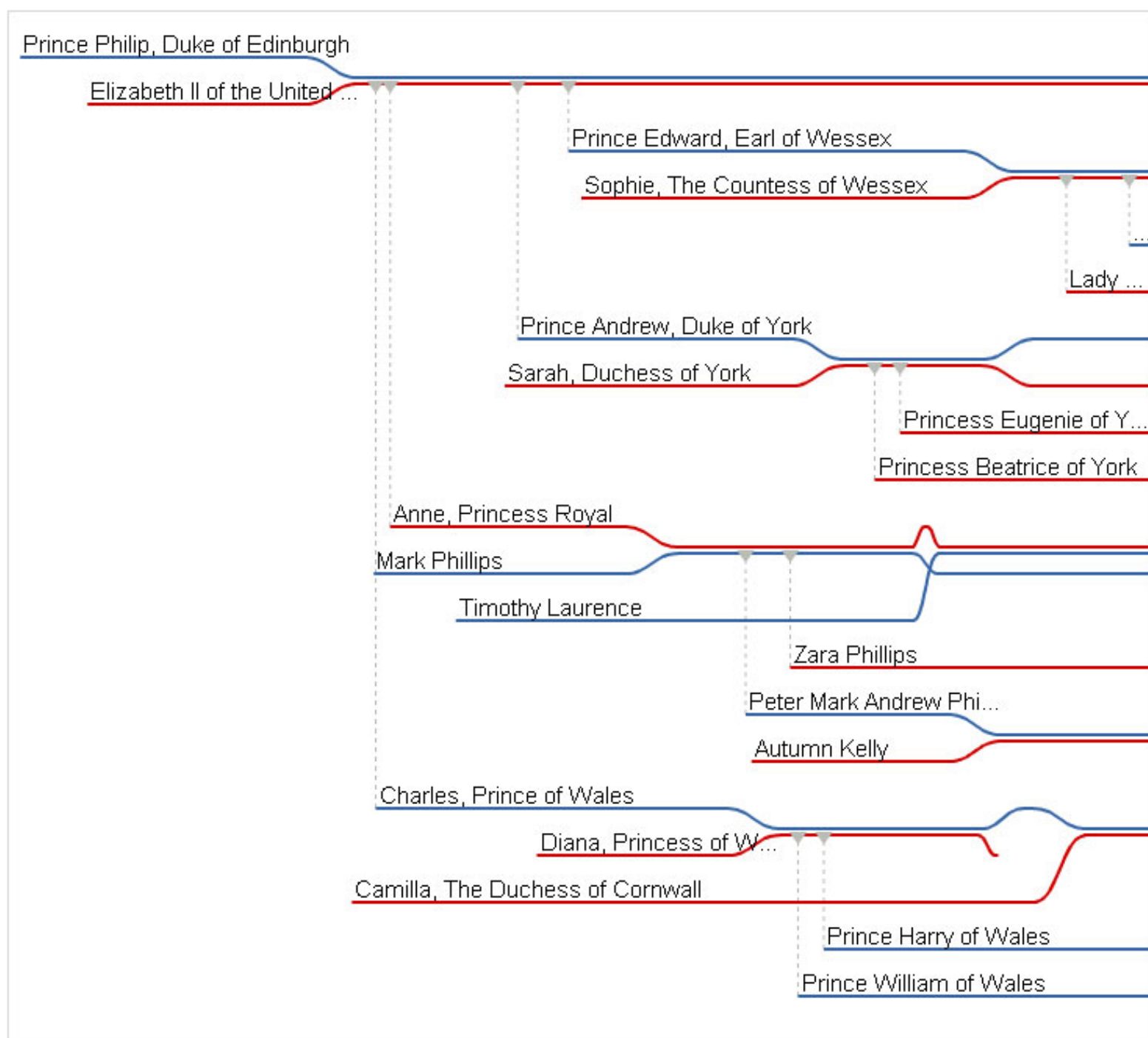
Charles, Prince of Wales

Diana, Princess of Wales

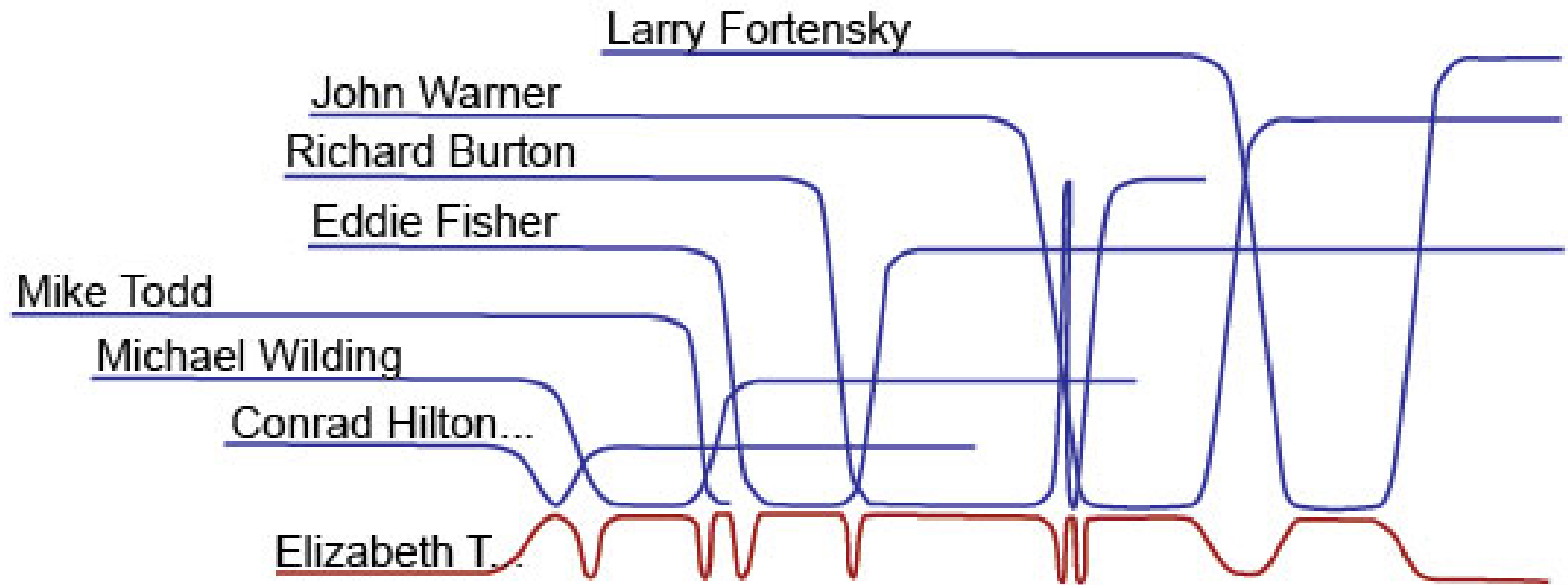
Camilla, The Duchess of Cornwall

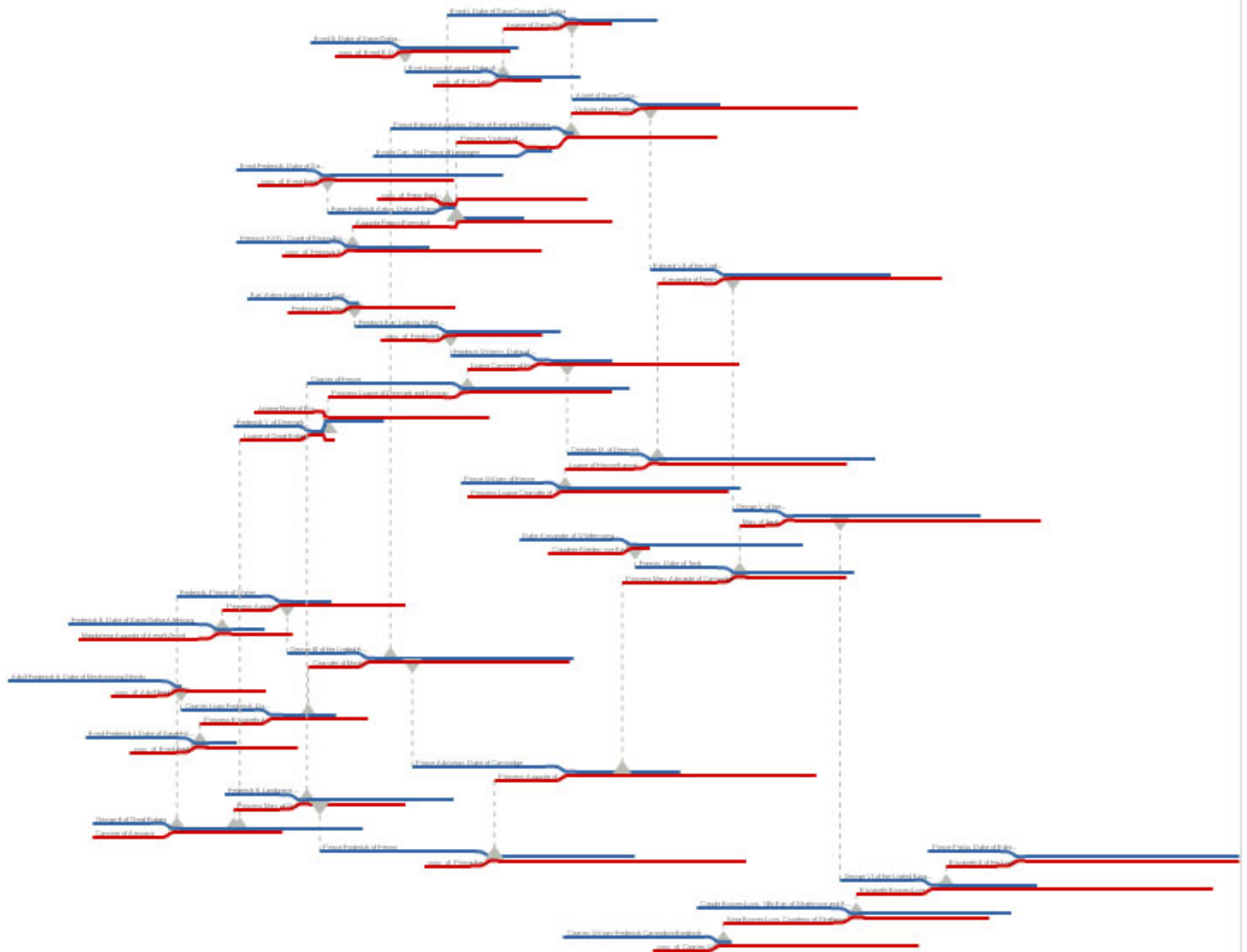
Prince Harry of Wales

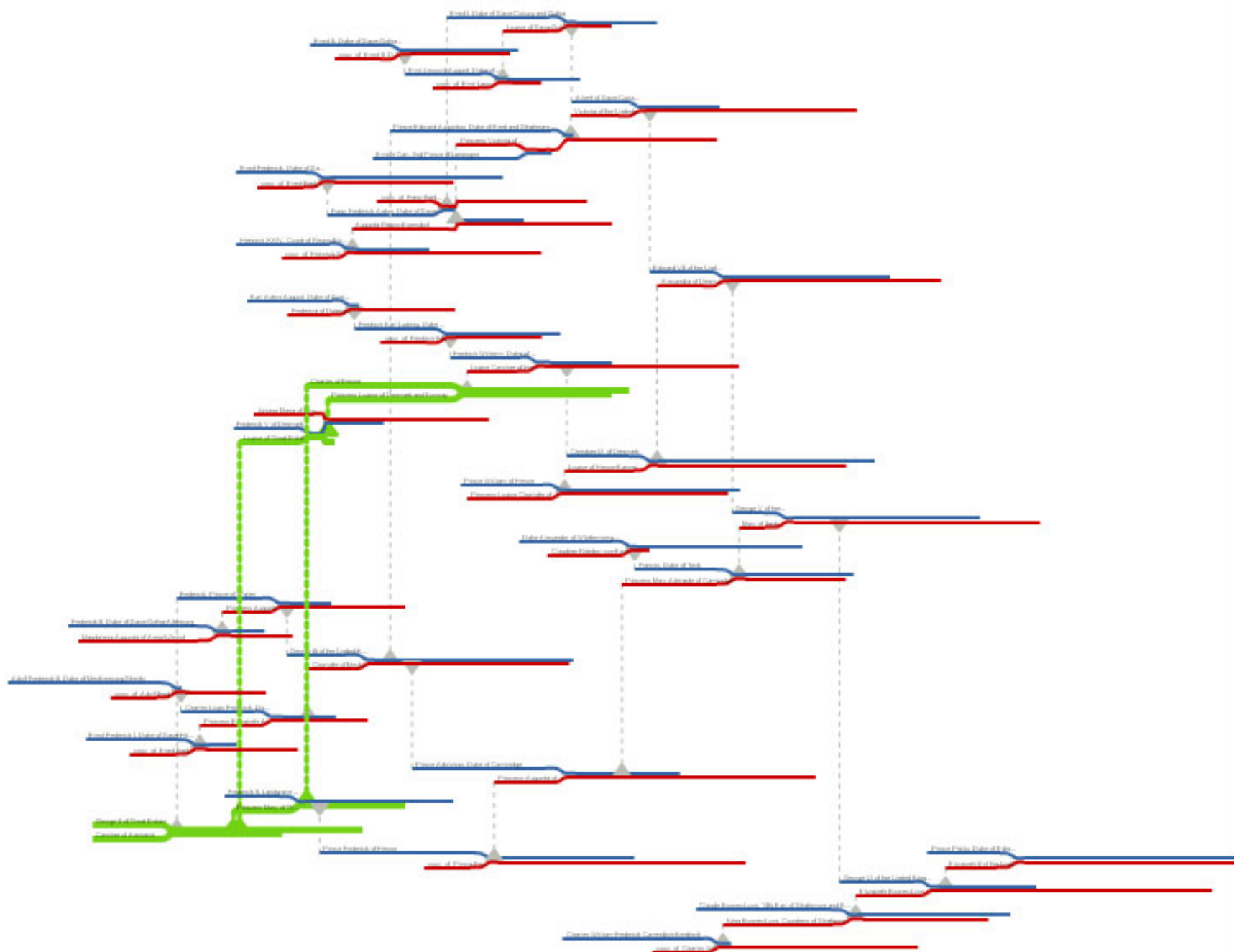
Prince William of Wales

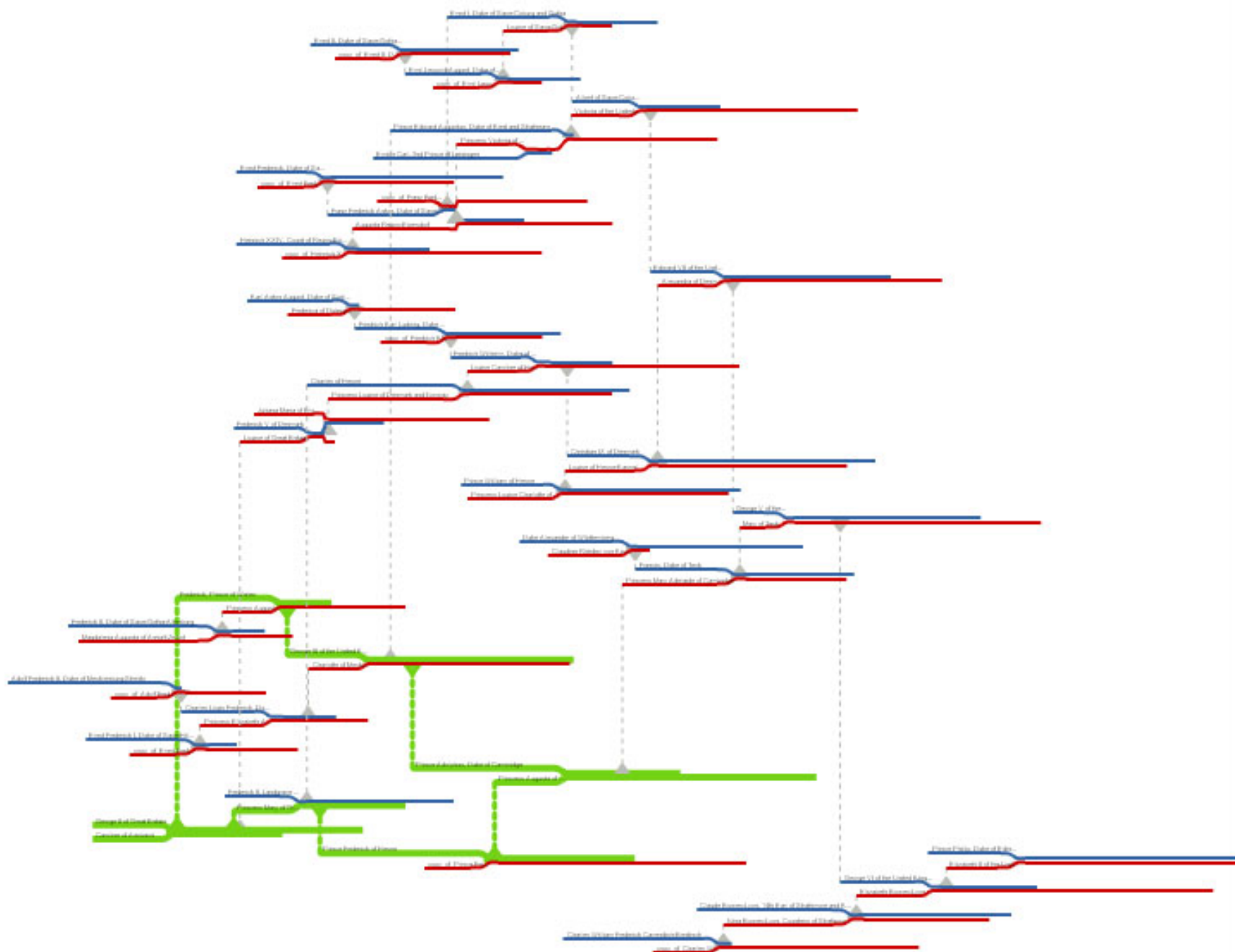


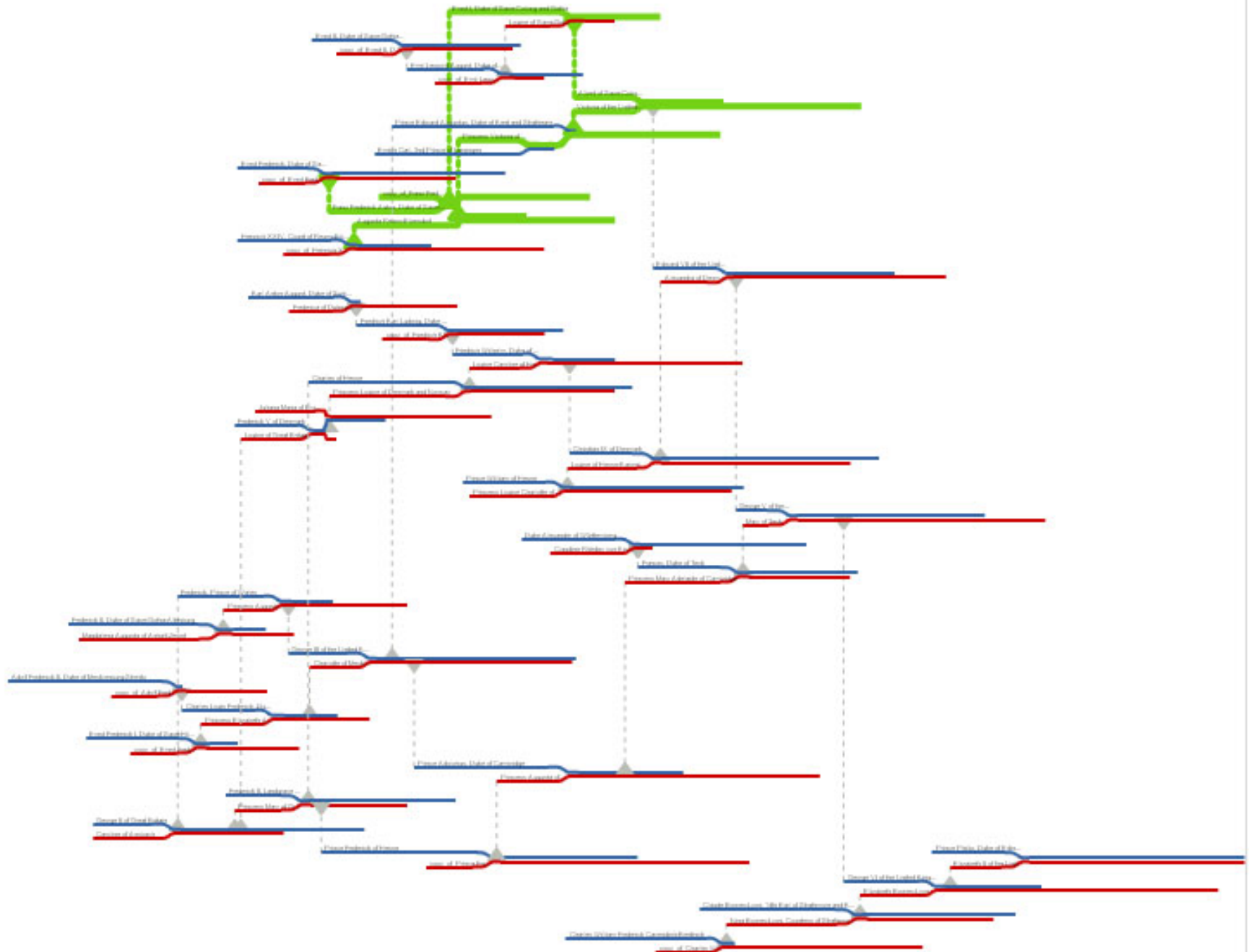
Elizabeth Taylor

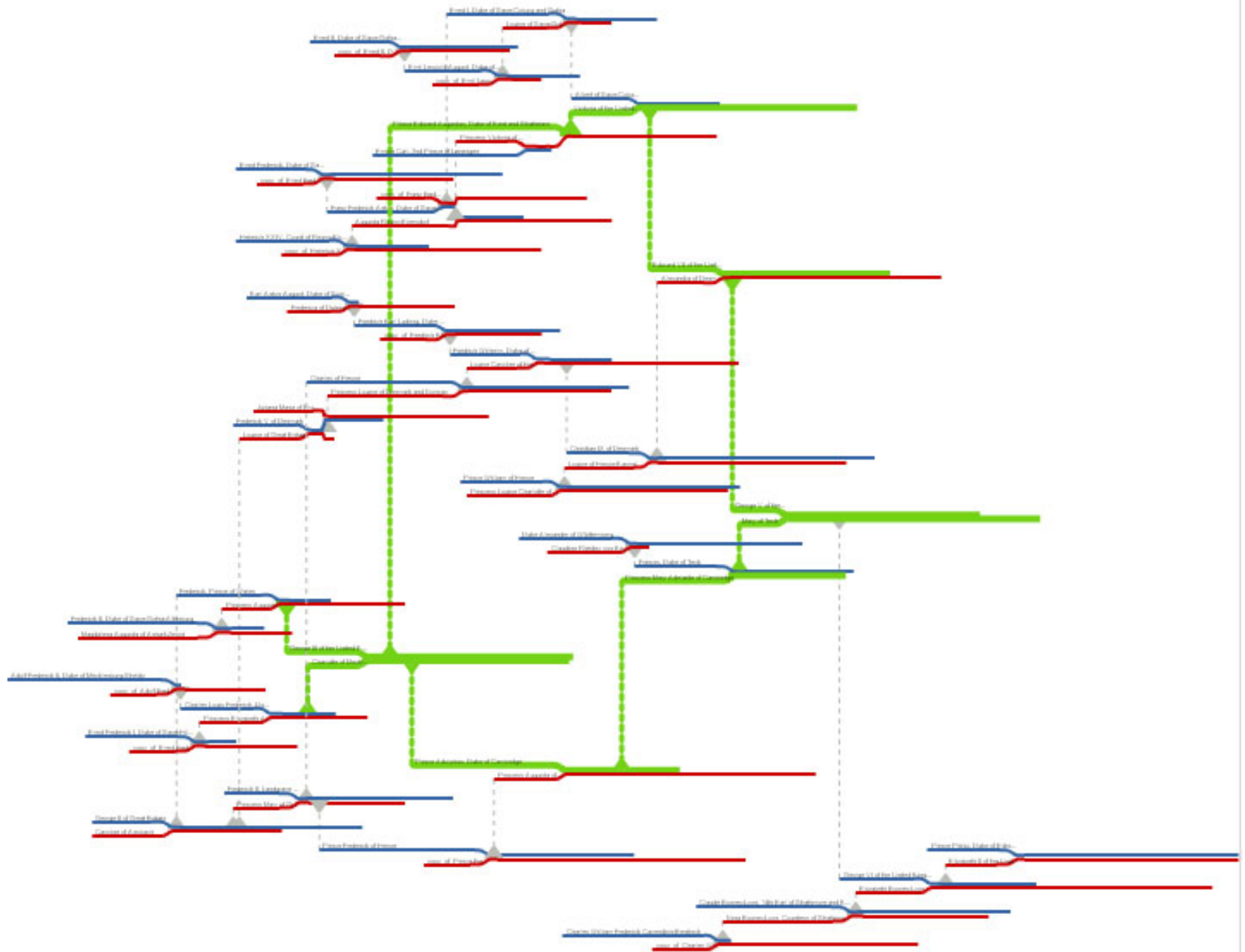


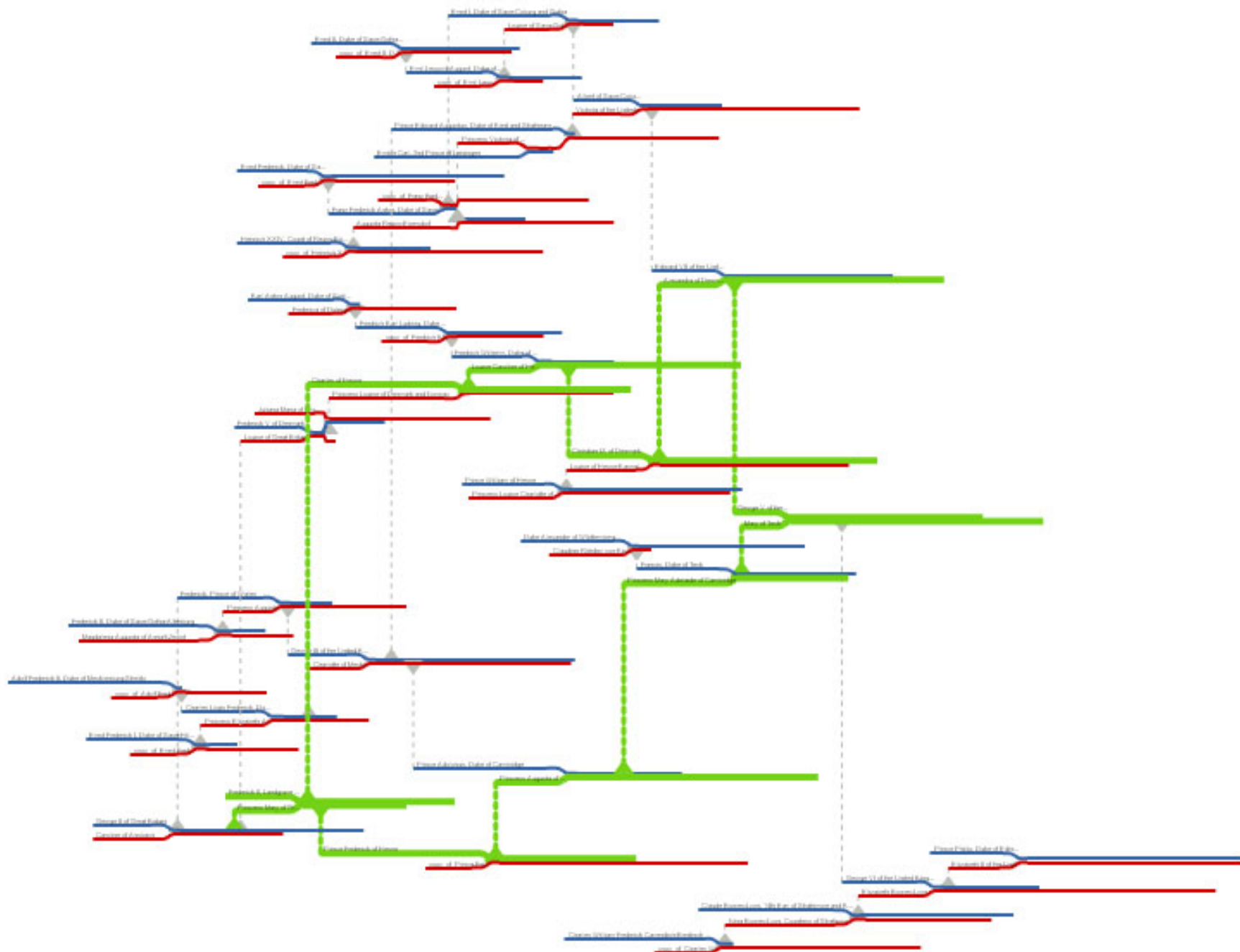




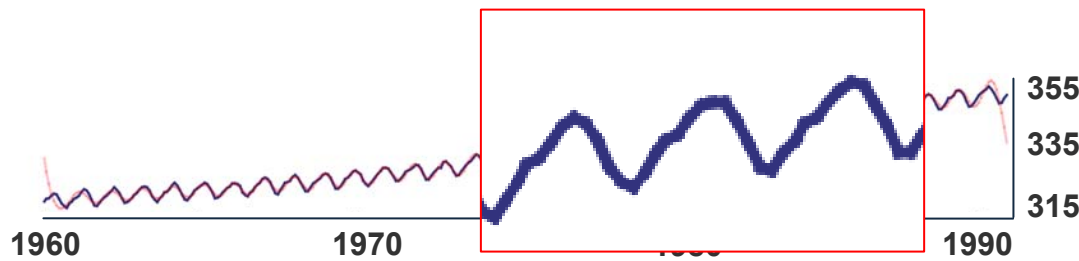
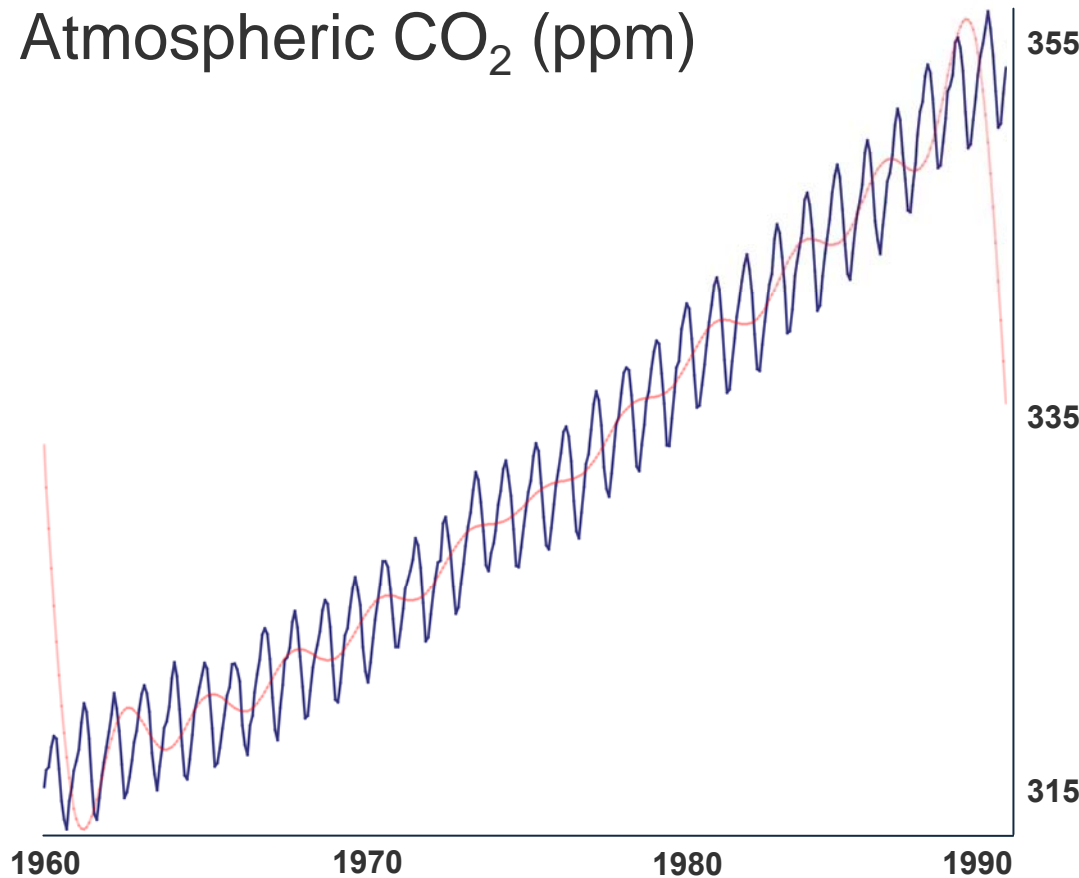








Atmospheric CO₂ (ppm)



Aspect Ratio Optimization

Maximize perceptual discriminability of line segment angles

$$\sum_i \sum_j |\theta_i(\alpha) - \theta_j(\alpha)|^2$$

Identify trends using spectral analysis; find ratios for trend lines

Research Challenges

Perceptual optimization algorithms

(Semi-)automated choice of color, size, layout, ...

Richer data types and data sources

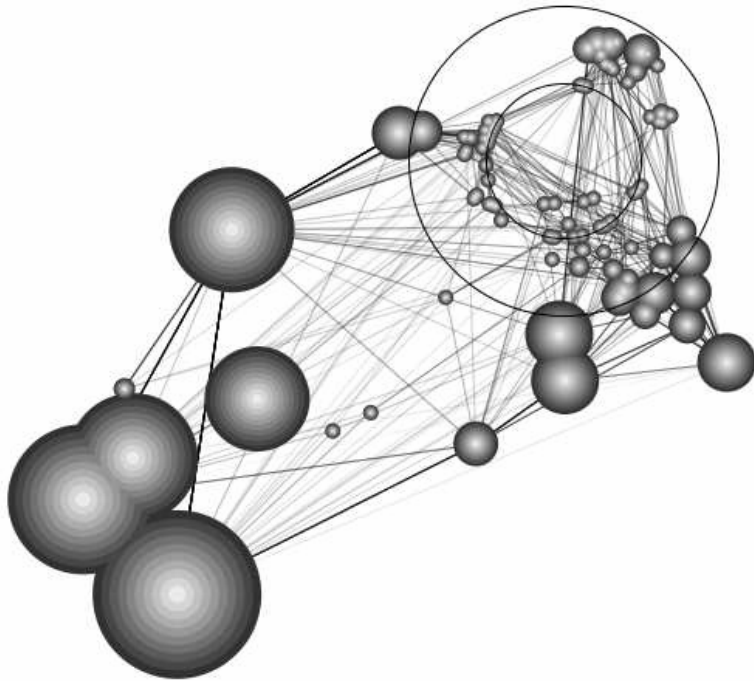
Text, video, sensor data, web extraction,
uncertainty

Novel devices and interaction techniques

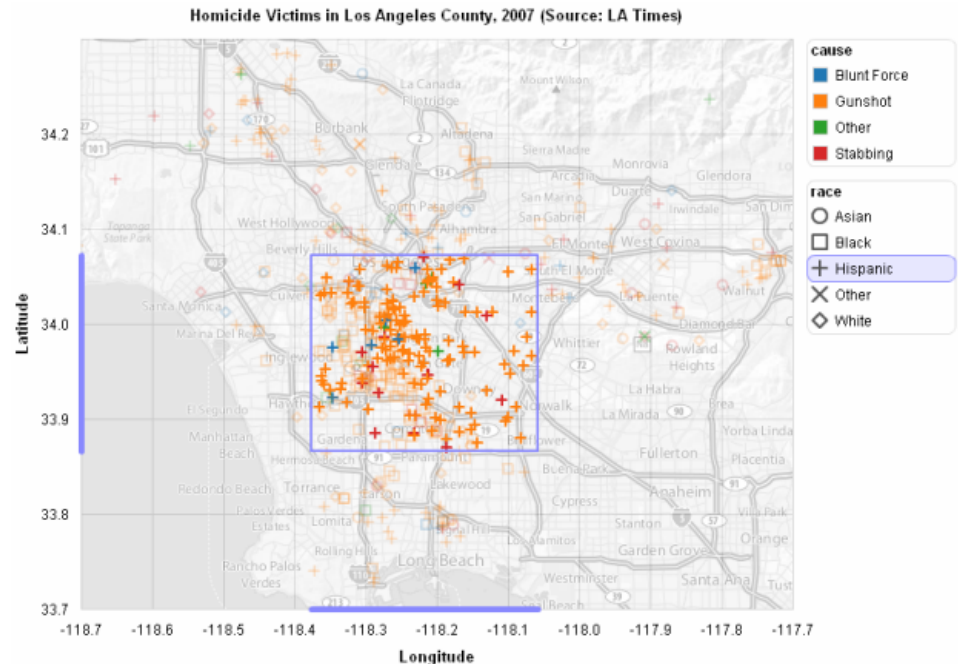
Mobile computing, large displays, physical
interaction

Visualization Tools

Support visualization design and literacy through tools for visualization creation



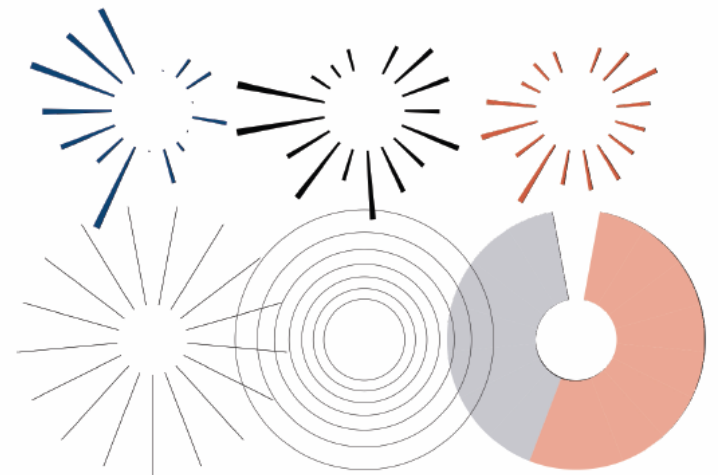
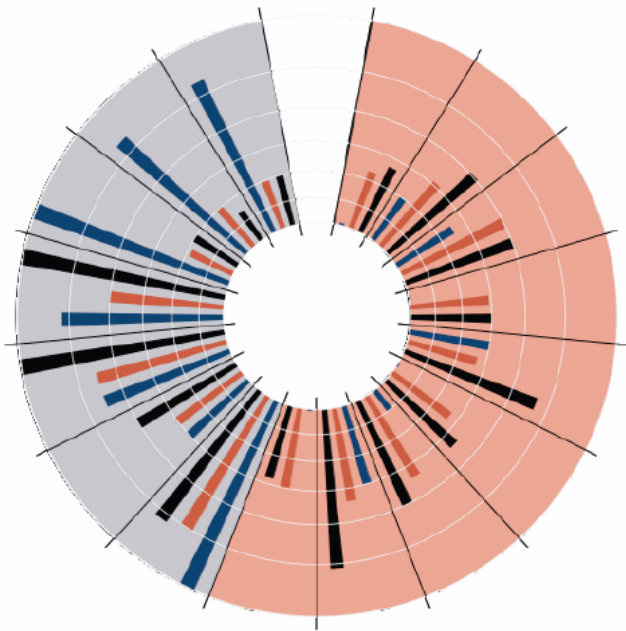
Prefuse (<http://prefuse.org>)

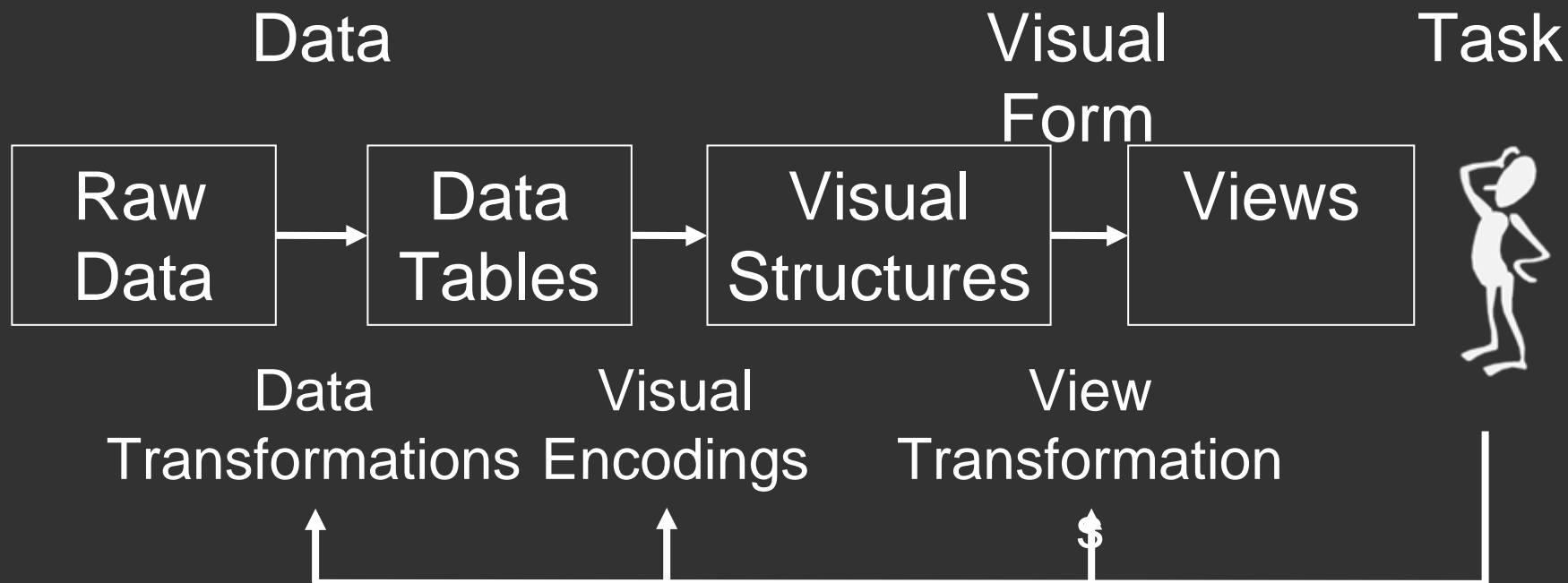


Flare (<http://flare.prefuse.org>)

Protovis: A Graphical Toolkit for Visualization

<http://protovis.org/>



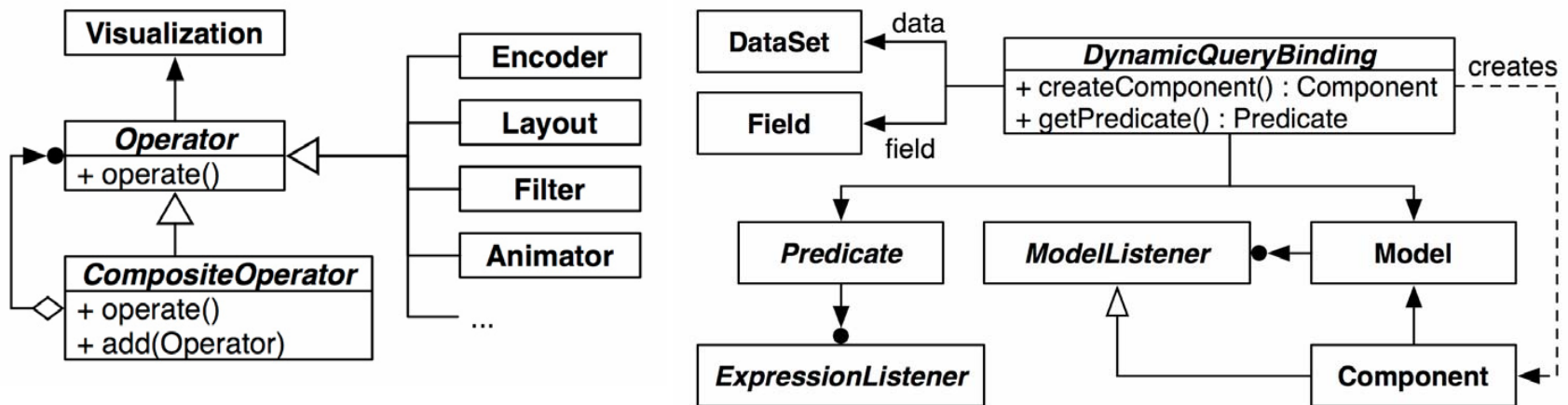


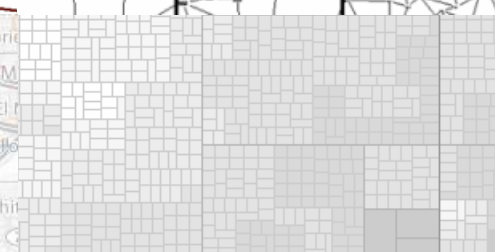
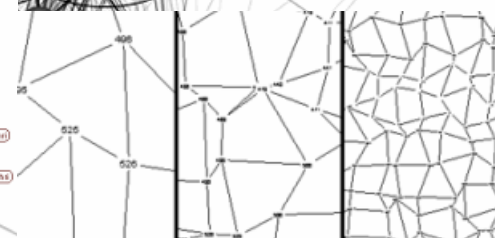
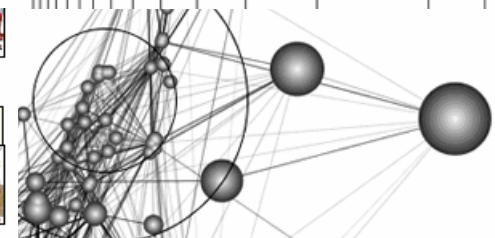
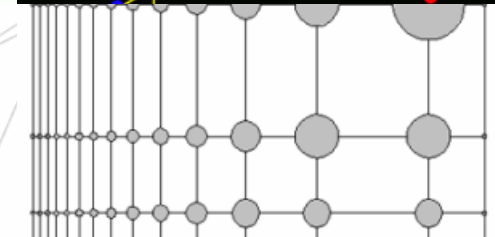
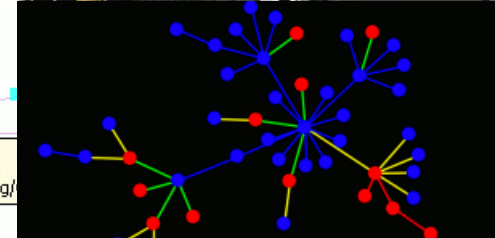
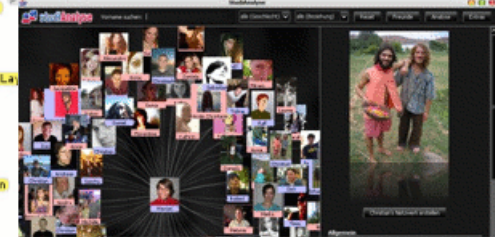
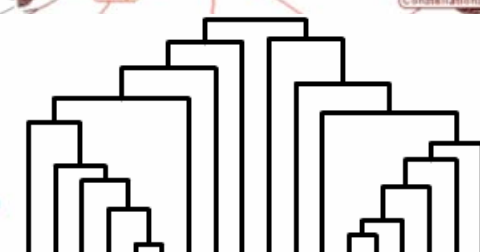
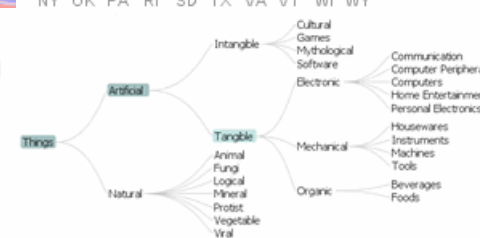
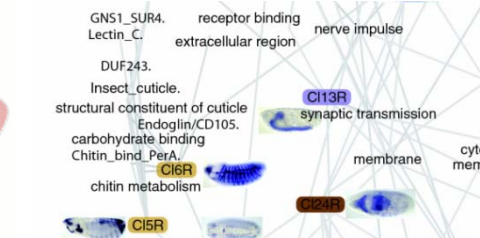
Usage and Uptake

Open Source projects 100,000+
downloads

Used by students, researchers, corporations

Design Patterns describing architecture





Research Challenges

Rapid design, prototyping, and publishing

Reduce need for programming, support larger audience

Integrate design and perceptual analysis

Put perceptual optimization in the hands of designers

Novel visual interfaces for data management

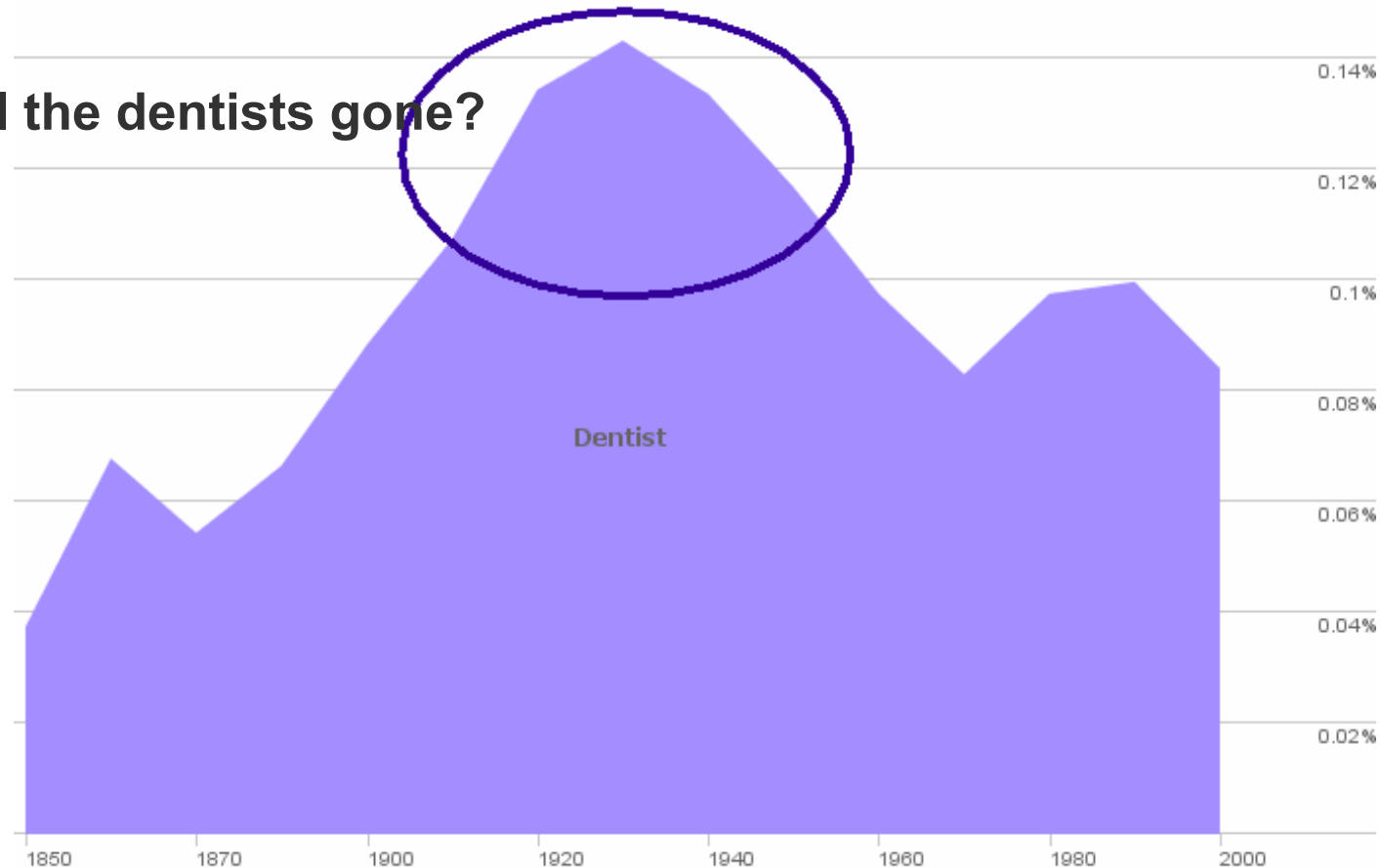
Support for importing, cleaning, and integrating data

Scaling to massive data sets

Visual Analysis Environments

Systems for visual data analysis supporting collaborative exploration and sensemaking

Where have all the dentists gone?



Enron E-Mail Corpus



3/6/97 - 2/13/02

time >>

search >> california

search >> FERC

steven.kean@enron.com

- 2000-09-01 04:25:00.0 Linda Jenkins on "Jerry's Show" Mond
2000-09-02 10:14:00.0 Re: The Governors' Natural Gas Summ
2000-09-08 10:03:00.0
2000-09-10 14:07:00.0 CPUC Hearing in SD on 9/8
2000-09-10 16:20:00.0 Re: Fletcher School/Enron
2000-09-13 00:53:00.0 Re: Contact

0 2 0 0 0 0 0 1 0 0 0 0 0 0 0 0

ID: 174285

Subject:

From: <steven.kean@enron.com>

Date: 2000-09-08 10:03:00.0

To: <kmagrude@enron.com>

Cc: Richard Shapiro <richard.shapiro@enron.com>

Get your message. I'm testifying at the Congressional hearing and Dasovich is covering **FERC**. I think Jeff's comments were taken out of context. He said policymakers do need to take care of small customers whose bills are tripling. Frankly, we'd get slaughtered if we said anything else. But he also said there is a right way and a wrong way to do it. Enron and others had provided a market based answer by offering a fixed price deal to SDG&E (which would have enabled them to cap rates to those who had not switched. **California** elected instead to cap rates and deficit spend (ie create a deferral account). I don't think we can stand for anything that doesn't protect the small customers, but we can continue to emphasize the market based solutions. One of the messages in my testimony will be: customers should be encouraged to choose. Those who did are doing fine.

Messages



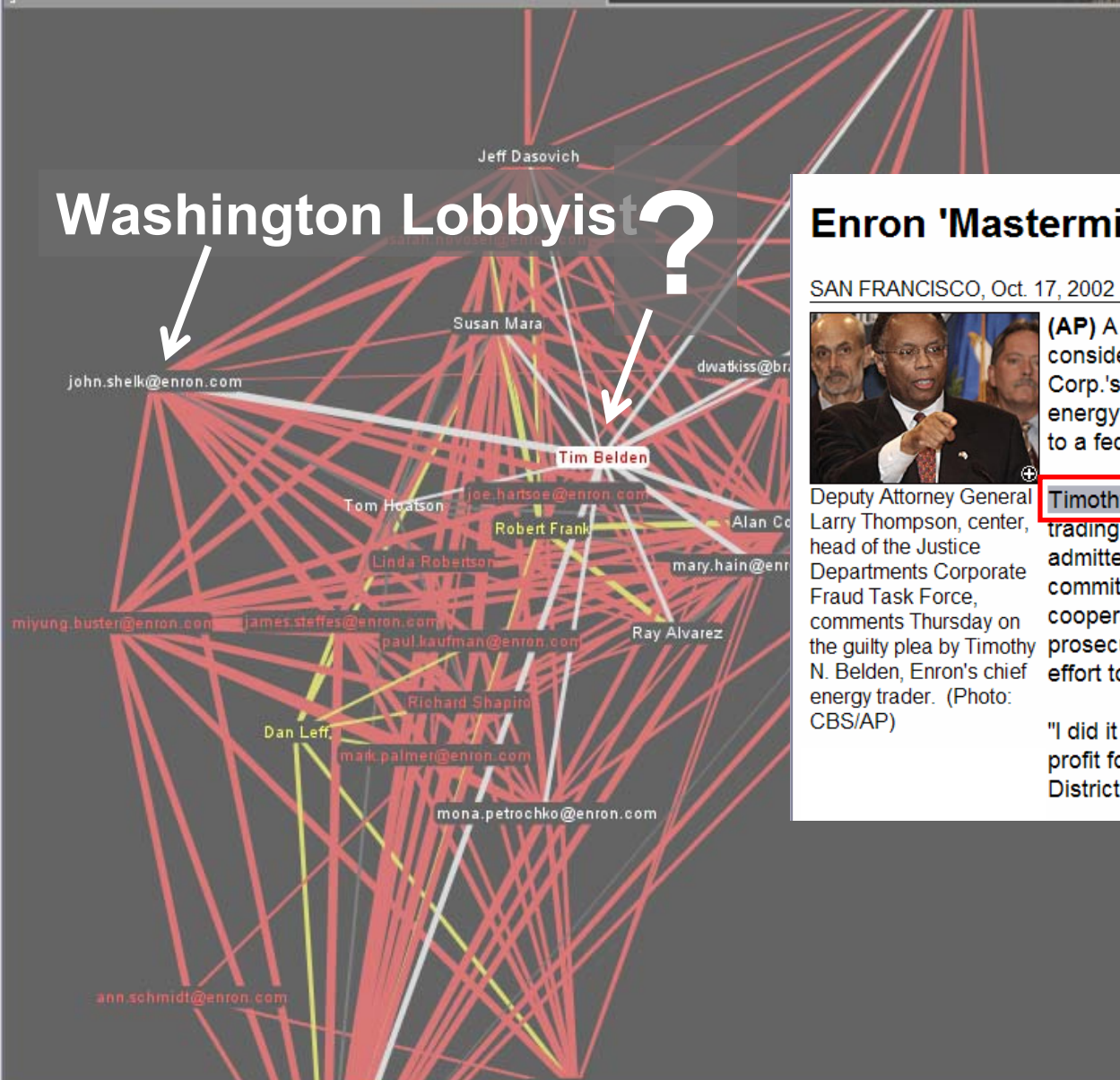
1/20/01 - 6/27/01



search >> california

search >> ferc

Washington Lobbyist?



Enron 'Mastermind' Pleads Guilty

SAN FRANCISCO, Oct. 17, 2002



Deputy Attorney General Larry Thompson, center, head of the Justice Departments Corporate Fraud Task Force, comments Thursday on the guilty plea by Timothy N. Belden, Enron's chief energy trader. (Photo: CBS/AP)

(AP) A former top energy trader, considered the mastermind of Enron Corp.'s scheme to drive up California's energy prices, pleaded guilty Thursday to a federal conspiracy charge.

Timothy Belden, the former head of trading in Enron's Portland, Ore., office, admitted to one count of conspiracy to commit wire fraud and promised to cooperate with state and federal prosecutors as well as any non-criminal effort to investigate the energy industry.

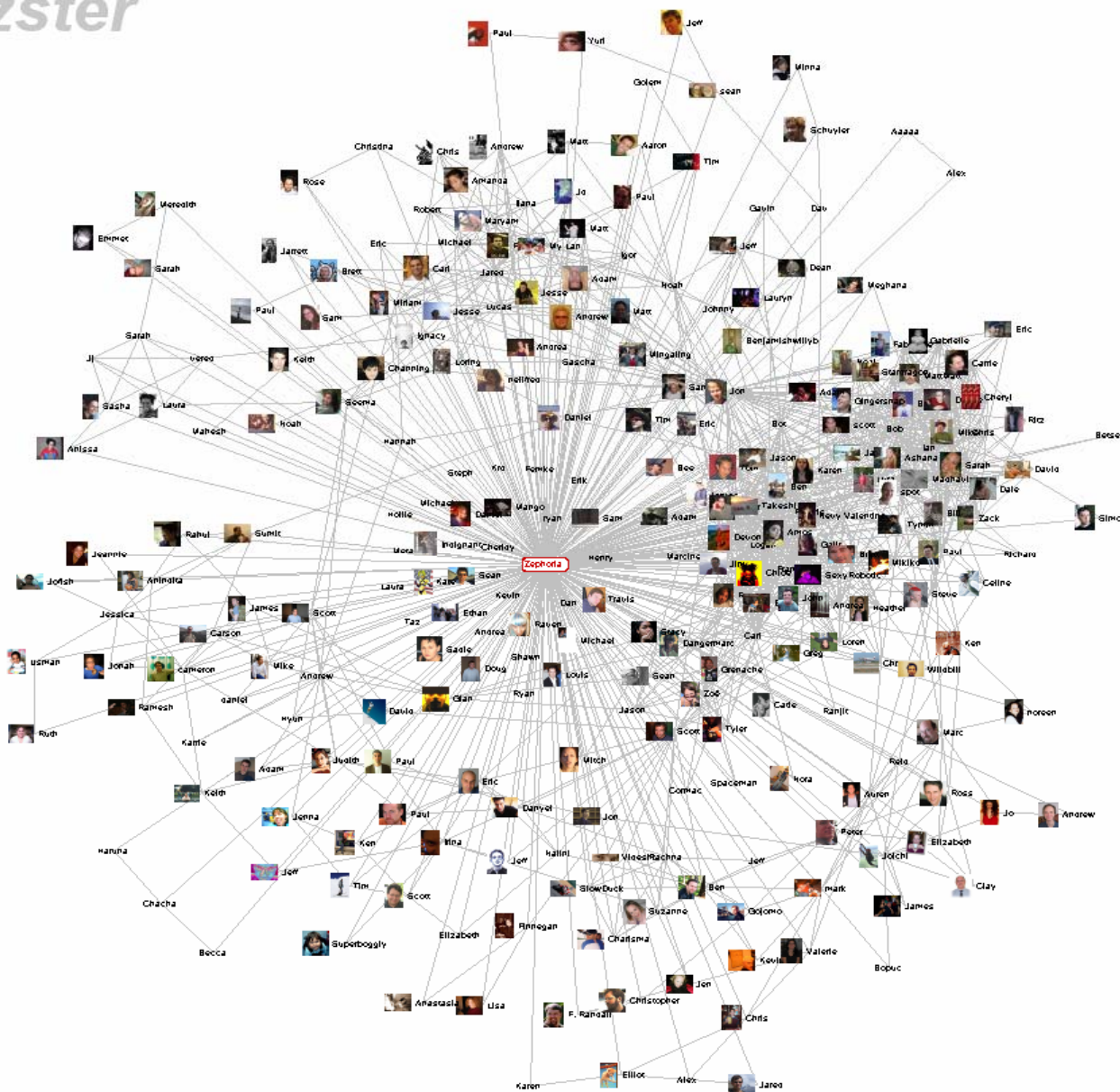
"I did it because I was trying to maximize profit for Enron," Belden told U.S. District Judge Martin Jenkins.

from four western governors -- those from Arizona, North Dakota, Utah and Wyoming -- saying that since FERC has acted, there is no need for Congress to pursue price control legislation.

There were a series of questions and comments on details and technical aspects of the orders. I will do an e-mail on these items later today. Please advise if you have any questions or comments.

Messages

vizster



Zephoria

User ID 21721

Friends ☐ 266

Age ??

Gender ☐ FemaleStatus ☐ Single

Location San Francisco, CA

Hometown Lancaster, PA

Occupation researcher: social networks, identity, context

Interests

apophenia, observing people, culture, questioning power, reading, buddhism, ipseity, computer-mediated communication, social networks, technology, anthropology, stomping

Music

psytrance/goa/trance [Infected Mushroom, Son Kite... Iboga/Digital Structures], Ani Difranco, downtempo, Thievery Corporation, Beth Orton, Morcheeba, Ween, White Stripes

Books

Authors: Irving Goffman, Stanley Milgram, Jeanette Winterson, Eric Schlosser, Leslie Feinberg, Dorothy Allison, Italo Calvino, Hermann Hesse

TV Shows

Movies

Koyaanisqatsi, Amelie, Waking Life, Tank Girl, The Matrix, Clockwork Orange, American Beauty, Fight Club, Boys Don't Cry

Member Since

Last Login 2003-10-21

Last Updated 2003-10-21

About [Some know me as danah...]

I'm a geek, an activist and an academic, fascinated by people and society. I see life as a very large playground and enjoy exploring its intricacies. I revel in life's chaos, while simultaneously providing my own insane element.

My musings:
<http://www.zephoria.org/thoughts/>

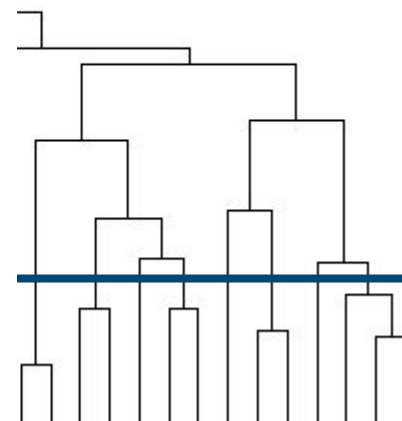
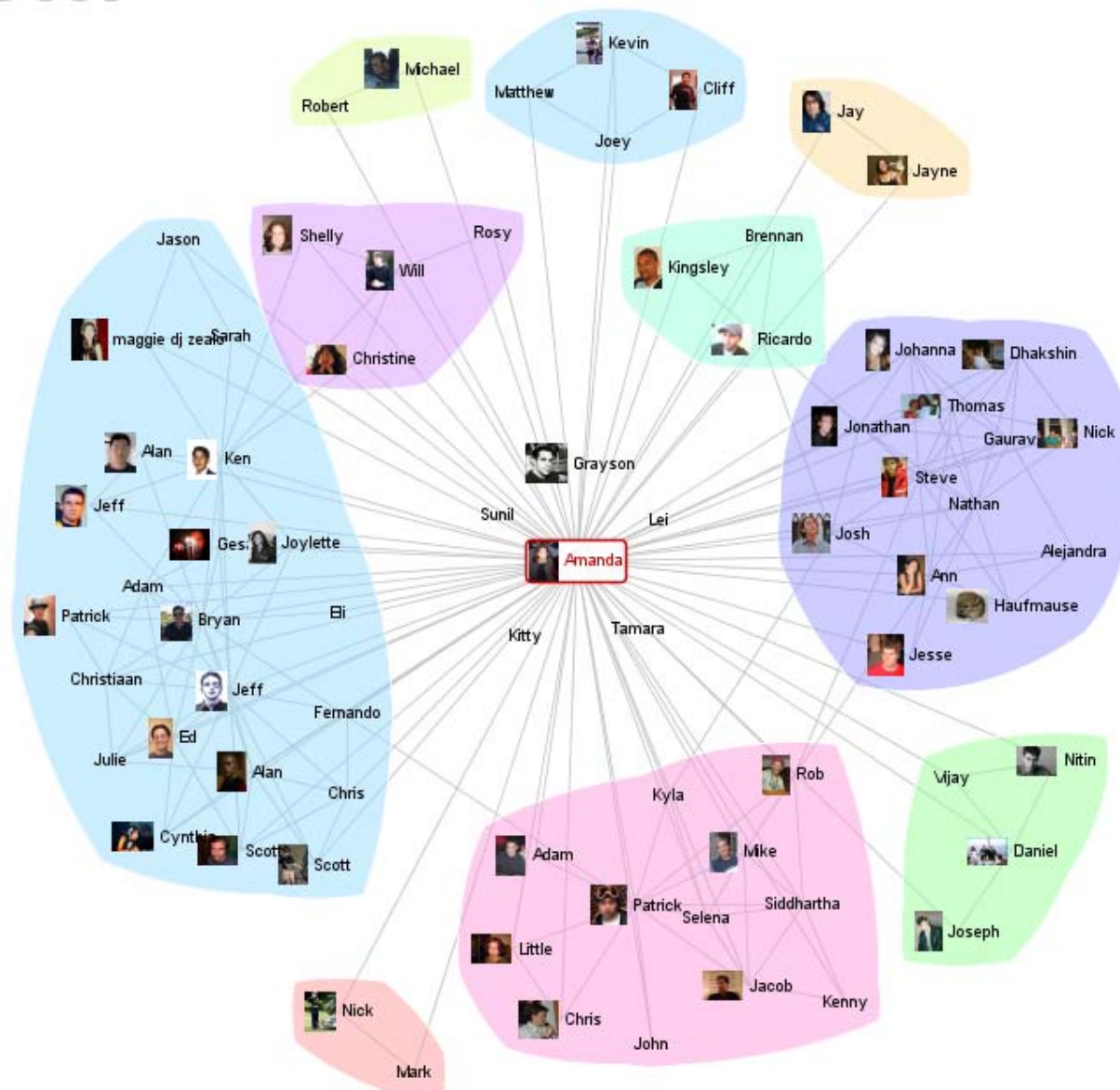
Want to Meet

Someone who makes life's complexities seem simply elegant.

community >>

Enable

search >>



community >>



Disable

sense.us

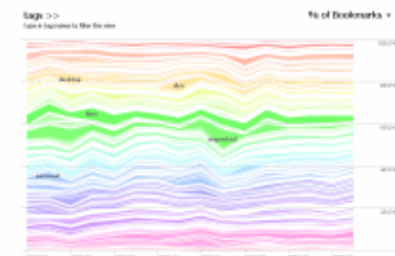
A Web Application for Collaborative
Visualization of Demographic Data

sense.us

Log in to add comments! ibm e-mail

pass

login help

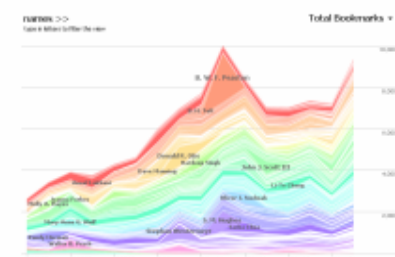


Dogear Tags

Dogear Tag Usage, May 2005 to August 2006

source: IBM Dogear

10 comments

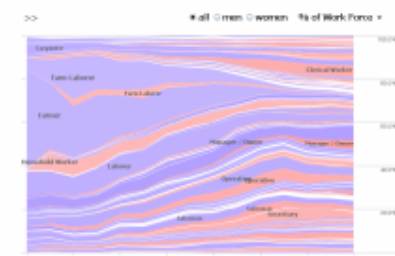


Dogear People

Dogear Bookmarking by Person, May 2005 to August 2006

source: IBM Dogear

1 comment

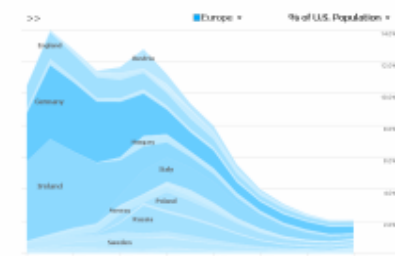


Job Voyager

Reported Occupations of U.S. Labor Force, 1850-2000

source: <http://ipums.org>

139 comments



Birthplace Voyager

Reported Birthplace of U.S. Residents, 1850-2000

source: <http://ipums.org>

10 comments

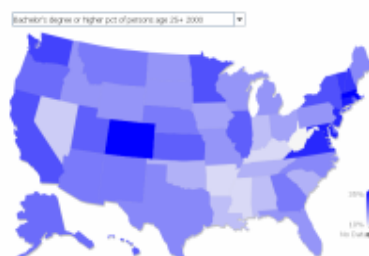
sense.us - social data visualization

sense.us is a prototype system for collaborative visualization.

- See the data. See what people have to say about it.
- Dive into the data and share your explorations.

The site requires **Java 1.5+** and either **Firefox** or **Internet Explorer**.Use your **IBM W3/BluePages e-mail and password** to login.Use at least **1024x768** resolution for the best experience.Check out the **user's guide** and **privacy policy** before getting started.

Having problems using Firefox with Java 1.4? Some users using Firefox and Java 1.4 have found that comments aren't loading properly. If you run into this problem, consider upgrading to Java 1.5 (**Windows, Linux**) or using Internet Explorer (on Windows systems). Sorry for any inconvenience!

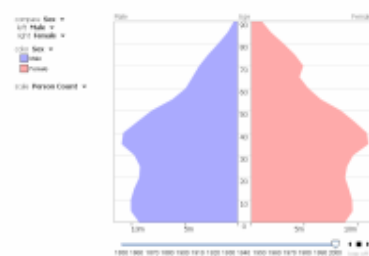


U.S. Census State Map

State Map of 2000-2005 Census Data

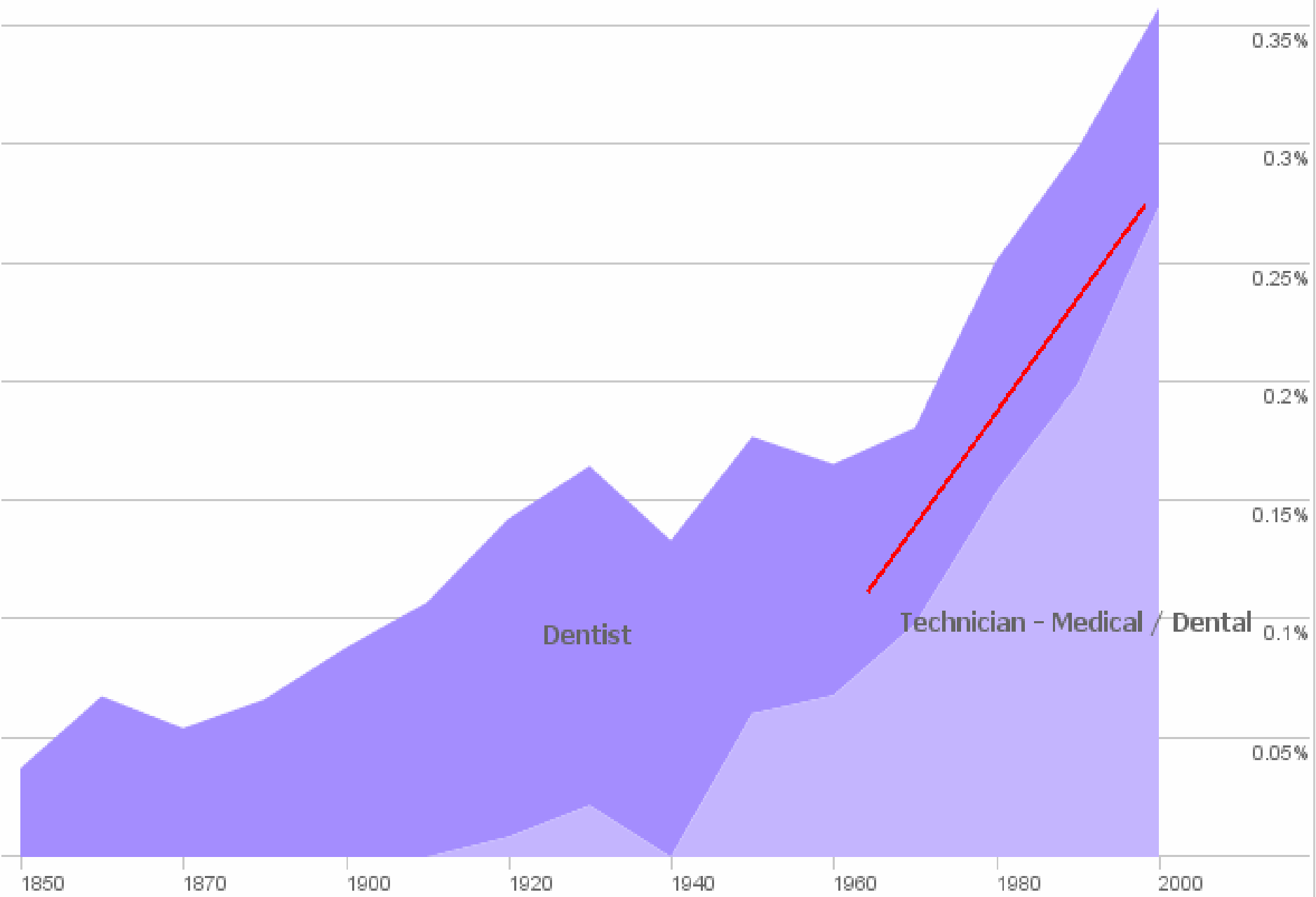
source: U.S. Census Bureau

16 comments



>> dent

all men women % of Work Force ▼



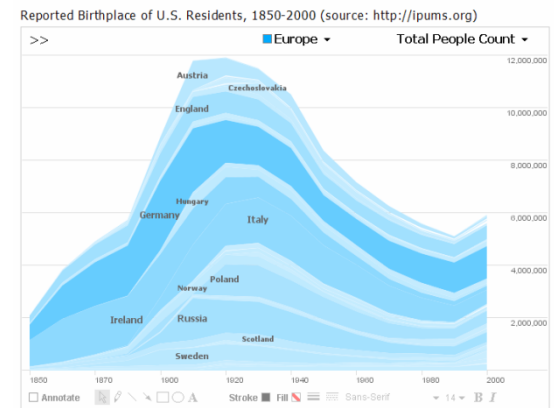
Voyagers and Voyeurs

Complementary faces of analysis

Voyager – focus on visualized data

Active engagement with the data

Serendipitous comment discovery

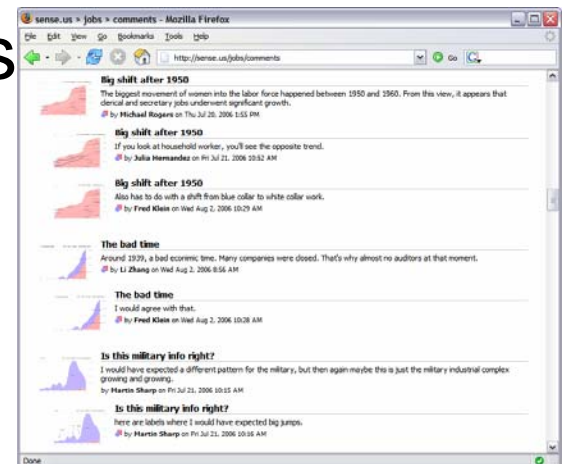


Voyeur – focus on comment listings

Investigate others' explorations

Find people and topics of interest

Catalyze new explorations

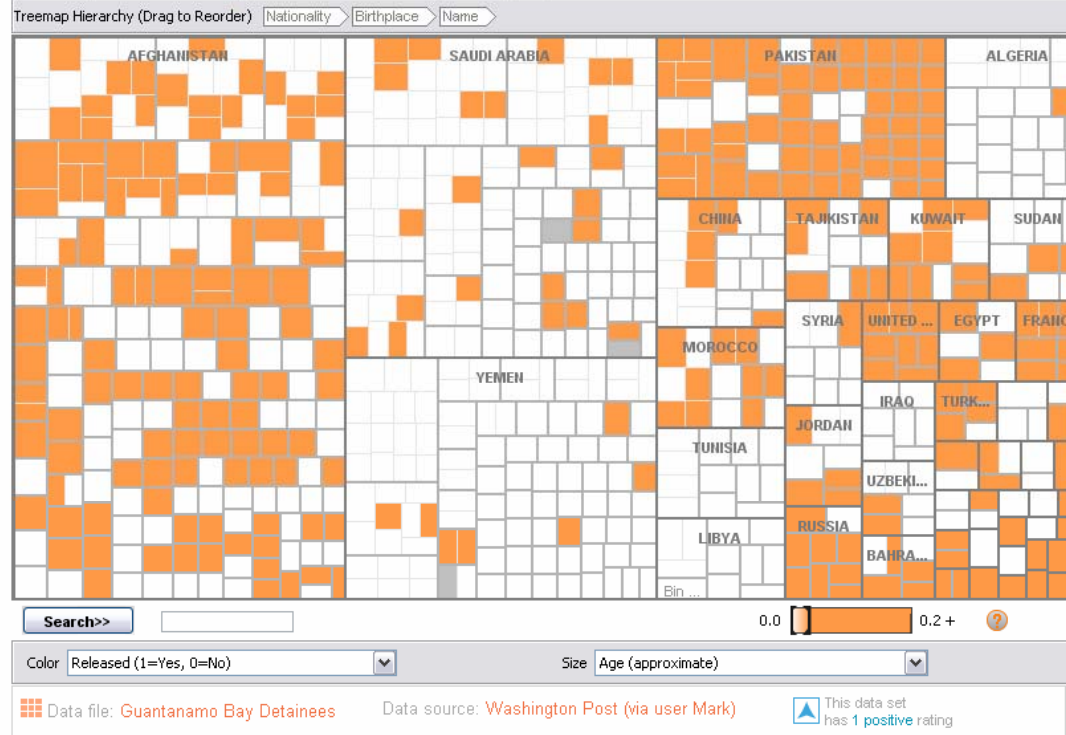




Visualizations : Guantanamo Bay Detainees, release status & age

Can't see the visualization? Download the latest Java plugin [here](#). On Macs: best viewed in Safari.

Created by: [Martin Wattenberg](#) Created on: Saturday February 24, 12:06 PM



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Comments (4)



[Martin Wattenberg](#) says:

In this view, orange means released, white means not released. Gray means committed suicide.

Posted Saturday February 24, 12:07 PM

[see view for this comment](#)



[Martin Wattenberg](#) says:

I'd be curious to hear ideas on why various countries have the release proportions that they do.

Posted Saturday February 24, 12:13 PM

[see view for this comment](#)



[Mark](#) says:



This visualization
has 1 positive rating



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Want to keep track of this
visualization? Add it to your
watchlist!

Learn more:



[About the Treemap](#)

Many- Eyes

Research Challenges

Integrating graphical and statistical analysis

Visual construction and inspection of models

Supporting the full data life-cycle

Data acquisition, integration, analysis, dissemination

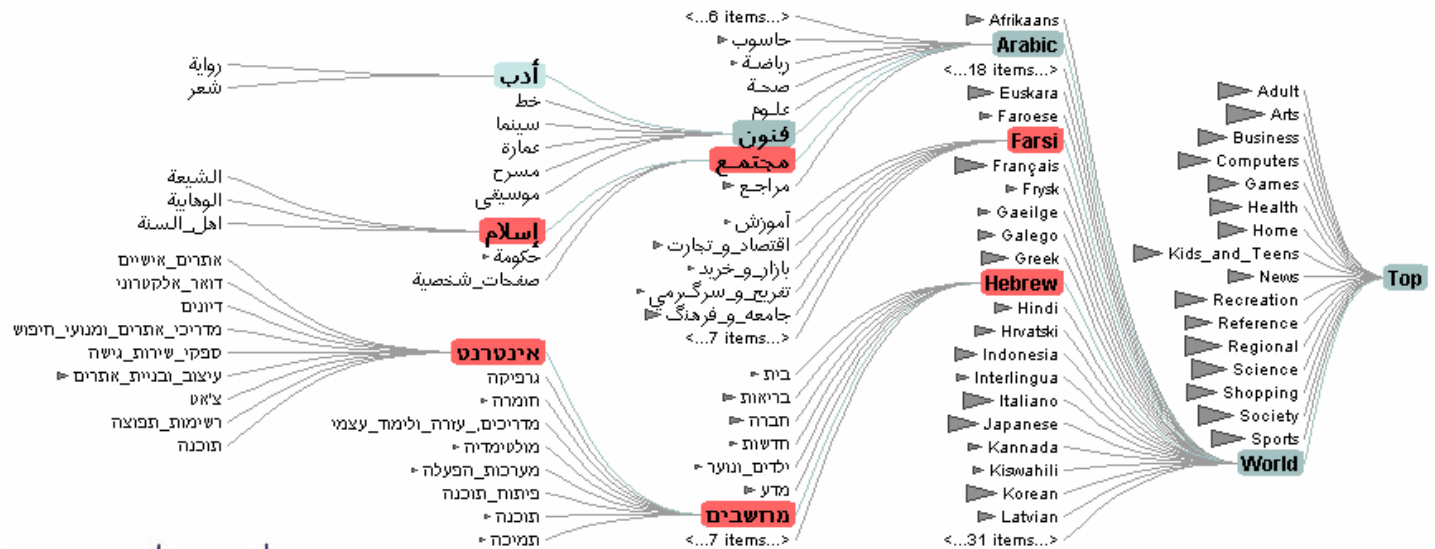
Novel techniques for facilitating collaboration

Integrating findings and visualizing activity patterns

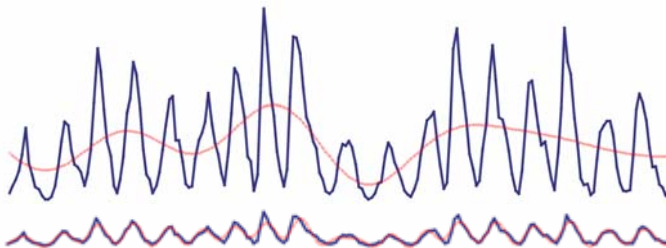
Conclusion

Visualization Techniques

Improve visual analysis and communication via novel algorithms, encodings, and interact'



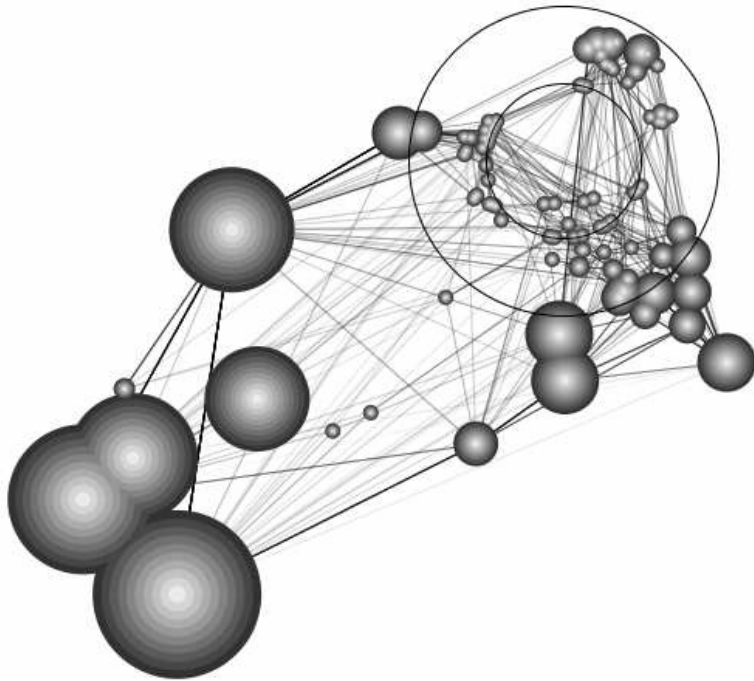
Degree-of-Interest Trees



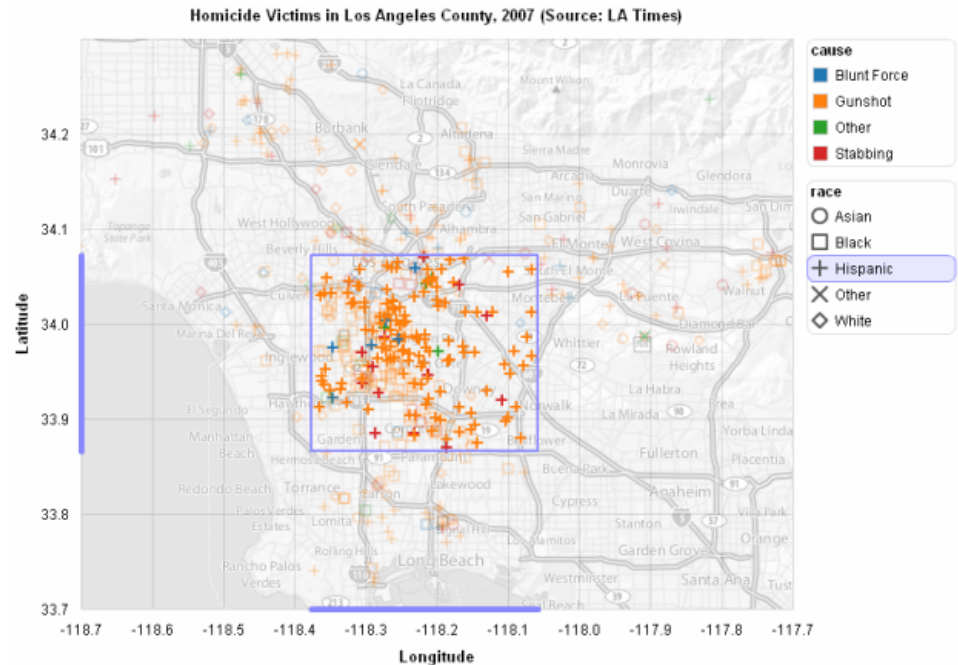
Aspect Ratio Optimization

Visualization Tools

Support visualization design and literacy through tools for visualization creation



Prefuse (<http://prefuse.org>)

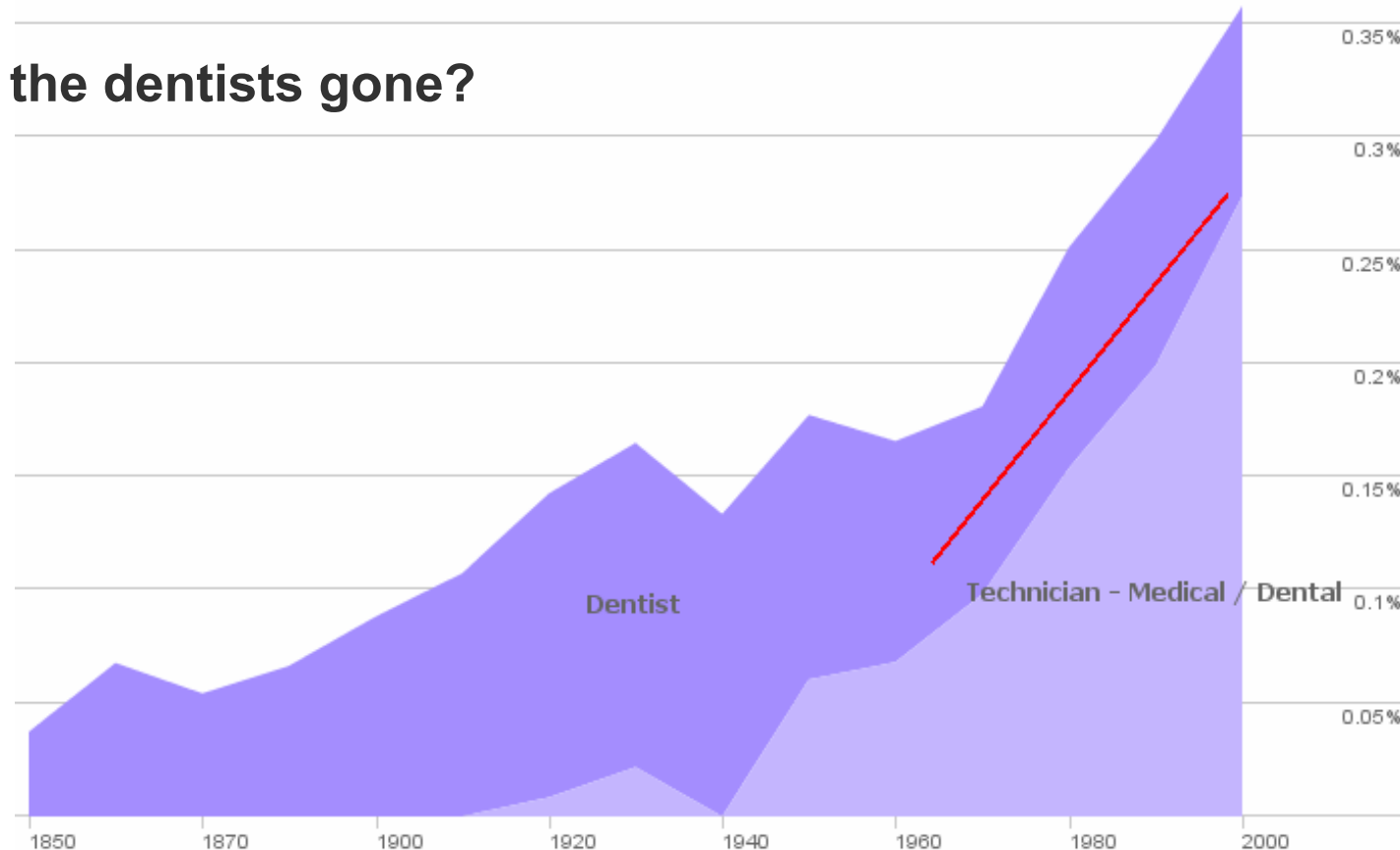


Flare (<http://flare.prefuse.org>)

Visual Analysis Environments

Systems for visual data analysis supporting collaborative sensemaking and exploration

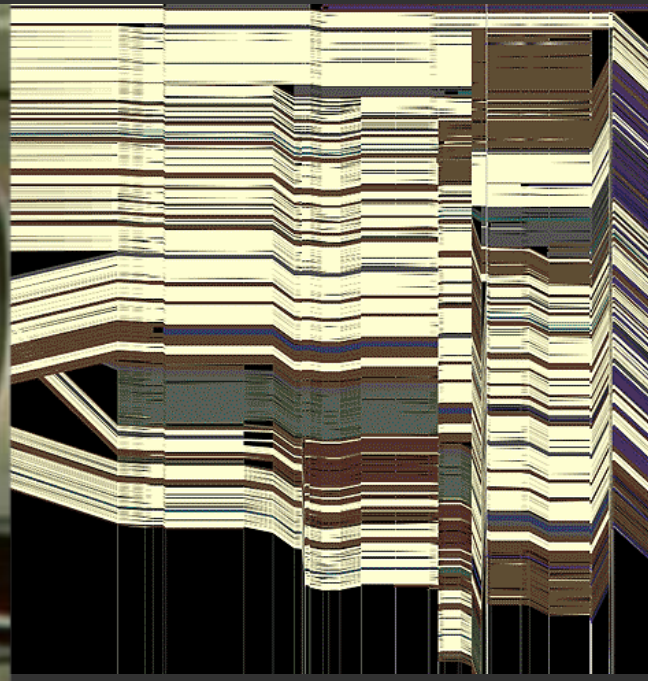
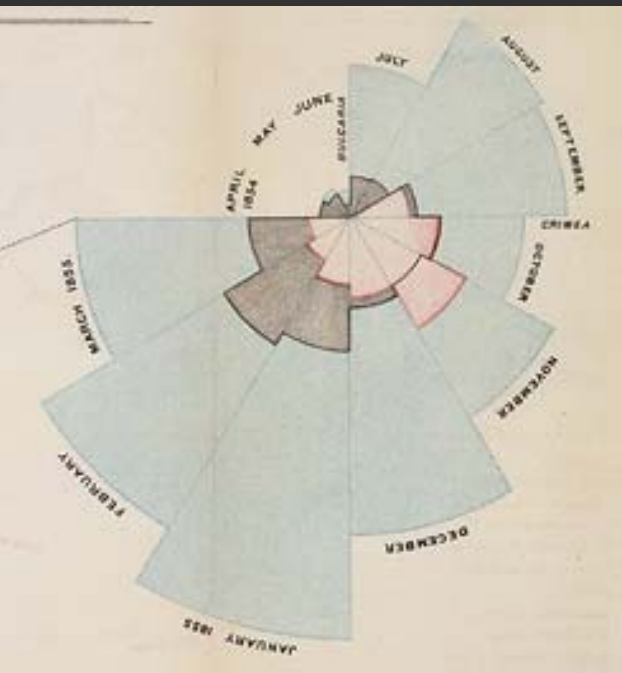
Where have all the dentists gone?





research topics in

Data Visualization



Jeffrey Heer hci.stanford.edu/jheer

I keep saying the **sexy job** in the next ten years will be **statisticians**. People think I'm joking, but who would've guessed that **computer engineers** would've been the sexy job of the 1990s?

Hal Varian, *The McKinsey Quarterly*, Jan 2009