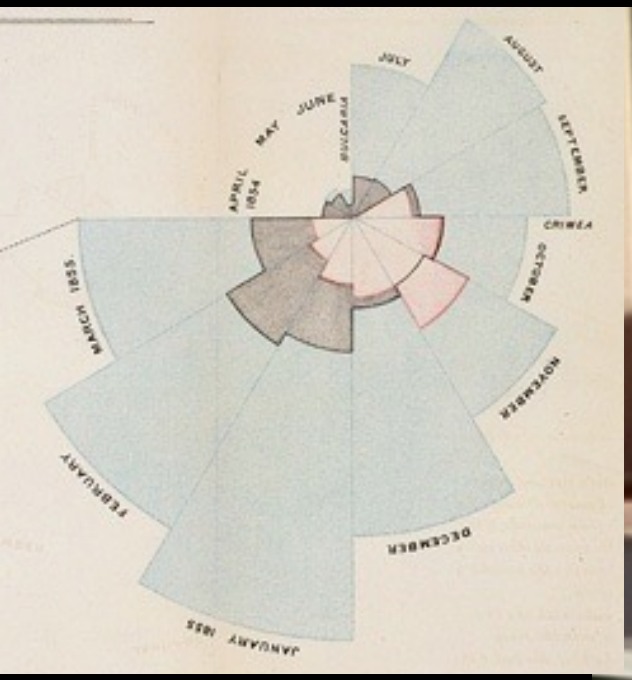
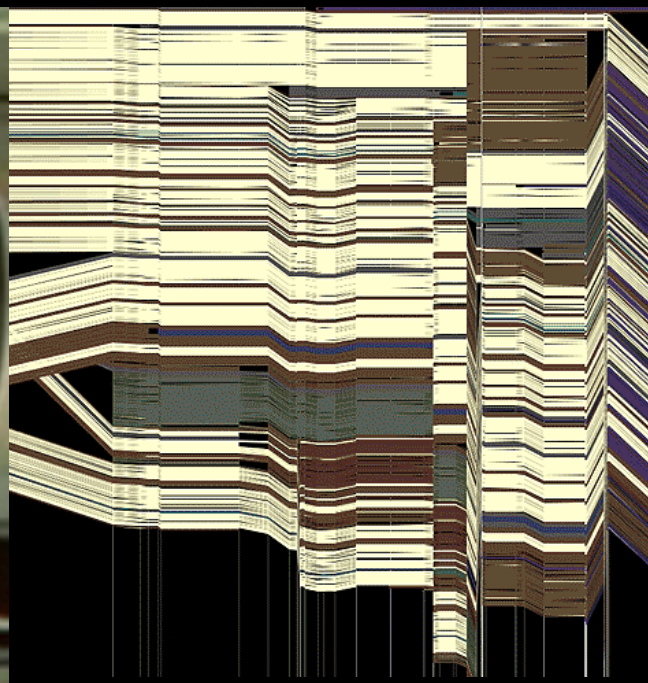
CSE 512 - Data Visualization

Collaborative Analysis



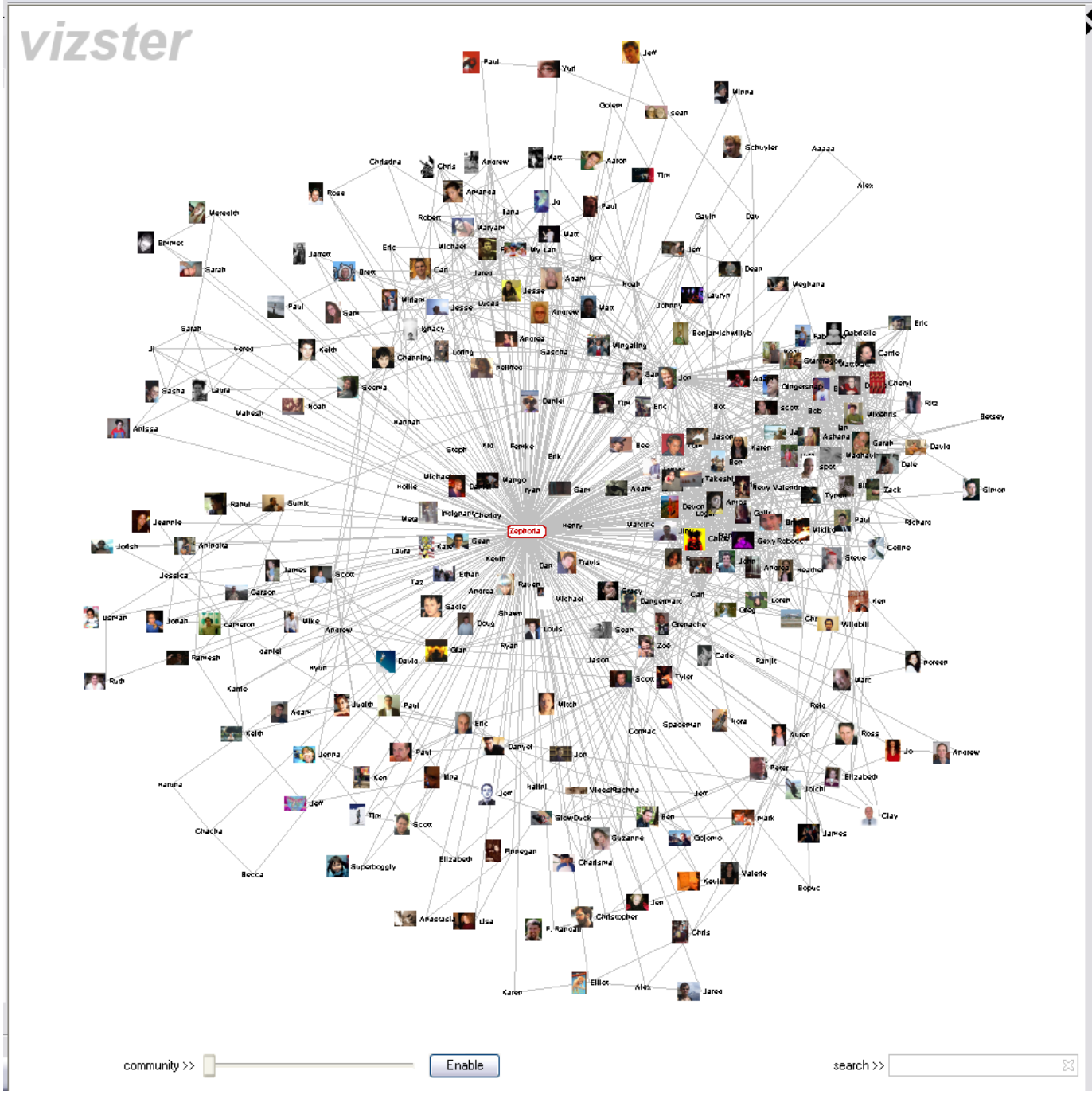


Jeffrey Heer University of Washington

A Tale of Two Visualizations

Vizster

File Options Tools



Zephoria

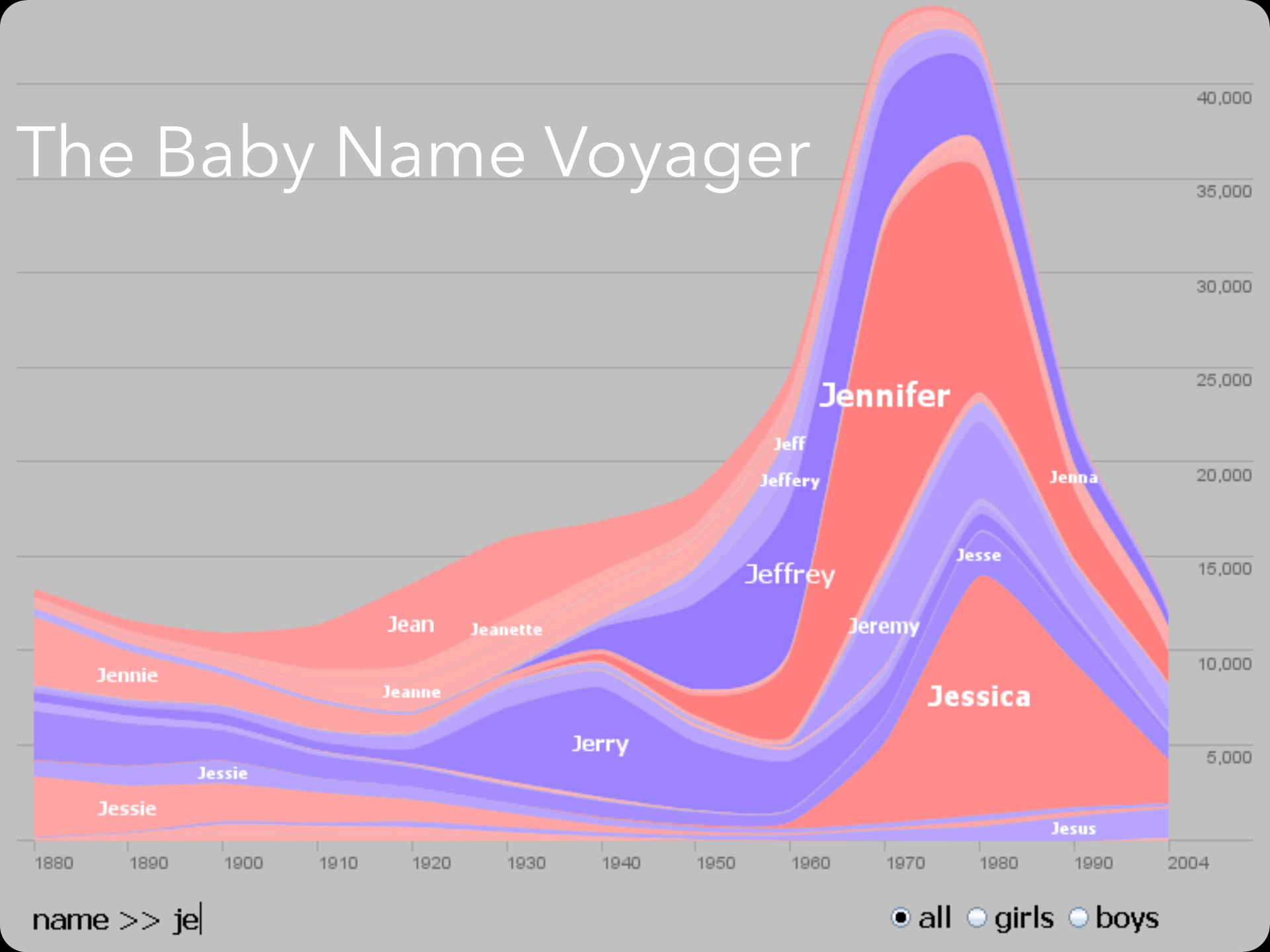
User ID	21721
Friends ☐	266
Age	??
Gender ☐	Female
Status ☐	Single
Location	San Francisco, CA
Hometown	Lancaster, PA
Occupation	researcher: social networks, identity, context
Interests	apophenia, observing people, culture, questioning power, reading, buddhism, ipseity, computer-mediated communication, 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: Erving 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.

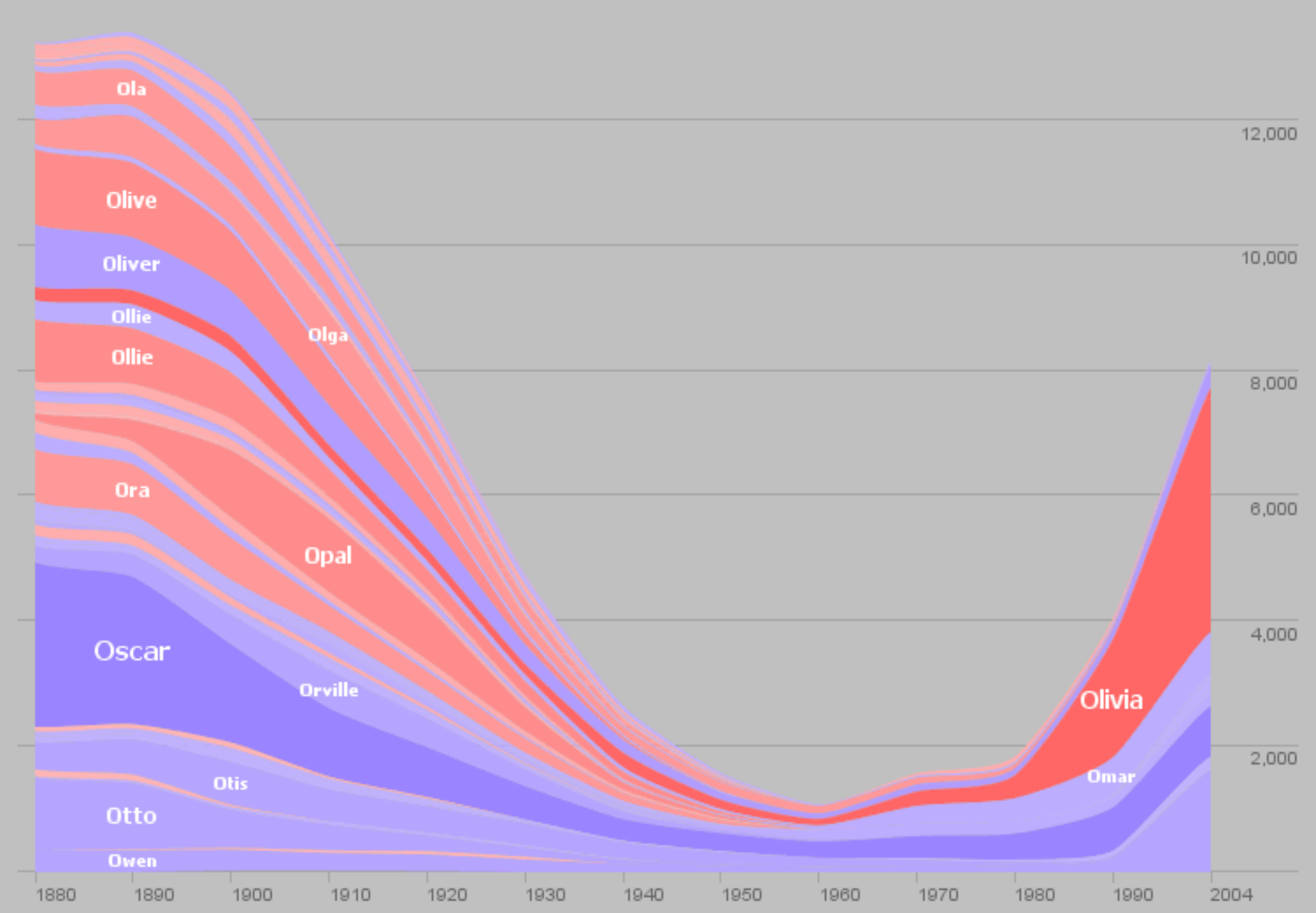
Observations

Groups spent more time in front of the visualization than individuals.

Friends encouraged each other to unearth relationships, probe community boundaries, and challenge reported information.

Social play resulted in informal analysis, often driven by story-telling of group histories.


The Baby Name Voyager
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
Jennifer
Jeff
Jeffery
Jenna
Jesse
Jeffrey
Jean
Jeanette
Jeremy
Jennie
Jeanne
Jessica
Jerry
Jessie
Jessie
Jesus
1880
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2004
name >> je
all
girls
boys



name >> o

all girls boys

Social Data Analysis

Visual sensemaking is a **social** process as well as a cognitive process.

Analysis of data coupled with **social interpretation and deliberation**.

How can user interfaces catalyze and support **collaborative visual analysis**?

sense.us

A Web Application for Collaborative Visualization of Demographic Data

with **Fernanda Viégas** and **Martin Wattenberg**

sense.us > social data visualization - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://sense.us/

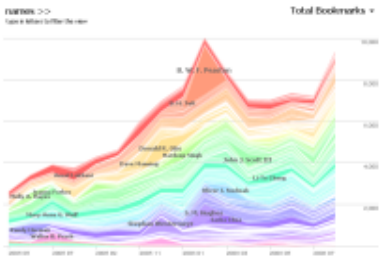
Google

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

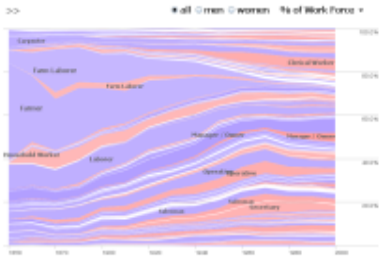
sense.us - social data visualization

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.

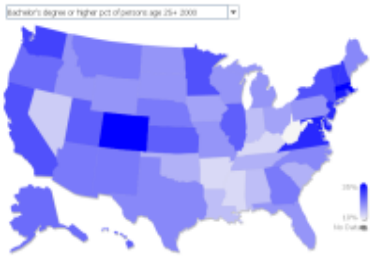
Check out the **user's guide** and **privacy policy** before getting started.

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!



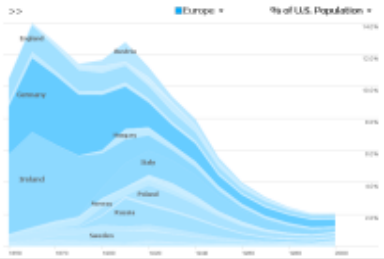
Job Voyager

Reported Occupations of U.S. Labor Force, 1850-2000
source: http://ipums.org
139 comments



U.S. Census State Map

State Map of 2000-2005 Census Data
source: U.S. Census Bureau
16 comments



Birthplace Voyager

Reported Birthplace of U.S. Residents, 1850-2000
source: http://ipums.org
10 comments

Population Pyramid

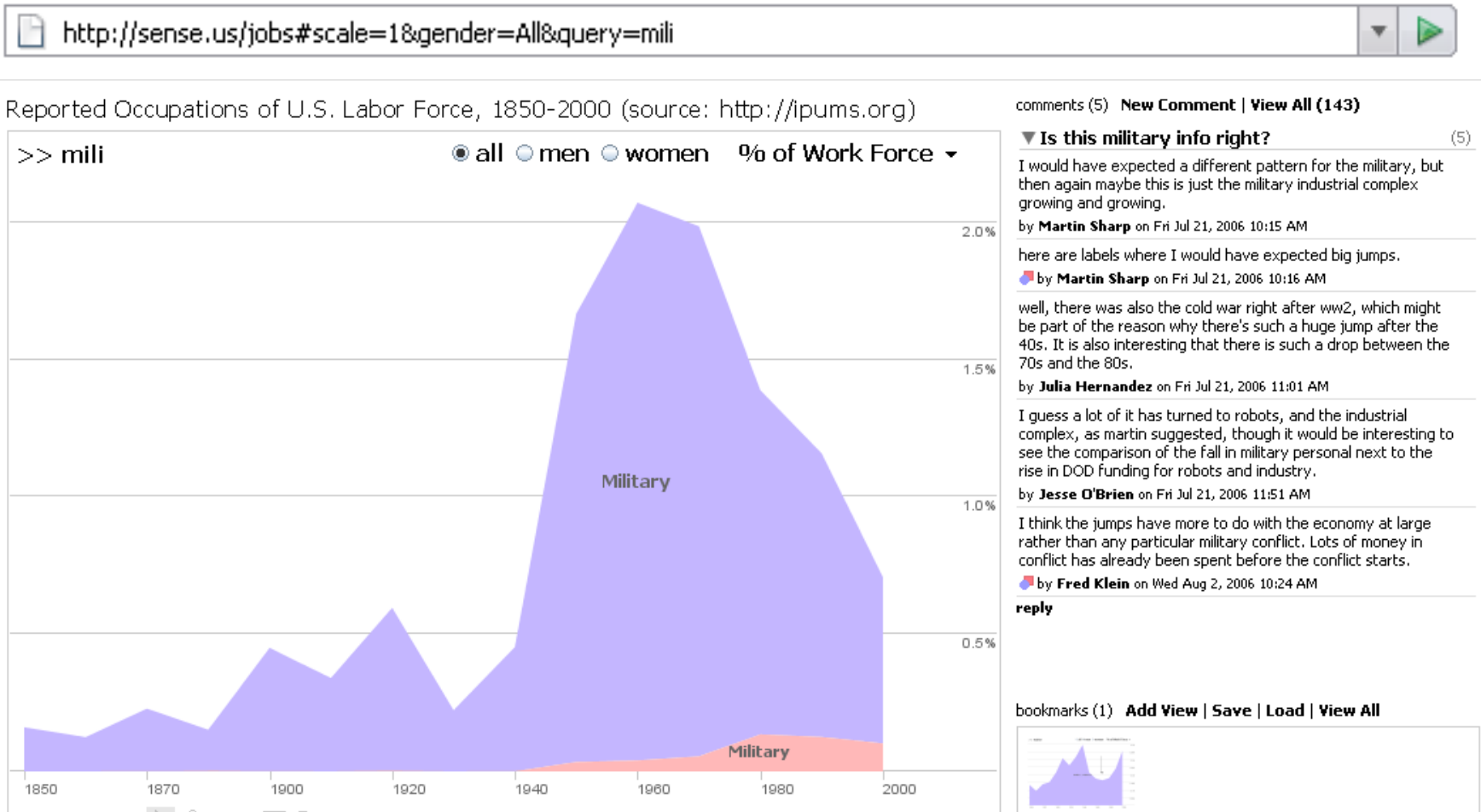
U.S. Population Demographics, 1850-2000
source: http://ipums.org
7 comments

[CHI 07]

Done

Supporting Collaboration

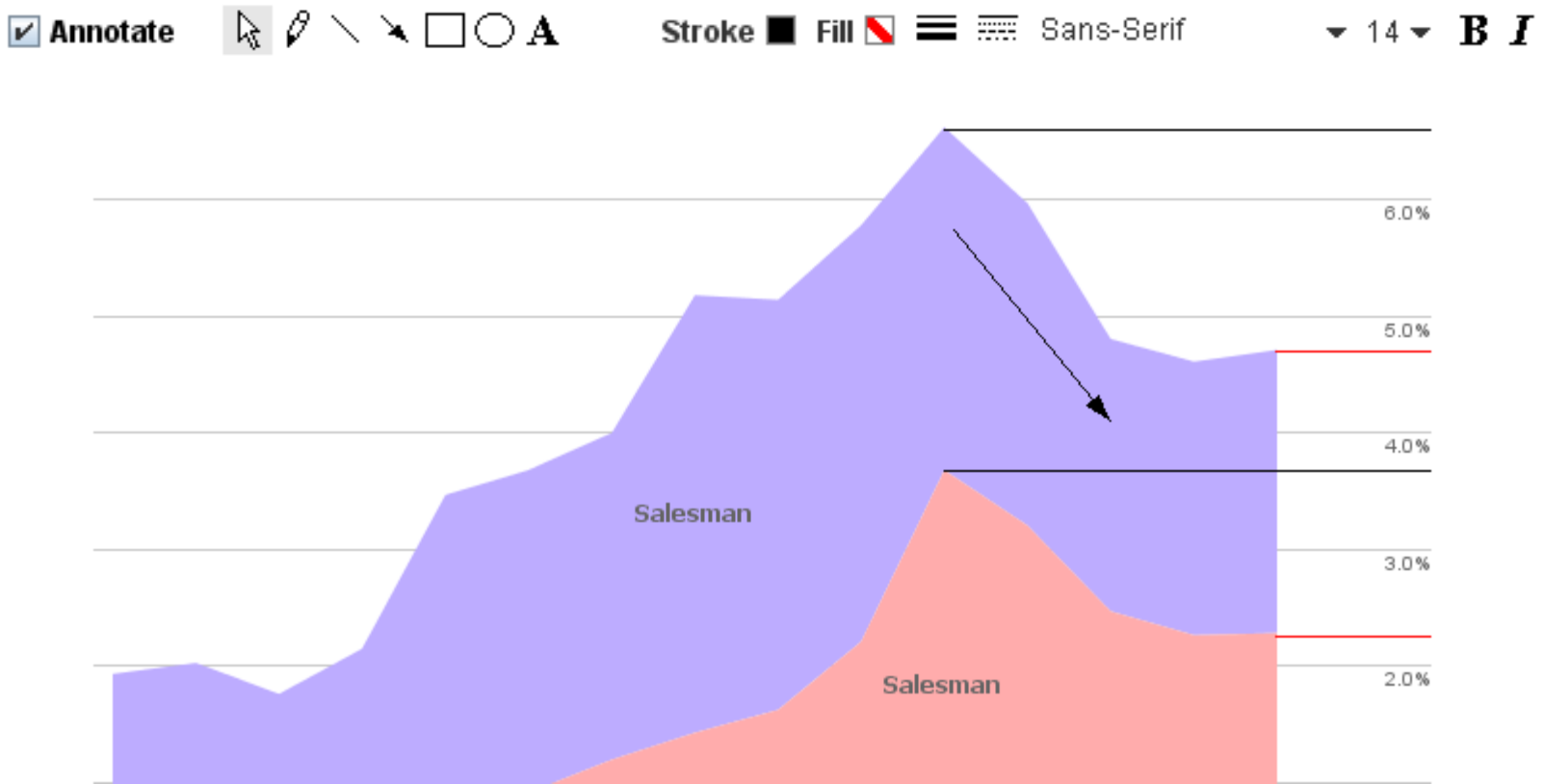
Sharing within visualizations and across the web



Supporting Collaboration

Sharing within visualizations and across the web

Pointing at interesting trends, outliers

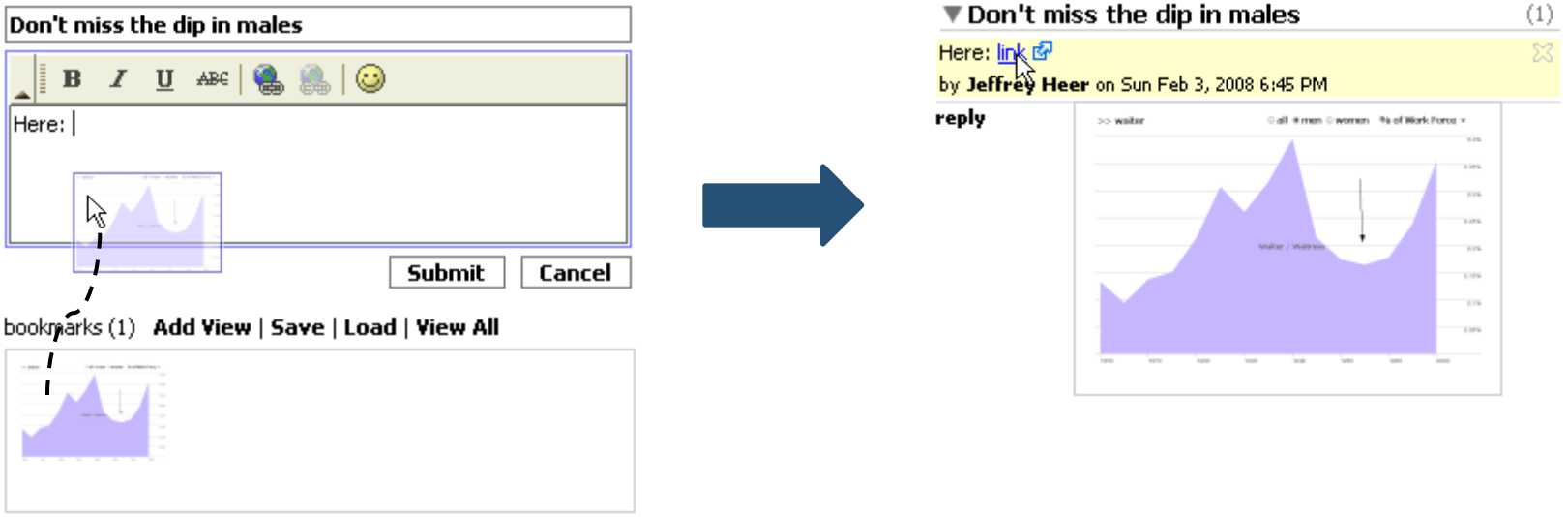


Supporting Collaboration

Sharing within visualizations and across the web

Pointing at interesting trends, outliers

Collecting and linking related views



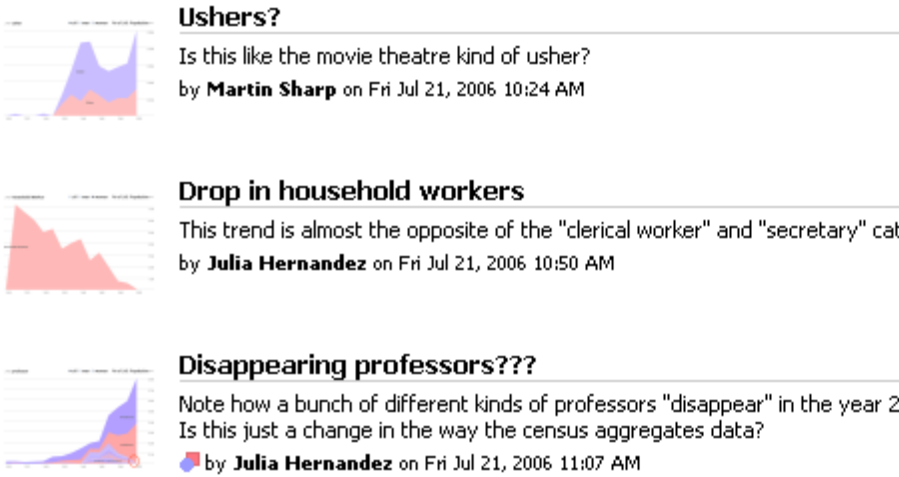
Supporting Collaboration

Sharing within visualizations and across the web

Pointing at interesting trends, outliers

Collecting and linking related views

Awareness of social activity



Supporting Collaboration

Sharing within visualizations and across the web

Pointing at interesting trends, outliers

Collecting and linking related views

Awareness of social activity

Embedding in external media (blogs, wikis, …)

Supporting Collaboration

Sharing within visualizations and across the web

Pointing at interesting trends, outliers

Collecting and linking related views

Awareness of social activity

Embedding in external media (blogs, wikis, …)

Don’t disrupt individual exploration

User Study Design

30 participant laboratory study
25 minute, unstructured sessions with job voyager

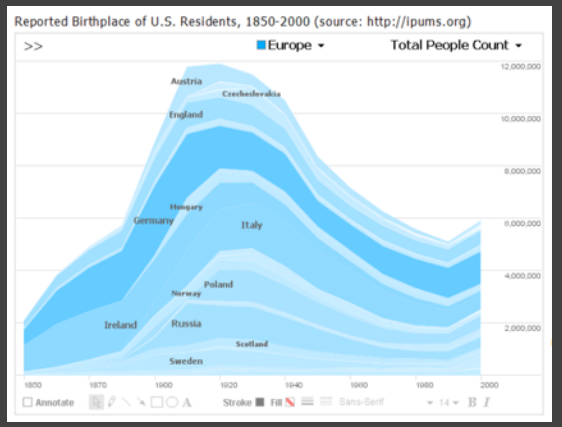
3-week live deployment on IBM intranet
Employees logged in using intranet accounts

Data analyzed
12.5 hours of qualitative observation
258 comments (41 pilot, 85 ibm, 60 ucb, 72 live)
Usage logs of user sessions

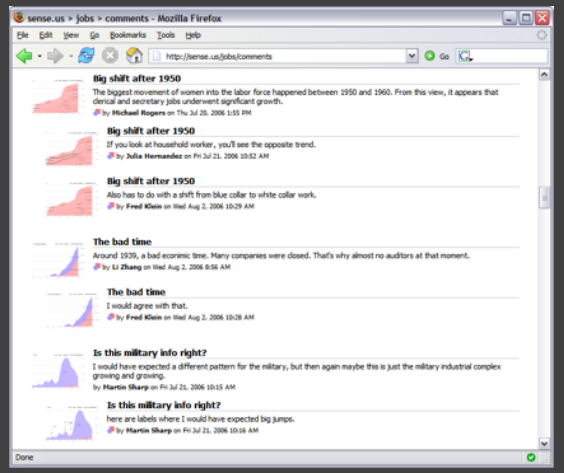
Voyagers & Voyeurs

Complementary faces of analysis

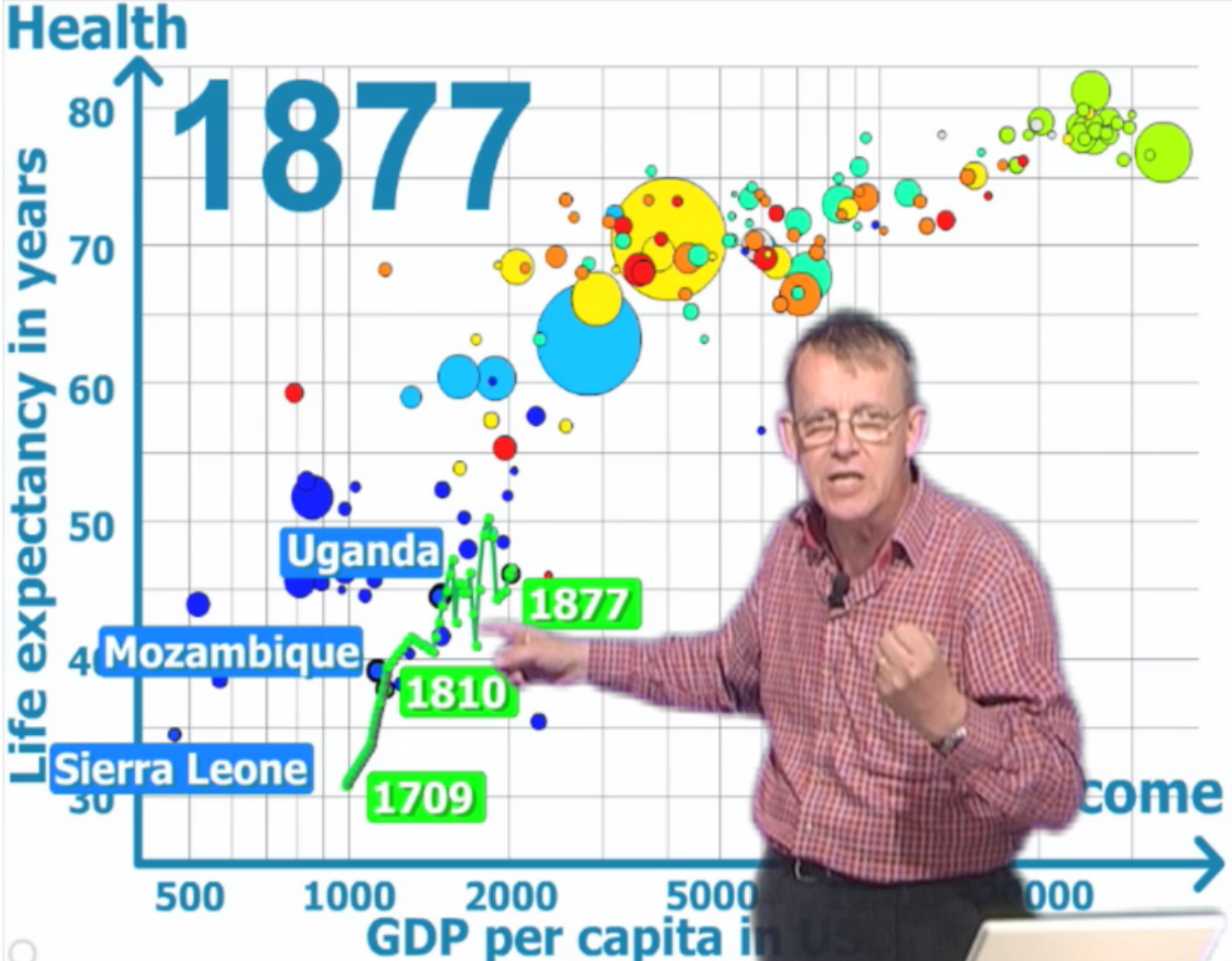
Voyager – focus on visualized data
Active engagement with the data
Serendipitous comment discovery



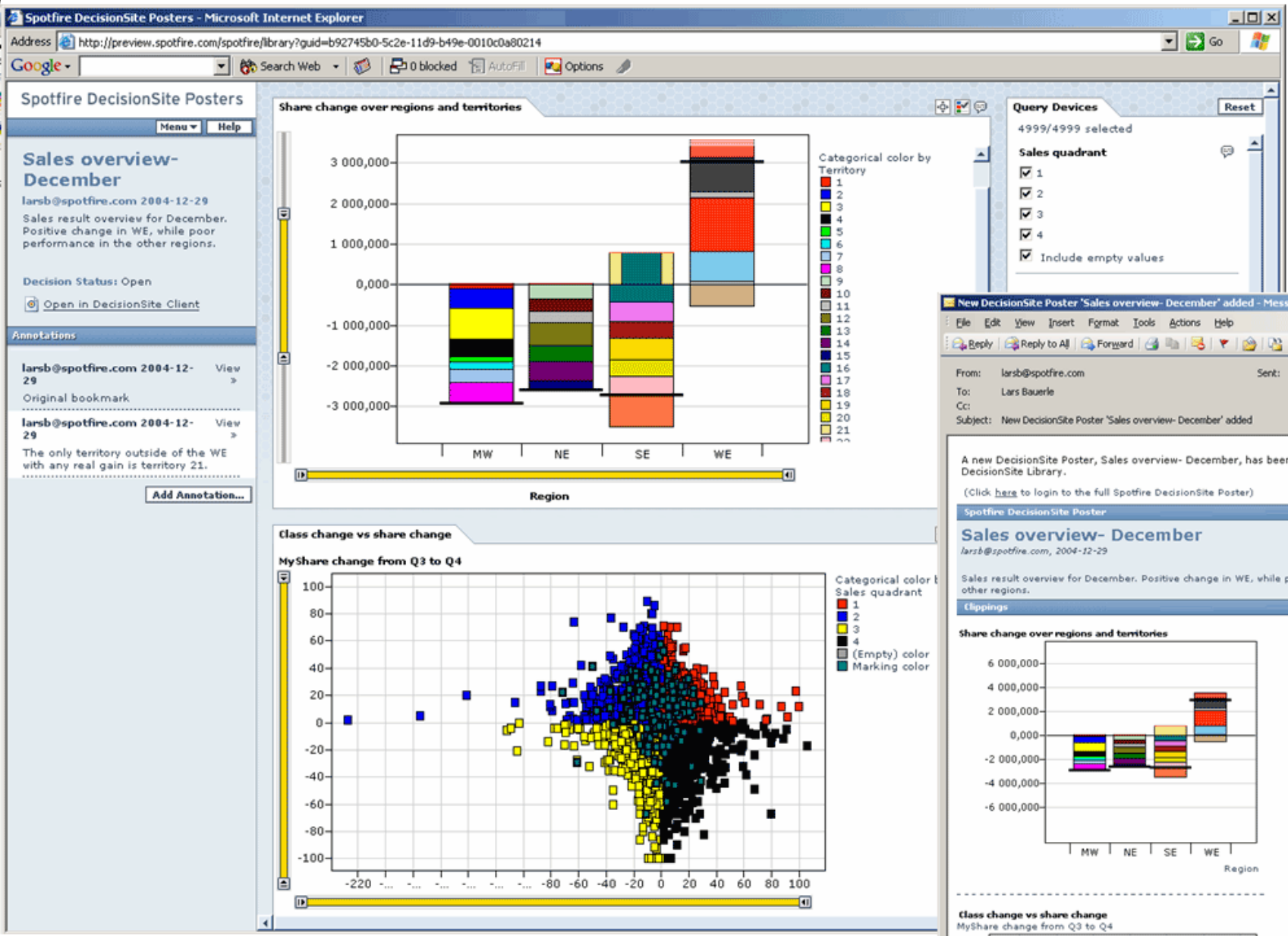
Voyeur – focus on comment listings
Investigate others' explorations
Find people and topics of interest
Catalyze new explorations



Social Data Analysis


Health
1877
80
70
60
50
40
30
Life expectancy in years
Uganda
1877
Mozambique
1810
Sierra Leone
1709
500
1000
2000
5000
GDP per capita in
come

650,000 Years of CO2 and Temperature
ALFR NOBEL
NAT MDCCC XXXIII
OB MDCCC XCVI
Temp. in F°
400,000
300,000
200,000
100,000
0



Spotfire Decision Site Posters

Views: Analytic Dashboard - Windows Internet Explorer

http://localhost/views/Wow/AnalyticDashboard

File Edit View Favorites Tools Help

Views: Analytic Dashboard

Page Tools

tableau Return to Views

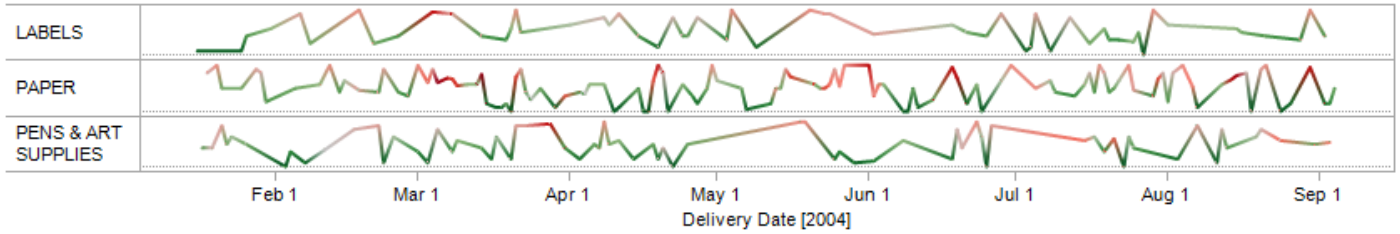
Help | Log Out

Search

Sort (Asc) Sort (Desc) Keep Only Exclude View Data Export Data Export Image Restore

Analytic Dashboard

Discounting by Product



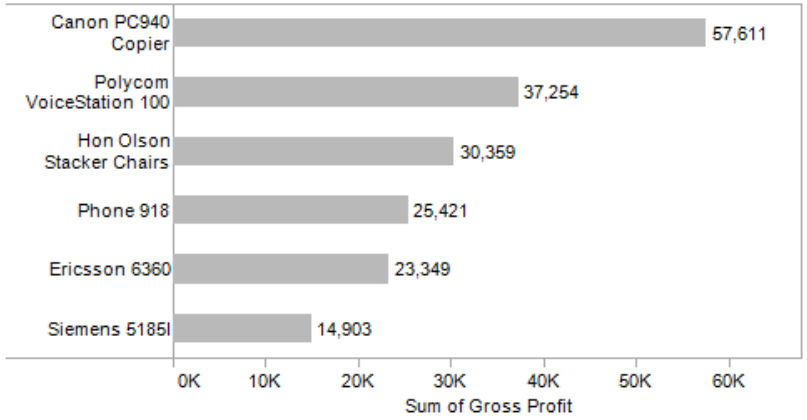
Region

- [x] CENTRAL
- [x] EAST
- [ ] WEST

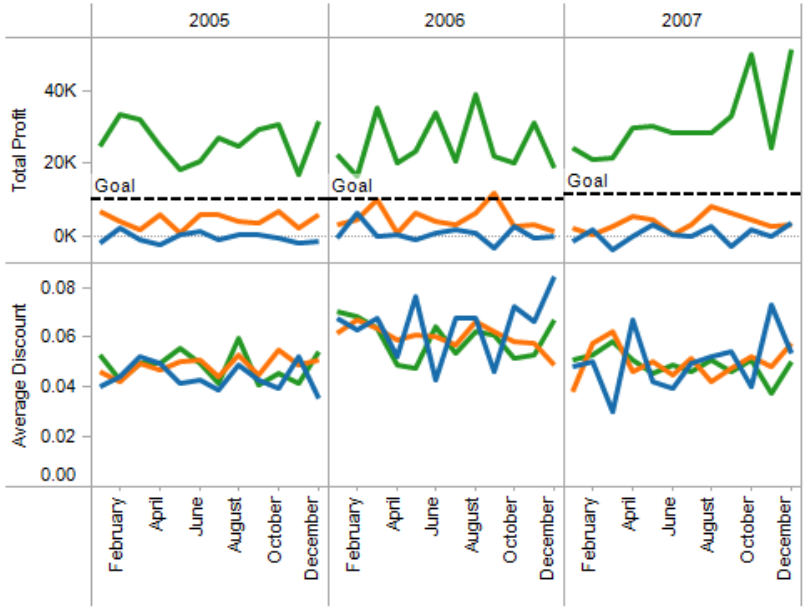
Product Category..

- FURNITURE
- OFFICE SUP..
- TECHNOLOGY

Top Products by Profitability



Annual Trends



Summary by Year and Product Type

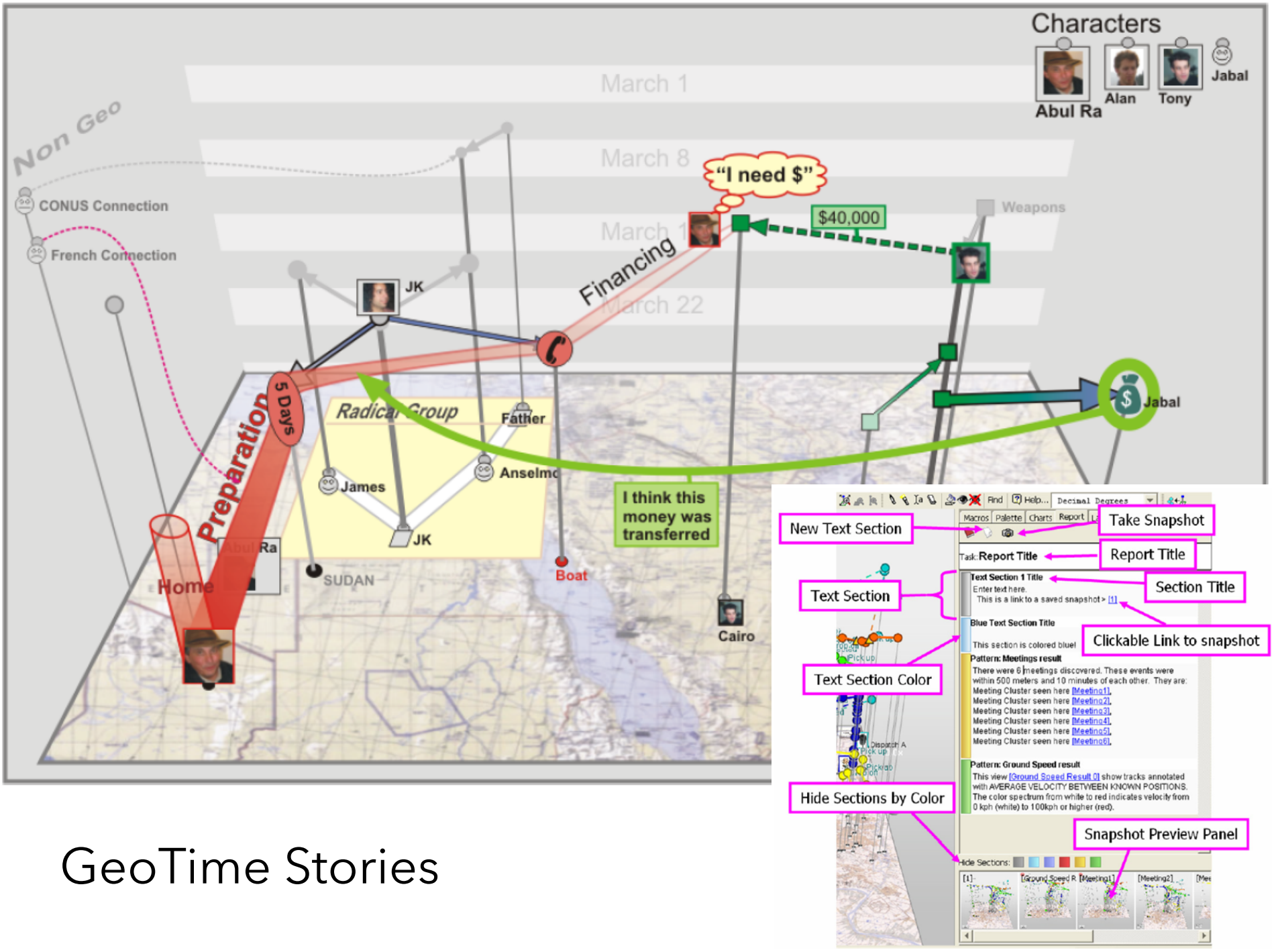
		2004	2005	2006	2007
FURNITURE	Total Discou..	13	5	7	5
	Total Profit	$40.4K	($7.4K)	$5.4K	$3.2K
OFFICE SUPPLIES	Total Discou..	53	37	40	38
	Total Profit	$70.6K	$51.8K	$56.1K	$41.9K

Comments

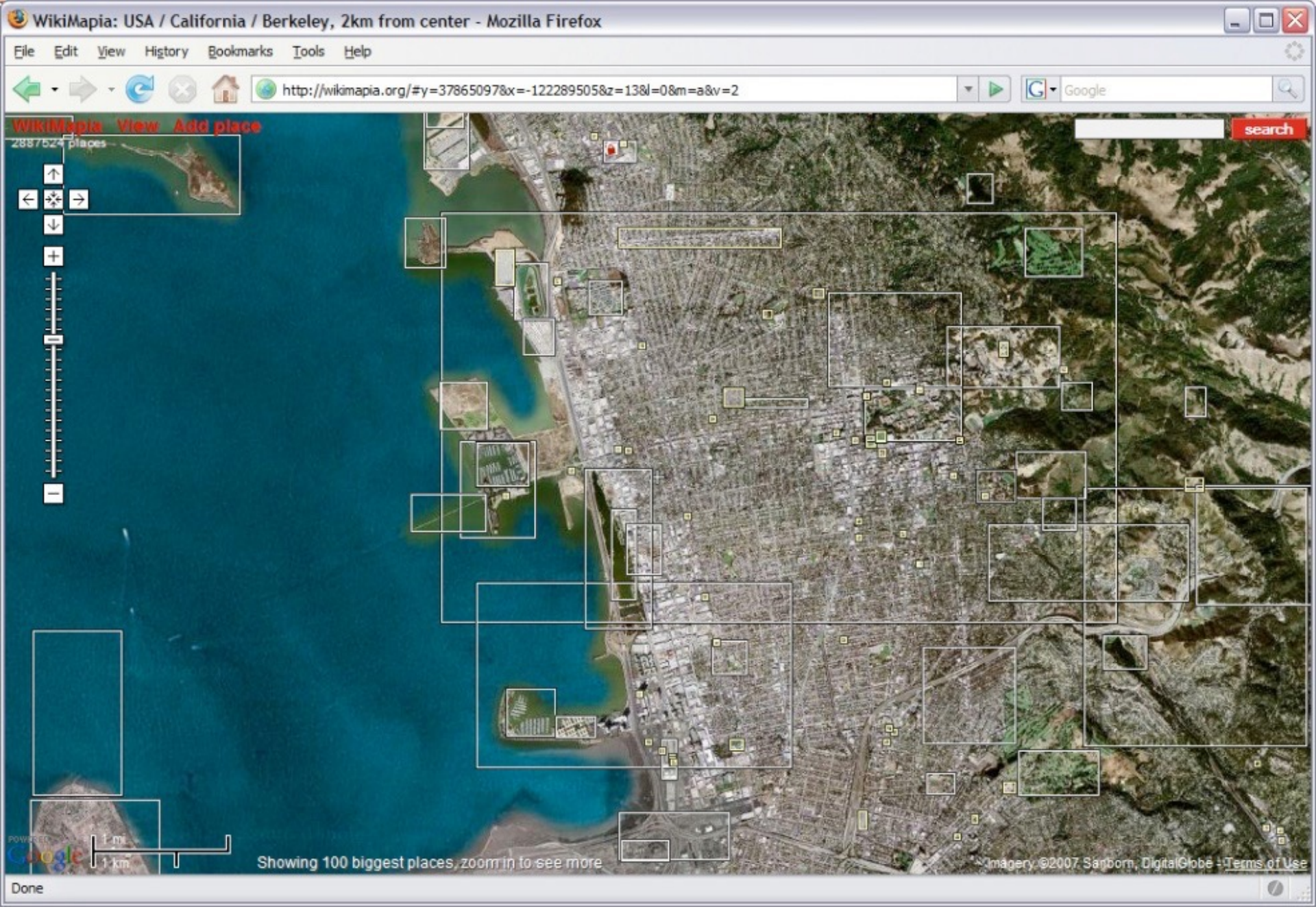
Done

Local intranet

100%



GeoTime Stories

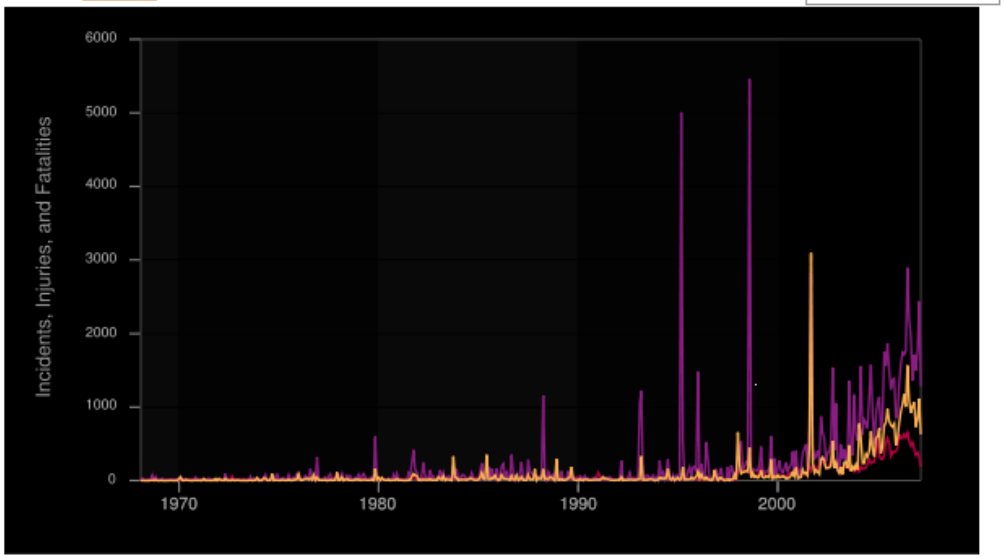


Wikimapia.org

The Status of George Bush's War on Terrorism

By seema on Feb 22, 2007
Viewed 8927 times

Graph | Table | Cloud | Map Absolute Relative All 31y 21y 4y > More Options



Bling Compare

Sources: MIPT Terrorism Knowledge Base (http://www.terrorismknowled...)

Incidents, injuries, and deaths from terrorism have increased during the new millenium. This may be because of the broader definition of what characterizes a terrorist act, or it may actually be a constant increase in such acts. —seema

Comments (12)

Anonymous says

Go BuSH!

posted 11 months ago

Tyler says

What a completely disingenuous graph, and comments to follow. You have absolutely no reason to think the line would stay flat without Bush.

You probably thought graphs like these (and your site more widely) would help people overcome preconceived notions by showing hard data.

Instead, you're just amplifying people's preconceived notions -- adding legitimacy

Share this Graph

Send an Email

Post to Blog

11 diggs digg it

Rate It

3 ratings

Sign in to rate

Like It

Feature It

Legend

Global Terrorist Incidents, 1968-2007

- Incidents
- Injuries
- Fatalities

More >

Tags

no tags yet

Community Tags

Add tags

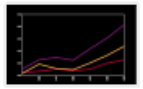
no tags yet

Correlations

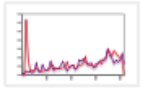
See all

89% Injuries and Fatalities

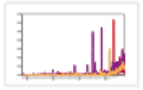
Related Graphs



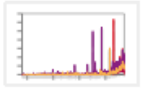
Yearly Terrorism Statistics
Created By: Dmitry
Views: 2474



Global Terrorism Incidents and Iraq Body Count
Created By: Dmitry
Views: 1868



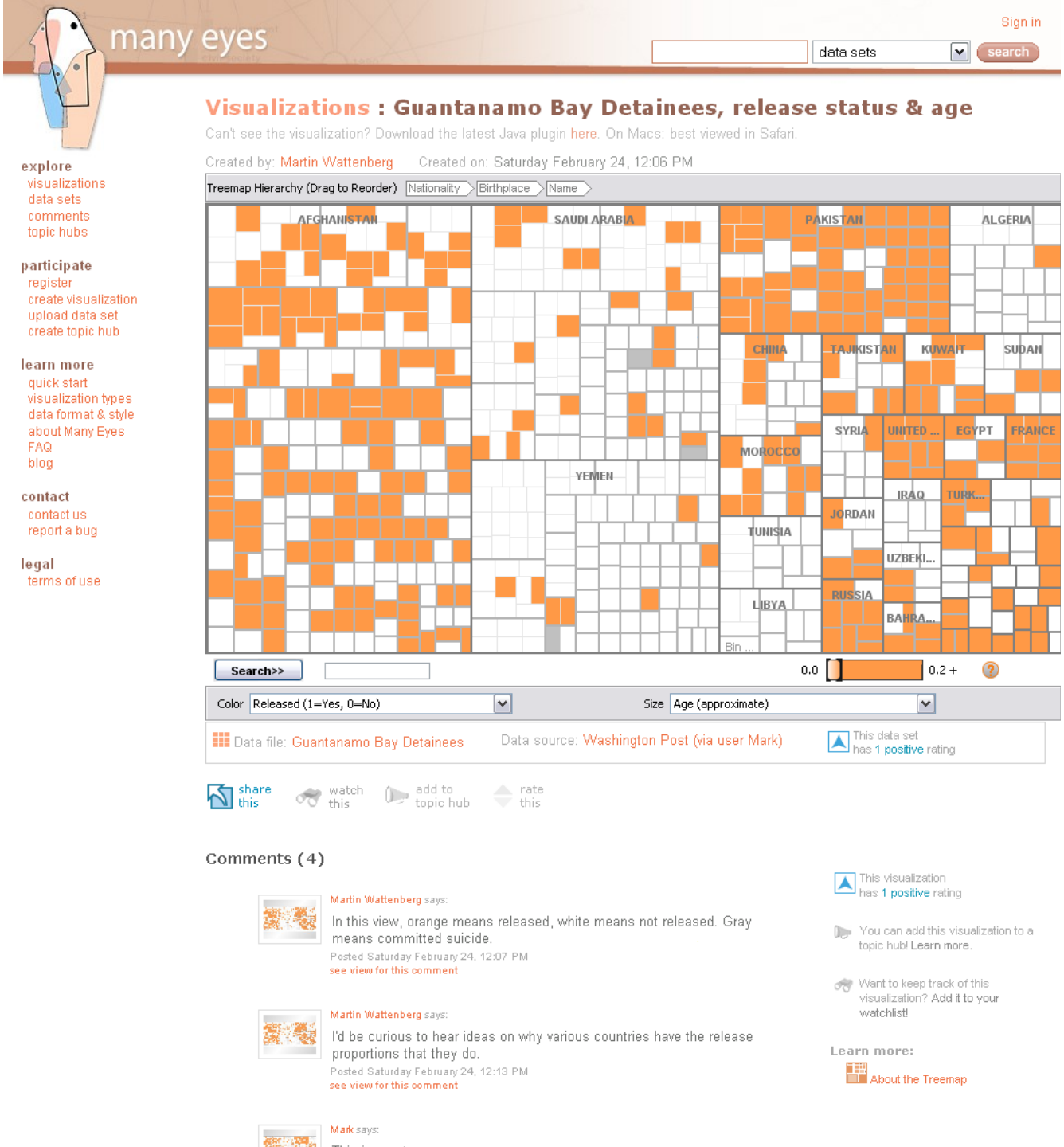
Reported Maximum vs. The Status of George Bush's War on Terrorism
Created By: quest
Views: 1192



Reported Maximum vs. The Status of George Bush's War on Terrorism
Created By: quest
Views: 1181

Reported

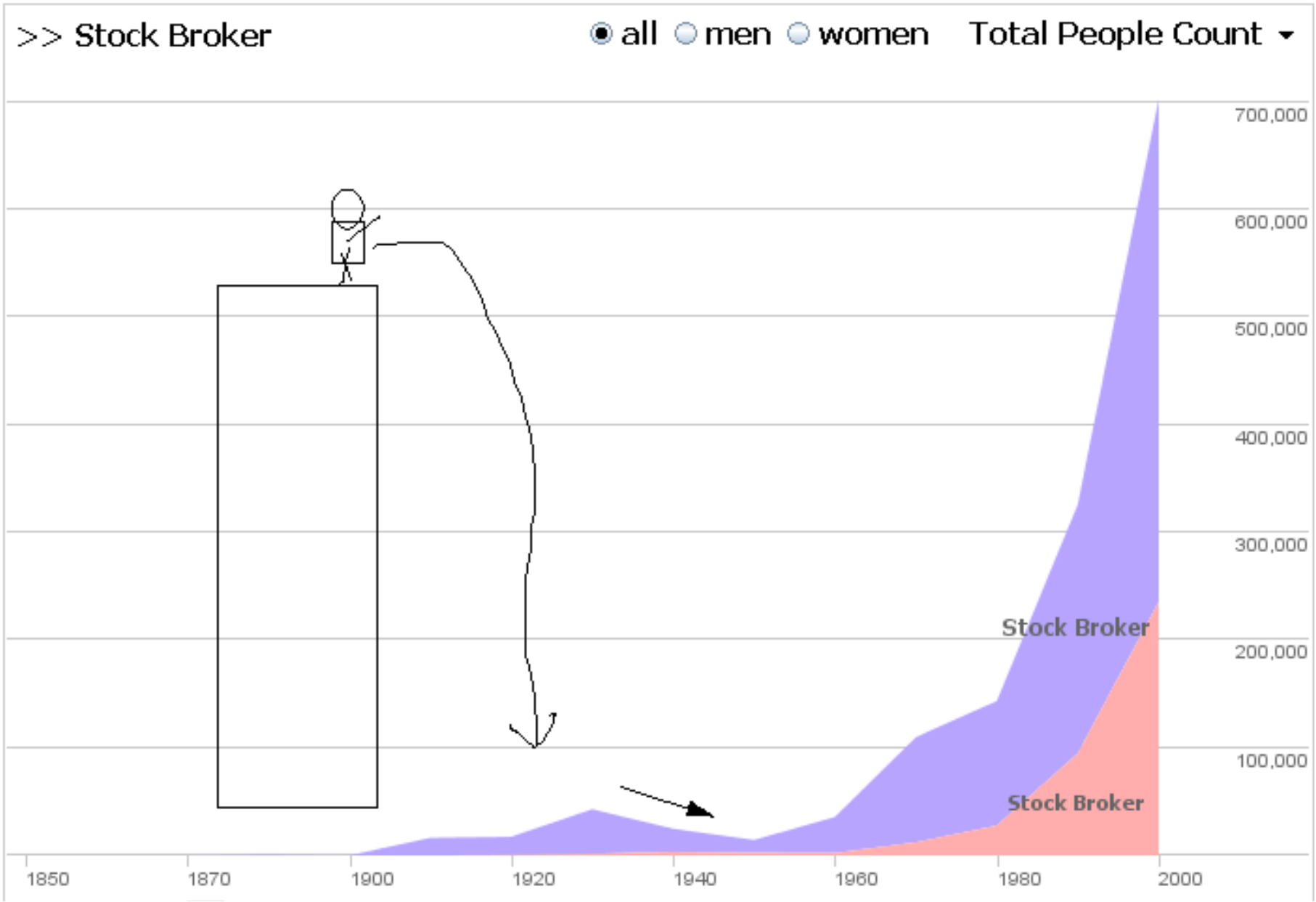
Reported Maximum vs. The

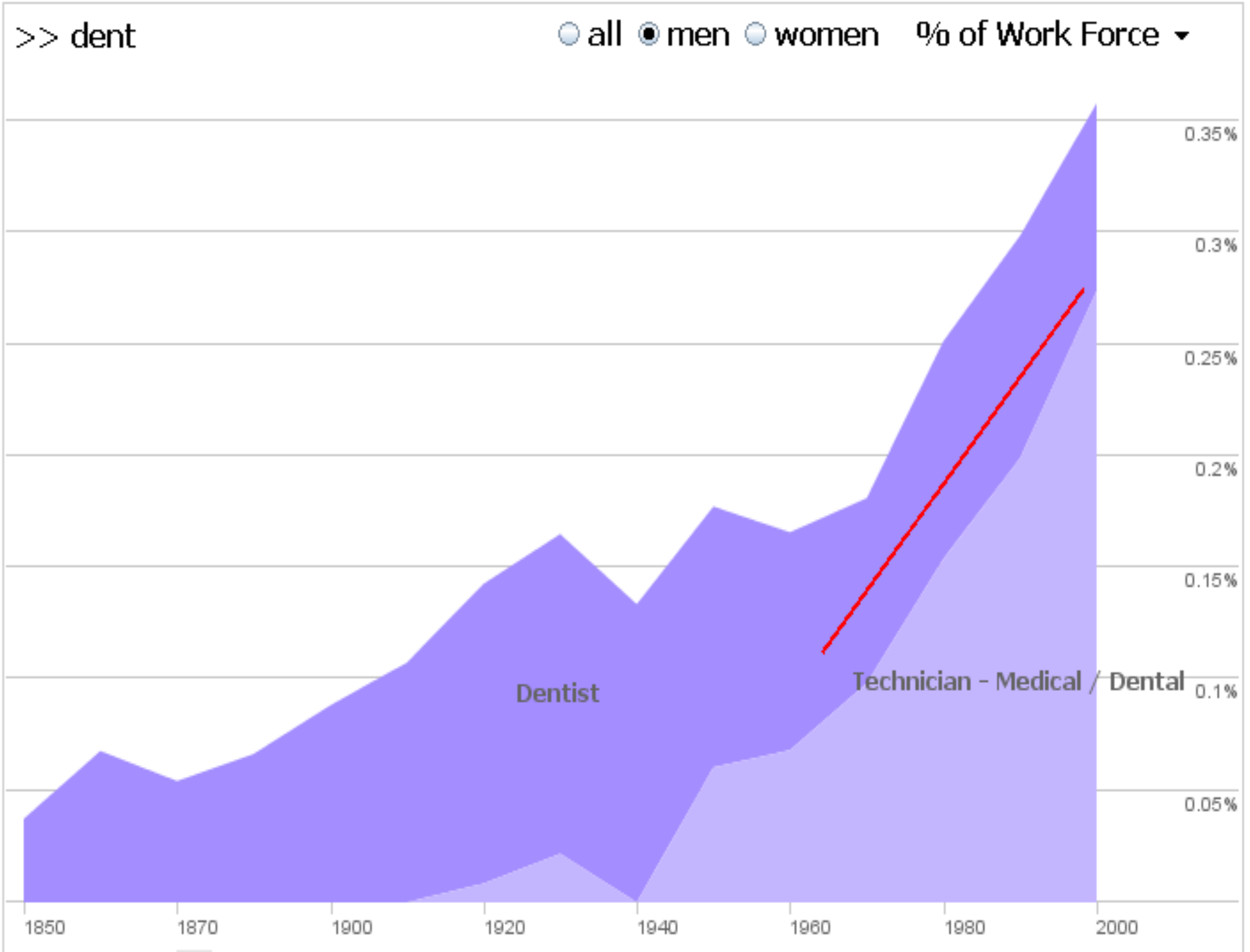

many eyes
Sign in
data sets
search
Visualizations : Guantanamo Bay Detainees, release status & age
Can't see the visualization? Download the latest Java plugin here. On Macs: best viewed in Safari.
Created by: Martin Wattenberg Created on: Saturday February 24, 12:06 PM
explore
visualizations
data sets
comments
topic hubs
participate
register
create visualization
upload data set
create topic hub
learn more
quick start
visualization types
data format & style
about Many Eyes
FAQ
blog
contact
contact us
report a bug
legal
terms of use
Treemap Hierarchy (Drag to Reorder) Nationality Birthplace Name
AFGHANISTAN
SAUDI ARABIA
PAKISTAN
ALGERIA
CHINA
TAJIKISTAN
KUWAIT
SUDAN
SYRIA
UNITED ...
EGYPT
FRANCE
MOROCCO
YEMEN
IRAQ
TURK...
JORDAN
TUNISIA
UZBEKI...
RUSSIA
LIBYA
BAHRA...
Bin ...
Search>>
0.0
0.2 +
Color Released (1=Yes, 0=No)
Size Age (approximate)
Data file: Guantanamo Bay Detainees
Data source: Washington Post (via user Mark)
This data set has 1 positive rating
share this
watch this
add to topic hub
rate this
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
You can add this visualization to a topic hub! Learn more.
Want to keep track of this visualization? Add it to your watchlist!
Learn more:
About the Treemap

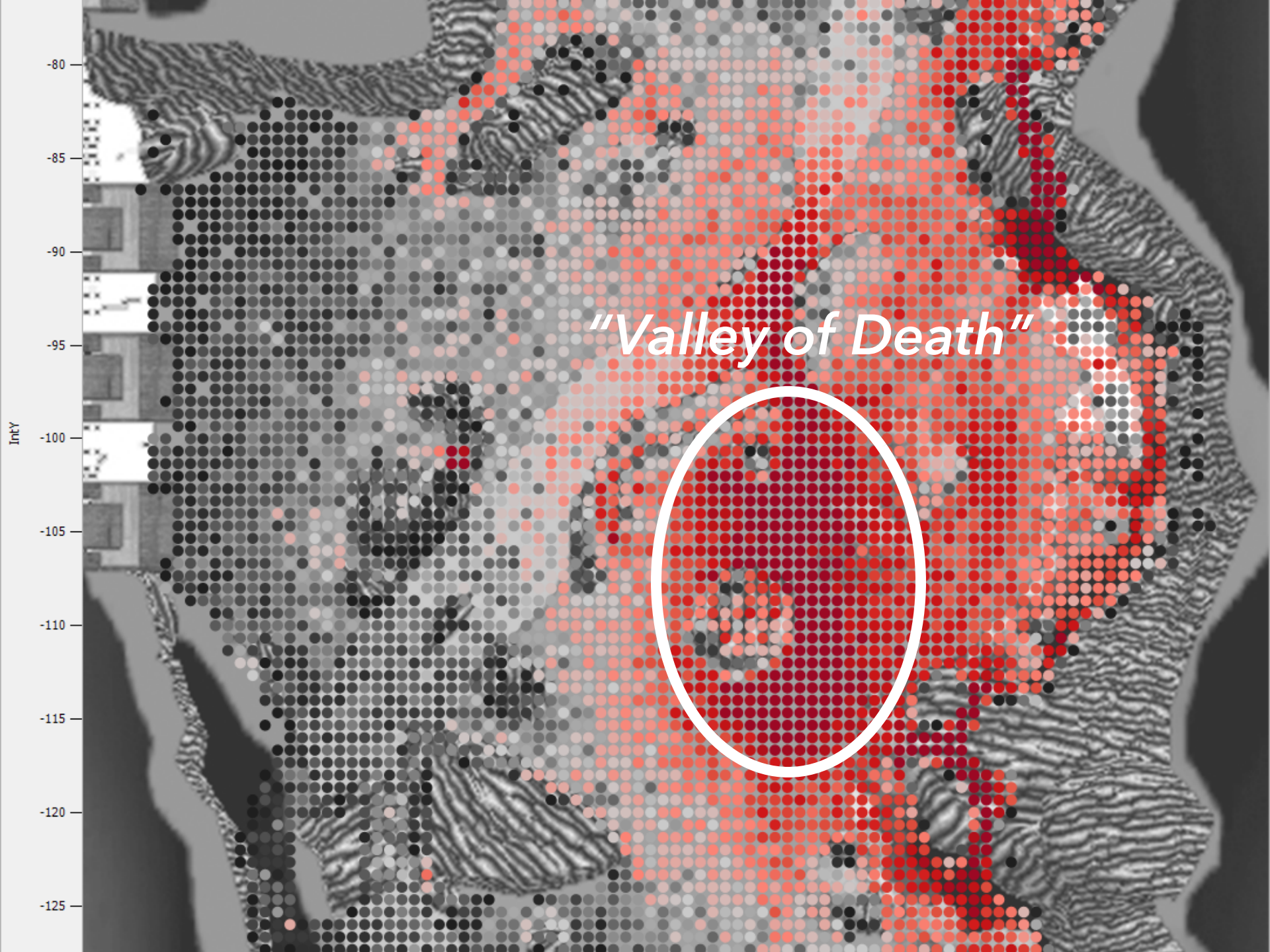
Many-Eyes

Discussion

Great depression "killed" a lot of brokers



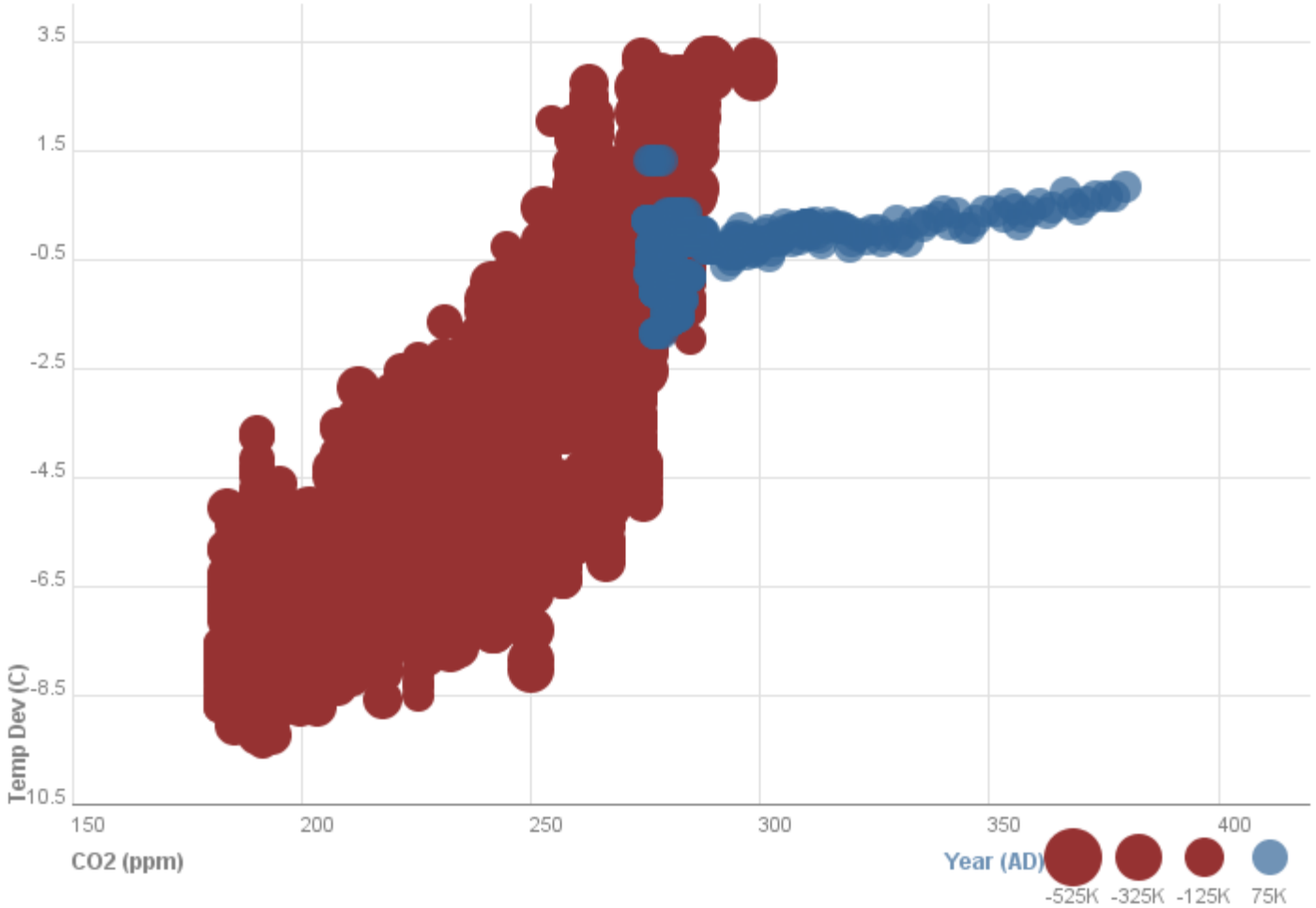

>> dent
all
men
women
% of Work Force
0.35%
0.3%
0.25%
0.2%
0.15%
0.1%
0.05%
Dentist
Technician - Medical / Dental
1850
1870
1900
1920
1940
1960
1980
2000


IntY
-80
-85
-90
-95
-100
-105
-110
-115
-120
-125
"Valley of Death"

Visualizations : Flawed Data - Temp Over Time and CO2 Levels

: This view shows the correlation between...

Creator: Bruce
Tags:



X Axis: CO2 (ppm) | Y Axis: Temp Dev (C) | Dot Size: Year (AD)

years cluster. What does this mean though that such high CO2 levels are preceeding significant changes in temperature? Something, much worse is yet to come?

Posted Monday January 29 2007, 09:32 AM
see view for this comment

experienced numerous times in the 4+ billion year history of the planet.

Posted Friday February 09 2007, 03:45 PM
see view for this comment

explore
visualizations
data sets
comments
topic hubs

participate
create visualization
upload data set
create topic hub
register

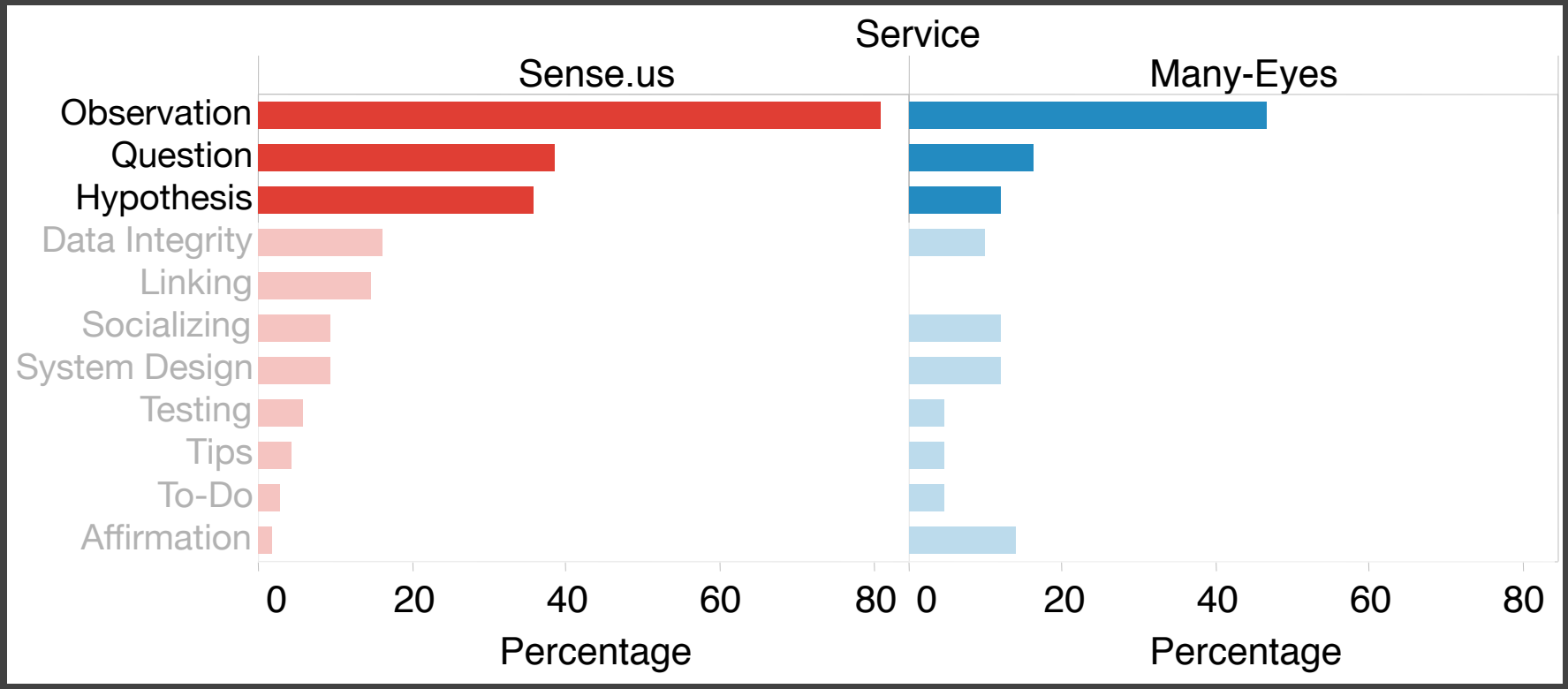
learn more
quick start
visualization types
data format & style
about Many Eyes
FAQ
blog

contact Us
contact
report a bug

legal
terms of use

Popular Dataset Tags
2007 2008 bible blo
books census crim
education eharmo
election energy fo
health inauguratio
internet ireland literatu
lyrics media mus
network obam
people politic
population
president prices religi
research soci
speech state stat
statistics supply-cha
survey text us web world
See More

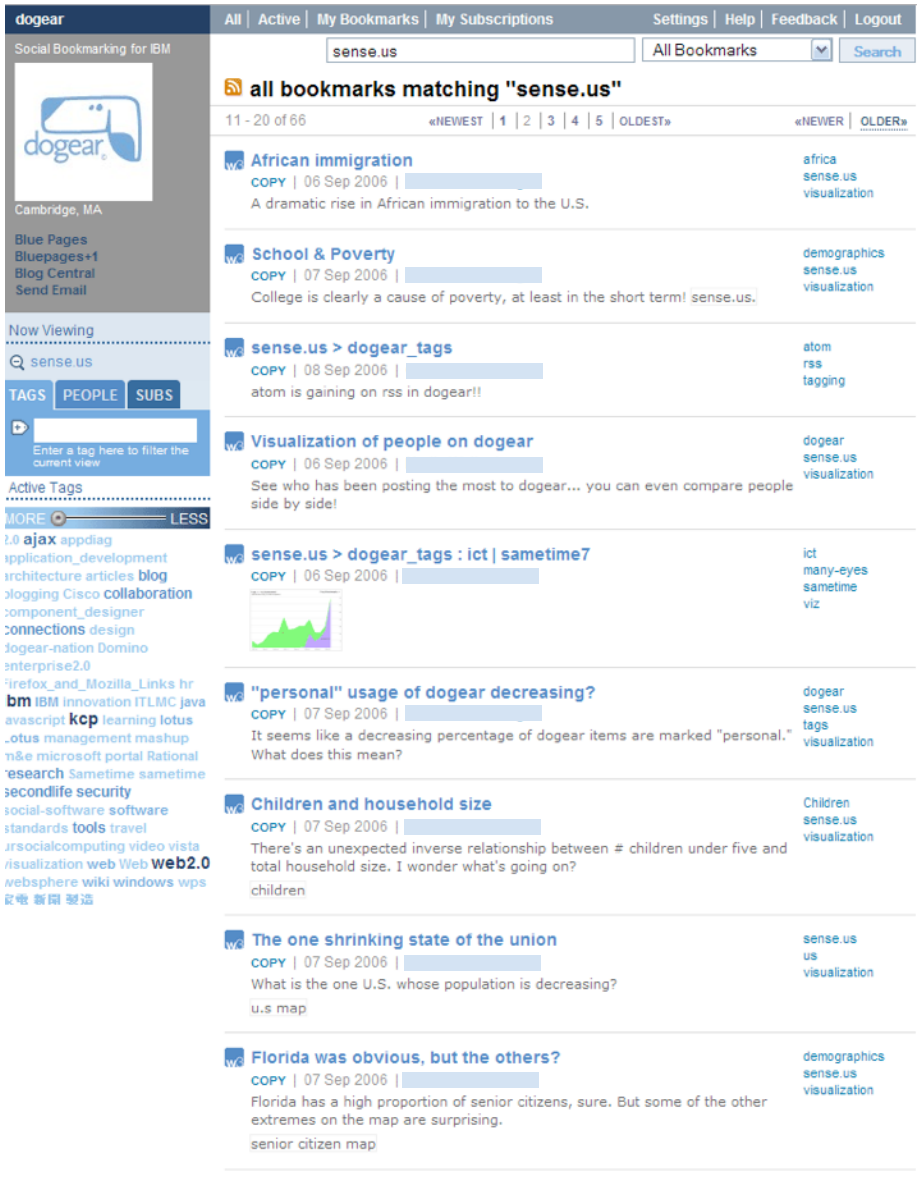
Content Analysis of Comments



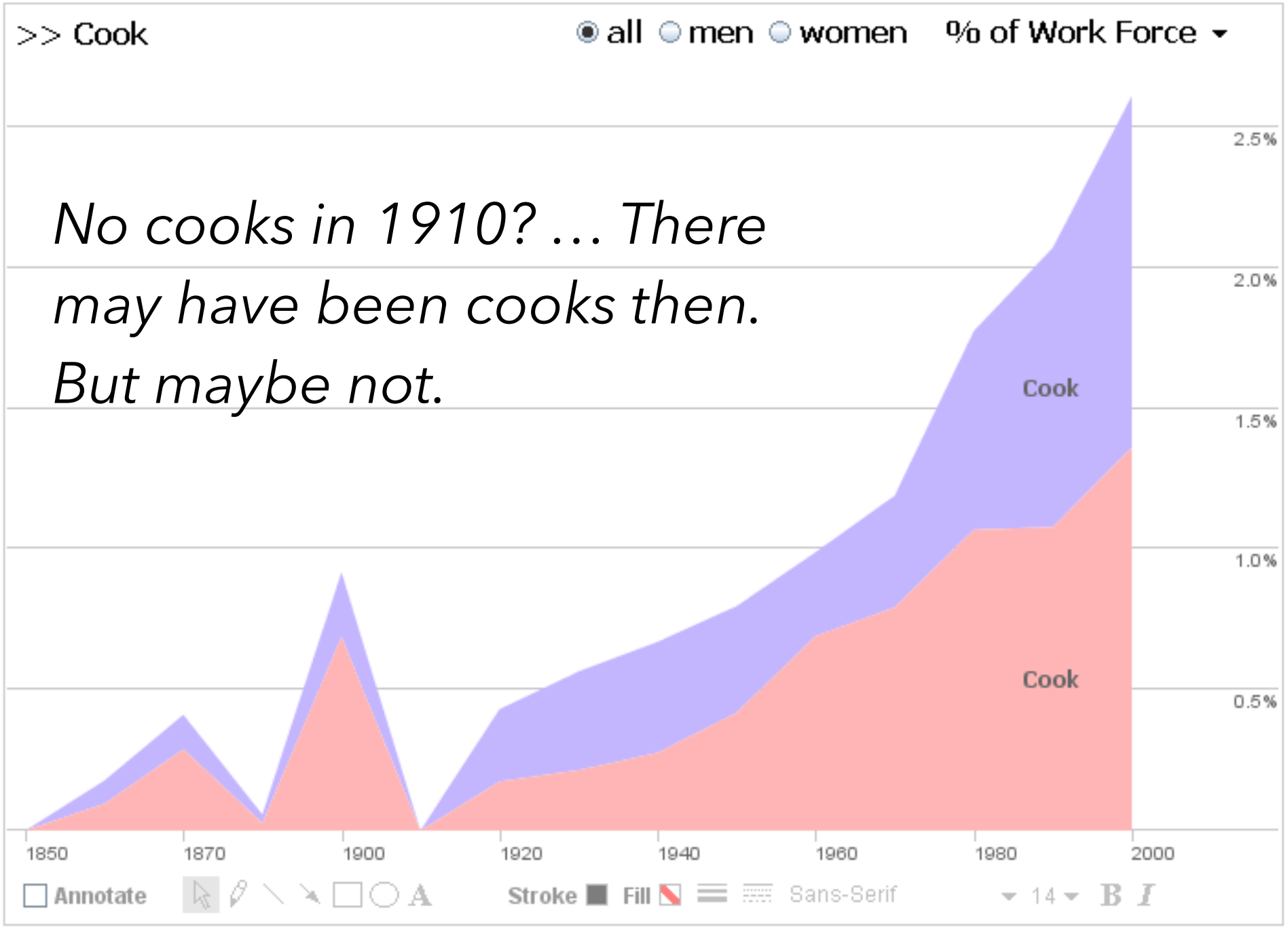
Feature prevalence from content analysis (min Cohen's κ=.74)

High co-occurrence of Observation, Question, and Hypothesis

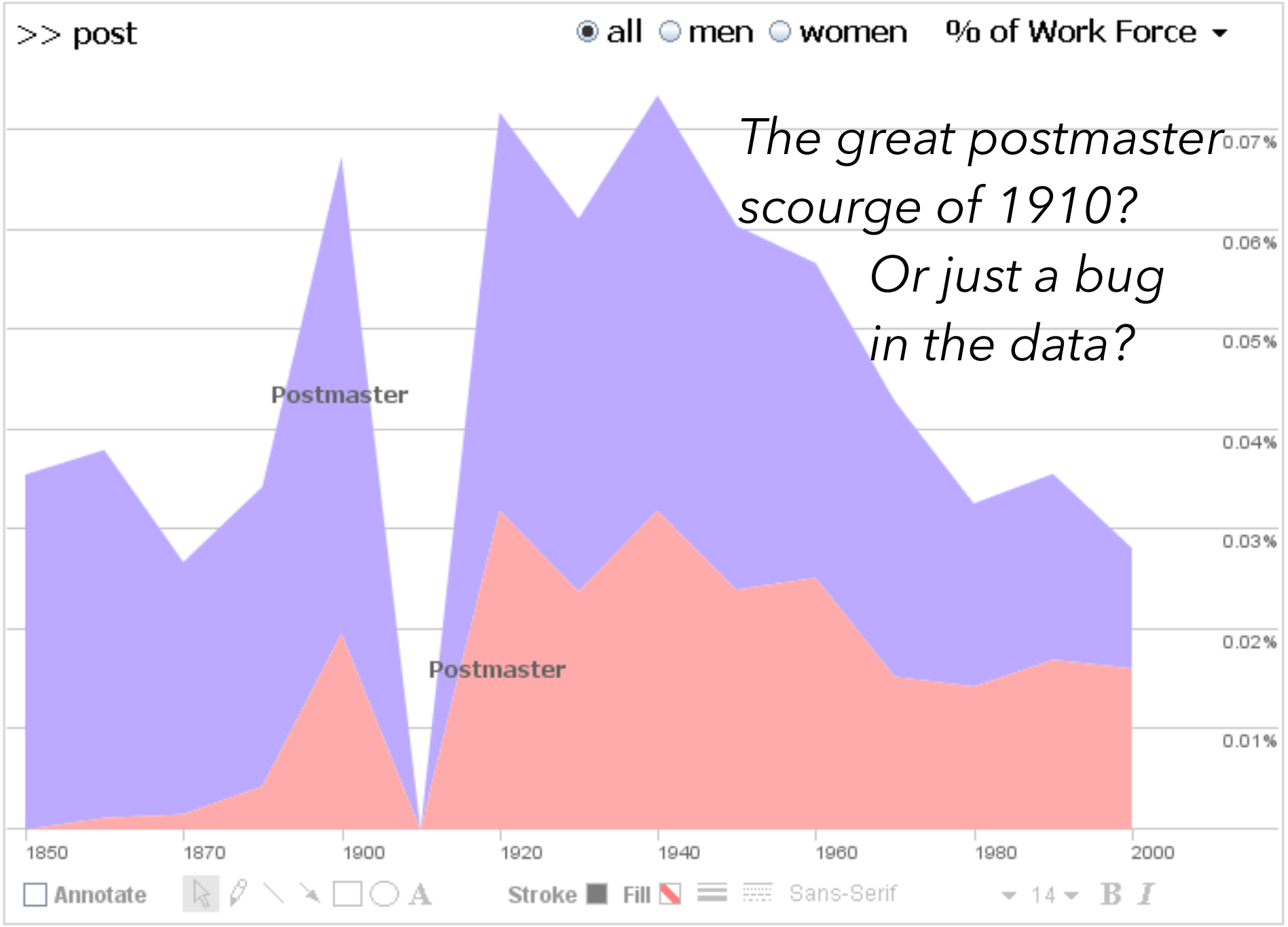
Sharing in External Media



Data Quality



No cooks in 1910? … There may have been cooks then. But maybe not.


>> post
all
men
women
% of Work Force
The great postmaster scourge of 1910?
Or just a bug in the data?
Postmaster
Postmaster
0.07%
0.06%
0.05%
0.04%
0.03%
0.02%
0.01%
1850
1870
1900
1920
1940
1960
1980
2000
Annotate
Stroke
Fill
Sans-Serif
14
B
I

Overview
Visualizations
Data Sets
Topics
My Lab
About Visualization Lab
Help

Visualization Software by IBM

Independents by Religious Tradition

Created by The New York Times

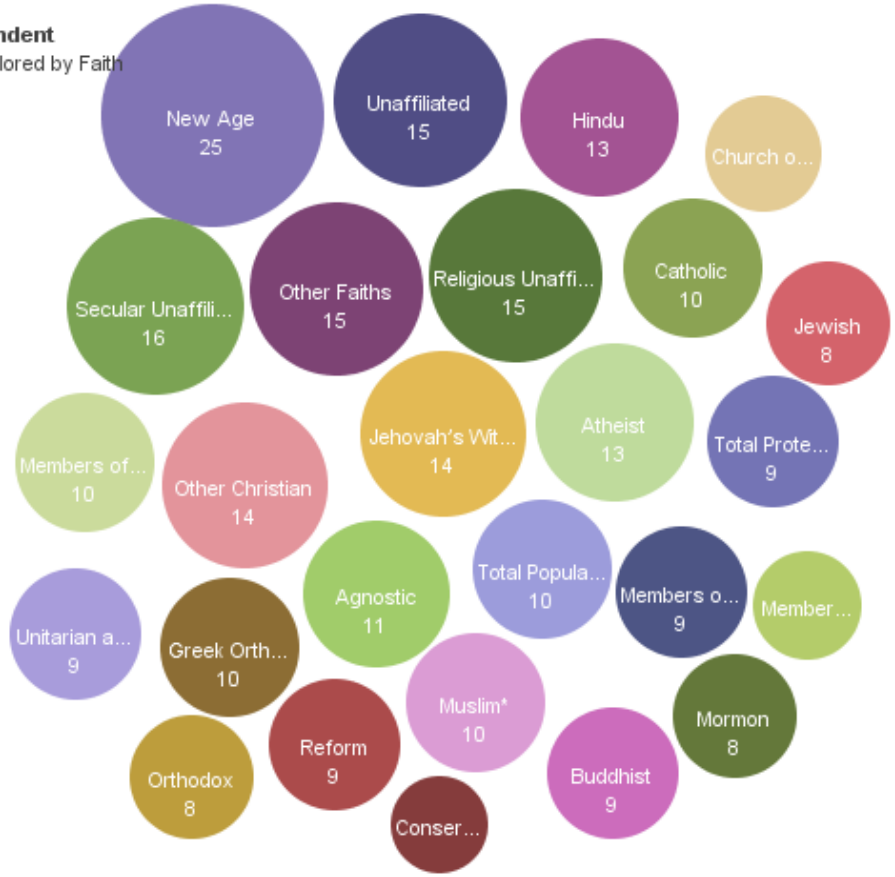
Browse All Visualizations »

Faith
Click to select,
Ctrl-Click: multiple
Shift-Click: range

- Total Population
- Total Protestants
- Members of Evang. Prot. Cl
- Members of Mainline Prot. C
- Members of Hist. Black Prot
- Catholic
- Mormon
- Church of Jesus Christ of La
- Jehovah's Witness
- Orthodox
- Greek Orthodox
- Other Christian
- Jewish
- Reform
- Conservative
- Muslim*
- Buddhist
- Hindu
- Other Faiths
- Unitarian and Other Liberal

Search>>

Independent
Disks colored by Faith



To highlight or find totals click or ctrl-click.

Bubble Size: Independent
Color: Faith

Independents by Religious Tradition > Um, I believe Church of Jesus...

Created by The New York Times

Browse All Visualizations »

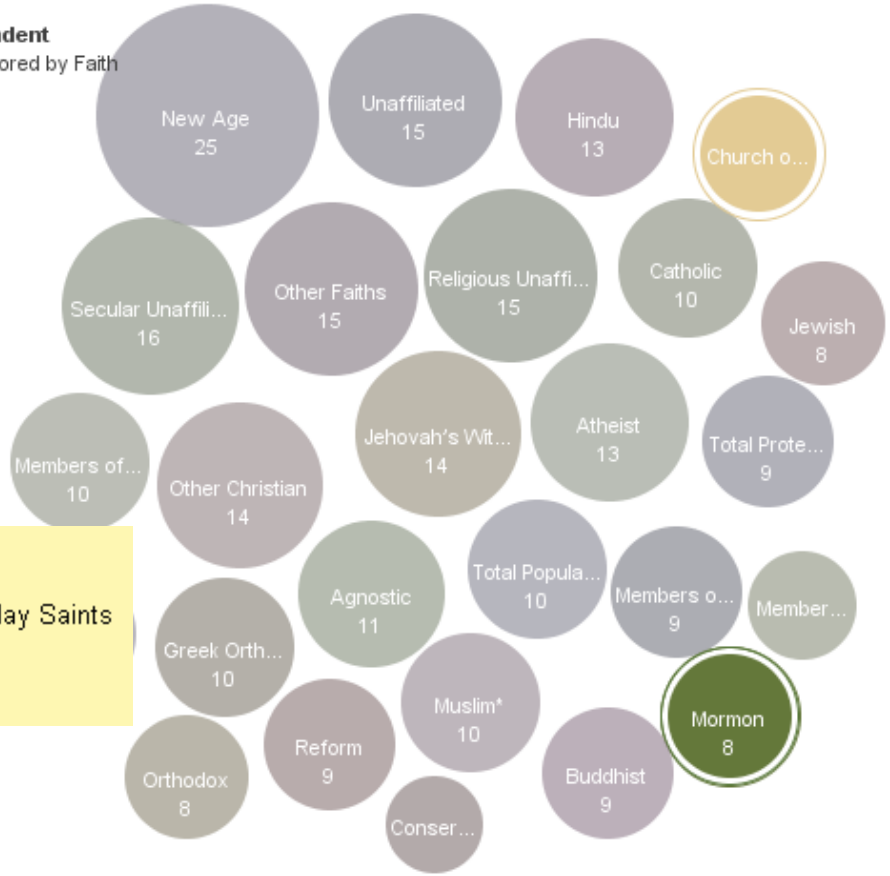
Faith
Click to select,
Ctrl-Click: multiple
Shift-Click: range

- Total Population
- Total Protestants
- Members of Evang. Prot. Cl
- Members of Mainline Prot. C
- Members of Hist. Black Prot
- Catholic
- Mormon
- Church of Jesus Christ of La
- Jehovah's Witness
- Orthodox
- Greek Orthodox
- Buddhist
- Hindu
- Other Faiths
- Unitarian and Other Liberal

10
5
0

Search>>

Independent
Disks colored by Faith

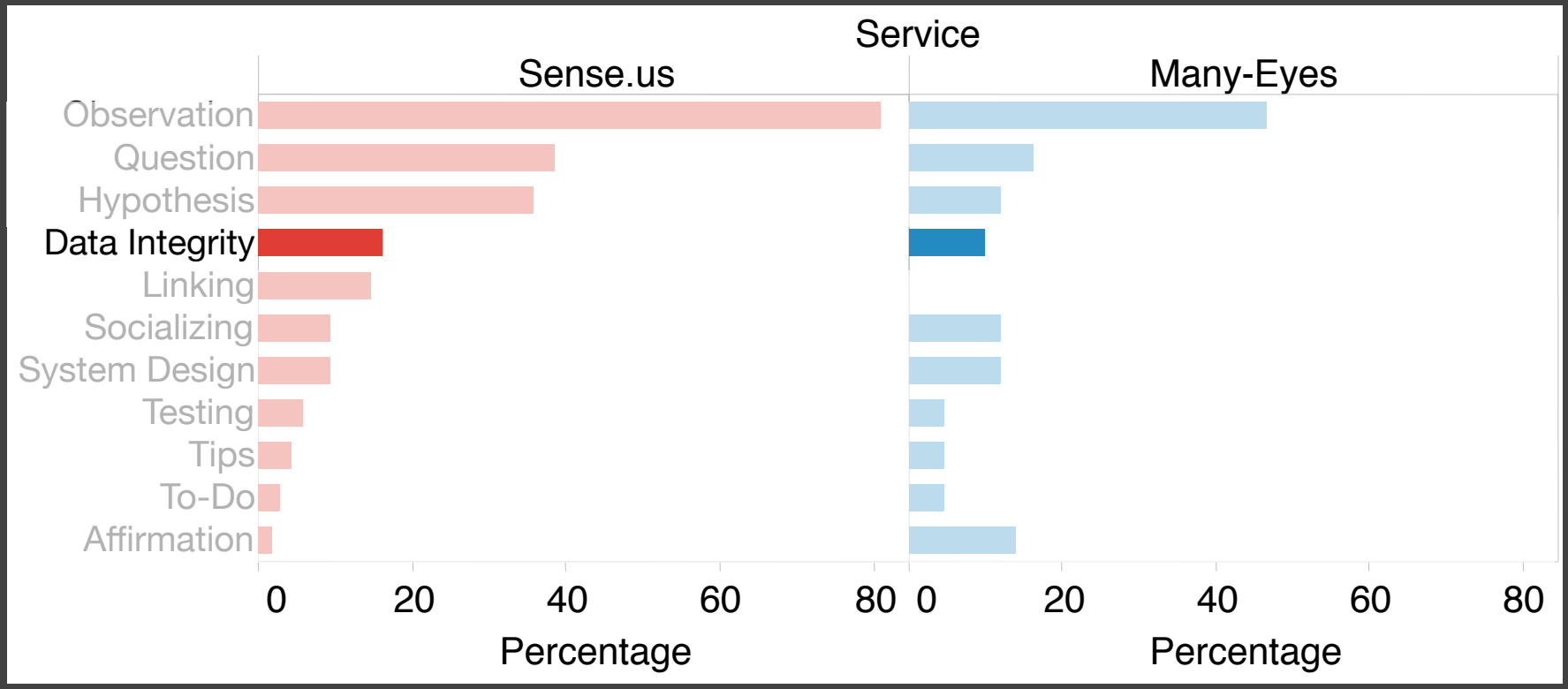


Highlighted: 1 item and 2 categories
total: 15 = 5%

Bubble Size: Independent
Color: Faith

Anonymous says:
Um, I believe Church of Jesus Christ of Latter-day Saints and Mormon are the same?

Content Analysis of Comments



16% of sense.us comments and **10%** of Many-Eyes comments reference *data integrity* issues.

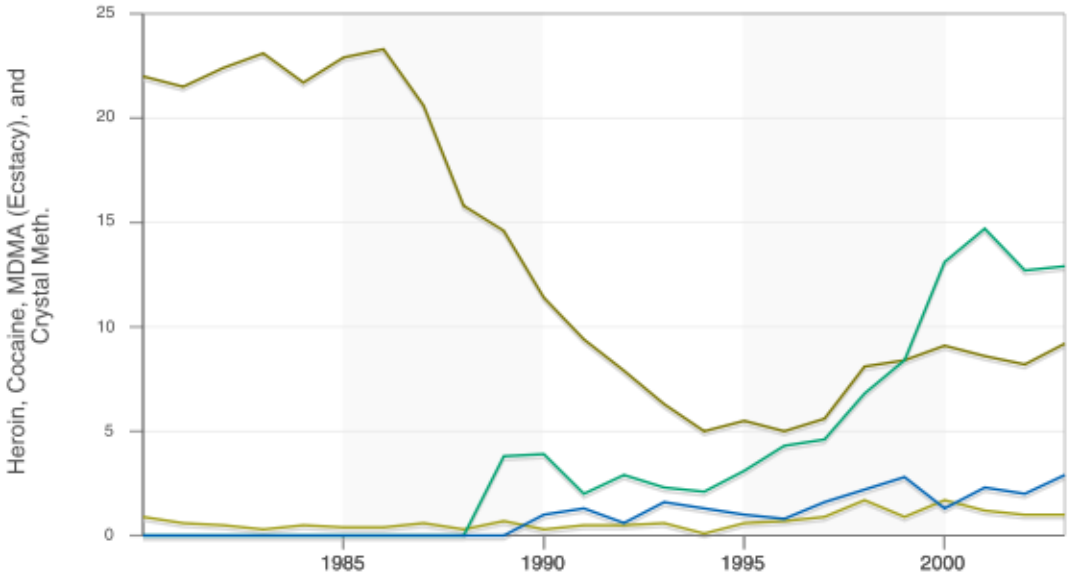
Data Integration *In Situ*

>> mili
all
men
women
% of Work Force
2.0%
1.5%
1.0%
0.5%
WW I
Civil war
Military
Military
1850
1870
1900
1920
1940
1960
1980
2000

Heroin vs. Cocaine vs. MDMA (Ecstacy) vs. Crystal Meth.

By guest on Dec 19, 2006
Viewed 20481 times

Graph Table Map Absolute Relative All 23y 17y 8y > More Options



Bling Compare

Sources: University of Michigan

Comments (1 - 20 of 32)

<script src='http:' />jonny12</script> says
jonny15
posted about 1 year ago

Anonymous says
Where's the pot?

Share this Graph

Send an Email
Post to Blog
Digg submit

Rate It

3 ratings

Swivel Business

Have you tried Swivel Business?

Legend

College Student Drug Use
- MDMA (Ecstacy)
- Cocaine
- Heroin
- Crystal Meth.

More >

Tags

no tags yet

Community Tags

Add tags

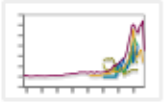
no tags yet

Correlations

See all

81% MDMA (Ecstacy) and Crystal Meth.

Related Graphs

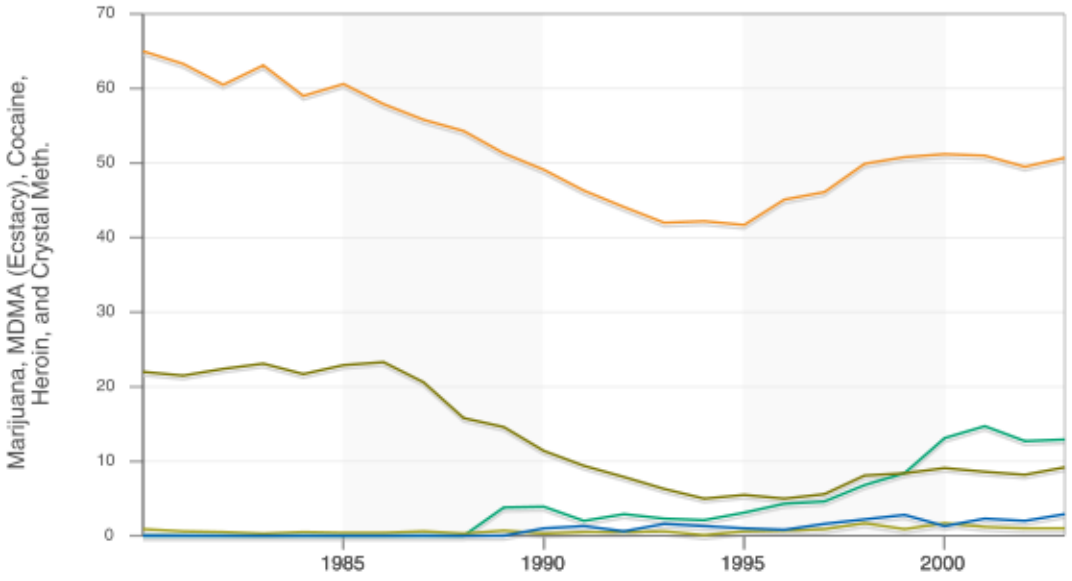


Heroin vs. Cocaine vs. MDMA (Ecstacy) vs. Crystal Meth. vs. Heroin vs. Cocaine vs. MDMA (Ecstacy) vs. Crystal Meth. vs. Cocaine, NASDAQ Adjusted Close, and Dow Jones Industrial Average Adjusted Close

Marijuana vs. Heroin vs. Cocaine vs. MDMA (Ecstacy) vs. Crystal Meth.

By guest on Mar 12, 2007
Viewed 25401 times

Graph Table Map Absolute Relative All 23y 17y 8y > More Options



Bling Compare

Sources: University of Michigan

Comments (17)

visnu says
pot pot pot pot
weed weed weed weed

posted about 1 year ago

MARTY says

Share this Graph

Send an Email
Post to Blog
Digg submit

Rate It

0 ratings

Swivel Business

Have you tried Swivel Business?

Legend

College Student Drug Use

- Marijuana
- MDMA (Ecstacy)
- Cocaine
- Heroin
- Crystal Meth.

More >

Tags

no tags yet

Community Tags

Add tags

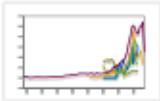
no tags yet

Correlations

See all

93% Marijuana and Cocaine

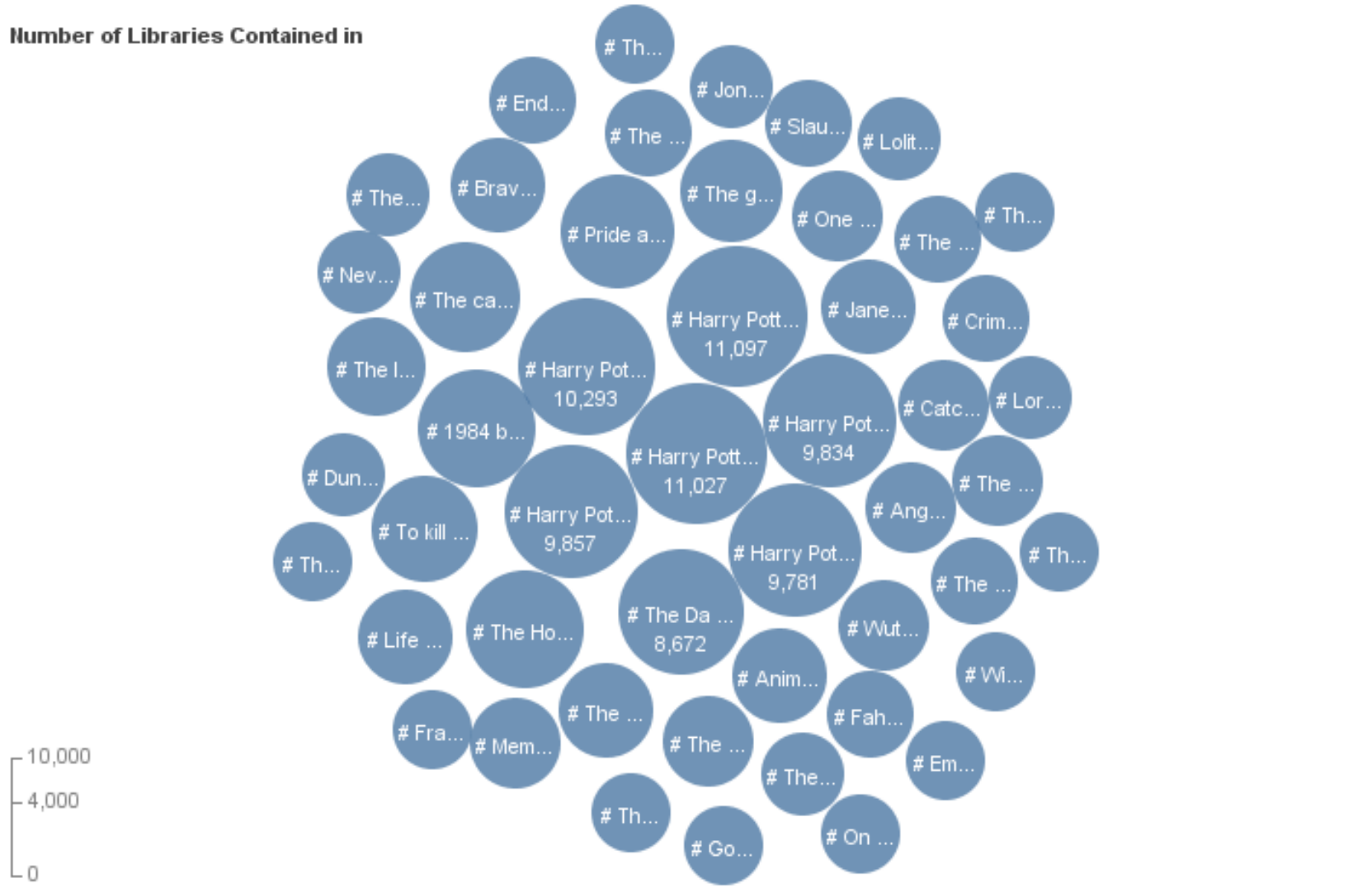
Related Graphs

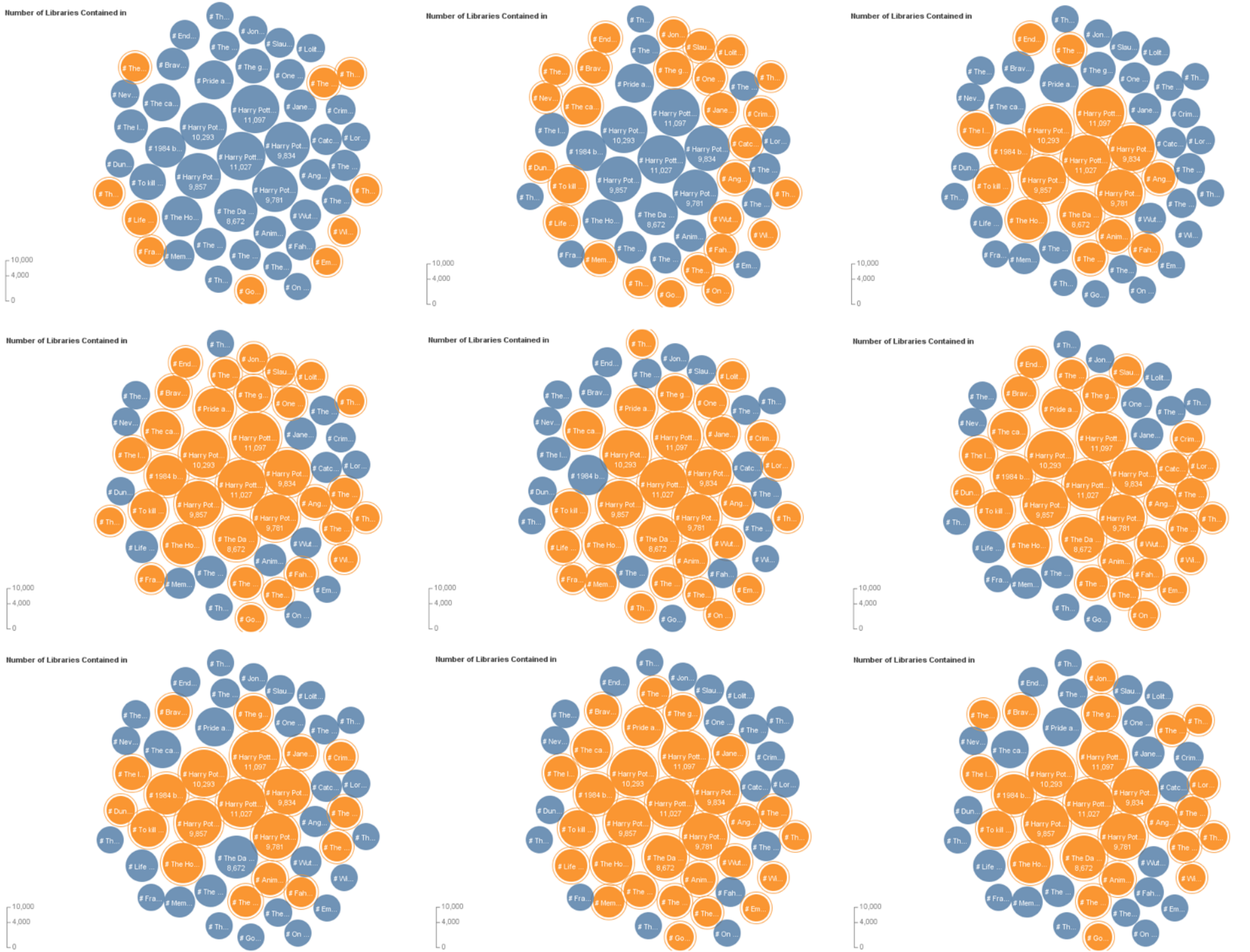


Heroin vs. Cocaine vs. MDMA (Ecstacy) vs. Crystal Meth. vs. Heroin vs. Cocaine vs. MDMA (Ecstacy) vs. Crystal Meth. vs. Cocaine, NASDAQ Adjusted Close, and Dow

Visualizations : Harry Potter is Freaking Popular

Creator: Alison
Tags:




Number of Libraries Contained in
10,000
4,000
0

What factors enable viable collaborations?

How might we design systems to facilitate social data analysis?

Administrivia

Final Project

Poster Presentations

Session is **Tue Jun 7 5-8pm** in CSE Atrium
Bring **Poster** + **Laptop/Device** for demos
Arrive *early* to setup!

Post Webpage on GitHub Pages

List team members, title, abstract, link to paper
Include summary image for project!

Final Project Reports

Due **Thu Jun 9**, by **8am**, posted to GitHub
4-6 pages in ACM or IEEE TVCG format

Design Considerations for Collaborative Analysis

Modules of Contributions

Data Management

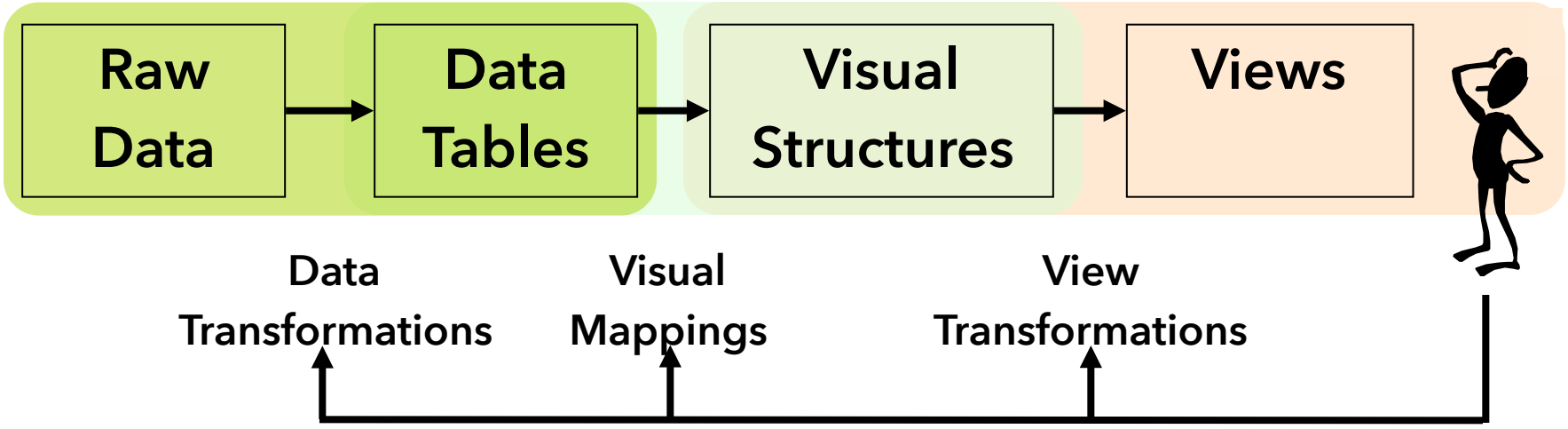
Contribute Data
Clean Data
Categorize Data
Moderate Data
Create Metadata

Visualization

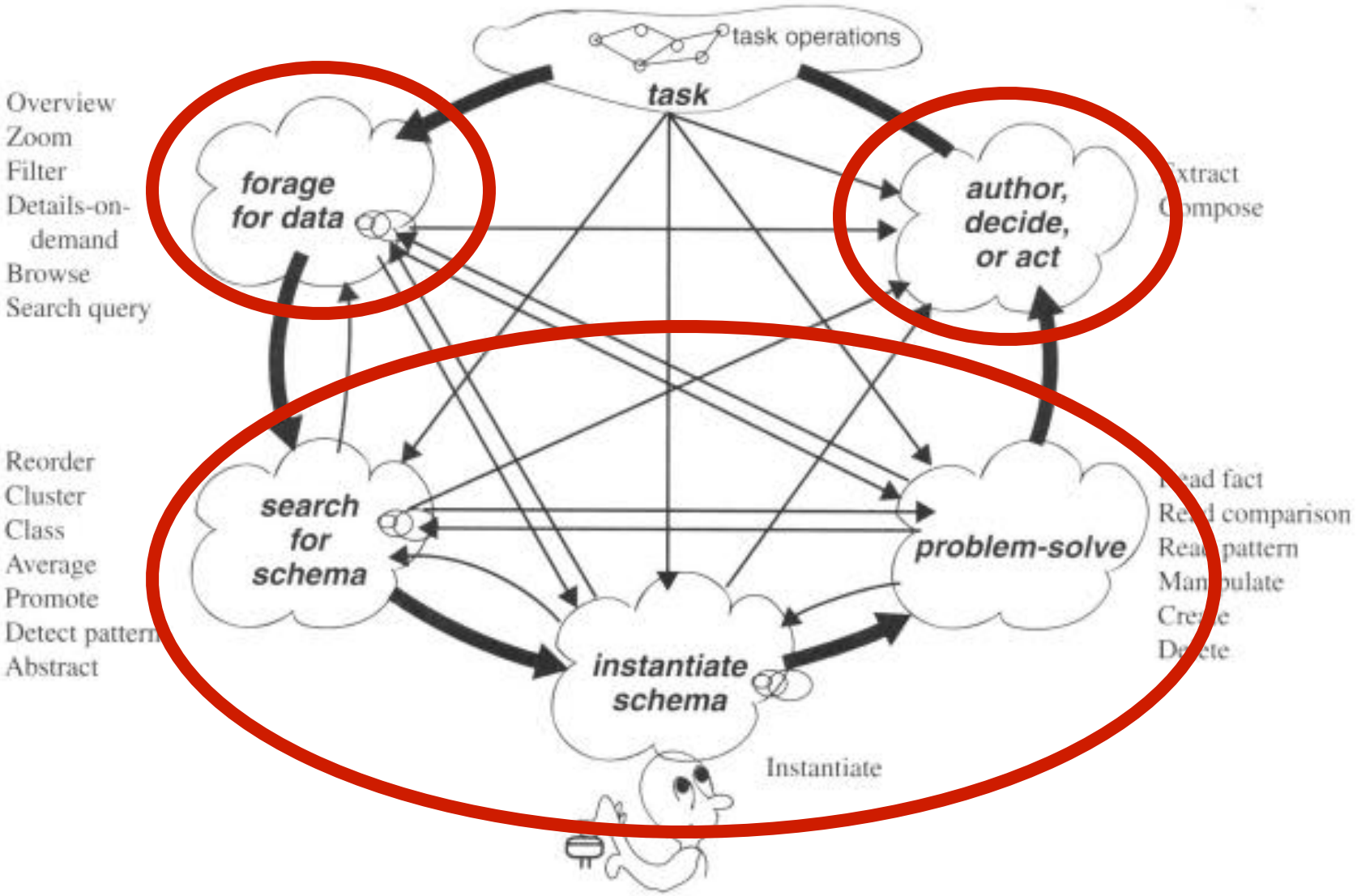
Select Data Sources
Apply Visual Encoding
Author Software

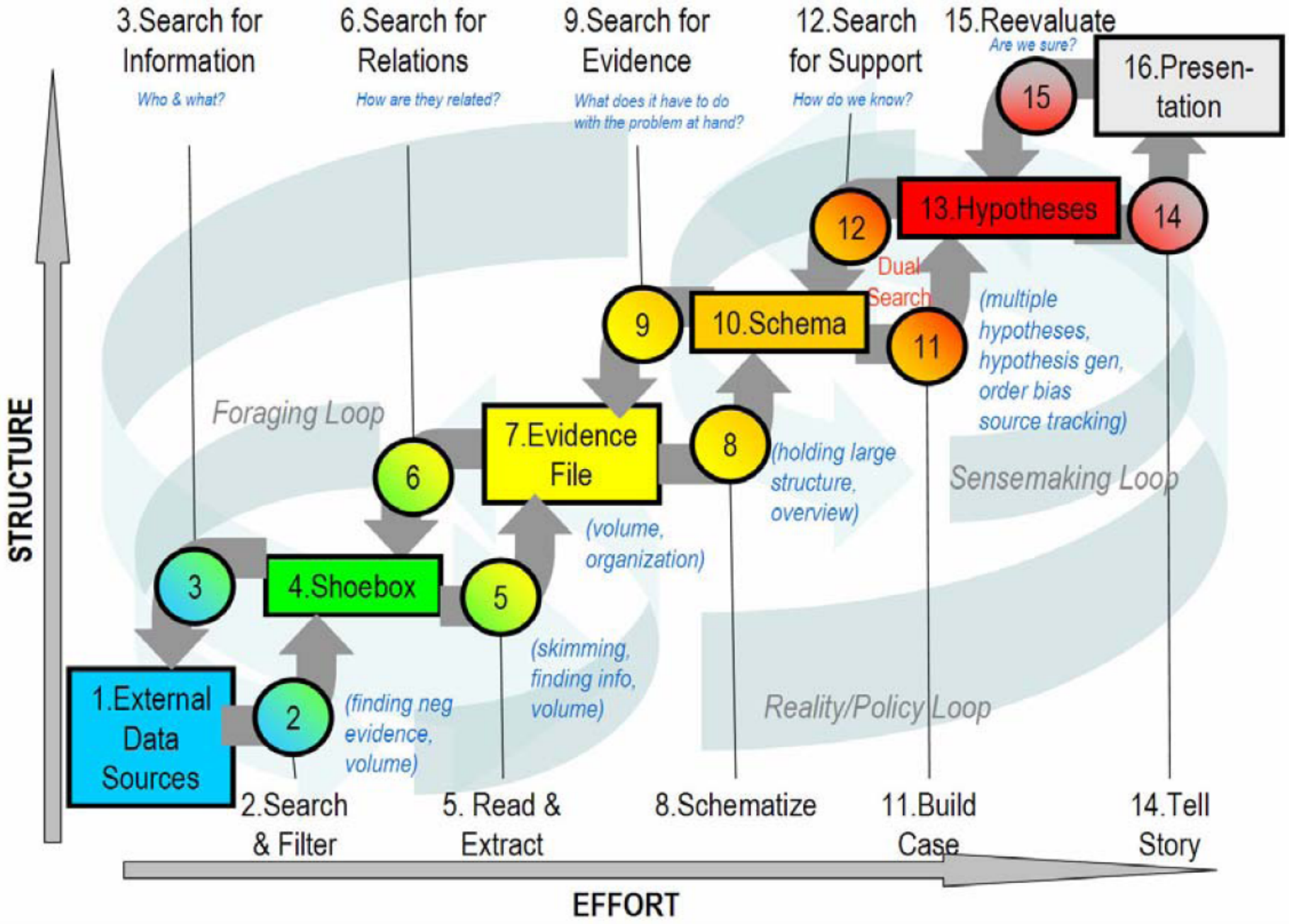
Visual Analytics

Observations
Hypotheses
Evidence (+/-)
Summarize
Report / Presentation



Sensemaking




3.Search for Information
Who & what?
6.Search for Relations
How are they related?
9.Search for Evidence
What does it have to do with the problem at hand?
12.Search for Support
How do we know?
15.Reevaluate
Are we sure?
16.Presen-tation
15
13.Hypotheses
14
12
Dual Search
9
10.Schema
11
(multiple hypotheses, hypothesis gen, order bias source tracking)
Foraging Loop
7.Evidence File
8
(holding large structure, overview)
Sensemaking Loop
6
(volume, organization)
3
4.Shoebox
5
(skimming, finding info, volume)
1.External Data Sources
2
(finding neg evidence, volume)
Reality/Policy Loop
STRUCTURE
2.Search & Filter
5. Read & Extract
8.Schematize
11.Build Case
14.Tell Story
EFFORT

Design Considerations

Division, allocation, and integration of work

Common ground and awareness

Reference and deixis (pointing)

Identity, trust, and reputation

Group formation and management

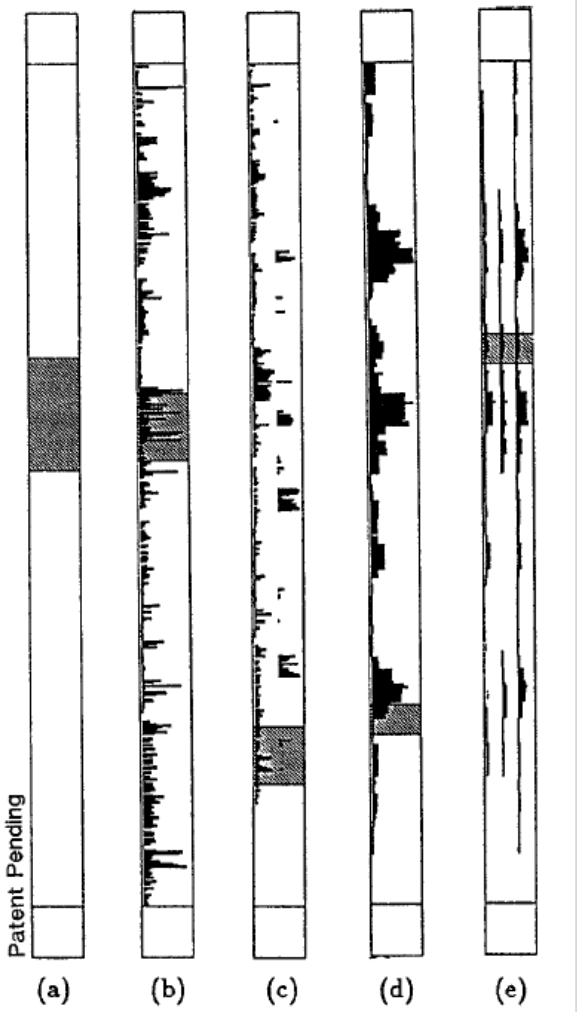
Incentives and engagement

Presentation and decision-making

Social Data Analysis

How can users' **activity traces** be used to improve awareness in collaborative analysis?

Social Navigation



Read & Edit Wear, Hill et al 1992

del.icio.us / jheer /

your bookmarks | your network | subscriptions | links for you | post

All your items (189)

« earlier | later » page 1 of 19

2005 MicroGraph Winners edit / delete
to visualization photography science ... saved by 5 other people ... on sept 20

NEJM -- The Spread of Obesity in a Large Social Network over 32 Years edit / delete
to health networks research science social visualization psychology ... saved by 30 other people ... on sept 06

PetersProjection-over.gif (GIF Image, 1203x800 pixels) edit / delete
to maps visualization ... saved by 3 other people ... on aug 30

Forbes Lists, World's Richest People, and more - Forbes.com edit / delete
to business data economics reference statistics ... saved by 202 other people ... on aug 25

Well-formed data | Elastic lists | Nobel prize winners demo edit / delete
to visualization vizgallery infovis flash sparklines design ... saved by 516 other people ... on aug 24

Data Visualization: Modern Approaches | Graphics edit / delete
to visualization web community infovis vizgallery design ... saved by 4456 other people ... on aug 24

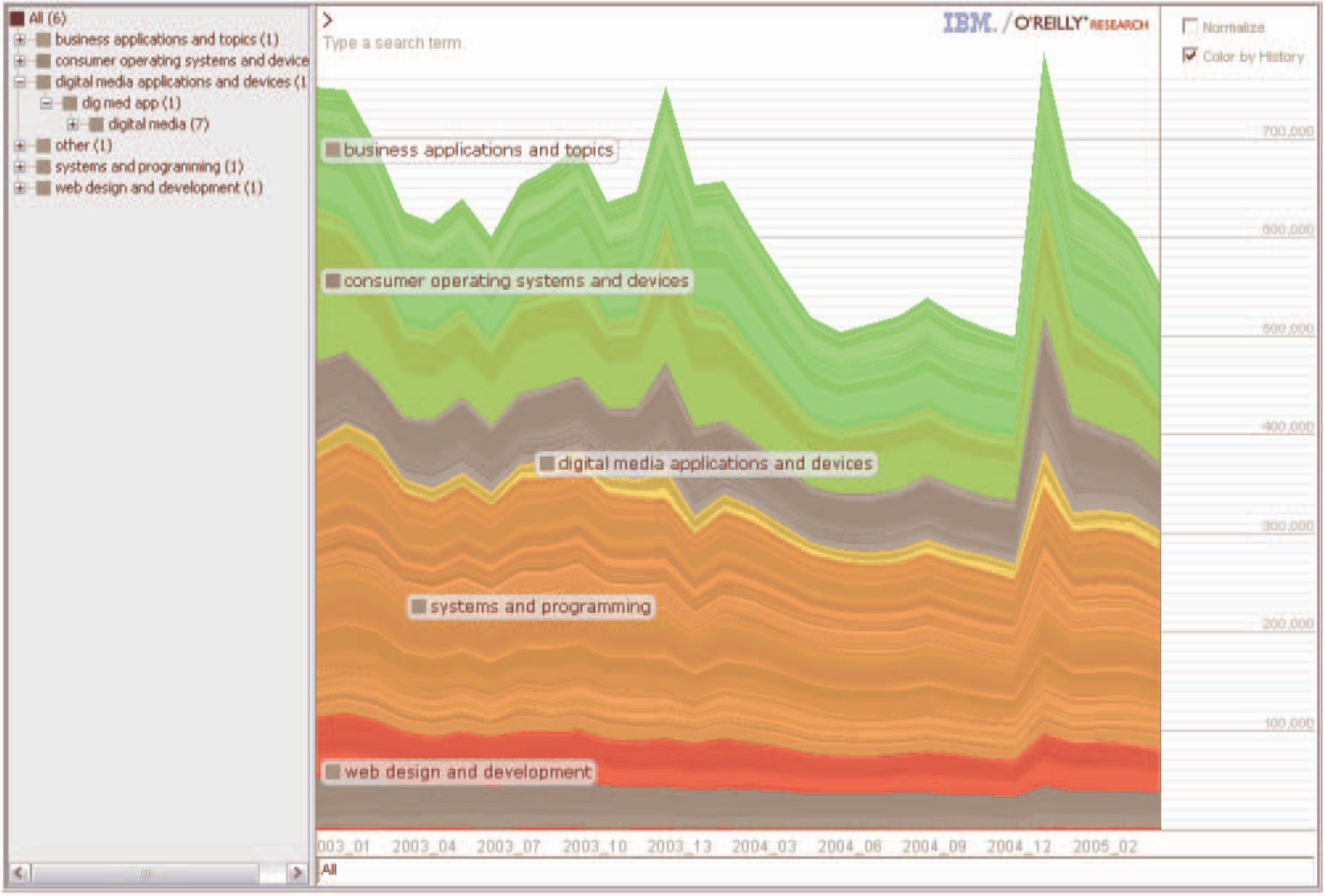
Christian Cantrell: ActionScript PNG and JPEG Encoders Updated edit / delete
... saved by 14 other people ... on aug 24

Acrobots edit / delete
to flash fun interaction animation ... saved by 61 other people ... on aug 23

Wikinvest | The Investing Wiki with Research about Companies, Investment Concepts, and mor
to collaboration web wiki reference finance economics business analysis visualization ... saved by 724 other people ...

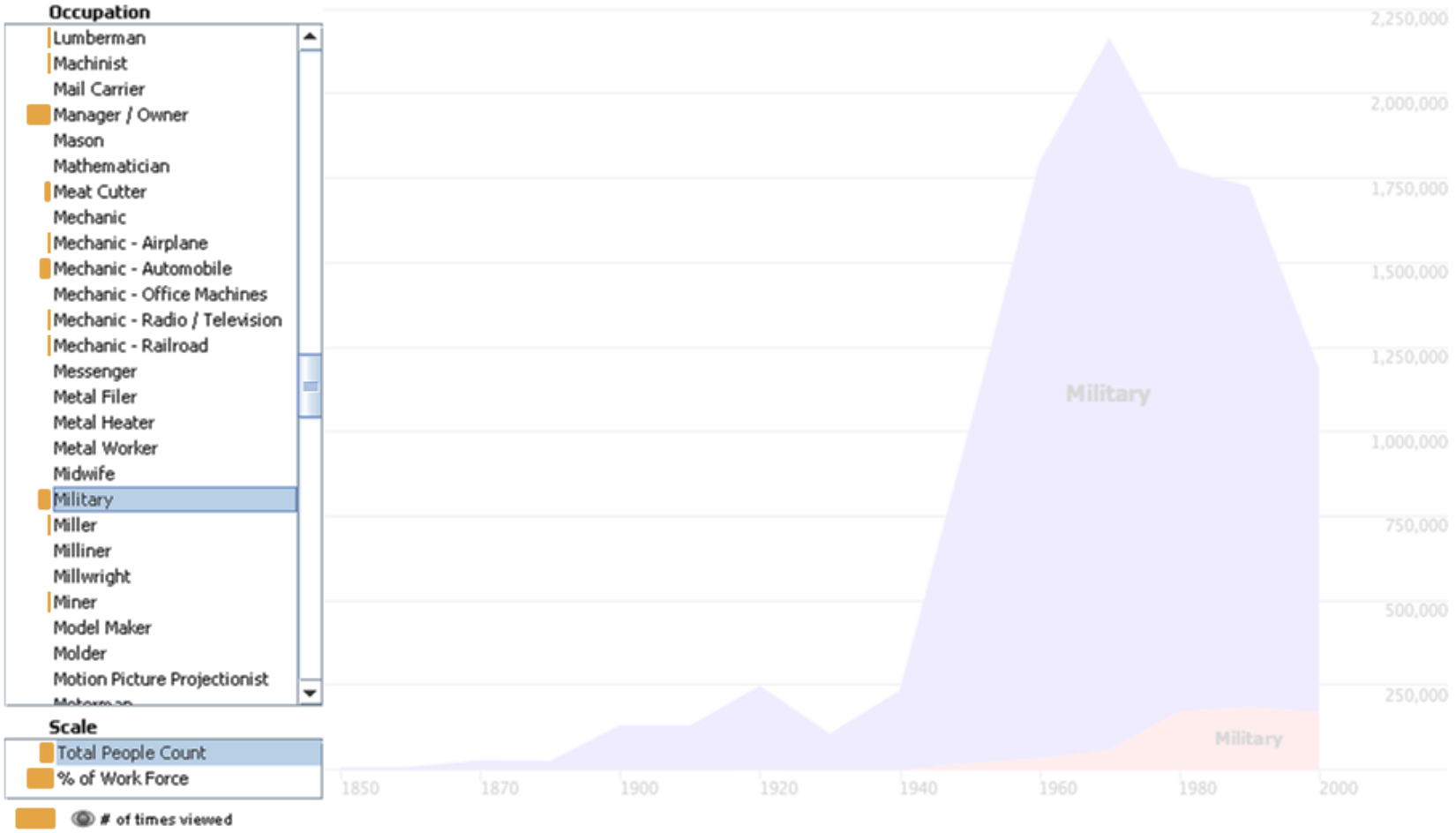
Los Angeles Times Homicide Map edit / delete
to maps statistics visualization infovis interaction news data ... saved by 63 other people ... on aug 14

« earlier | later » page 1 of 19



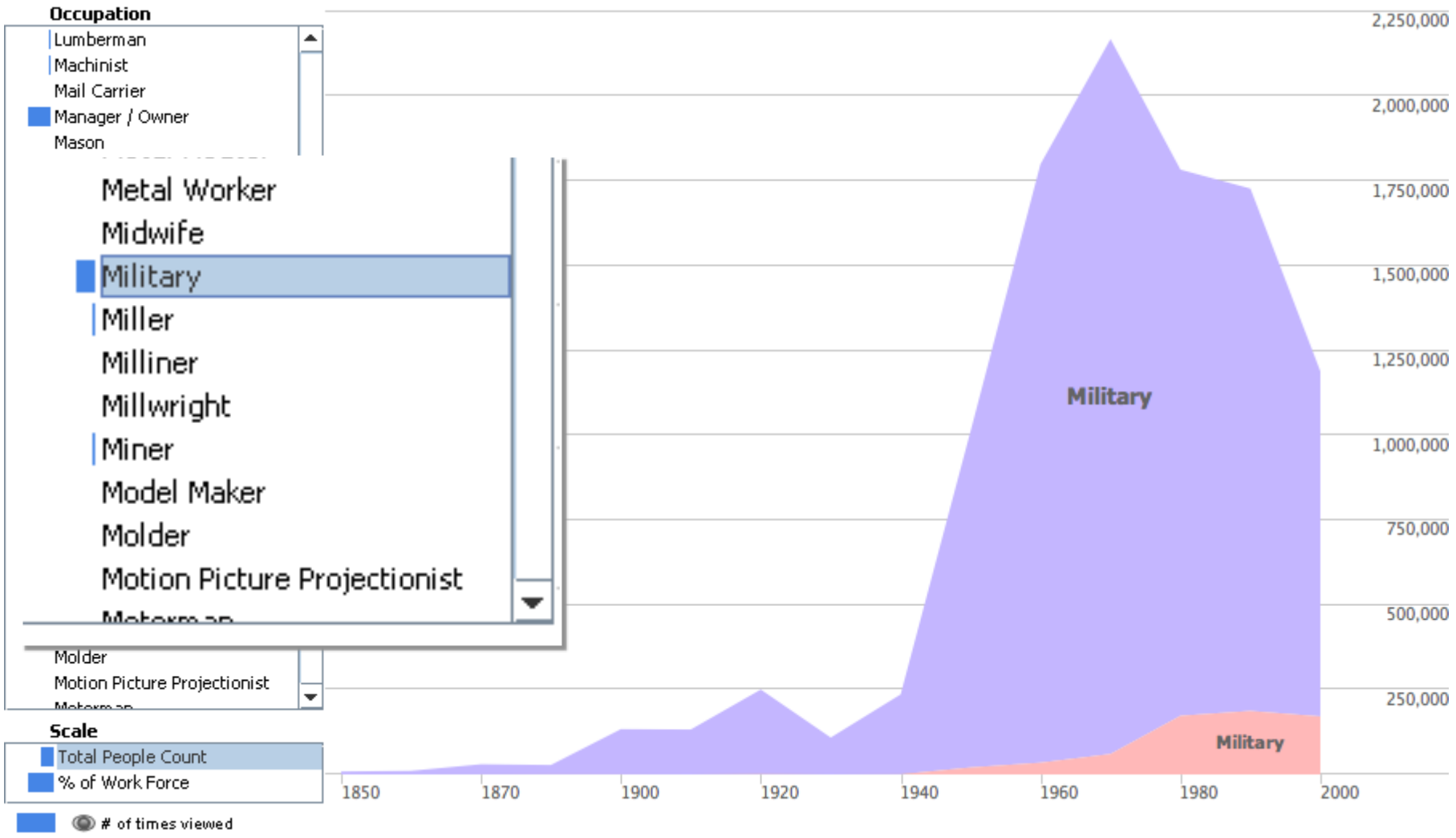
Wattenberg & Kriss - Color by history: gray regions have already been visited

Scented Widgets [InfoVis'07]

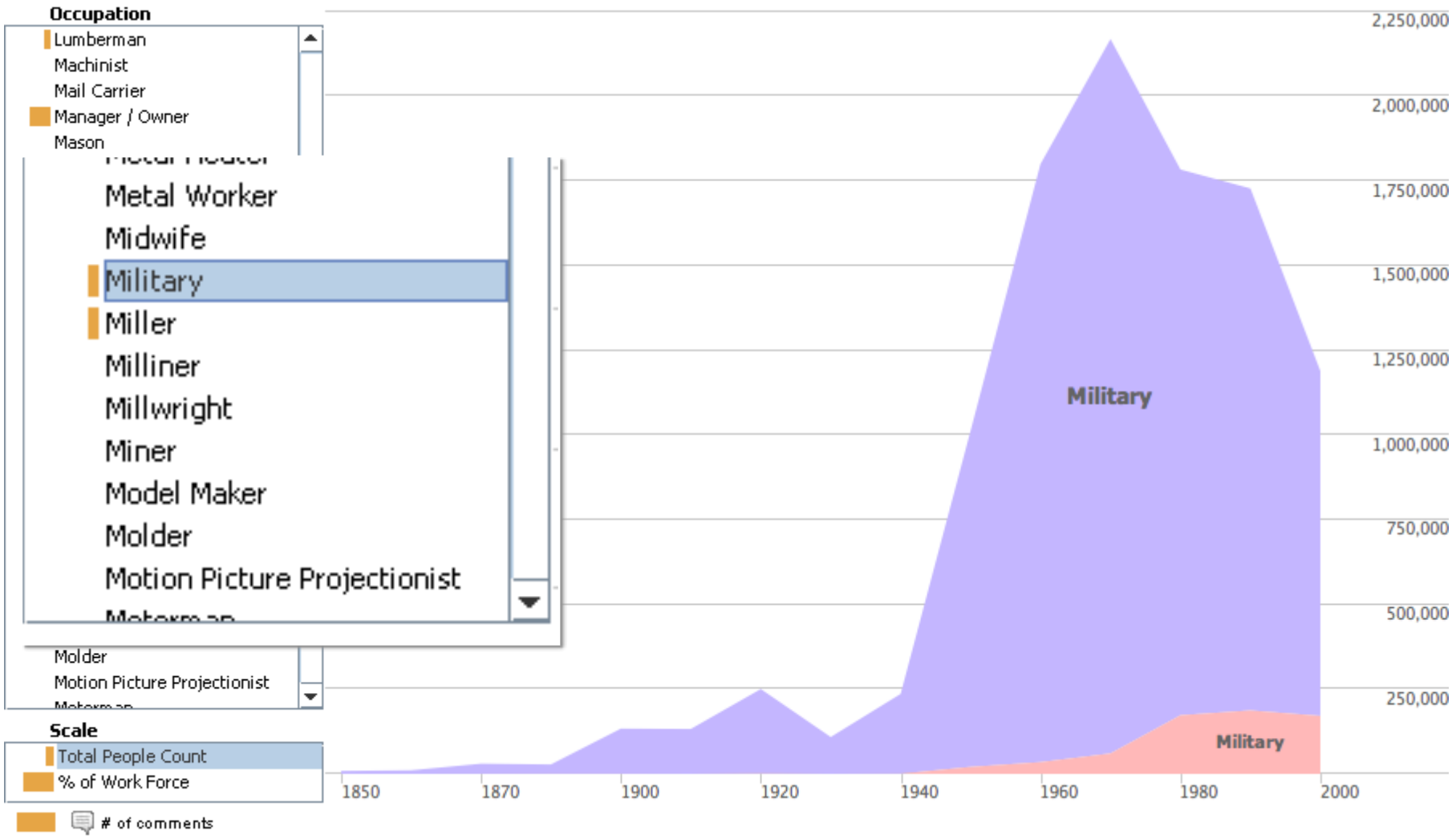


Visual navigation cues embedded in interface widgets

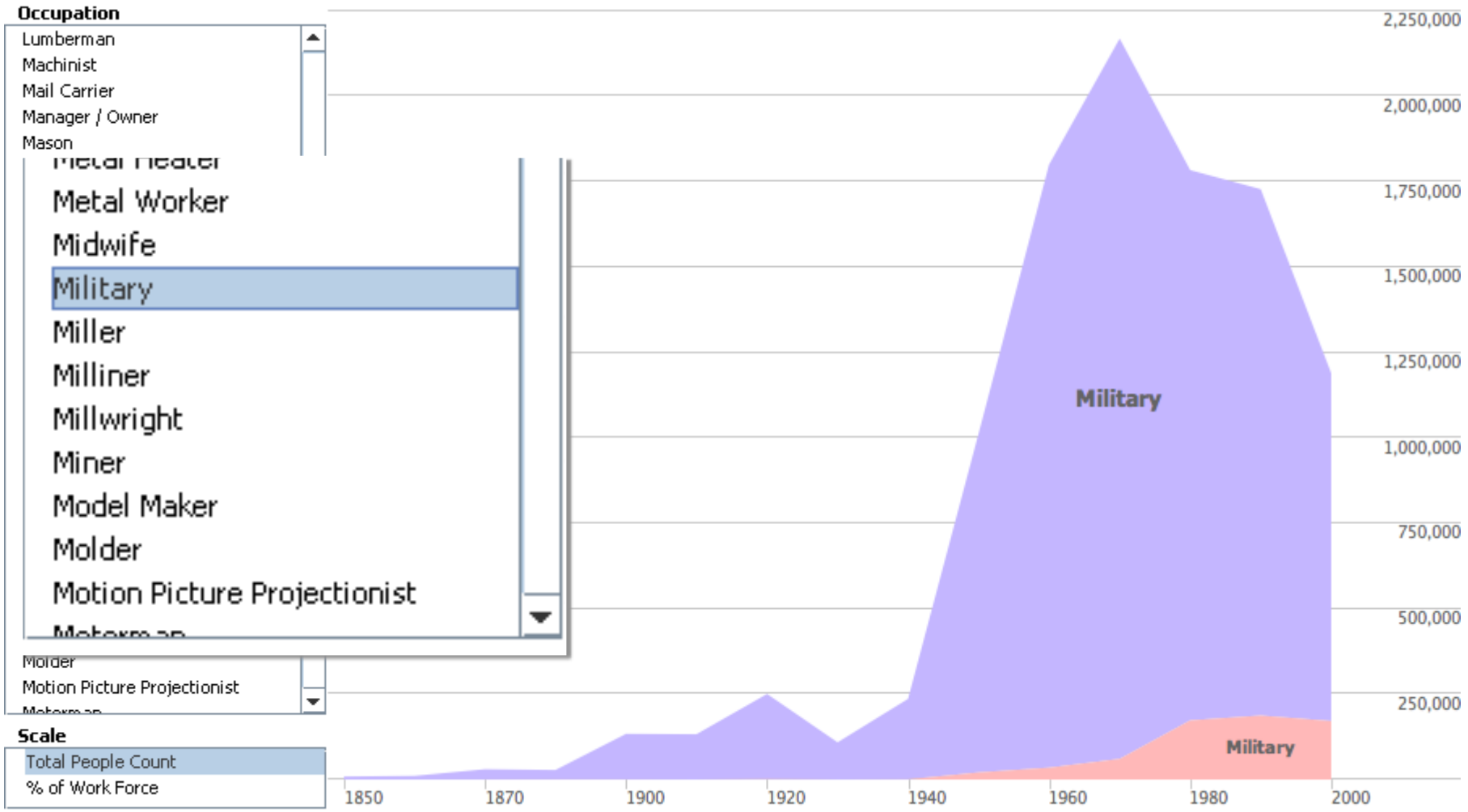
Visitation Counts



Comment Counts



No Scent (Baseline)

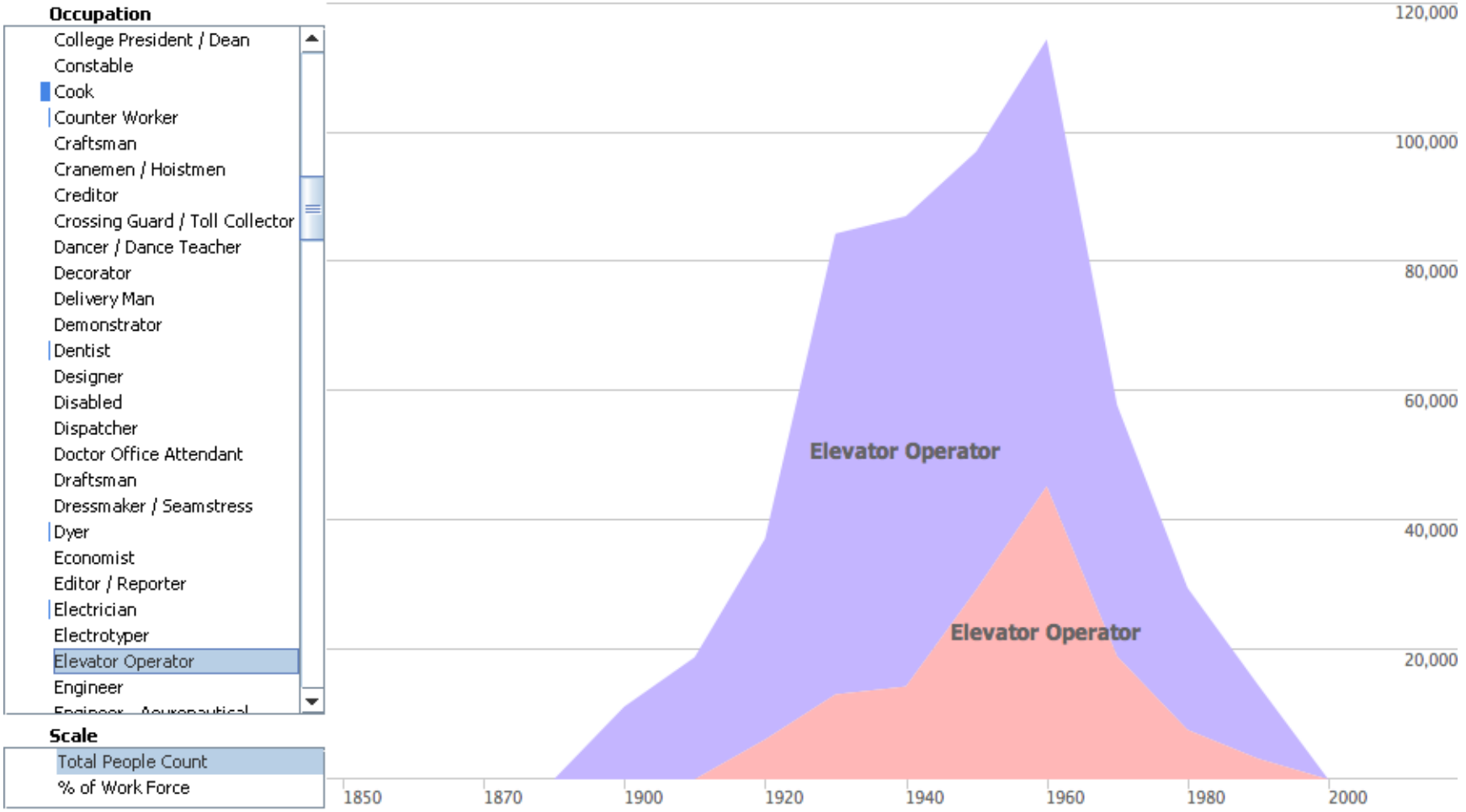


Do Activity Cues Affect Usage?

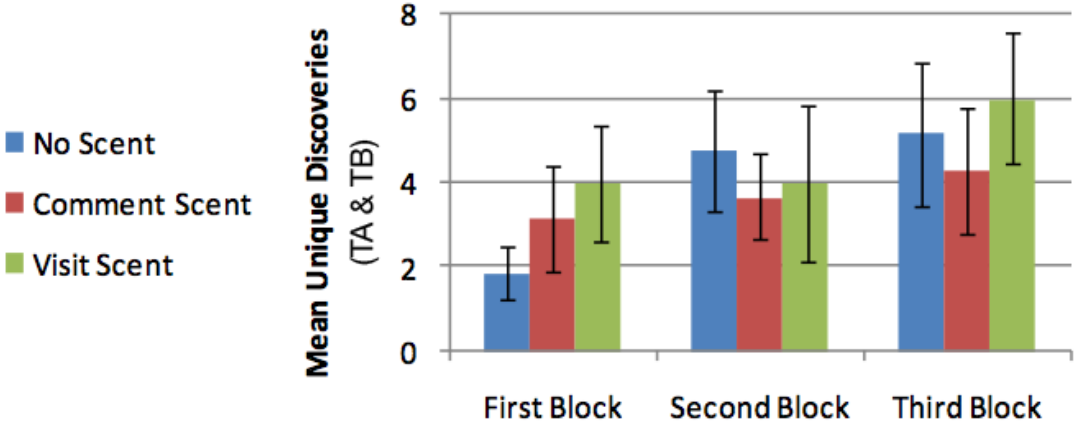
Hypotheses: With activity cues, subjects will
1. Exhibit more revisitation of popular views
2. Make more unique observations

Controlled experiment with 28 subjects
Collect evidence for and against an assertion
Varied scent cues (3) and foraging task (3)
Activity metrics collected from sense.us study

“Technology is costing jobs by making occupations obsolete.”



Results



Unique Discoveries

Visit scent had sig. higher rate of discoveries in first block. Less reliance on scent when subjects were familiar with data and visualization.

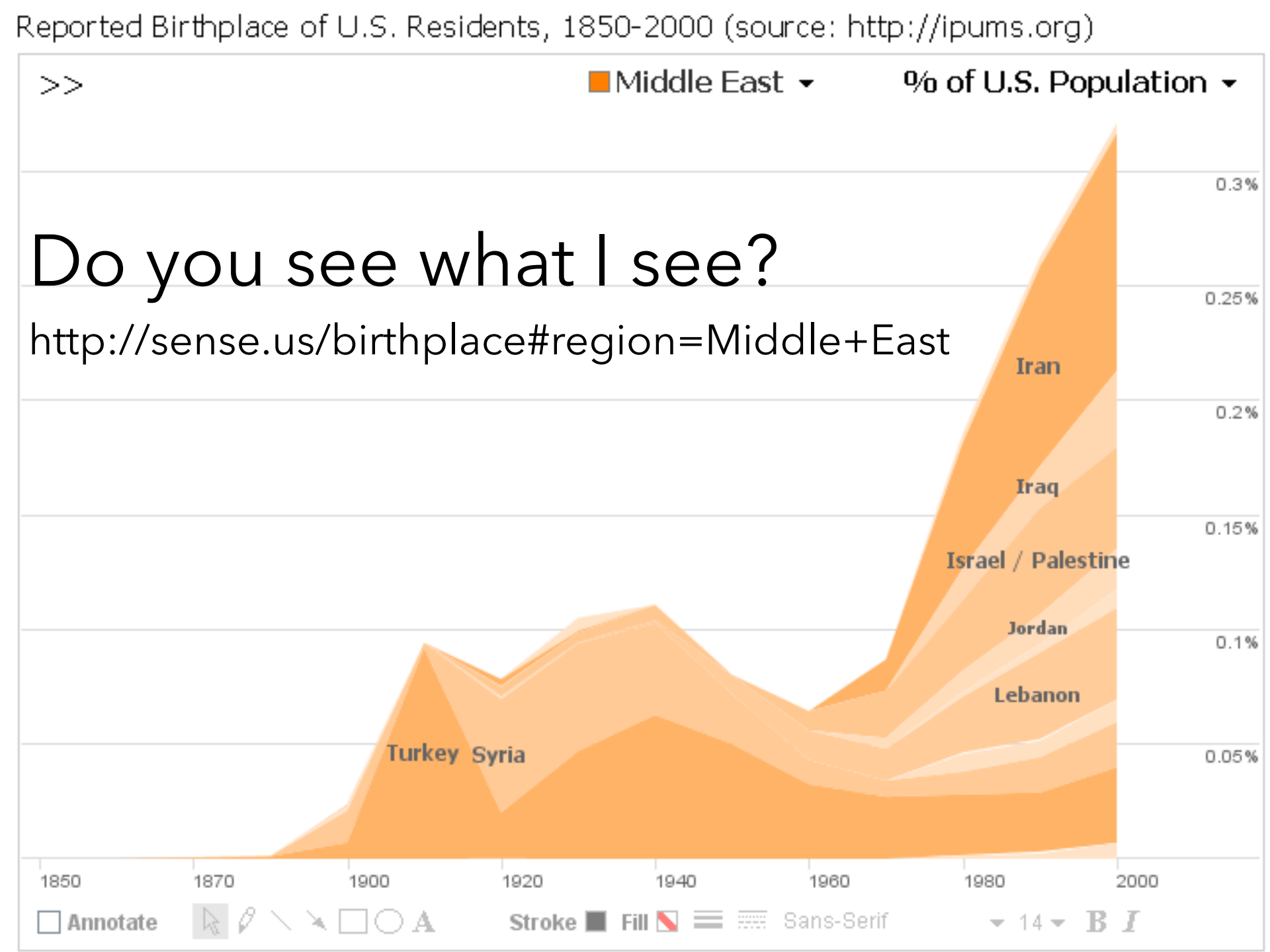
Revisitation

Visit and comment scent conditions correlate more highly with seed usage than no scent.

Social Data Analysis

How can users' **activity traces** be used to improve collaborative analysis?

How should **annotation techniques** be designed to provide nuanced pointing behaviors?


Reported Birthplace of U.S. Residents, 1850-2000 (source: http://ipums.org)
>>
Middle East
% of U.S. Population
Do you see what I see?
http://sense.us/birthplace#region=Middle+East
0.3%
0.25%
0.2%
0.15%
0.1%
0.05%
Iran
Iraq
Israel / Palestine
Jordan
Lebanon
Turkey
Syria
1850
1870
1900
1920
1940
1960
1980
2000
Annotate
Stroke
Fill
Sans-Serif
14

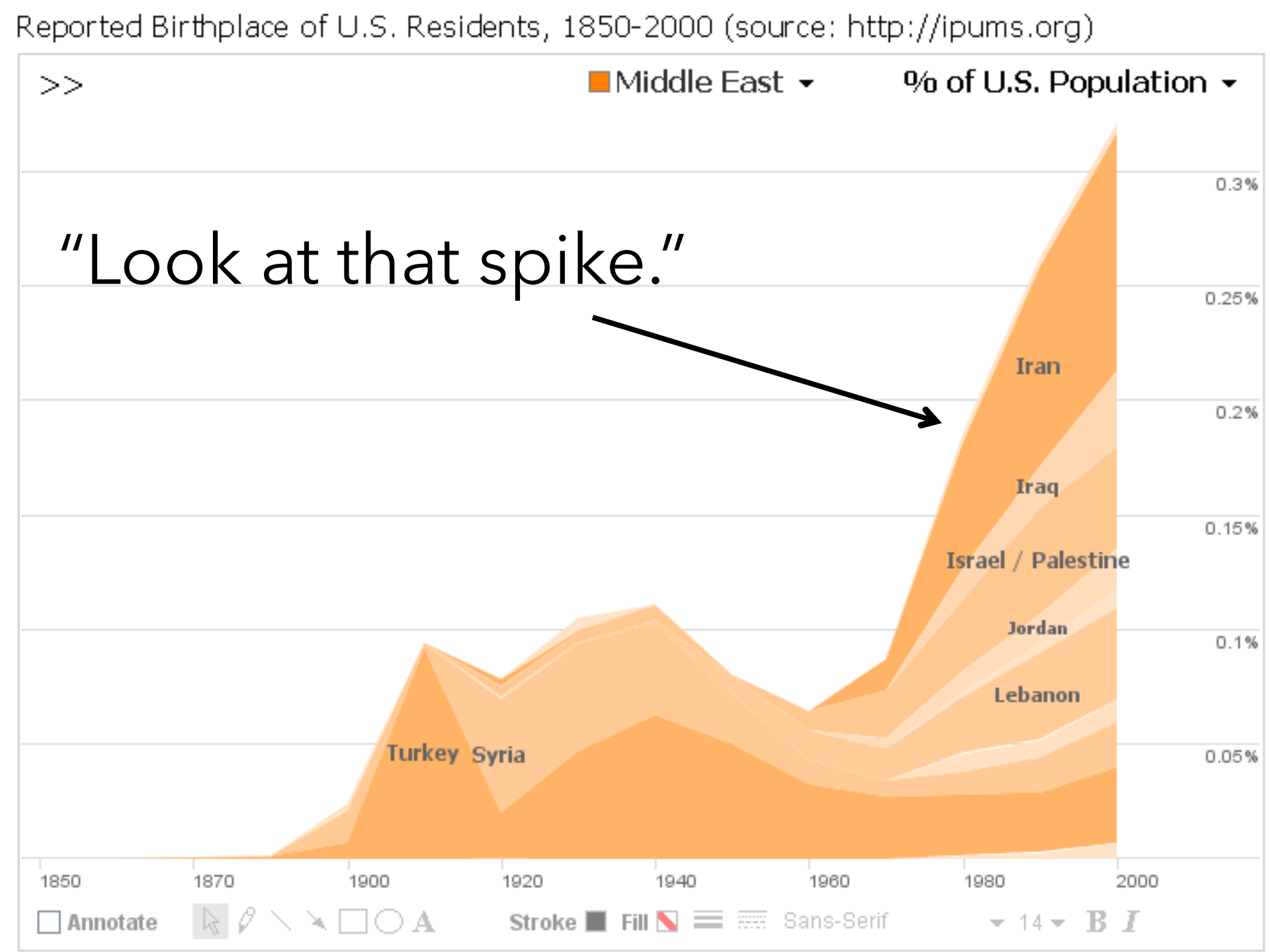
Common Ground

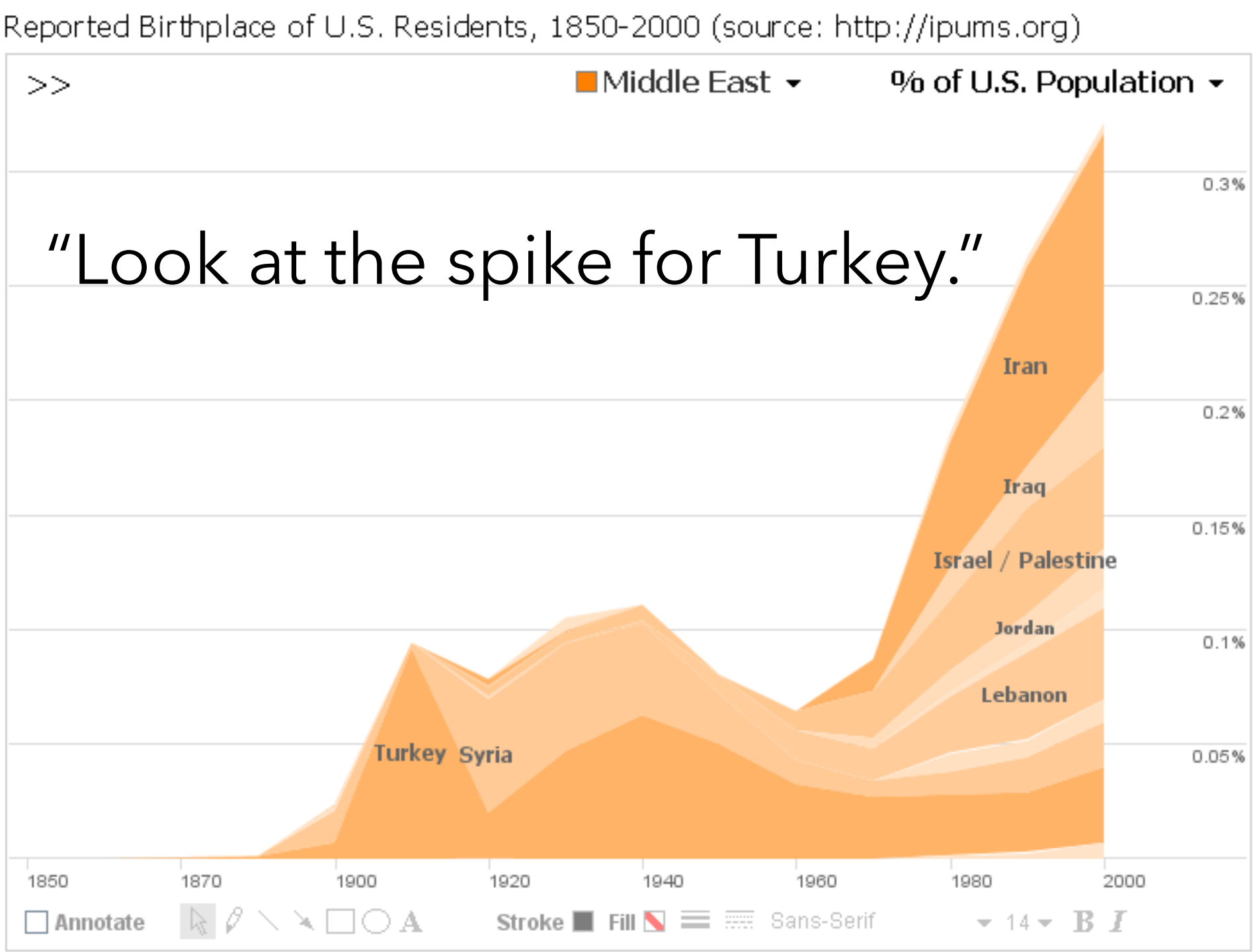
Common Ground: the shared understanding enabling conversation and collaborative action [Clark & Brennan '91]

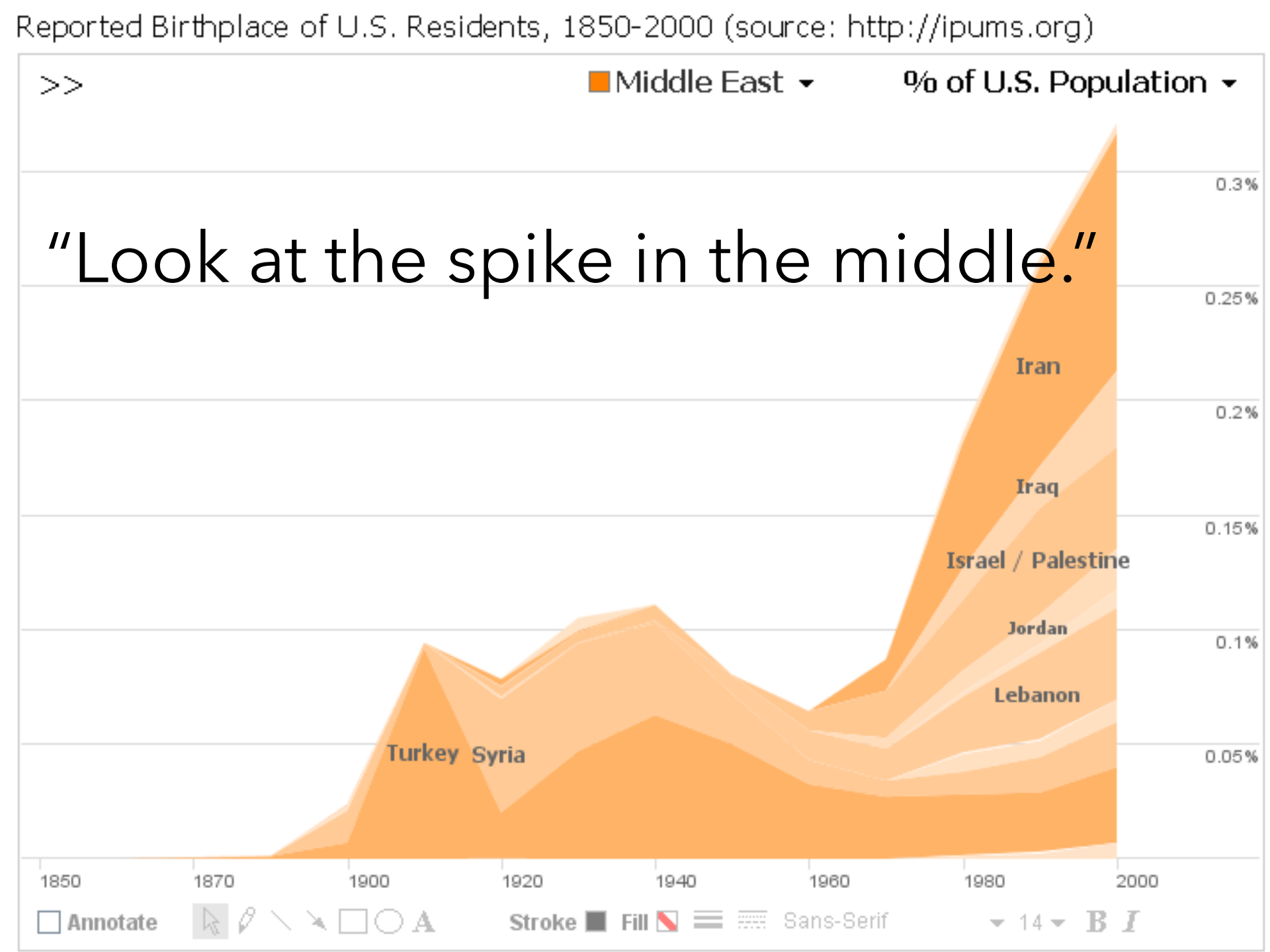
Do you see what I see? -> View sharing (URLs)

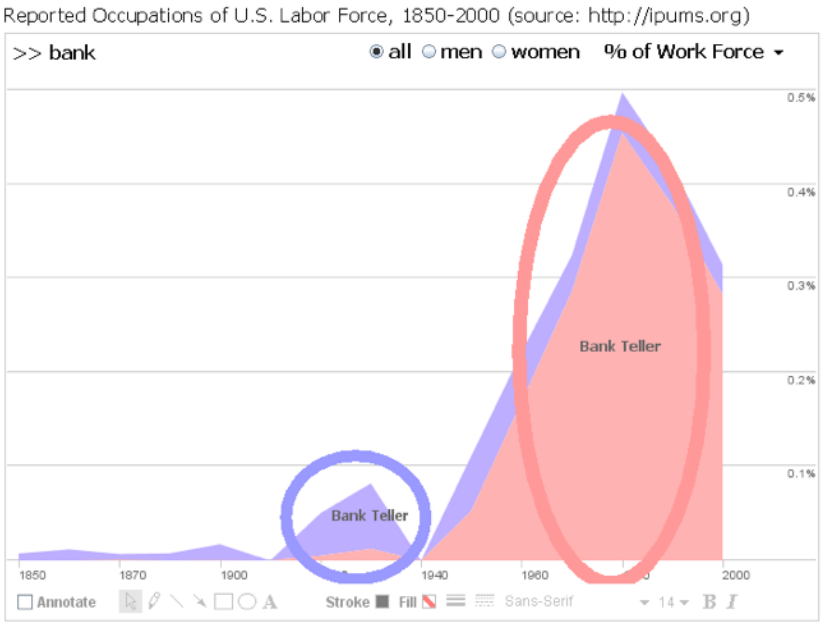
How do collaboration models affect grounding? Linked discussions vs. embedded comments vs. …

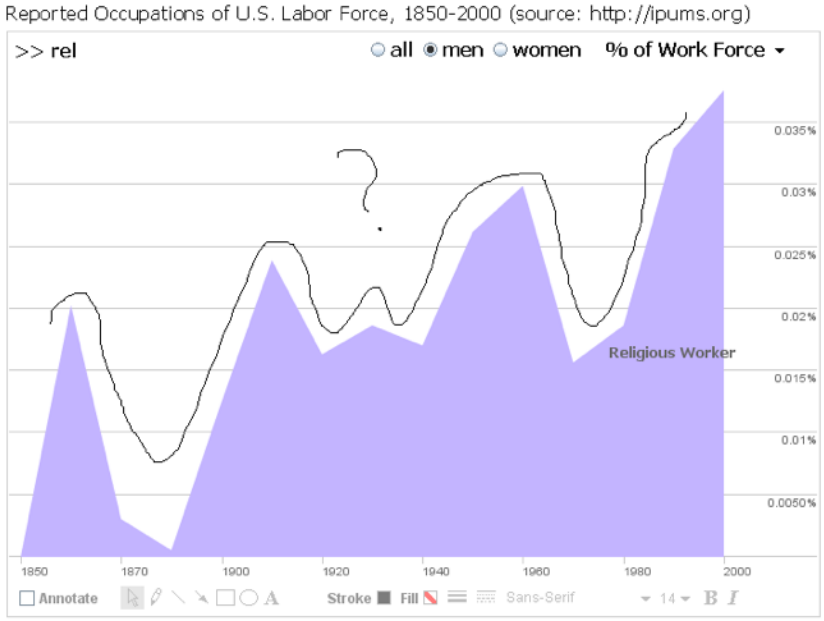
Principle of Least Collaborative Effort: participants exert *just enough* effort to successfully communicate. [Clark & Wilkes-Gibbs '86]


Reported Birthplace of U.S. Residents, 1850-2000 (source: http://ipums.org)
>>
Middle East
% of U.S. Population
"Look at that spike."
0.3%
0.25%
0.2%
0.15%
0.1%
0.05%
Iran
Iraq
Israel / Palestine
Jordan
Lebanon
Turkey
Syria
1850
1870
1900
1920
1940
1960
1980
2000
Annotate
Stroke
Fill
Sans-Serif
14
B
I

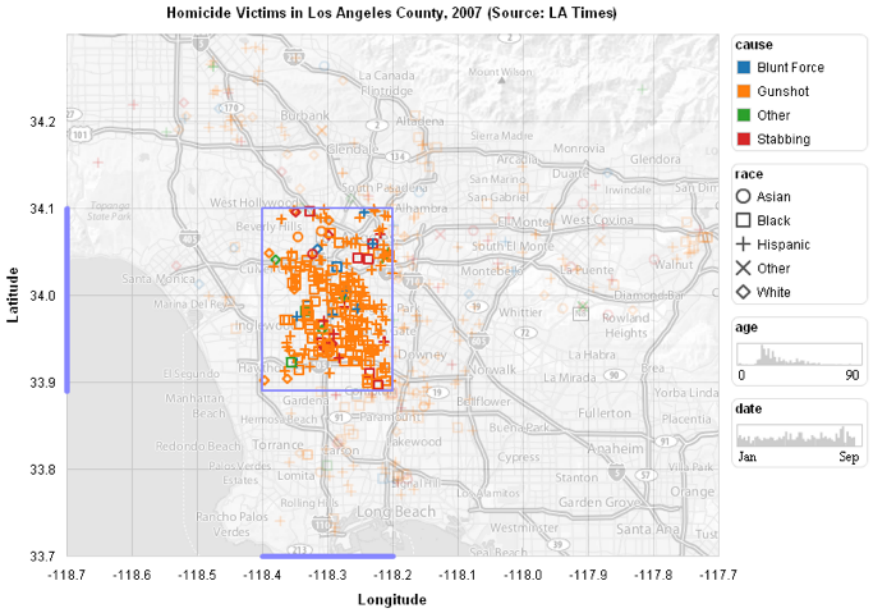

Reported Birthplace of U.S. Residents, 1850-2000 (source: http://ipums.org)
>>
Middle East
% of U.S. Population
"Look at the spike for Turkey."
0.3%
0.25%
0.2%
0.15%
0.1%
0.05%
Iran
Iraq
Israel / Palestine
Jordan
Lebanon
Turkey
Syria
1850
1870
1900
1920
1940
1960
1980
2000
Annotate
Stroke
Fill
Sans-Serif
14

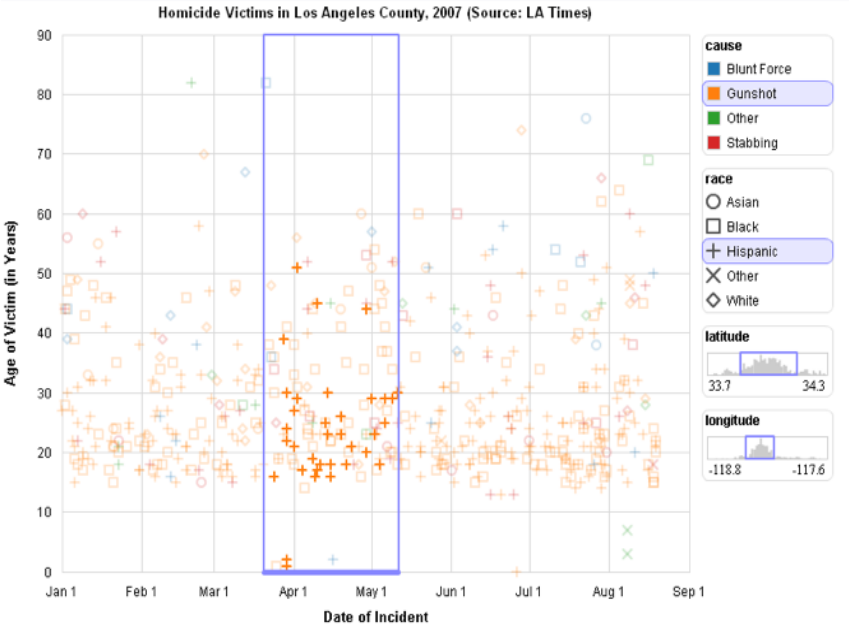

Reported Birthplace of U.S. Residents, 1850-2000 (source: http://ipums.org)
>>
Middle East
% of U.S. Population
"Look at the spike in the middle."
0.3%
0.25%
0.2%
0.15%
0.1%
0.05%
Iran
Iraq
Israel / Palestine
Jordan
Lebanon
Turkey
Syria
1850
1870
1900
1920
1940
1960
1980
2000
Annotate
Stroke
Fill
Sans-Serif
14





Free-form





Data-aware

Use of Annotations

Arrows	25.1%	|||||||||||||||||||||||||
Text	24.6%	|||||||||||||||||||||||||
Ovals	17.9%	||||||||||||||||||
Pencil	16.2%	||||||||||||||||
Lines	14.5%	||||||||||||||||
Rectangles	1.7%	||

39.0% of comments included annotations

Pointing to specific points, trends, or regions (88.6%)

Drawing to socialize or tell jokes (11.4%)

Variety of subject responses

‘Not always necessary’, but ‘surprisingly satisfying’

Some concern about professional look

Social Data Analysis

How can users' **activity traces** be used to improve collaborative analysis?

How should **annotation techniques** be designed to provide nuanced pointing behaviors?

How can interface design better support **communication of analytic findings**?

sense.us > map - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://sense.us/map#option=7&comment=210

sense.us / map

hello, Jeffrey profile comments trails help logout

State Map of 2000-2005 Census Data (source: U.S. Census Bureau)

Female persons percent 2004

Annotate Stroke Fill Sans-Serif 14 B I

comments (5) **New Comment | View All (16)**

All the Men are Moving to Nevada? (5)

Compare this "where the women are" with the population increase maps. Nevada is booming, but not with woemn.

by **Andrew Roberts** on Wed Sep 6, 2006 5:19 PM

Well, duh, they still make up 49% in Nevada. Those nice color ranges made me lazy. Or is this an important UI issue? The range between color extremes changes with little notice, perhaps causing the viewer, as I did, to assume that there is a constant, or larger, range of change than is actually present.

by **Andrew Roberts** on Wed Sep 6, 2006 5:23 PM

is Las Vegas causing a massive shift (i.e. gamblers)? since the entire state is being colored uniformly, you get the impression that this is an even distribution, but the reality might be very different due to large aggregations of people around the major cities.

by **Thomas Chang** on Wed Sep 6, 2006 5:37 PM

I think one or two percentage points might actually make a big difference in the culture... any Alaskans care to comment?

by **Martin Sharp** on Wed Sep 6, 2006 7:10 PM

test

by **Michael Rogers** on Wed Sep 27, 2006 1:49 AM

reply

bookmarks (3) **Add View | Save | Load | View All**

visual communication lab privacy feedback help

See something interesting? **Add a comment, it's easy!**

Done

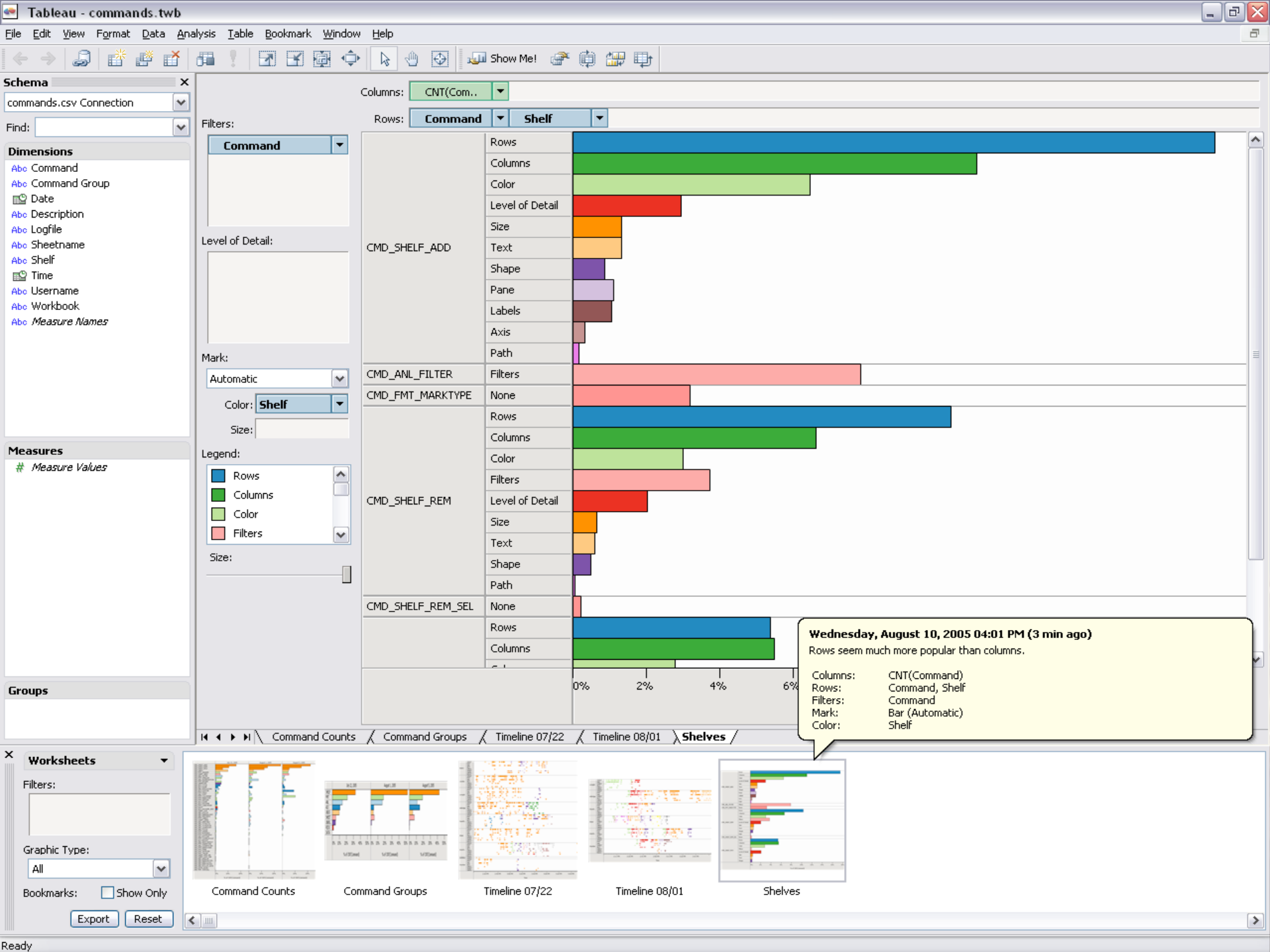
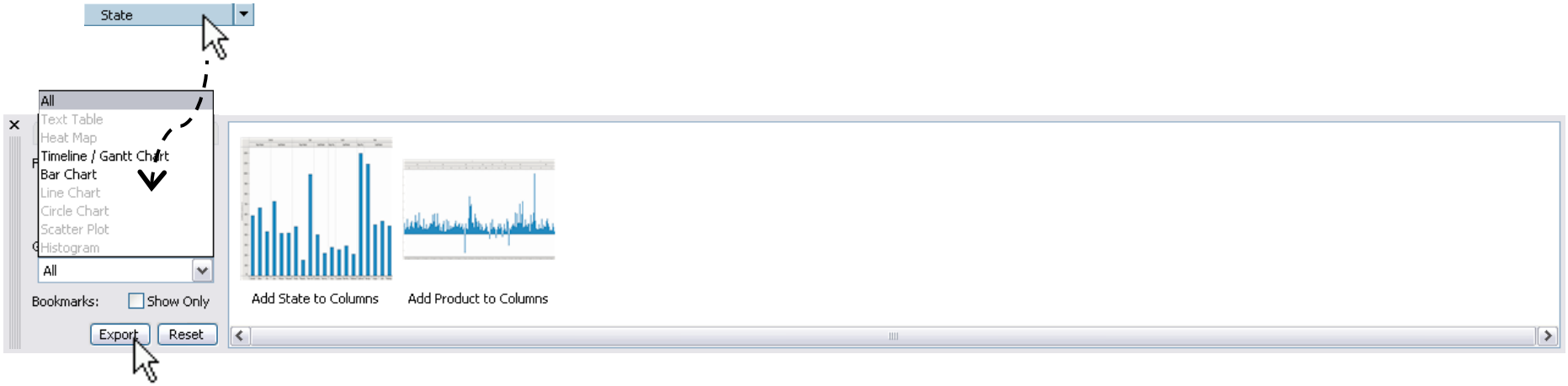


Tableau - commands.twb
File Edit View Format Data Analysis Table Bookmark Window Help
Show Me!
Schema
commands.csv Connection
Find:
Dimensions
Abc Command
Abc Command Group
Date
Abc Description
Abc Logfile
Abc Sheetname
Abc Shelf
Time
Abc Username
Abc Workbook
Abc Measure Names
Measures
Measure Values
Groups
Columns: CNT(Com..
Rows: Command Shelf
Filters:
Command
Level of Detail:
Mark:
Automatic
Color: Shelf
Size:
Legend:
Rows
Columns
Color
Filters
Size:
CMD_SHELF_ADD
CMD_ANL_FILTER
CMD_FMT_MARKTYPE
CMD_SHELF_REM
CMD_SHELF_REM_SEL
0%
2%
4%
6%
Wednesday, August 10, 2005 04:01 PM (3 min ago)
Rows seem much more popular than columns.
Columns: CNT(Command)
Rows: Command, Shelf
Filters: Command
Mark: Bar (Automatic)
Color: Shelf
Command Counts
Command Groups
Timeline 07/22
Timeline 08/01
Shelves
Worksheets
Filters:
Graphic Type:
All
Bookmarks:
Show Only
Export
Reset
Ready

Graphical Analysis Histories



Microsoft PowerPoint - [Presentation1]

File Edit View Insert Format Tools Slide Show Window Help

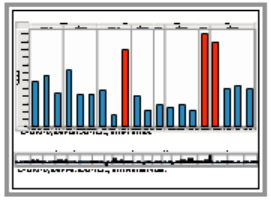
Type a question for help

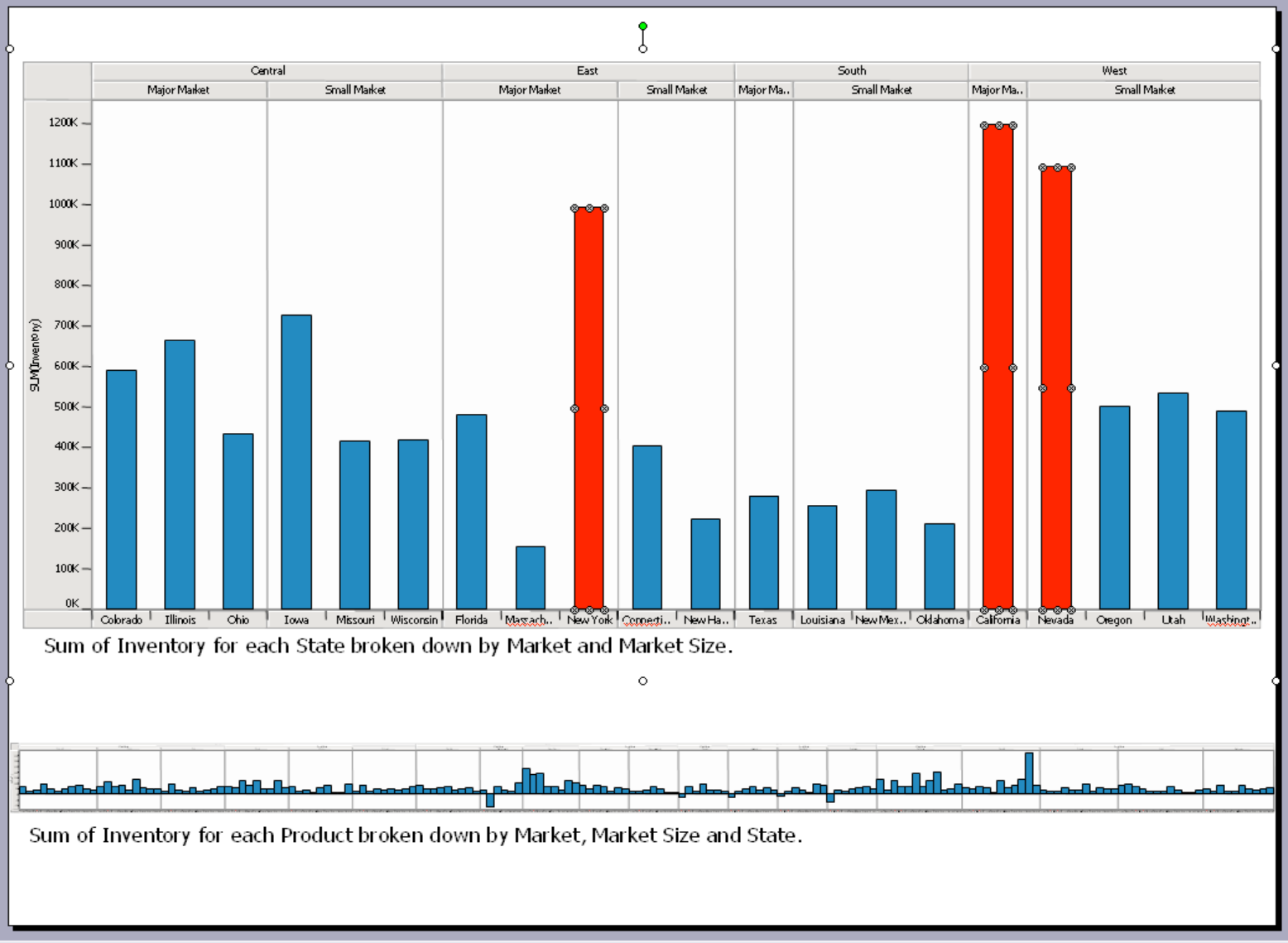
106% Design New Slide

SnagIt Window

Outline Slides

1





Sum of Inventory for each State broken down by Market and Market Size.

Sum of Inventory for each Product broken down by Market, Market Size and State.

Click to add notes

Draw AutoShapes

Slide 1 of 1 Default Design

Social Data Analysis

How can users' **activity traces** be used to improve collaborative analysis?

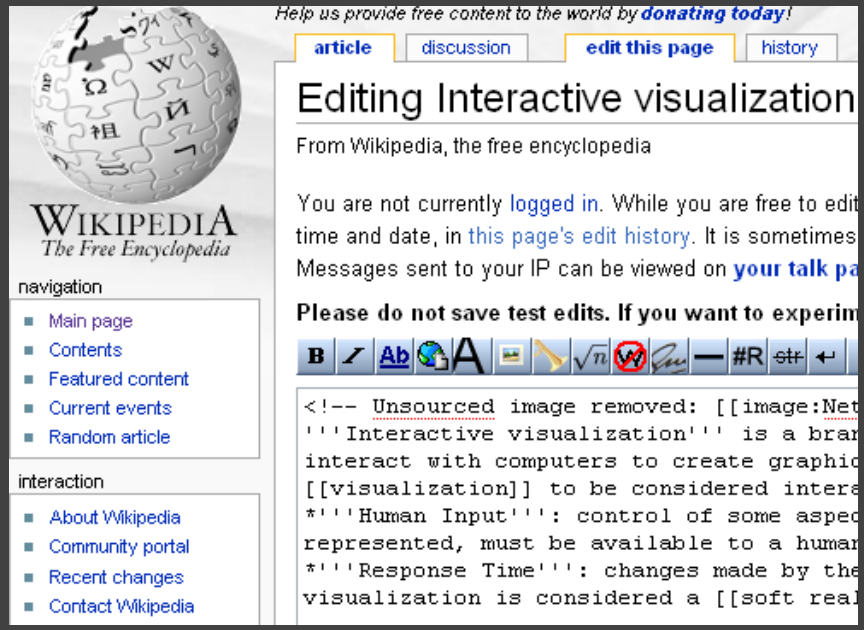
How should **annotation techniques** be designed to provide nuanced pointing behaviors?

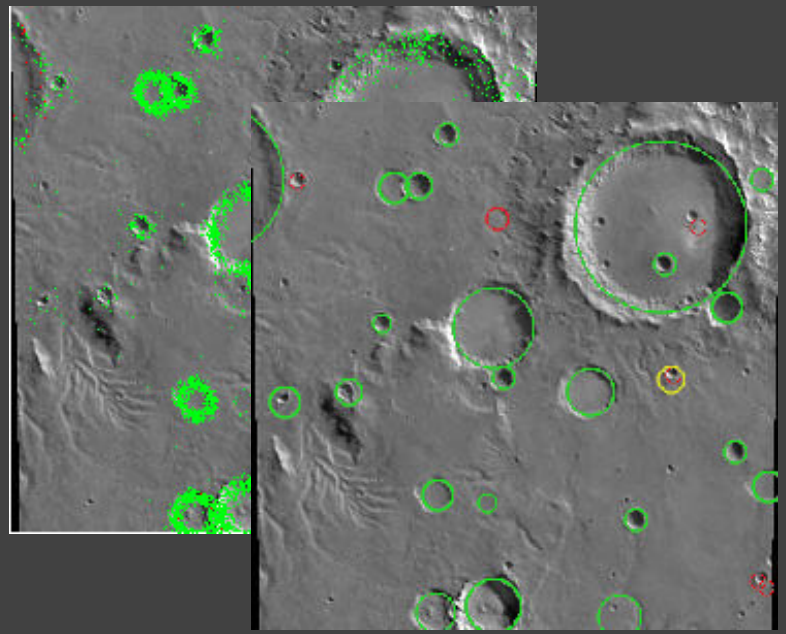
How can interface design better support **presentation of analytic findings**?

How can contributions be **better integrated**?

Structured Conversation

Reduce the cost of synthesizing contributions

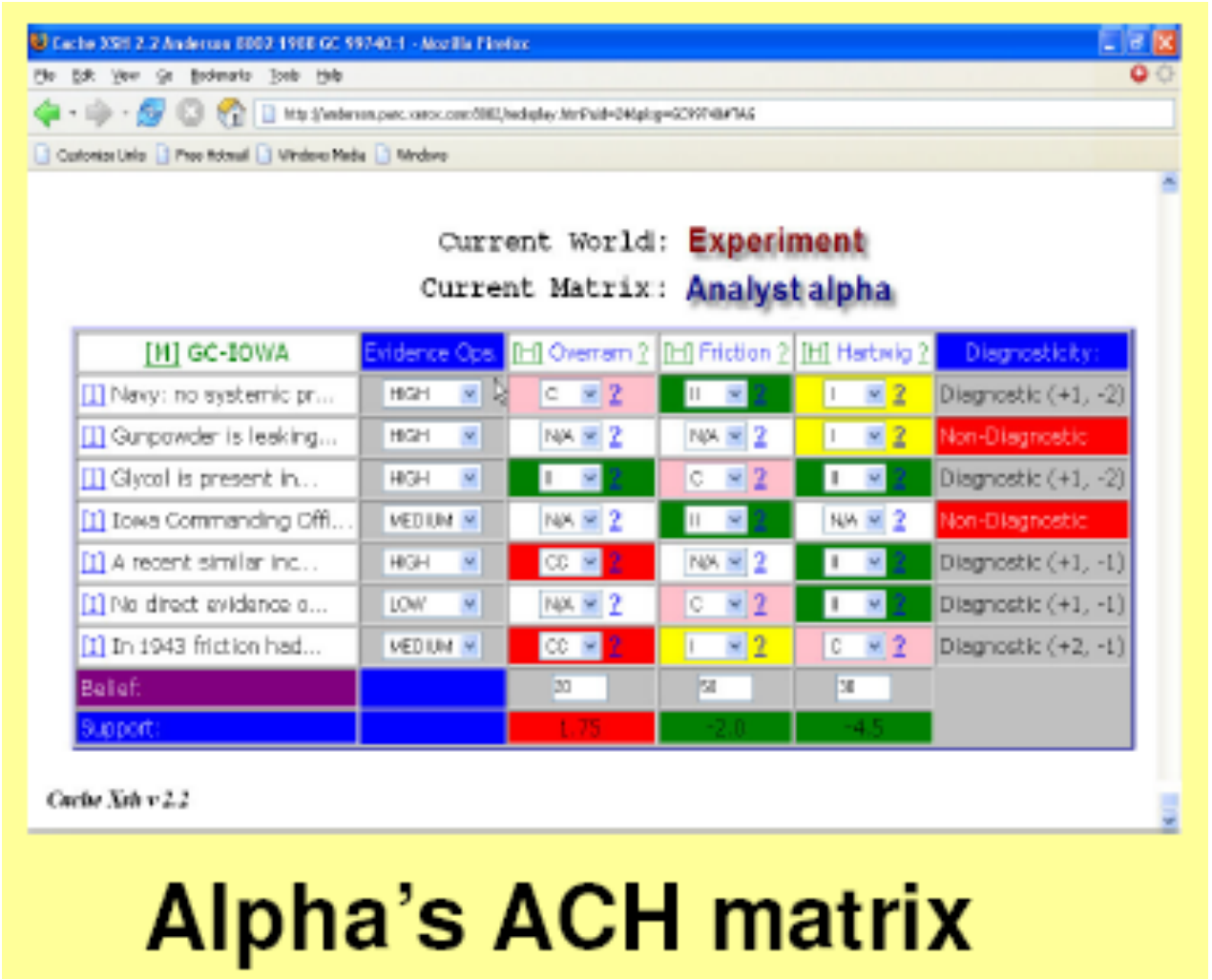




Wikipedia: Shared Revisions

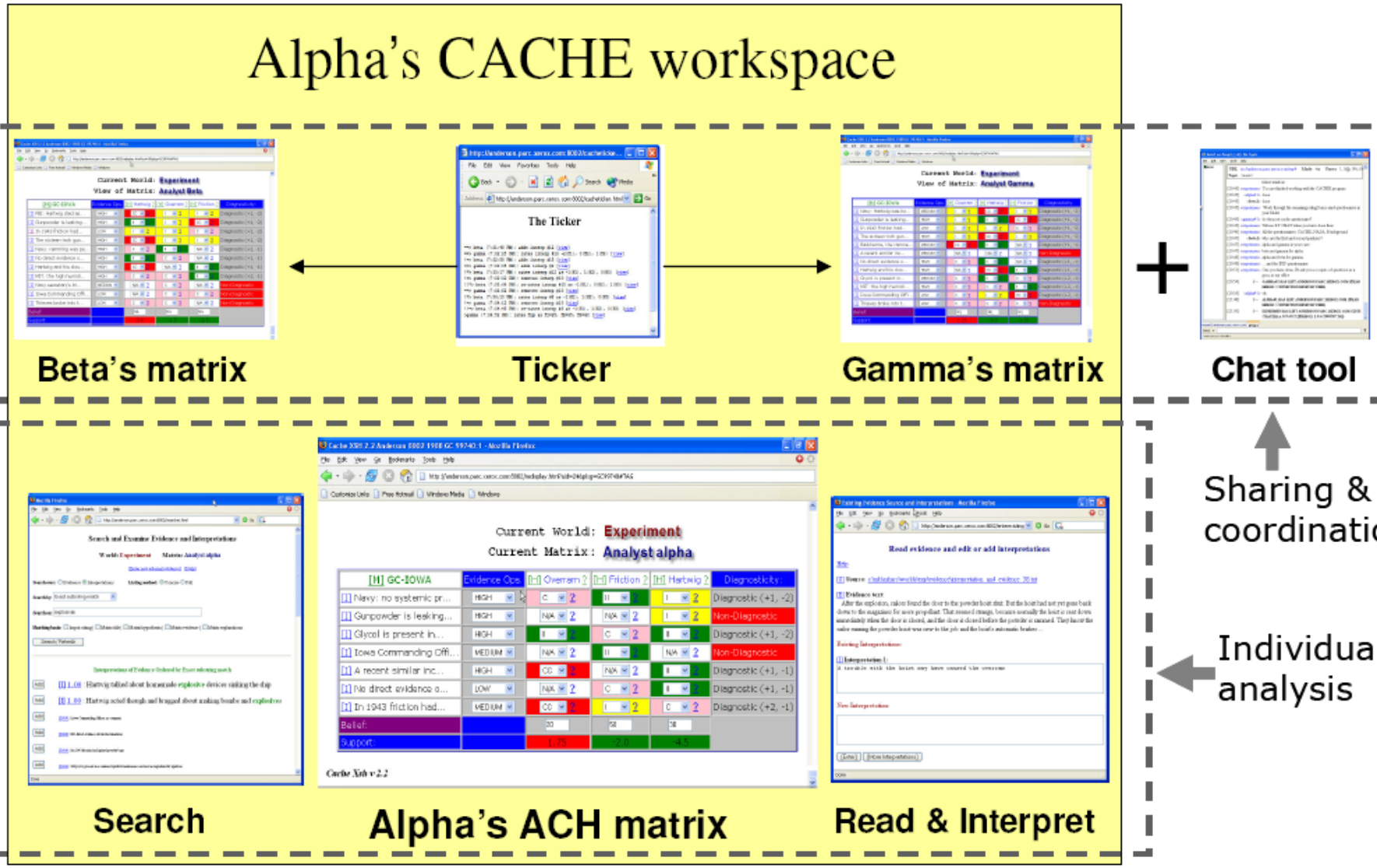
NASA ClickWorkers: Statistics

Integration: Evidence Matrices

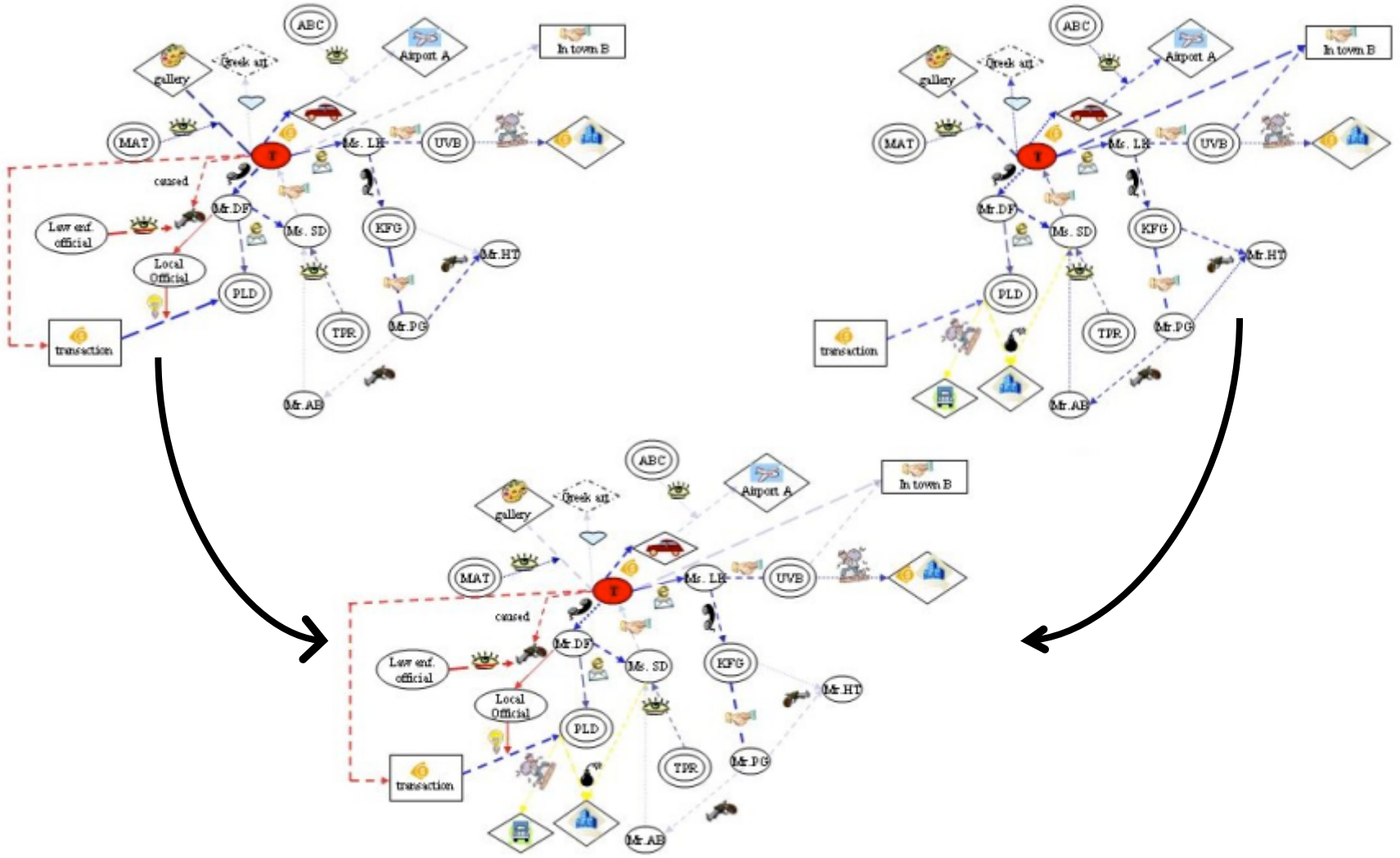


Alpha's ACH matrix

Integration: Evidence Matrices



Merging Analysis Structures [Brennan '06]



Design Considerations

Division, allocation, and integration of work

Common ground and awareness

Reference and deixis (pointing)

Identity, trust, and reputation

Group formation and management

Incentives and engagement

Presentation and decision-making

Ongoing Work

How to better structure analysis tasks?
Observe trends / patterns of interest
Generate hypotheses
Marshall evidence for/against a claim
Structured tasks improve outcomes [Willett 2011]

How to better encourage participation?
Narrative: storytelling to spur exploration
Financial incentives / crowdsourcing [Willett 2012]

Social Data Analysis

Visual sensemaking is a **social** process as well as a cognitive process.

Analysis of data coupled with **social interpretation and deliberation**.

How can user interfaces catalyze and support **collaborative visual analysis**?