

Storytelling with InfoVis



CS 7450 - Information Visualization
September 30, 2015
John Stasko

Purpose

Review



- Two main uses of infovis
 - Analysis – Understand your data better and act upon that understanding
 - Presentation – Communicate and inform others more effectively
- Today we look at that second one more

Telling Stories



- Data visualization can help to communicate ideas, summarize, influence, unite, explain, persuade
- Visuals can serve as evidence or support

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A Famous Example



The screenshot shows the TED website interface for a talk by Hans Rosling. The title is "Hans Rosling shows the best stats you've ever seen". The video player shows a man speaking with a "gapm" logo in the background. The page includes navigation links, a search bar, and a sidebar with "About this talk" and "What to watch next" sections.

Hans Rosling
Gapminder

2006

http://www.ted.com/index.php/talks/hans_rosling_shows_the_best_stats_you_ve_ever_seen.html

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They Had Him Back



The screenshot shows the TED website interface. At the top, there's a navigation bar with 'TED Ideas worth spreading' and a search bar. Below that, there's a 'TALKS' section with the title 'Hans Rosling's new insights on poverty'. The main content area features a video player with a play button and a 'Share' button. To the right of the video, there's an 'About this talk' section with a description of the talk and an 'About Hans Rosling' section. Below the video, there are social media sharing options and a 'Discuss this Talk' section.

2007

http://www.ted.com/index.php/talks/hans_rosling_reveals_new_insights_on_poverty.html

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Discuss



- Why has this had such a big impact?

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InfoGraphics



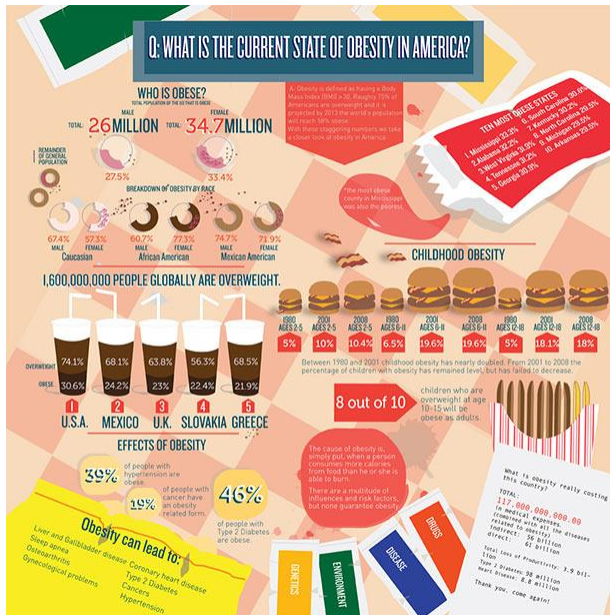
- See them everywhere today
- Perhaps a good example of infovis for presentation purposes
 - Typically not interactive though

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<http://thedinformatics.com/2011/11/16/obesity-in-america-facts-statistics-and-lies/>

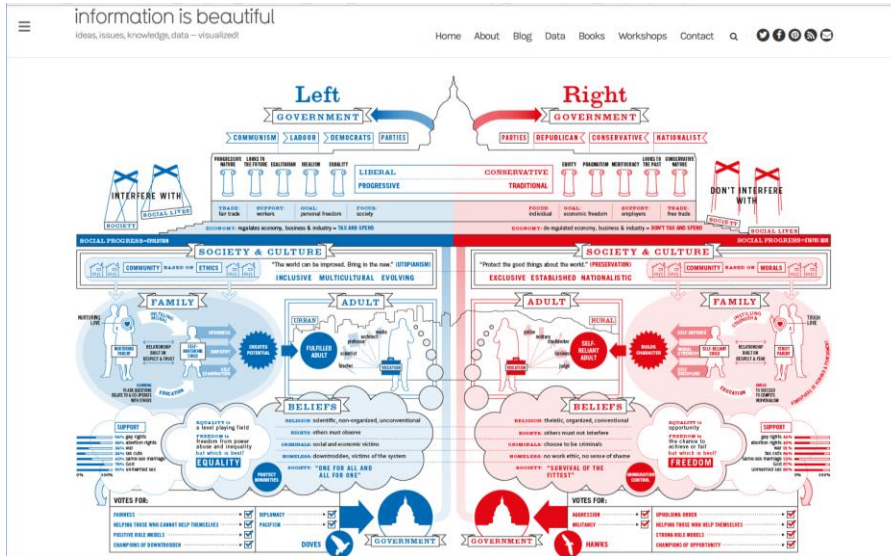


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<http://www.informationisbeautiful.net/visualizations/left-vs-right-us/>

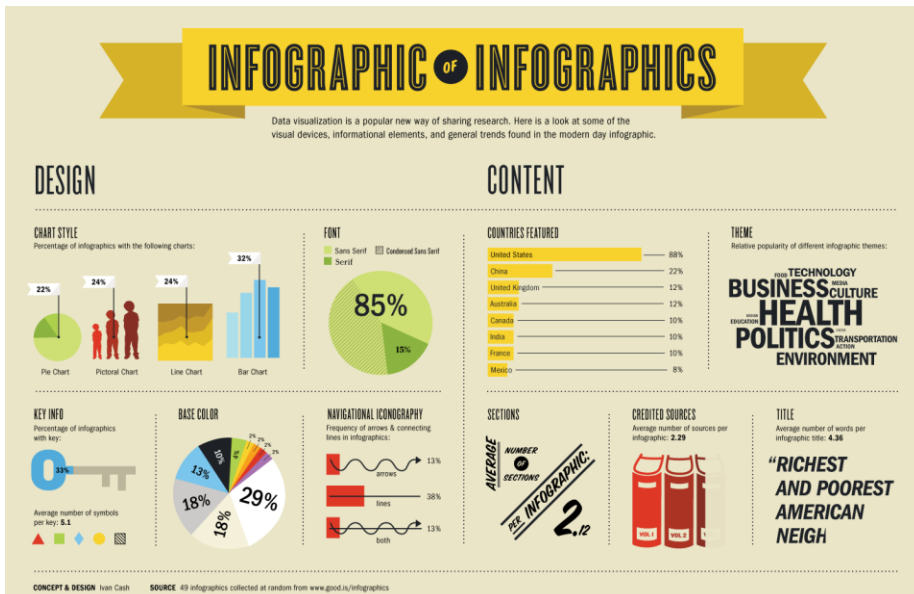


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<http://www.wired.com/2012/07/you-suck-at-infographics>



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A Lead Paper

Segel & Heer
TVCG (InfoVis) '10



- Studied storytelling: Described topics as “Narrative Visualization”
 - How does this differ from traditional forms of storytelling
 - Reviews the design space
 - Characterizes genres
 - Describes a framework

IEEE TRANSACTIONS ON VISUALIZATION AND COMPUTER GRAPHICS, VOL. 16, NO. 6, NOVEMBER/DECEMBER 2010 1119

Narrative Visualization: Telling Stories with Data

Edward Segel and Jeffrey Heer

Abstract—Data visualization is regularly provided for its ability to reveal stories within data, yet these “data stories” often in important ways from traditional forms of providing. Characters, especially unique personalities, have increasingly been integrating visualization into their narratives. In some cases allowing the visualization to function in place of a written story. In this paper, we systematically review the design space of this emerging form of visualization. Drawing on case studies from news media to visualization research, we identify distinct genres of narrative visualization. We characterize these design differences, together with interactivity and navigation, in terms of the factors behind the narrative flow provided by the author, the impact of graphical elements, and the methods used either directly or in the past to the reader (often through interactive exploration). Our research suggests design strategies for narrative visualization, including prioritizing under-explored approaches to personalization, storytelling and educational media.

1 INTRODUCTION

In recent years, many have commented on the storytelling potential of data visualization. News organizations including the New York Times, Washington Post, and the Guardian regularly incorporate dynamic graphics into their journalism. Politicians, activists, and interest groups use interactive visualizations as a backdrop for their public and political health and economic (1) and scientific media (2). A case feature in The Economist (3) explores the possibilities of digital data and visualizations designed for “making the world of computer science, statistics, artistic design and user-relevant.”

Data visualizations have long been used to support storytelling, usually in the form of diagrams and charts embedded in a larger body of text. In this format, the text conveys the story, and the image typically provides supporting evidence or critical details. An emerging class of visualizations attempts to combine narratives with interactive graphics. Specifically, especially online, journalists are increasingly integrating complex visualizations into their narratives.

Crafting successful “data stories” requires a diverse set of skills. Goodrich and Page (12) note that effective story telling “requires skills like those familiar to movie directors, broadcast journalists, expert knowledge of computer programming, and science.” While techniques

In this paper, we investigate the design of narrative visualizations and identify techniques for telling stories with data graphics. We take an empirical approach, analyzing visualizations from online journalism, blogs, instructional videos, and visualization research. After reviewing related work, we define the design space of narrative visualization through design strategy and taxonomy of design approaches. We then formulate a design space constructed from an analysis of 58 examples. The analytical taxonomy characterizes dimensions of visual storytelling, including how graphical techniques and interactivity can combine various narrative structures and narrative flow. We describe several genres of narrative visualization: magazine style, annotated chart, personalized games, flow charts, comic strip, slide shows, and videos. These genres can be combined with interactivity and messaging to produce varying balances of author-driven and reader-driven experiences. Finally, we discuss the implications of our framework, noting emerging design strategies, promising yet under-explored approaches to integrating visualization with other media, and the potential for improved user navigation, personalization, and educational applications. We conclude with a taxonomy of narrative visualizations, the implications from the literature to the cognitive and emotional experience of the reader. We discuss the significance of these elements, however, and describe the

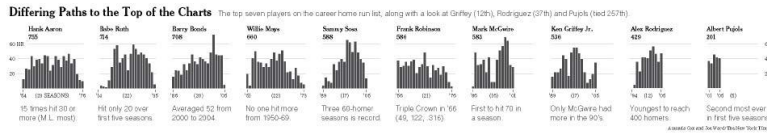
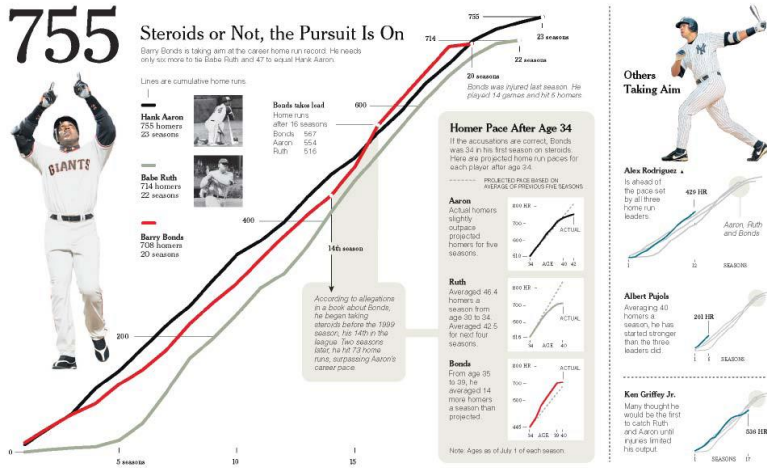
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Case Studies

NY Times 2006



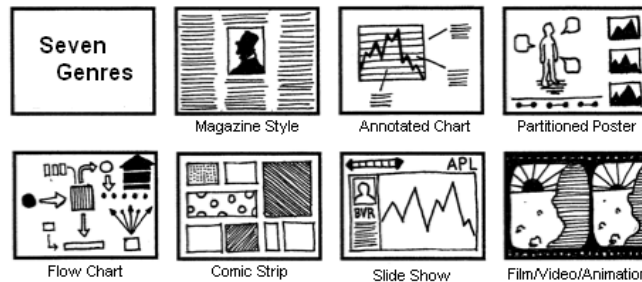
12

Design Space Dimensions



- Genre (next slide)
- Visual Narrative Tactics
 - Visual structuring
 - Highlighting
 - Transition Guidance
- Narrative Structure (non-visual mechanisms to assist narrative)
 - Ordering
 - Interactivity
 - Messaging

Genres



Observations



- Clusters of different ordering structures
- Consistency of interaction design
- Under-utilization of narrative messaging

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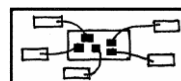
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Approach



- Author-driven vs. reader-driven
- Common patterns
 - Martini glass
 - Interactive slideshow
 - Drill-down story



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Follow-on work



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<http://datadrivenjournalism.net>

Journalism Angle



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Data Journalism Handbook



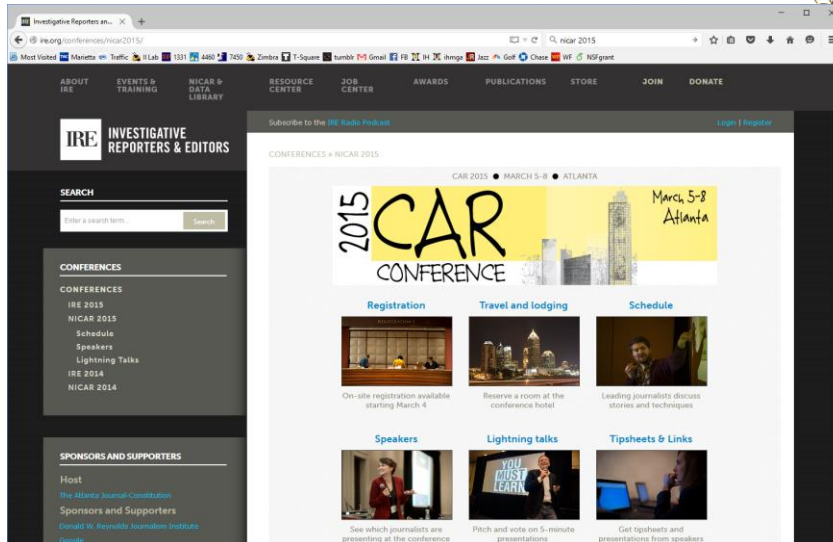
<http://datajournalismhandbook.org/1.0/en/>

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Computer-Assisted Reporting

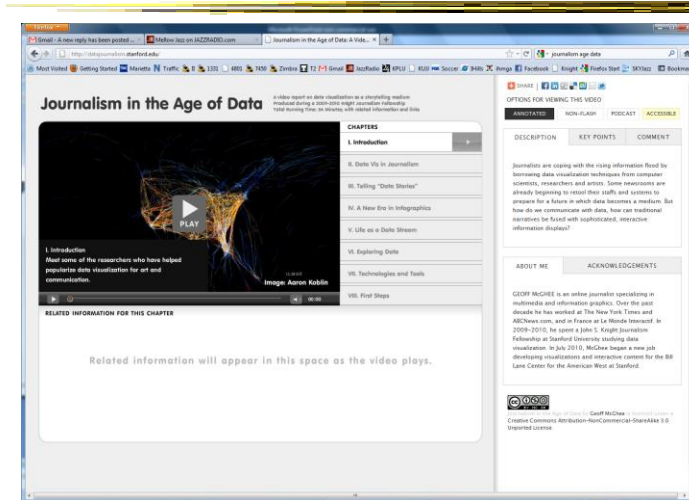


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Journalism in the Age of Data



<http://datajournalism.stanford.edu/>

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Some Examples



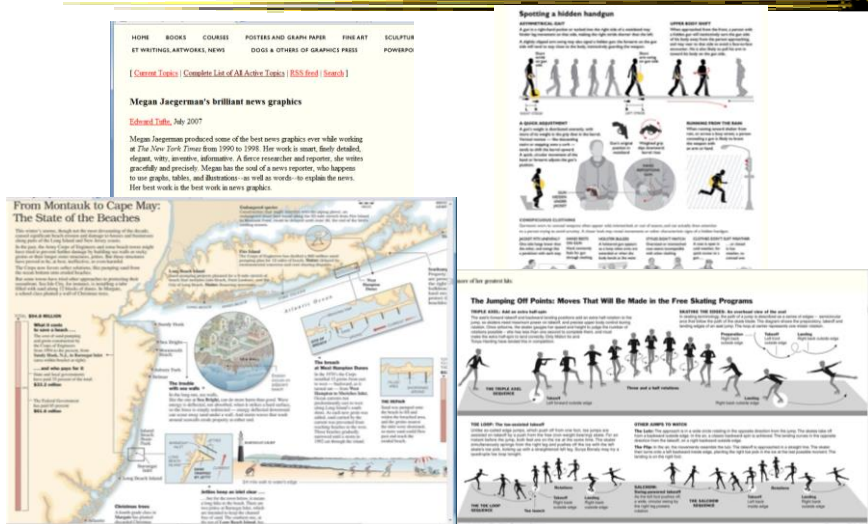
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News Stories

Tufte praises the work of Megan Jaegerman at NY Times



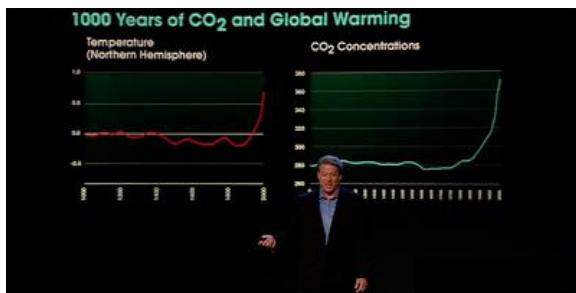
http://www.edwardtufte.com/bboard/q-and-a-fetch-msg?msg_id=0002w4

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Films



An Inconvenient Truth

Gore made extensive use of data graphics

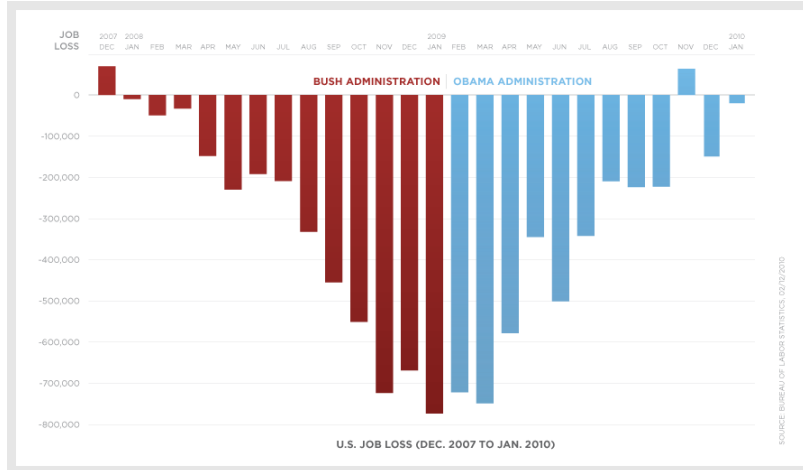


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Infographics (with a message)



Controversial, see <http://soquelbythecreek.blogspot.com/2010/02/what-does-obama-job-chart-really-mean.html>

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<http://www.nytimes.com/interactive/2010/06/29/magazine/rivera-pitches.html?ref=multimedia>

The New York Times Magazine

Published: June 29, 2010

How Mariano Rivera Dominates Hitters

The closer has confounded hitters with mostly one pitch: his signature cutter. [Related Article >](#)

By GRAHAM ROBERTS, SHAN CARTER and JOE WARD | [Send Feedback](#)

Sources: Major League Baseball, New York University Movement Lab, Complete Game Consulting

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[SIGN IN TO E-MAIL](#)
[SHARE](#)

MOST POPULAR - MAGAZINE

1. Food: Coffer's Slow Dance
2. Shaken-Baby Syndrome Faces New Questions in Court
3. Unhappy Meals
4. Recipes: Yuzu Chiffon Cake
5. The Medium: A Prescription for Fear
6. How Hef Got His Groove Back
7. A Plan for Peace That Still Could Be

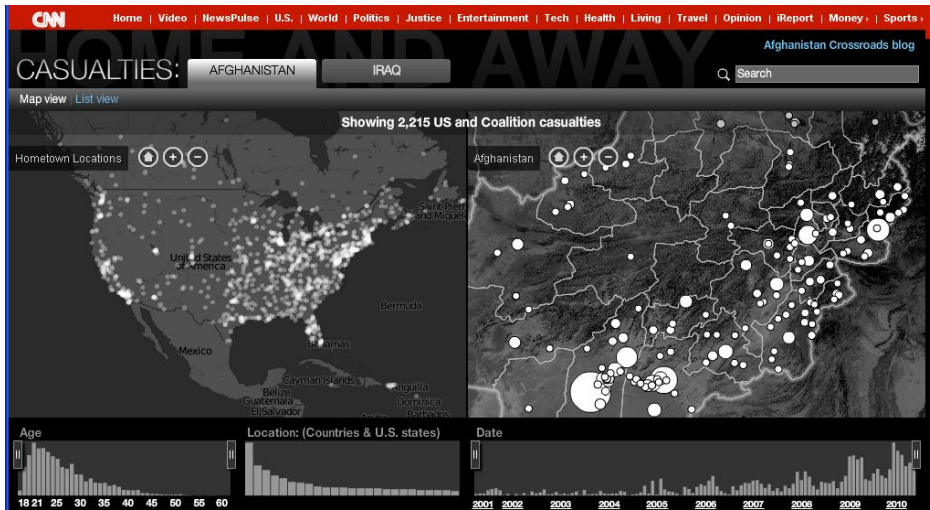


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<http://www.cnn.com/homeandaway>



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<http://www.bloomberg.com/graphics/2015-whats-warming-the-world/>



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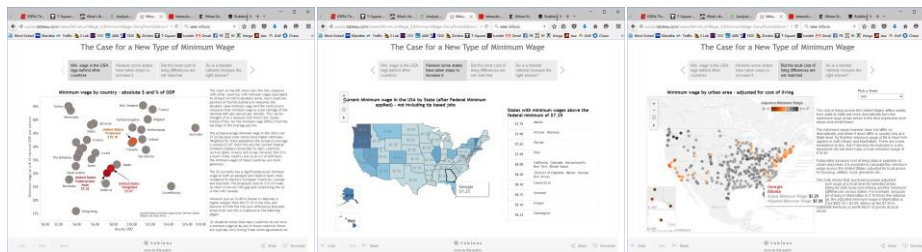
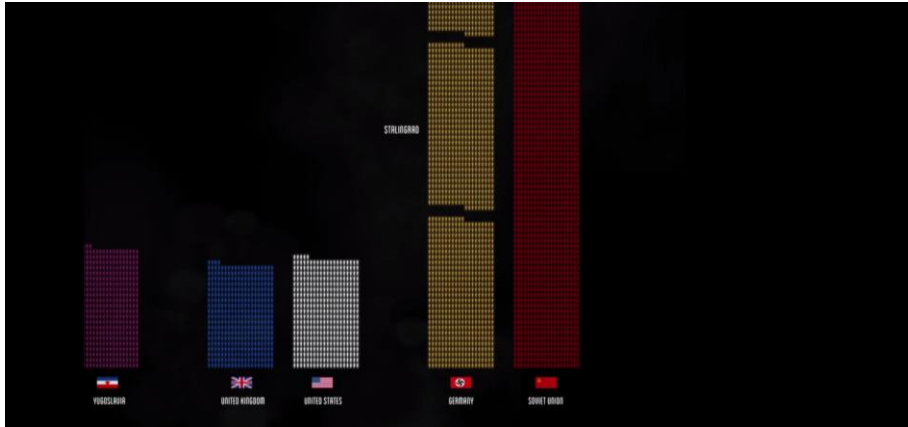
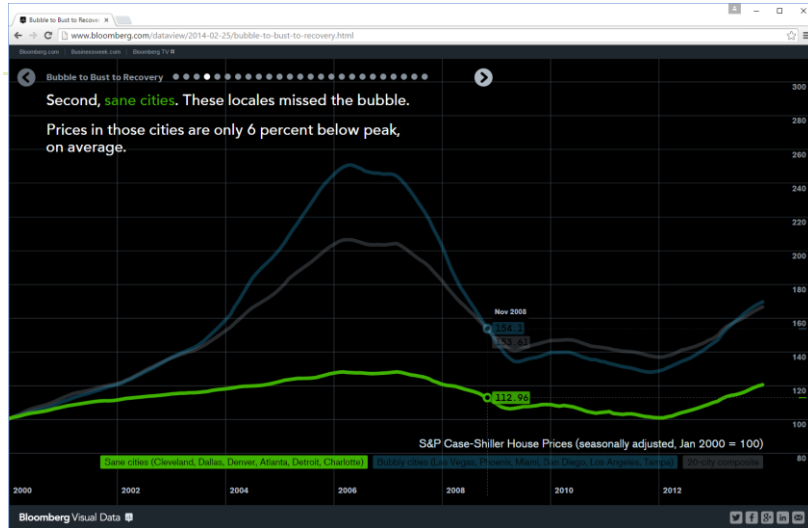


Tableau StoryPoints

Textual narrative, slides with titles as breadcrumbs, element highlighting, and textual annotation on the chart

<http://www.bloomberg.com/dataview/2014-02-25/bubble-to-bust-to-recovery.html>



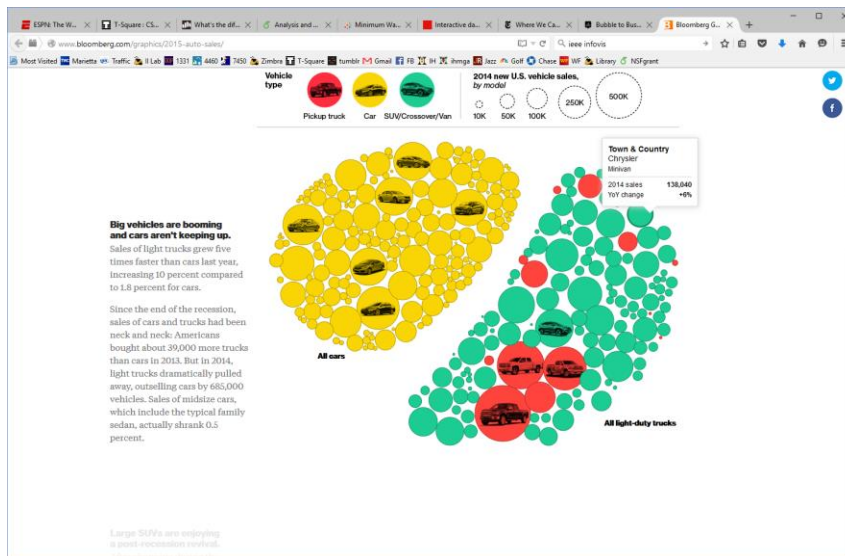
Dot breadcrumbs, interaction on charts, tooltips, ...

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<http://www.bloomberg.com/graphics/2015-auto-sales/>



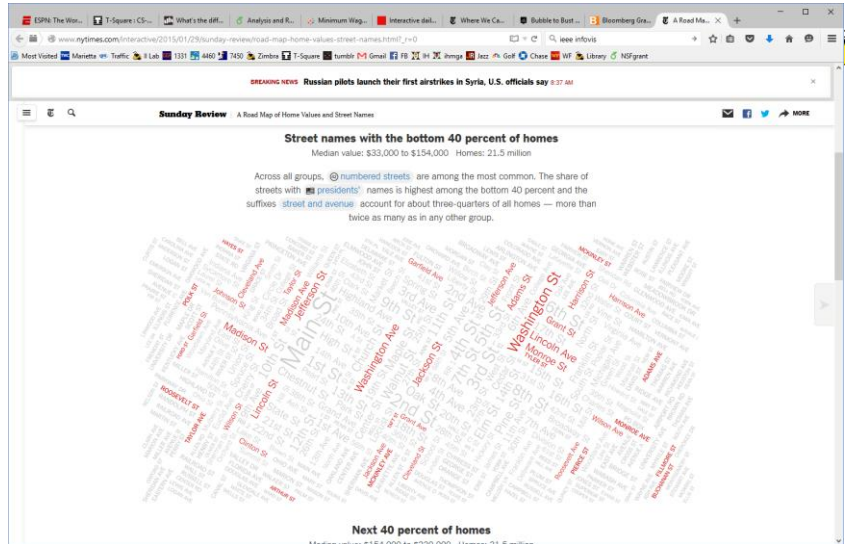
Page scroller, text annotations, rearranging glyphs

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http://www.nytimes.com/interactive/2015/01/29/sunday-review/road-map-home-values-street-names.html?_r=0



Dynamic query widget embedded in textual narrative

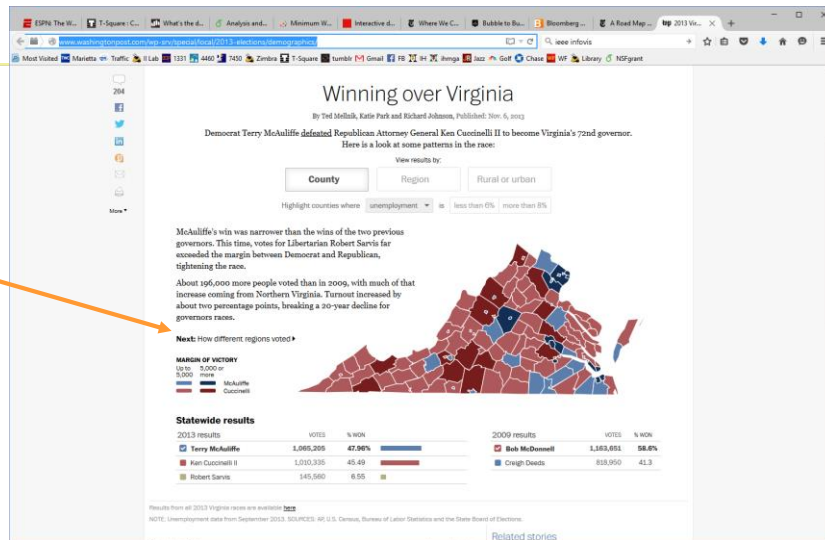
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http://www.washingtonpost.com/wp-srv/special/local/2013-elections/demographics/

Steps



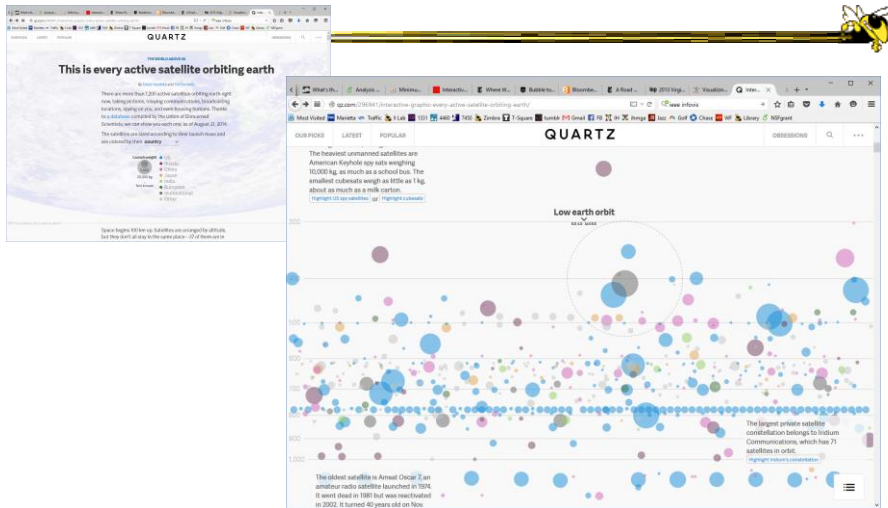
Linear steps with much interaction, comments

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<http://qz.com/296941/interactive-graphic-every-active-satellite-orbiting-earth/>



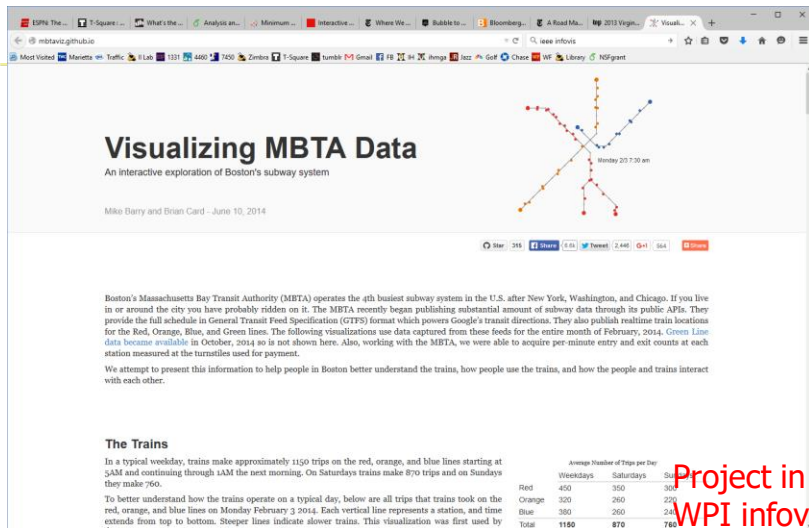
Animated interaction, tooltips, scrolling

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<http://mbtaviz.github.io/>



Project in
WPI infovis
class

Scrolling page with many visualizations, much interaction

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Even the President Goes Interactive

2011 State of Union Address

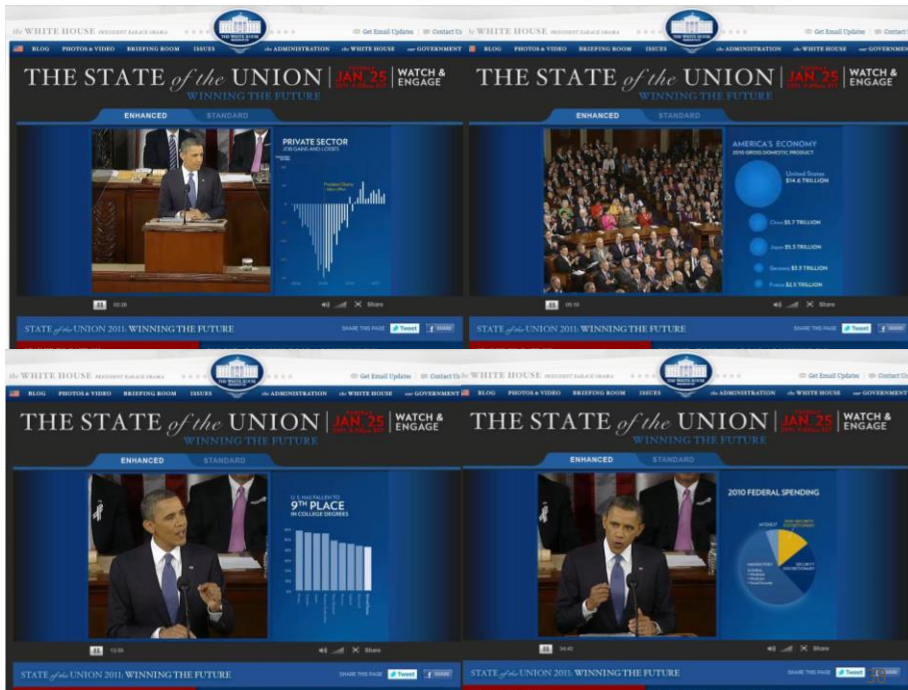


Side channel data visualizations accompanied speech

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Defined by ordered sequence of steps

Usually, but not always, told in linear fashion

Kosara & Mackinlay
Computer'13

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Storytelling Scenarios

- Self-running presentations for a large audience
- Live presentations
- Individual or small group presentations

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Research Directions



- Storytelling approaches and affordances
 - What vis affordances can help guide reader through story?
- Evaluation
 - How to measure effectiveness?
- Memory, context, & embellishments
 - What makes one memorable, and is that good?
- Interaction
 - How to allow without interfering with story?
- Annotations & highlights
 - How to balance text and visualization?
- Learning from other disciplines
 - What can we learn from journalism, choreography, directing, etc.?
- Techniques specific to storytelling
 - Which vis techniques are good matches?
- Stories & collaboration
 - How to facilitate more collaboration?

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Data Matters



The screenshot shows the TED website interface. At the top, there's a navigation menu with 'TED Ideas worth spreading' and links for 'Themes', 'Speakers', 'Talks', and 'Translations'. Below the menu, the main content area features a video player for 'David McCandless: The beauty of data visualization'. The video player shows a man on stage with a large 'TED' logo in the background. To the right of the video player, there's a section titled 'About this talk' with a link to 'Open interactive transcript'. Below that, there's a section titled 'About David McCandless' with a brief description of his work. At the bottom of the page, there's a 'What to watch next' section with a recommendation for 'TED2010 Gary Flake: Is Pivot a turning...'

David
McCandless

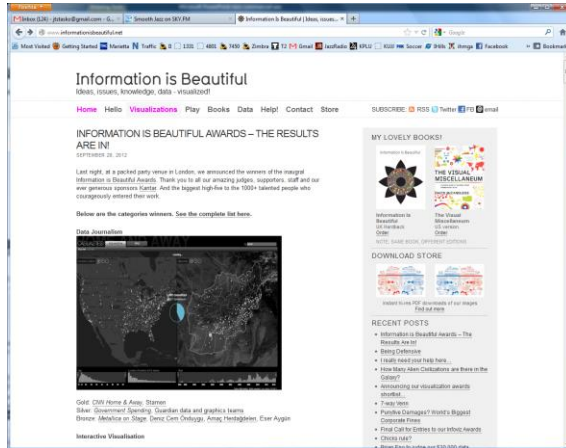
http://www.ted.com/talks/david_mccandless_the_beauty_of_data_visualization.html

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McCandless Website



<http://www.informationisbeautiful.net/>

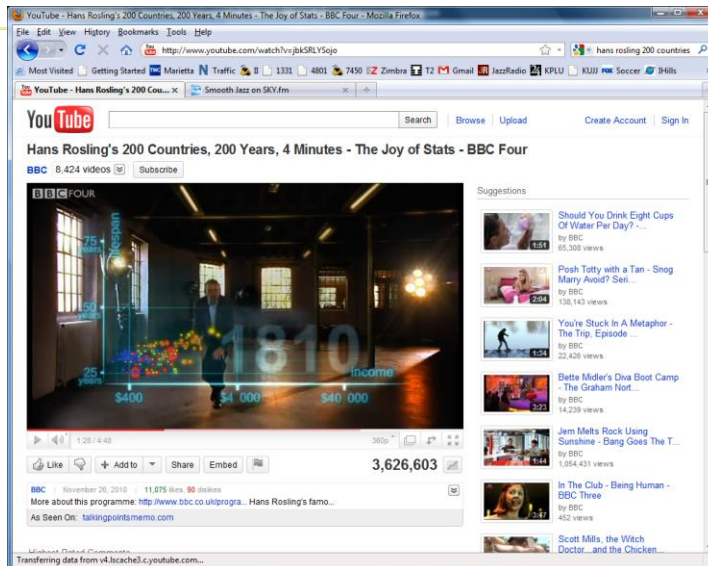
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<http://www.youtube.com/watch?v=jbkSRLYSojo>

Back to Where We Started

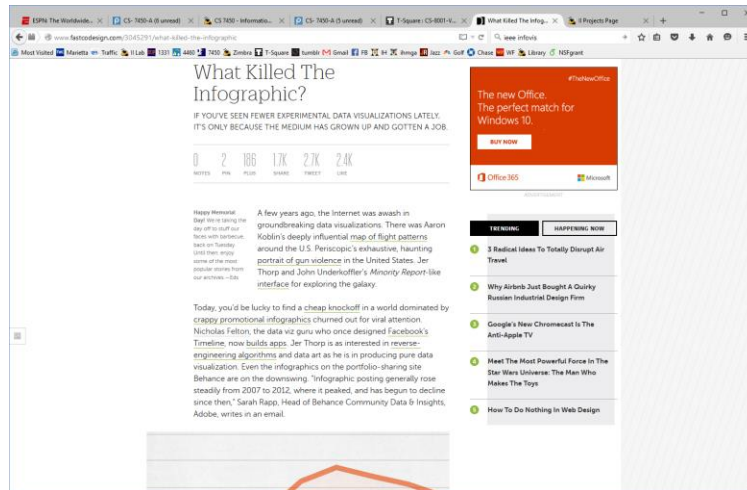


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Changing Trends



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Questions



- How do these types of visualizations differ from “traditional” infovis?

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Questions



- Would you characterize all of these as information visualizations?
 - Consider some of the different examples

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My Reflections



- InfoVis for analysis and presentation are different
 - Apples & oranges (both fruit though)
- How?

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Resources



The screenshot shows a web browser displaying a blog post on the Juicebox website. The page title is "Data Storytelling: The Ultimate Collection of Resources" by Zach Genigron, dated April 19, 2013. The post features a diagram titled "Ocean of the Stream of Stories" which is a complex network of lines and nodes. The text discusses the concept of "data storytelling" and its evolution, referencing Edward Tufte's "Visual Explanations" and Salman Rushdie's "Ocean of the Streams of Story". A list of bullet points is provided at the end of the main text, and a sidebar on the right contains sections for "Featured Design Principles", "Recent Posts", and "The Last Mile of Business Intelligence (Revisited)".

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HW 3



- Scores in t-square
 - Design ones handed back now

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HW 4



- Commercial systems review
 - Any questions?
- Due next Weds Oct 9
 - Bring two copies

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Poster Session Monday



- Not looking for fancy, professional posters
 - Show us your design ideas
 - Variety & creativity

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Upcoming



- Poster session
- Casual InfoVis
 - Reading:
Pousman et al '07
- Fall Break
- Tufte's Principles