



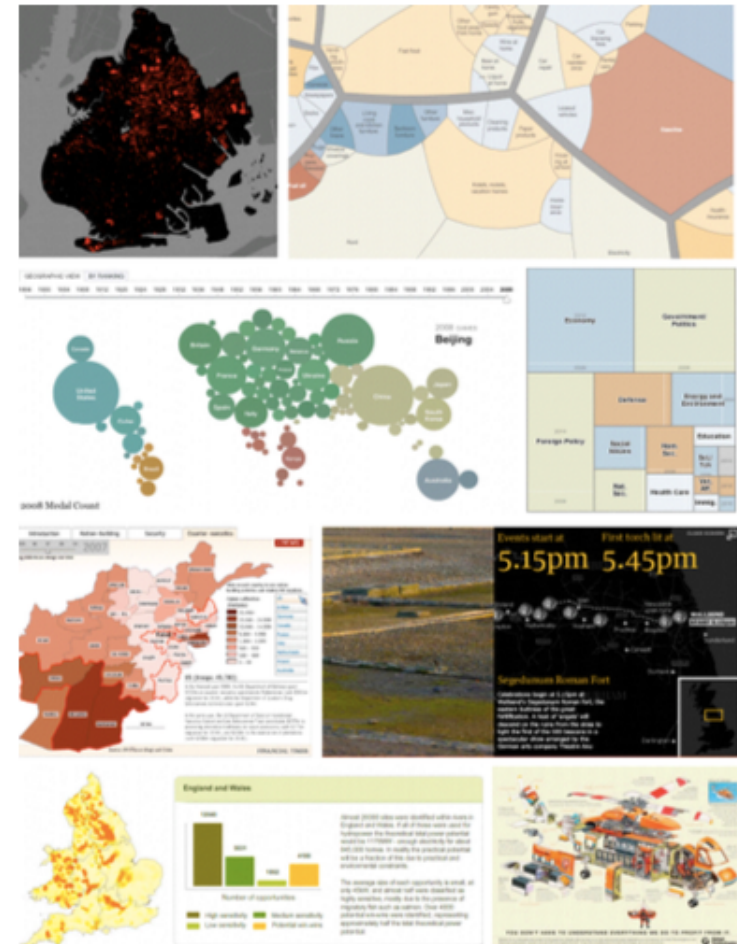
S. Rinzivillo – rinzivillo@isti.cnr.it

DATA VISUALIZATION AND VISUAL ANALYTICS

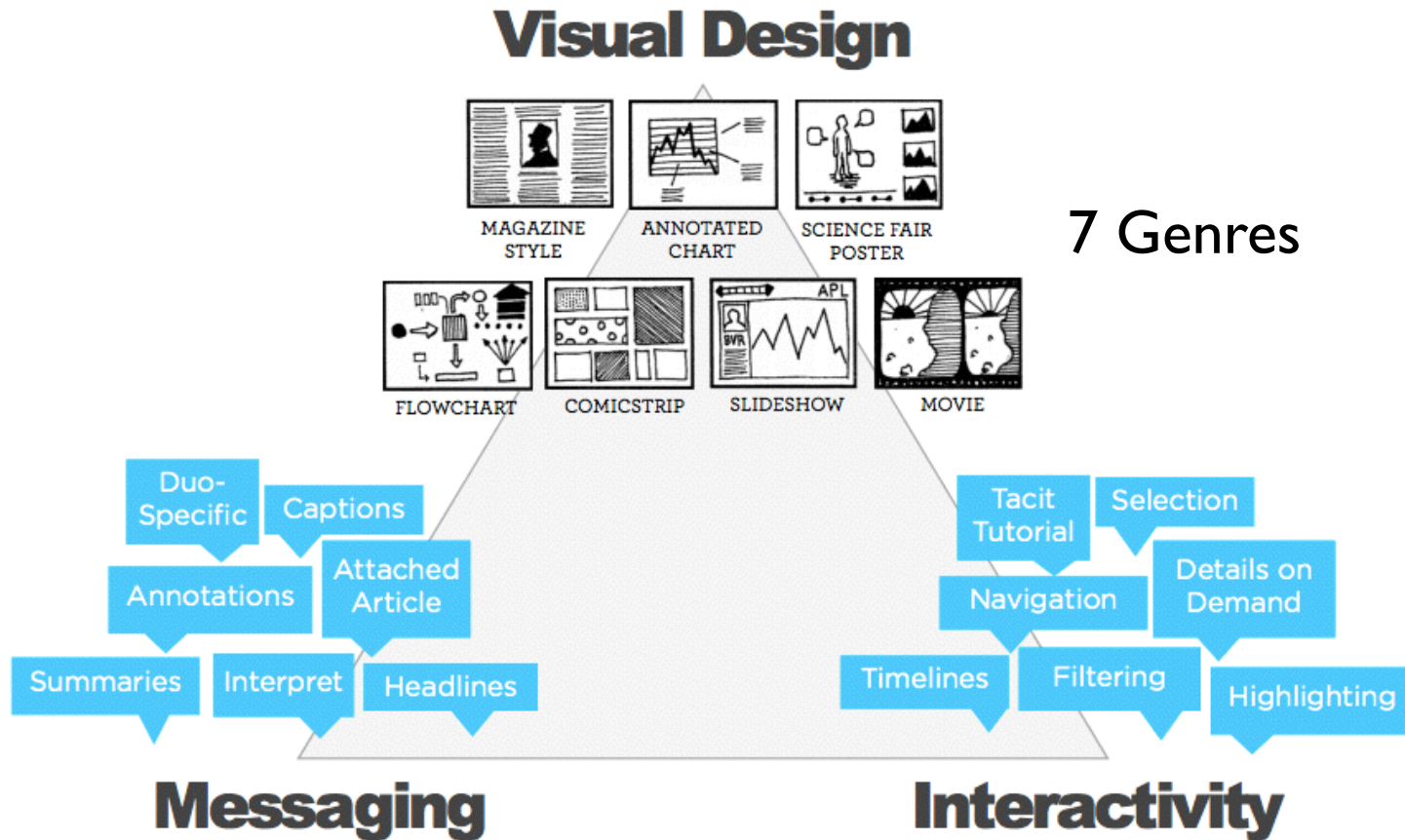
Visual Storytelling

Adapted from “Narrative Visualization: Telling Stories with Data”
E. Segel and J Heer (DOI:10.1109/TVCG.2010.179)

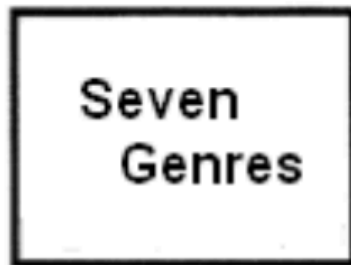
- 58 Case Studies
 - 70% Journalism
 - 20% Business
 - 10% Research



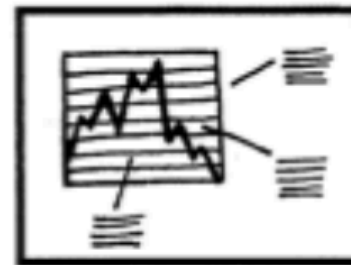
Design Space



Genres



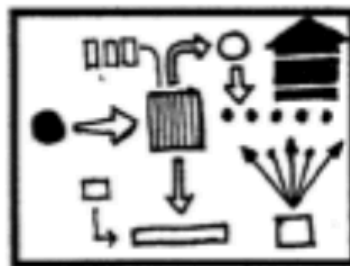
Magazine Style



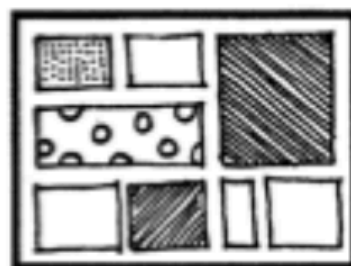
Annotated Chart



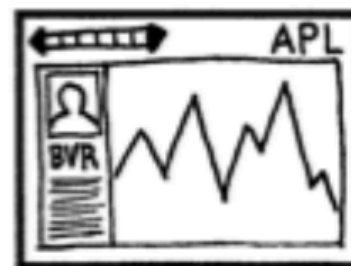
Partitioned Poster



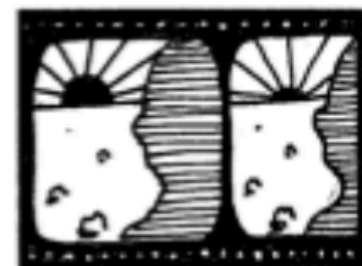
Flow Chart



Comic Strip



Slide Show



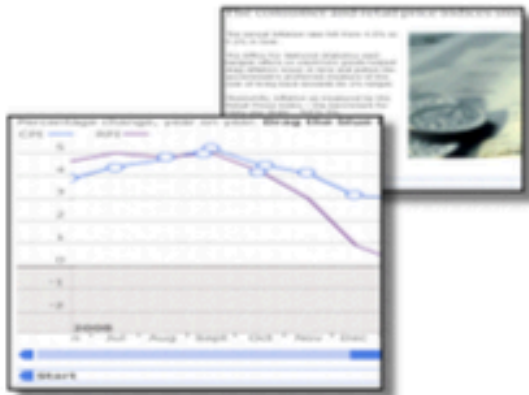
Film/Video/Animation

(a) Number of frames

(b) Ordering of visual elements

Genres + Interactivity + Messaging

STORYTELLING	Author Driven	Reader Driven	ASK QUESTIONS
CLARITY	strong ordering	weak ordering	EXPLORE
SPEED	heavy messaging	light messaging	FIND
	limited interactivity	free interactivity	



martini glass



interactive slideshow



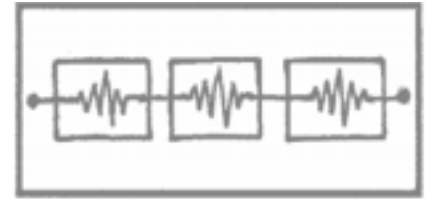
drill-down story

Martini Glass approach



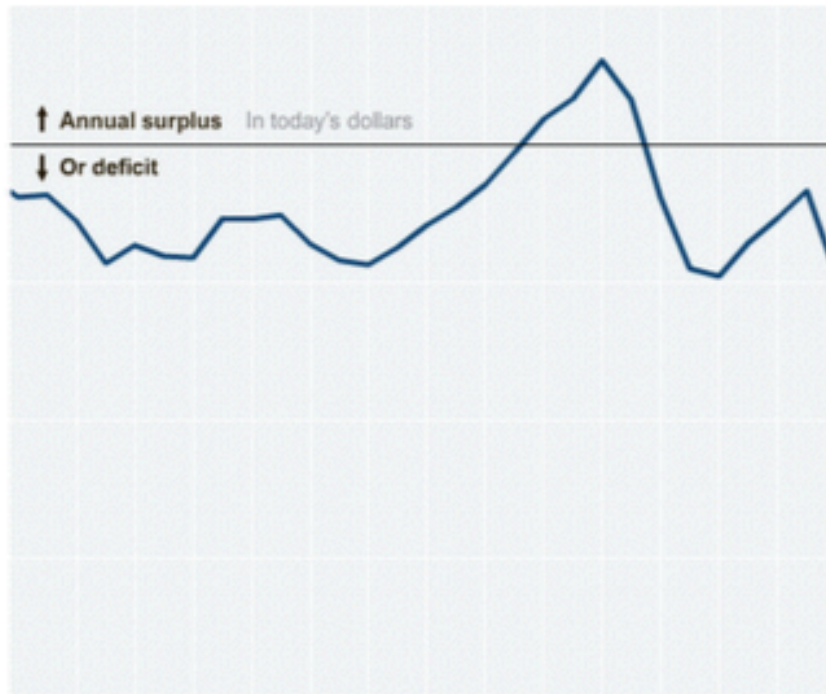
- Strongly Author-driven
 - First author narrative
 - Then reader may explore
- Different levels
 - Authoring
 - Short or long stem
 - Wide or narrow reader exploration

Interactive Slideshow



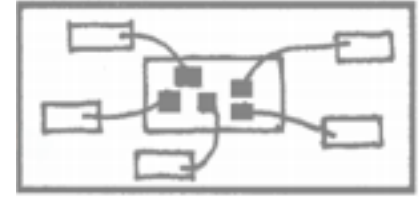
Compared With Reality

How accurate have past White House budget forecasts been?



- Slideshow with mid-narrative interactions confined in each slide
- A single slide may be organized as a Martini Glass style
- Efficient for complex data and narrative
 - Complex data: author may guide reader to different dimensions of data
 - Complex narrative: author may draw discrete boundaries

Drill Down Story



The Major North Korean Prison Camps

Political prison camps for more than 50 years, twice as long as the Gulag in the former Soviet Union. People imprisoned are forced to do slave labor in the camps, which hold an estimated 200,000 prisoners. North Korea's camps don't exist, but high-resolution satellite images show otherwise.

Click markers below for more information on each site.



- Presents a general theme and allows to explore particular instances
- More emphasis to the reader
- Author should select which interactions are possible and which explorations are feasible



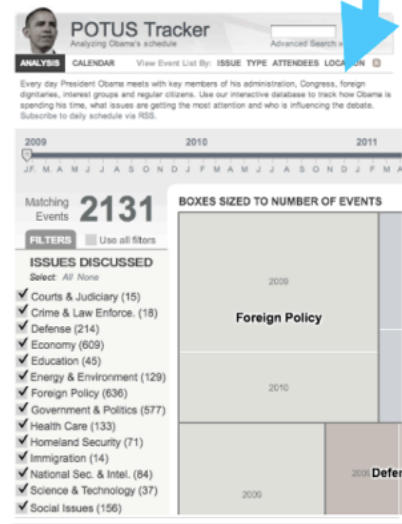
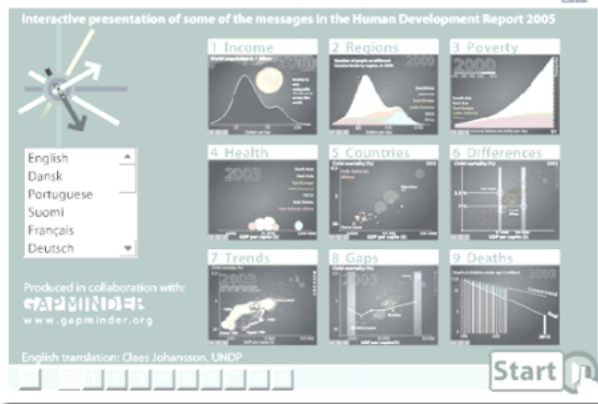
VISUAL DESIGN

Make it clear where to start. Don't let readers defect.



where?

Human Development Trends 2005



755

Steroids or Not, the Pursuit Is On

Barry Bonds is taking aim at the career home run record. He needs only six more to tie Babe Ruth and 47 to equal Hank Aaron.



Lines are cumulative home runs.

Hank Aaron
755 homers
23 seasons



Babe Ruth
714 homers
22 seasons



Barry Bonds
708 homers
20 seasons

Bonds takes lead
Home runs
after 19 seasons:
Bonds 567
Aaron 554
Ruth 516

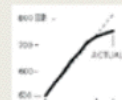
According to allegations in a book about steroids, he began taking steroids before the 1999 season, hit 47 in the league. Two seasons later, he hit 73 home runs, surpassing Aaron's career pace.

Homer Pace After Age 34

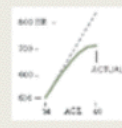
If the accusations are correct, Bonds was 34 in his first season on steroids. Here are projected home run paces for each player after age 34.

----- PROJECTED PACE BASED ON AVERAGE OF PREVIOUS FIVE SEASONS

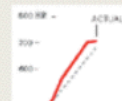
Aaron
Actual homers slightly outpace projected homers for five seasons.



Ruth
Averaged 46.4 homers a season from age 30 to 34. Averaged 42.5 for next four seasons.



Bonds
From age 25 to 39, he averaged 14 more homers a season than projected.

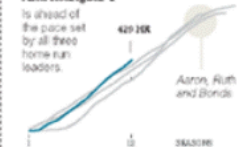


Note: Ages as of July 1 of each season.

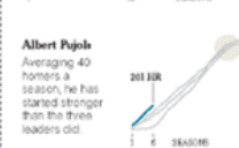
Others Taking Aim



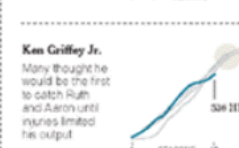
Alex Rodriguez
Is ahead of the pace set by all three home run leaders.



Albert Pujols
Averaging 40 homers a season, he has started stronger than the three leaders did.



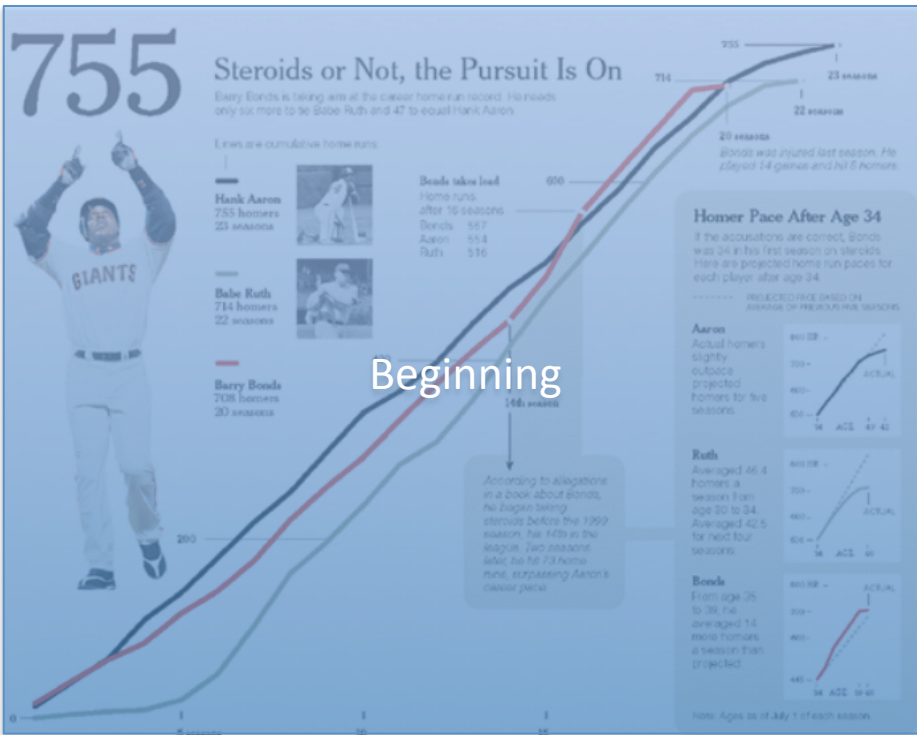
Ken Griffey Jr.
Many thought he would be the first to catch Ruth and Aaron until injuries limited his output.



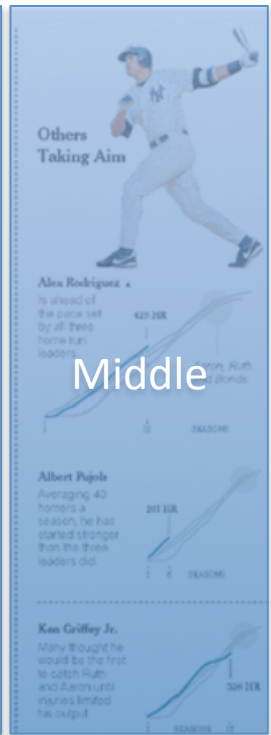
Differing Paths to the Top of the Charts

The top seven players on the career home run list, along with a look at Griffey (12th), Rodriguez (27th) and Pujols (54th 257th).





Beginning



Middle



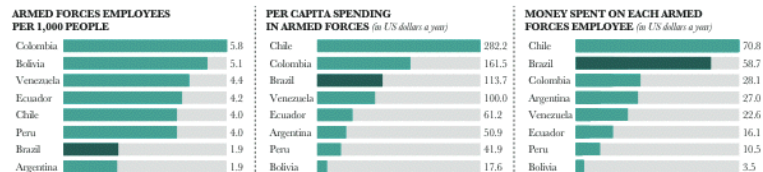
THE DEFENSE OF THE NEIGHBORS

An overview of the armed forces of countries around Brazil

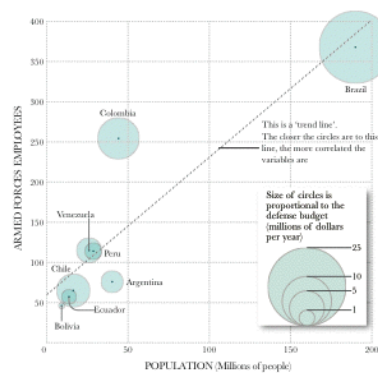
Brazil has the strongest armed forces in South America in absolute terms—



—but not in relative terms



A different look at the data



Future investments



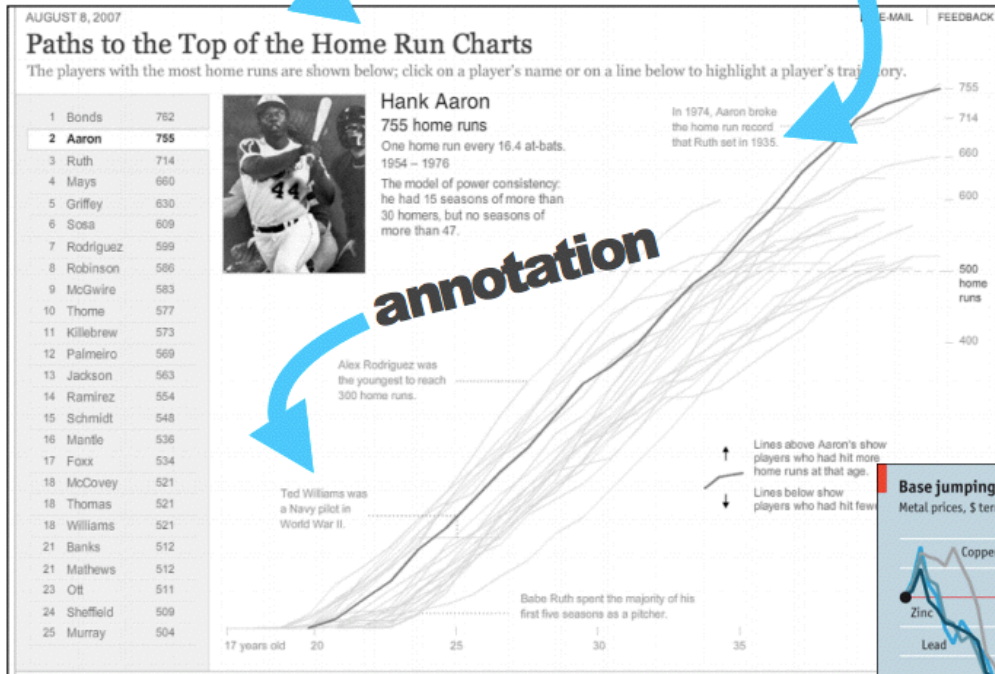


MESSAGING

headline

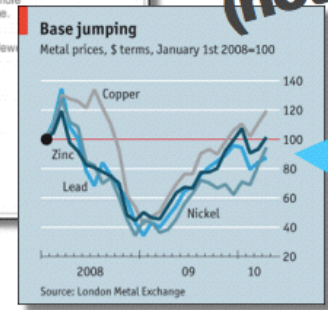
caption

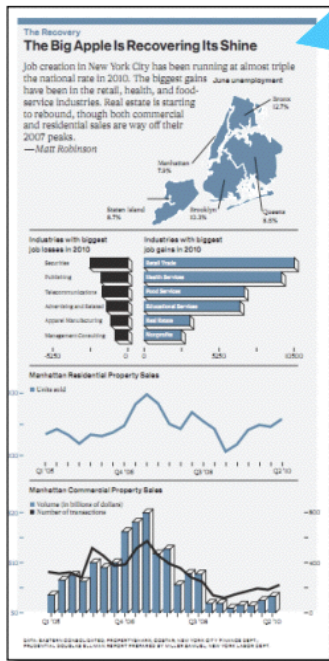
Use headlines, captions, & annotations. Quickly draw attention to what's important.



annotation

(nothing)





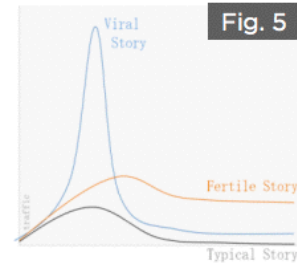
June 20, 2011

isolated

Weave text into the graphic—not just at the beginning. Text and graphics work better together than apart.

Connect the text to the relevant graphics. See Fig. 5

quite significantly more work than traditional news. To make this more economical, visualizations need to be tied to stories that are either *persistent* or *viral* in order to generate traffic. *Persistent stories* cover thematic themes that maintain relevance over time (e.g., crisis, food economics, the housing market). *Viral stories* are "fatter and longer" than typical news, and these visualizations receive heavy traffic over several months and years. These stories tend to focus on celebrity, personalities, or sensational news. To get the most out of the buck, produce visualizations for editorial content that is either *persistent* or *viral*.



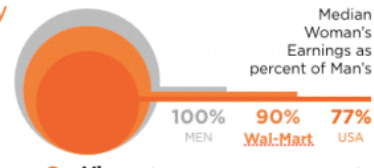
integrated

1.5 million women sued **Wal-Mart** for discriminatory pay & promotion practices, using mostly statistics to make their case.



Women were paid less than men in every region, even when they had higher ratings and seniority.

But **Wal-Mart's** numbers showed their women fared better than elsewhere in the country.



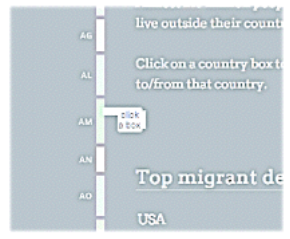
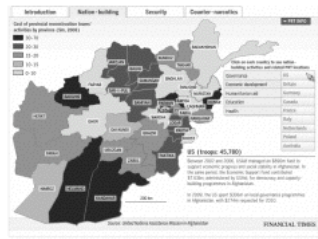
OurView The Supreme Court was right.



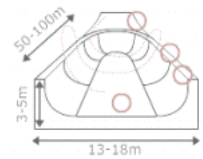
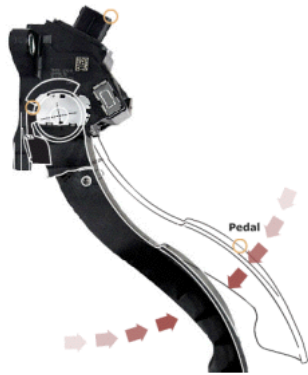
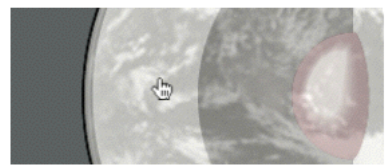
INTERACTIVITY

Interactive features should scream interactivity. Avoid a click-and-seek experience.

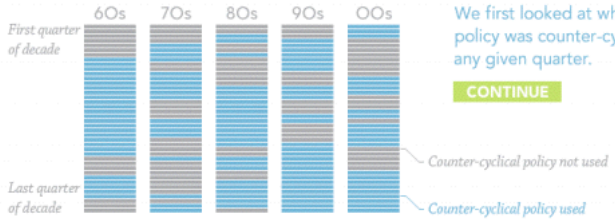
Be explicit.



suggested actions

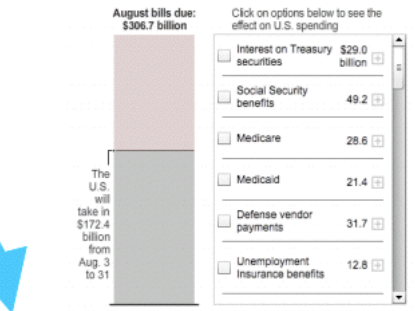


visual cues



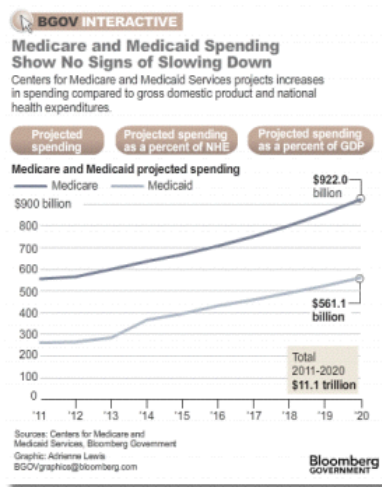
Source: Bloomberg

We first looked at whether policy was counter-cyclical in any given quarter.

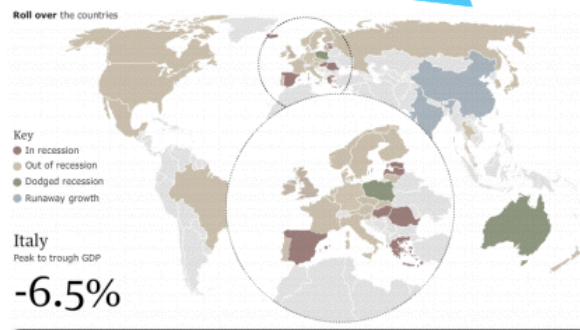
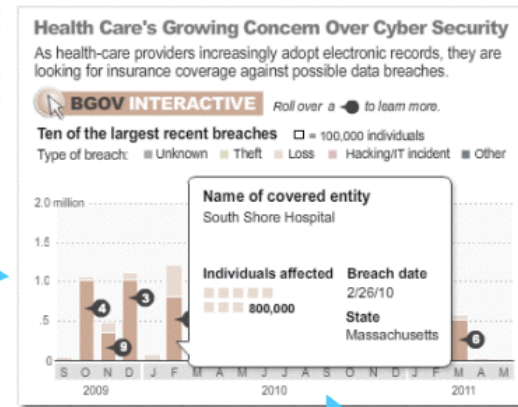


familiar widgets

Linked Displays - Brushing



Interactive features should react to the user. Depress buttons, highlight items, animate widgets.



Don't obscure data. Avoid letting pop-ups obscure data.

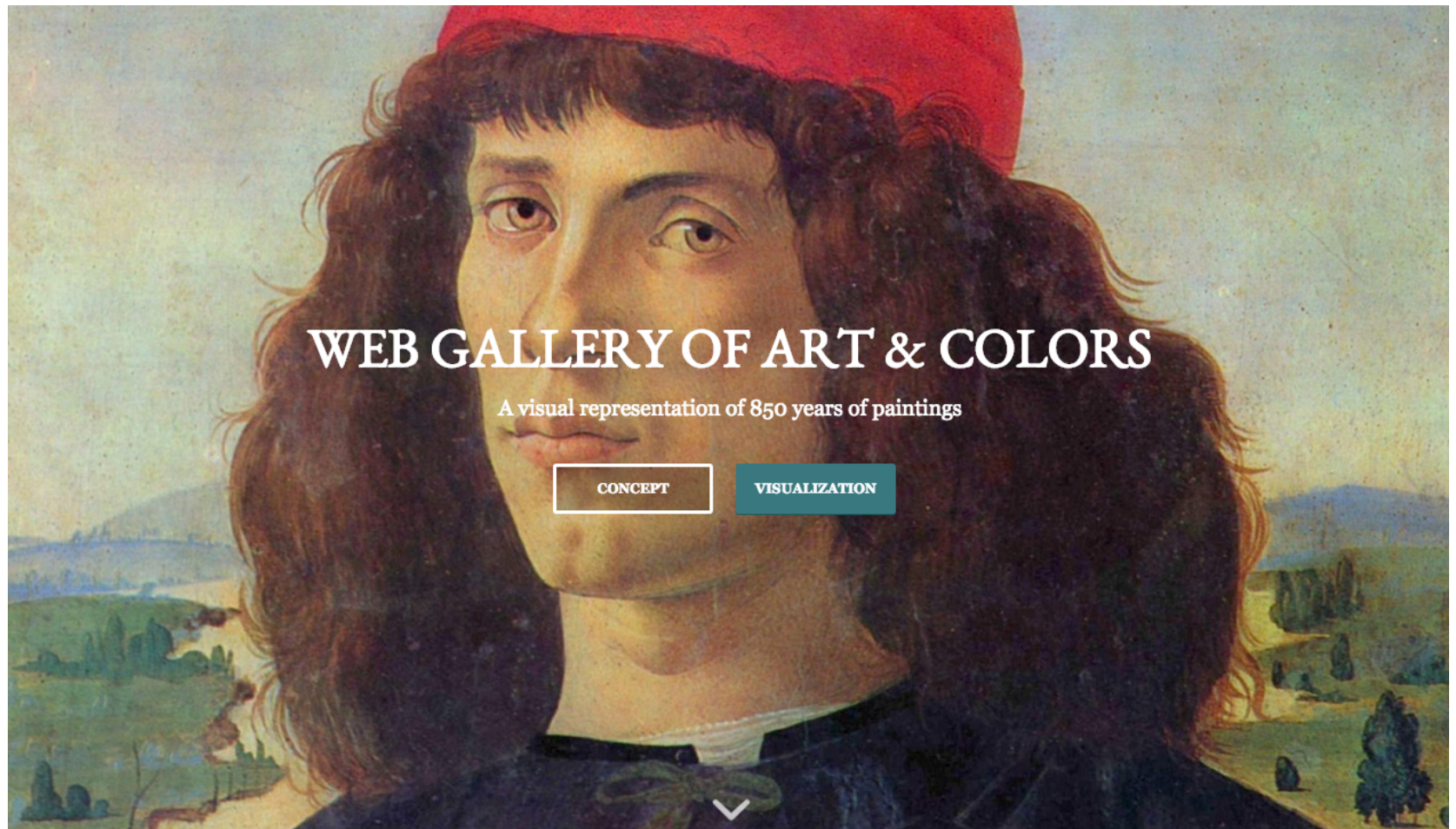


Example - Crossfilter.js



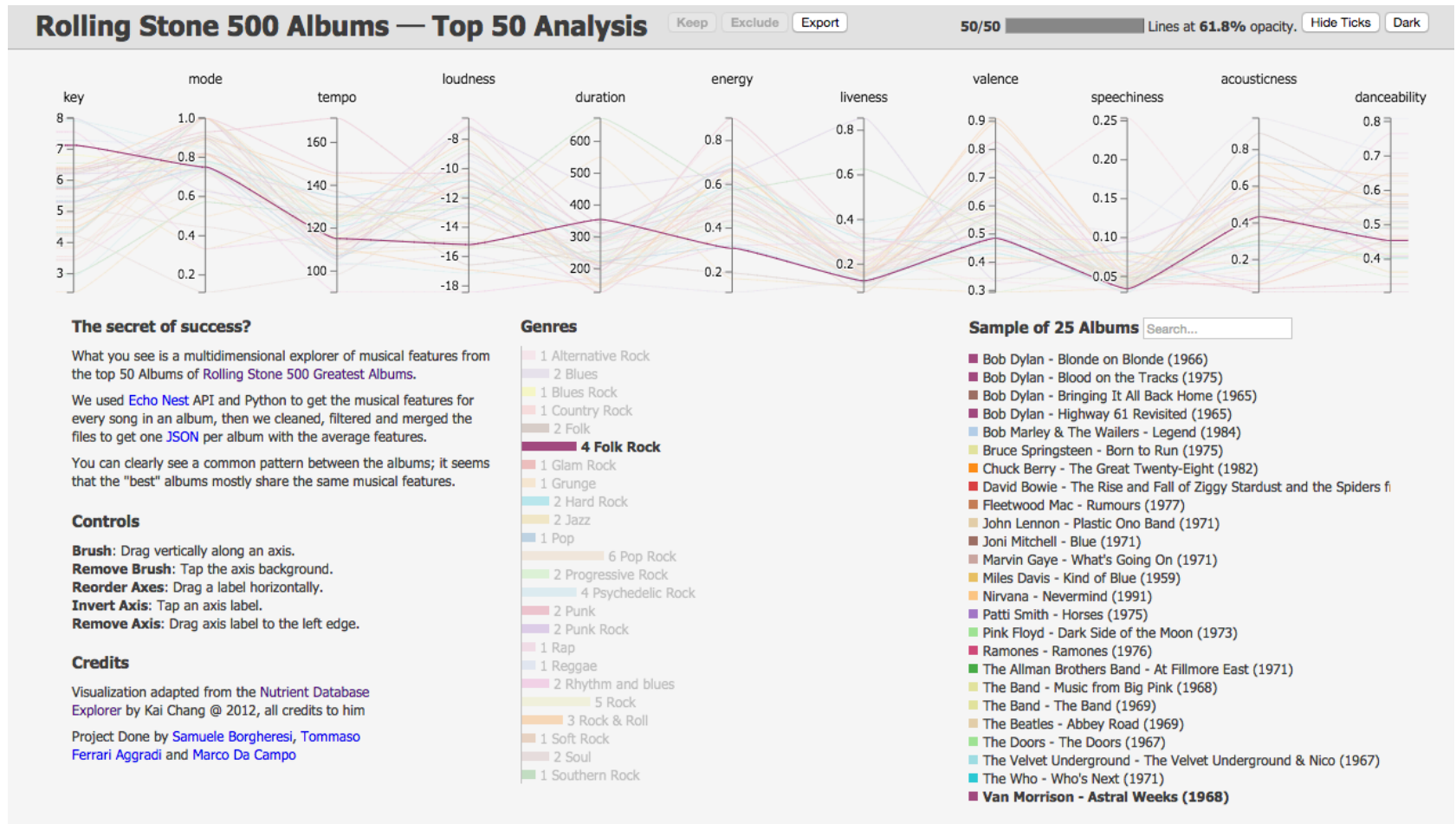
EXAMPLES

Art and Colors



<http://sobigdata.danielefadda.com/>

Rolling Stone 500 Albums



Social Network dei Migranti



<http://migranti.danielefadda.com/>