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CHANGE THE WORLD FROM HERE

Terminology

What is Data Visualization?

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Terminology

- Data Visualization
- Scientific Visualization
- Information Visualization
- Statistical Graphics
- Visual Analytics
- Information Dashboards
- Infographics
- Informative Art

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Terminology

- **Differences between terms are often fuzzy**
  - Information visualization *versus* infographics
- **Differences between terms are sometimes highly contested**
  - Information visualization *versus* statistical graphics
- **Differences between terms often come down to 2 aspects**
  - Type of data being visualized
  - Why data is being visualized

http://andrewgelman.com/2011/07/22/information-visualization-vs-statistical-graphics/

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Data Visualization

- **Communicates non-visual data visually**
- Results should be readable and recognizable*
- Transforms raw **data** into **information**
- Subfields include **scientific visualization** and **information visualization**

* http://eagereyes.org/criticism/definition-of-visualization

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- 3D rendered image
- Example of computer graphics
- NOT an example of data visualization

http://venturebeat.com/2009/03/08/caustic-graphics-to-create-graphics-chips-with-novel-ray-tracing-technology/

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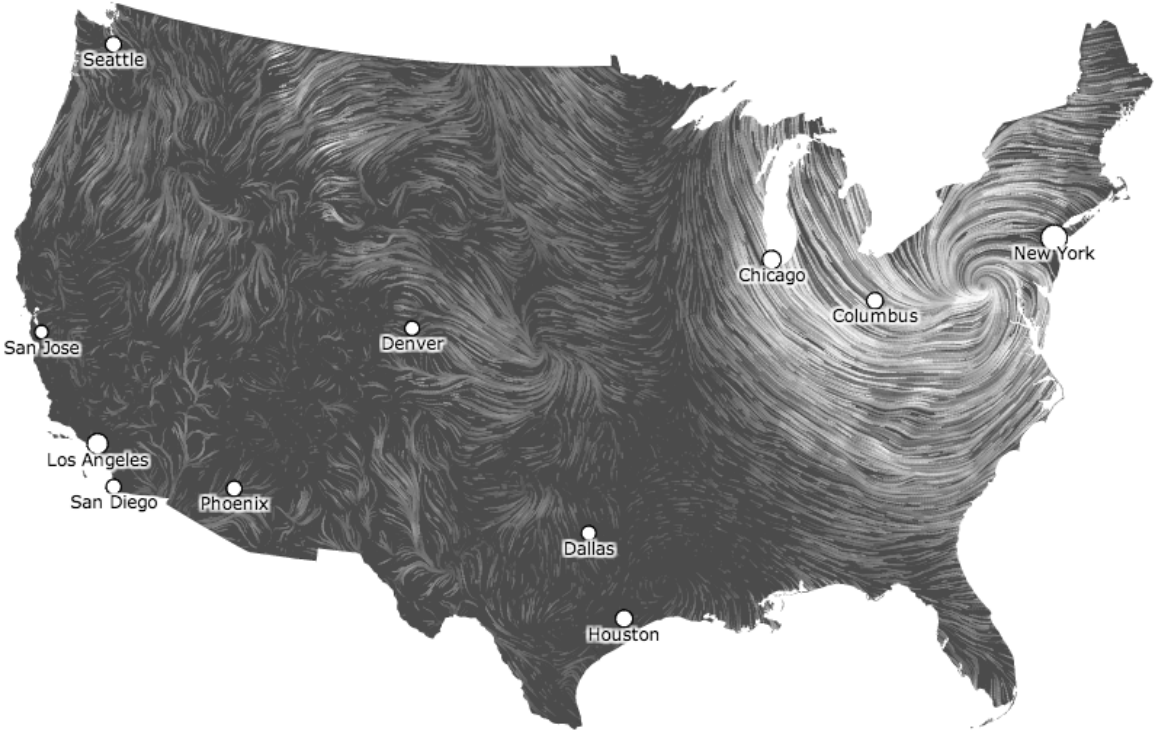

- Wind map
- Non visual data
  - Wind speed
  - Wind direction
- Displayed visually
- Example of data visualization

http://hint.fm/wind/gallery/oct-30.js.html

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Scientific Visualization

- Visualizes **scientific data** (1D, 2D, or 3D data points)
- Data often scalar or vector fields from computer simulations
- Aims to convey scientific data **accurately**
- Aims to reveal underlying **structure** in data
- Aims to encourage **exploration** of data (interactivity)

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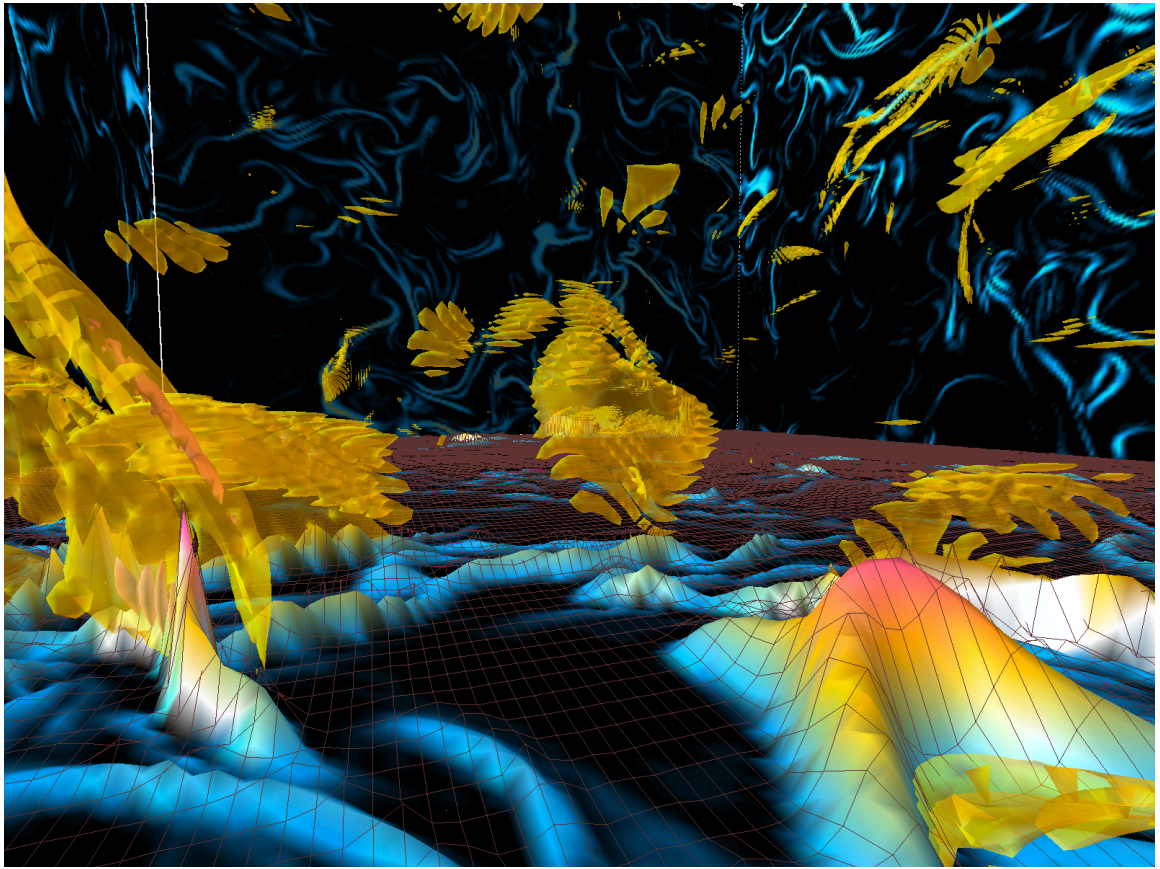

http://vis.lbl.gov/Events/SC04/Incite3/index.html

- Visualization to help understand turbulent flows
- Example of scientific visualization

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Information Visualization

- Visualizes **abstract data** (has no inherent physical form)
- Data may be numerical, categorical, temporal, geospatial, or textual/unstructured
- Aims to convey abstract data **accurately**
- Aims to reveal underlying **structure** in data
- Aims to encourage **exploration** of data (interactivity)
- Aims to display data **aesthetically**

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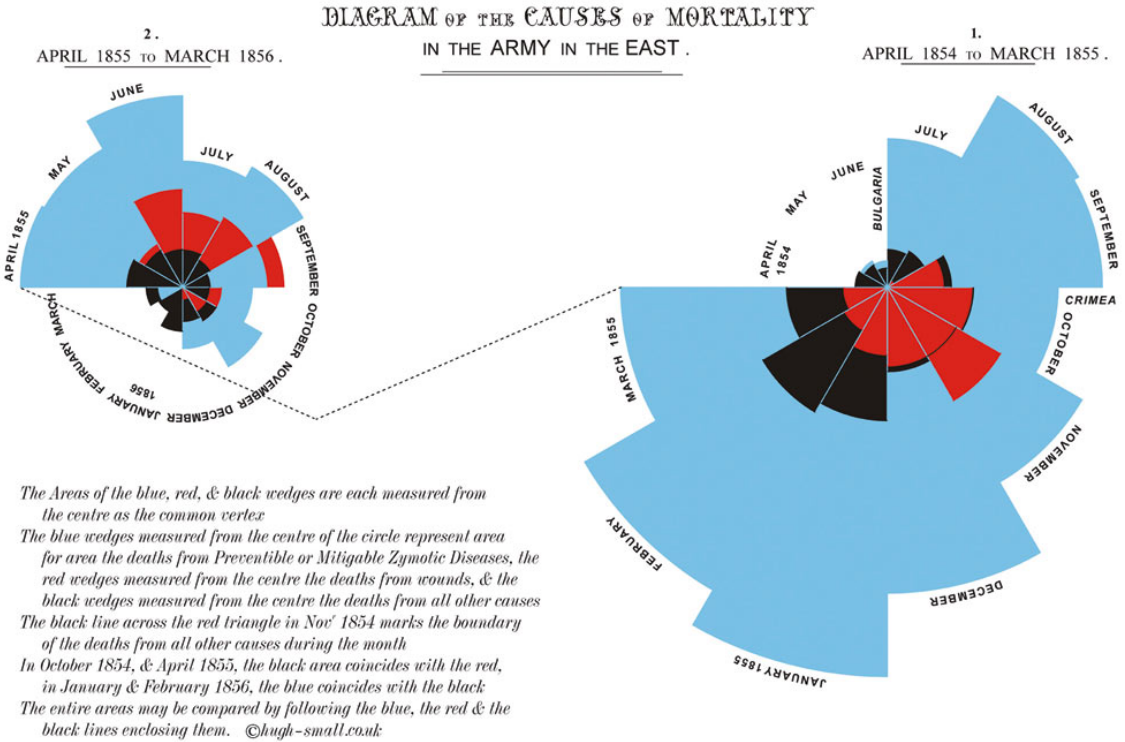

- Known as "Nightingale's Rose"
- An early example of information visualization
- Published in 1858
- Visualizes causes of deaths of soldiers during Crimean war

Created by Florence Nightingale, 1858. Image from http://www.economist.com/node/10278643 online.

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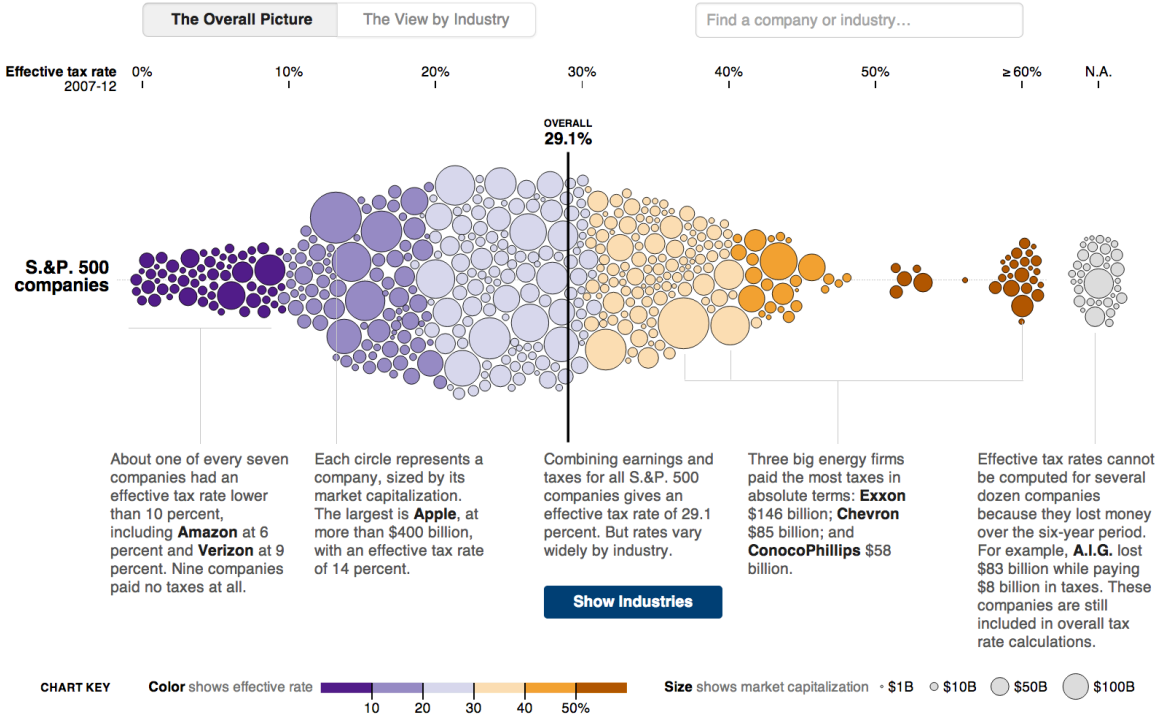

- Visualizes tax rates by industry
- Encodes multiple types of data
- Interactive
- Aesthetically pleasing

http://www.nytimes.com/interactive/2013/05/25/sunday-review/corporate-taxes.html

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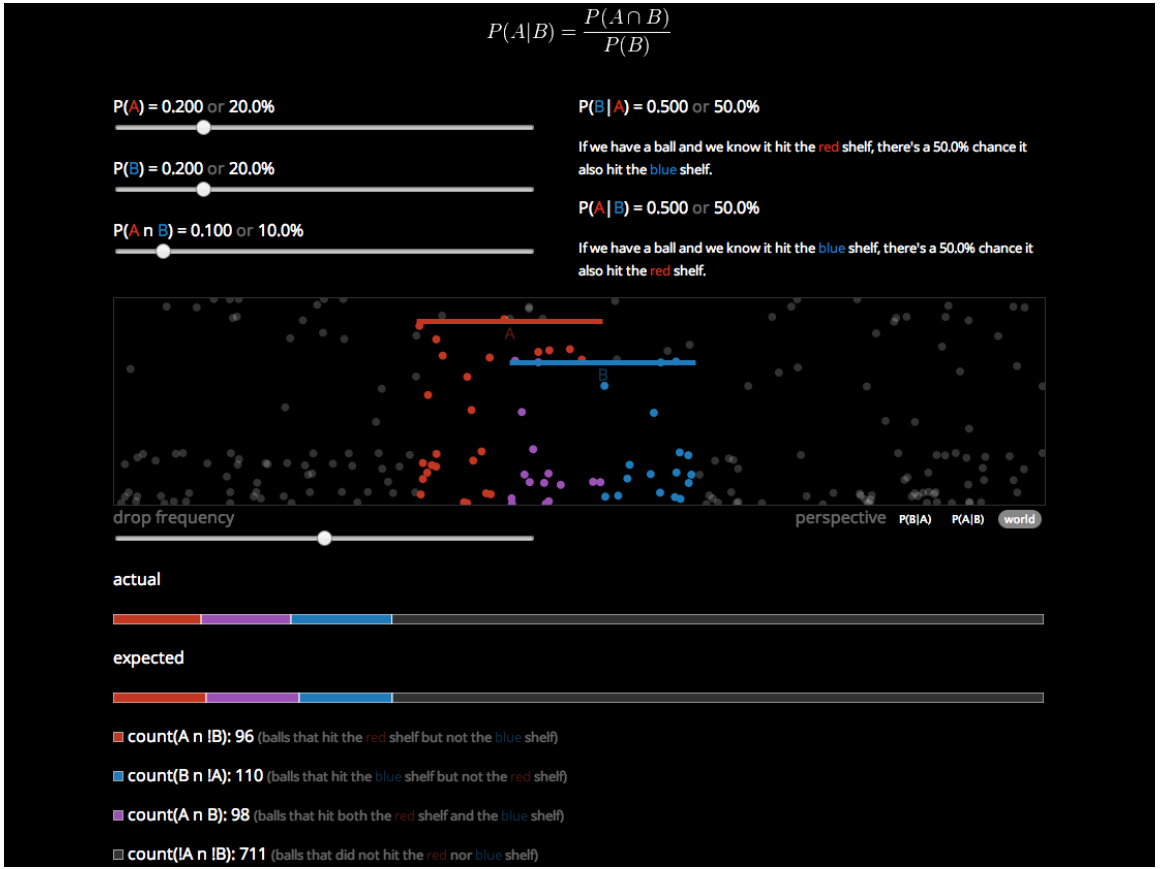

http://setosa.io/conditional/

- Visualizes conditional probability
- Animated and interactive
- Aesthetically pleasing

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Statistical Graphics

- Visualizes **statistical data** (also considered abstract)
- Data may be statistical, quantitative, or numerical
- Aims to convey statistical data **accurately**
- Aims to convey underlying **structure** in data
- *May not necessarily be aesthetically pleasing*
- *May not encourage exploration or be interactive*

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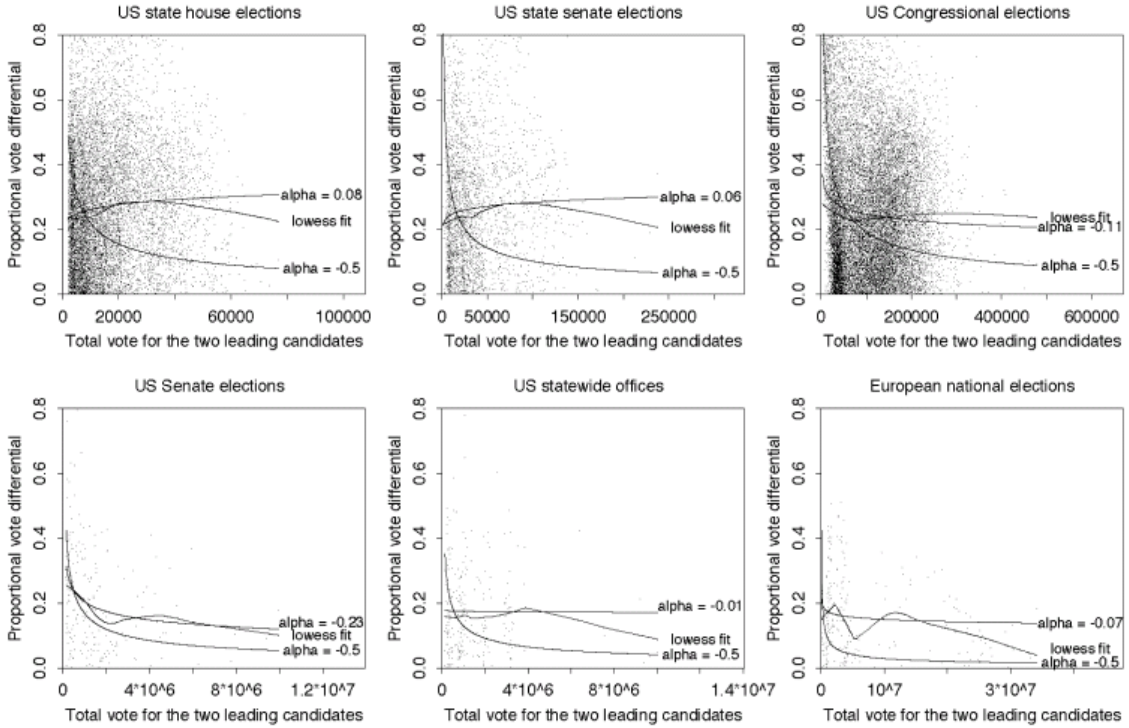

- Examines proportional vote differential
- No interactivity
- Example of statistical graphics

http://andrewgelman.com/2007/10/09/why_the_squarer/

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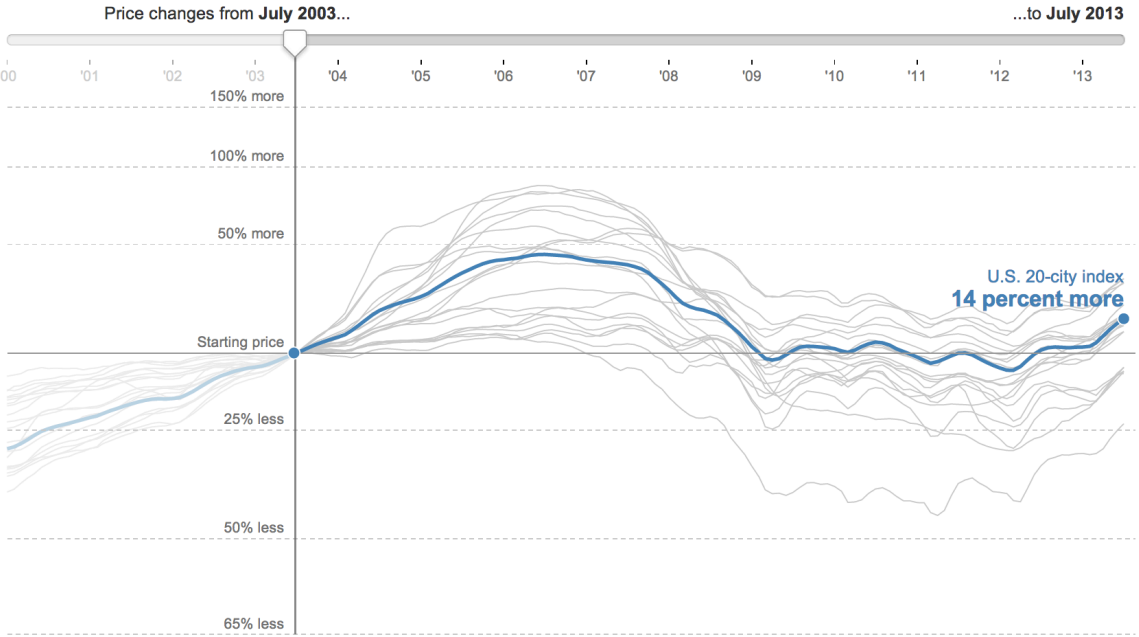
Housing's Rise and Fall in 20 Cities

If you bought an average home in a major city around Jul. 2003 it would be worth **14 percent more** today.



- May be considered statistical graphics
- May be considered information visualization
- Interactive and aesthetically pleasing

http://www.nytimes.com/interactive/2011/05/31/business/economy/case-shiller-index.html

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Visual Analytics

- Visualizes **abstract data** (has no inherent physical form)
- Aims to answer a specific question (**goal-oriented**)
- Aims to support **analytical reasoning** with interactive visual interfaces
- Aims to support **expert users**, not general public
- *May not be aesthetically pleasing*
- *May not be constrained by a single display*

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- Created to answer specific questions
- Not constrained to a single display
- Example of visual analytics

http://ff.cx/vast-challenge-2012/

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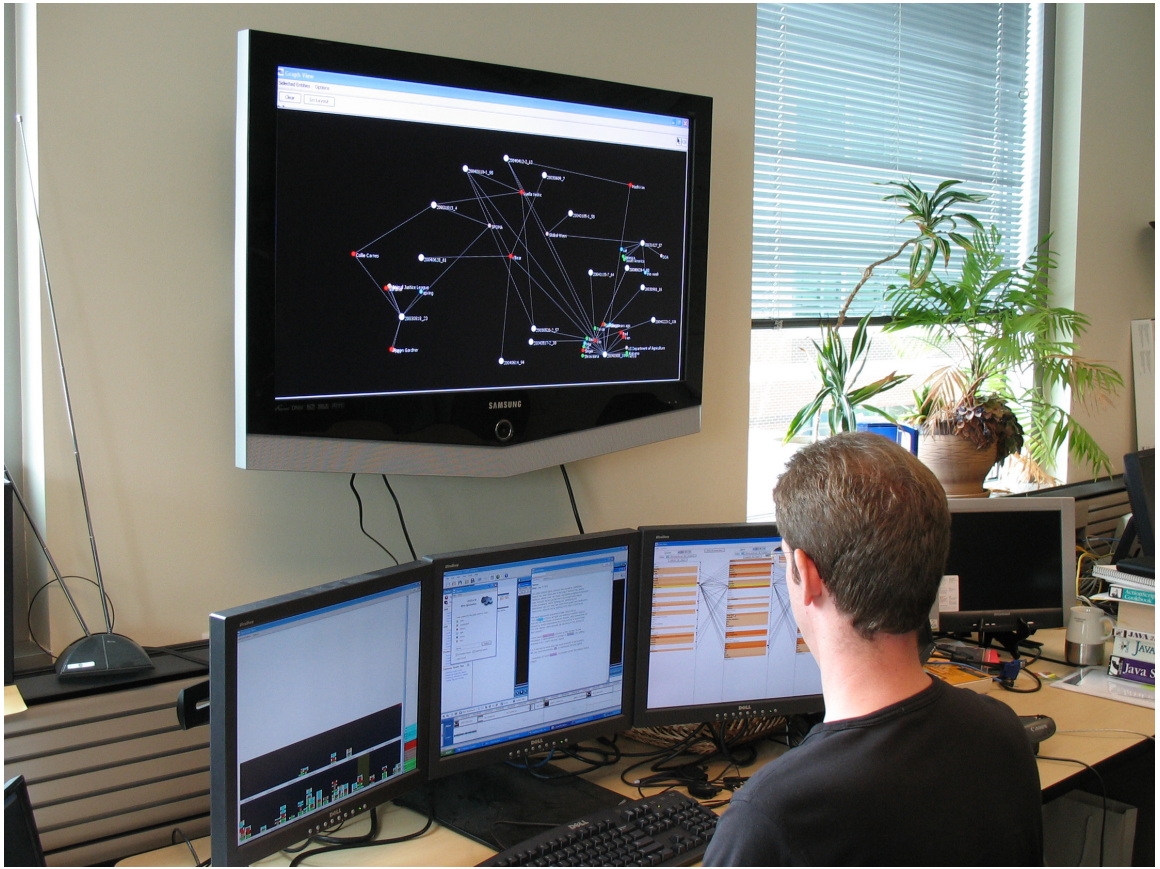

- Multiple views and displays
- Combined with expert user interface
- Used for analysis of document collections

http://gtresearchnews.gatech.edu/newsrelease/visual-analytics.htm • http://www.cc.gatech.edu/gvu/ii/jigsaw/

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Information Dashboards

- Visualizes **temporal data/time series** (also considered abstract)
- Aims to convey large amount of information **quickly**
- Aims to convey **outliers** and **trends** at a glance
- *May not be interactive (view-only)*

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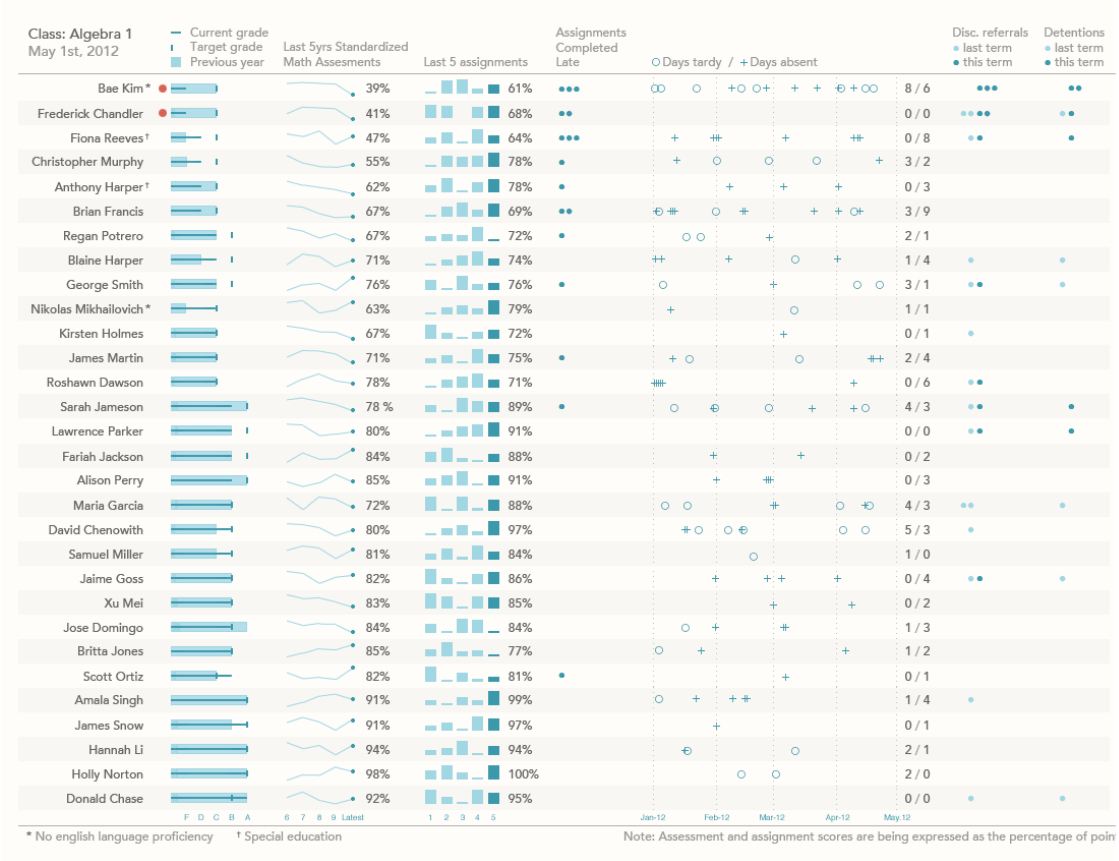

- Red alert icons make outliers easily visible
- Able to see general trends in data
- Extremely dense (parts cutoff for slide)

http://www.perceptualedge.com/blog/?p=1374

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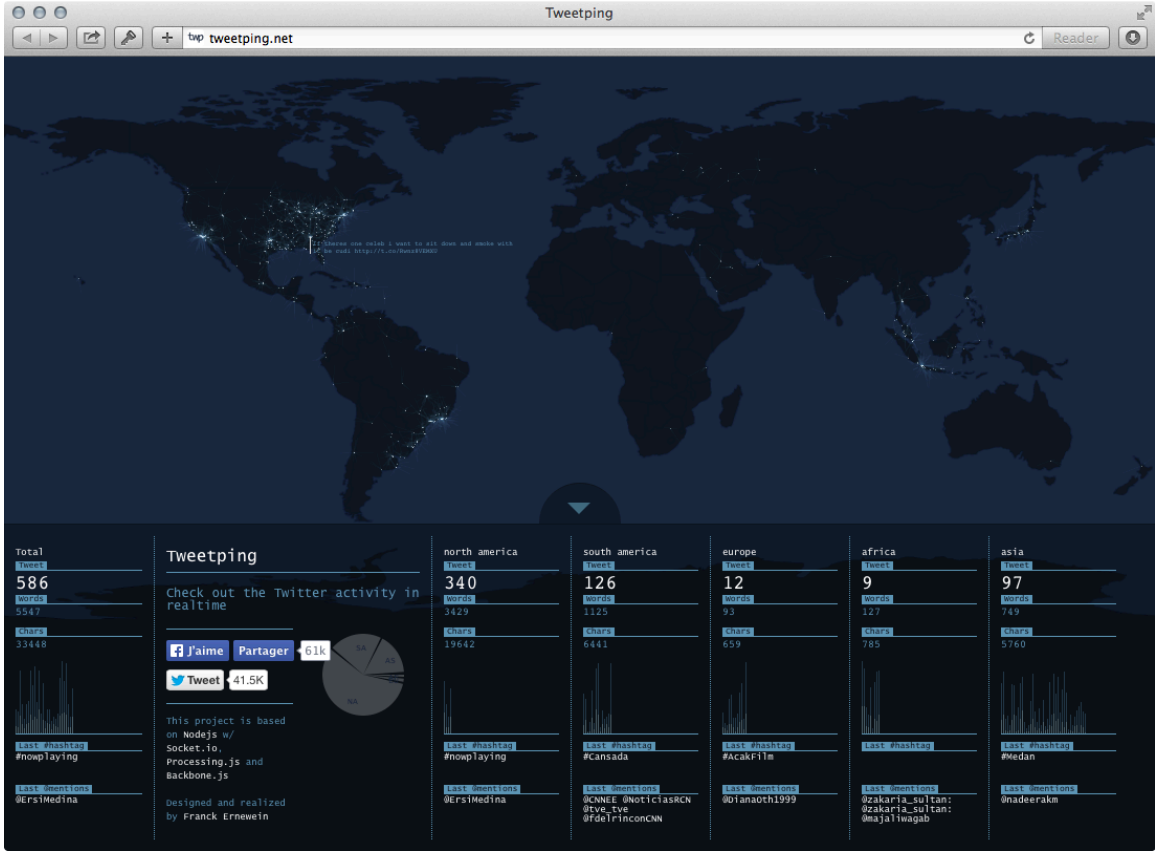

- Shows Twitter activity in real-time
- Something you watch more than interact

http://tweetping.net

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Infographics

- Visualizes **abstract data** (has no inherent physical form)
- Aims to be eye-catching and **capture attention**
- Aims to convey information **quickly**
- *May not be accurate*
- *May not use space efficiently*
- *May not encourage exploration of data*

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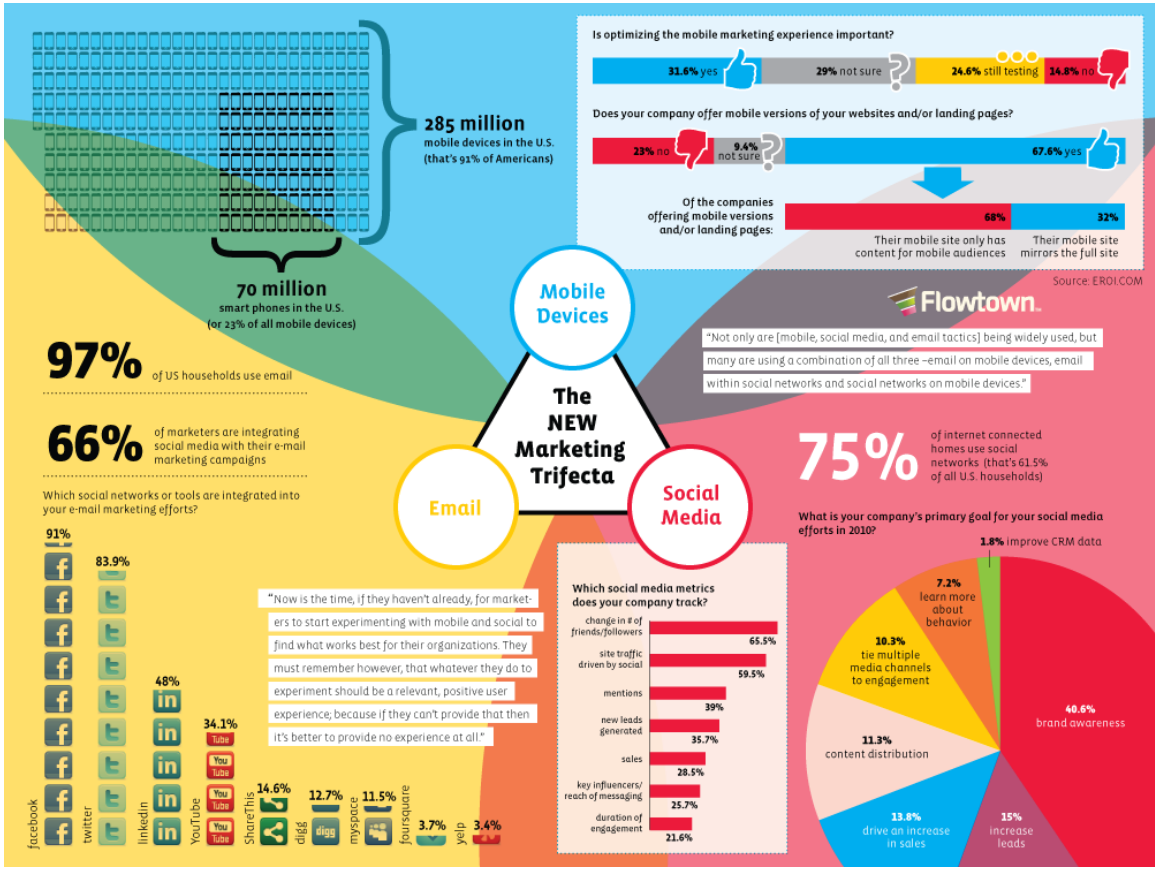

- Extremely colorful and eye-catching
- Silly representations of data (use of icons)
- Ineffective types of visualizations (cutoff pie chart)

http://visual.ly/new-world-marketing

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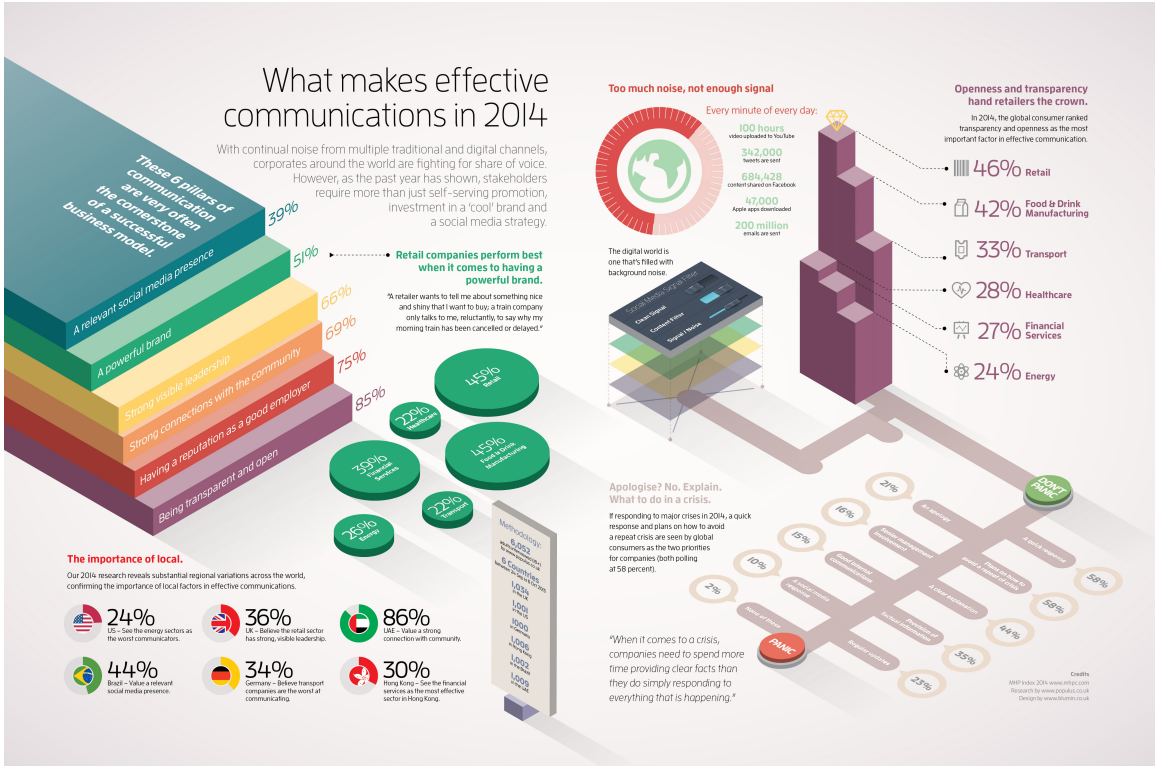

- Cheesy use of 3D hinders ability to interpret data
- Not dense (very few data points shown)
- Aesthetically pleasing

http://visual.ly/what-makes-effective-communications-2014

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Informative Art

- Sometimes known as ambient visualization
- Visualizes **abstract data** (has no inherent physical form)
- Aims to make visualization **ambient** or a part of everyday life
- Aims to be **aesthetically pleasing**
- May not be informative
- May or may not be eye catching

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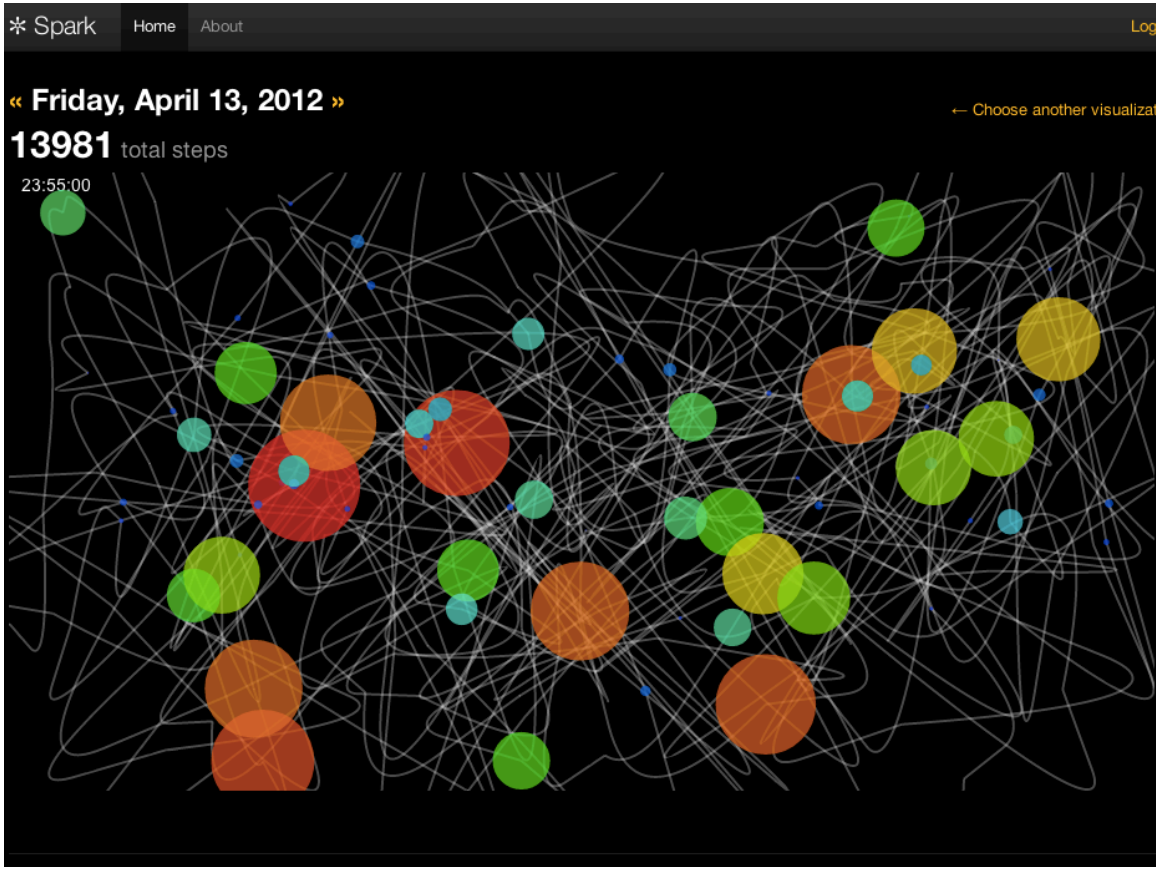

- Inspired by Jackson Pollock
- Lines are random
- Activity causes bubbles to be drawn

http://quantifiedself.com/2012/05/spark-visualizing-physical-activity-using-abstract-ambient-art/

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- Visualizes Twitter users as organisms
- Based on dataset with reputation scores
- Interesting to watch, but not necessarily informative

http://kunalanand.com/tweetures/

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- Data wall visualizes in real time data
- Includes interactive touchscreens
- Something you can walk past and appreciate aesthetics, or spend time with

http://www-03.ibm.com/ibm/history/ibm100/us/en/thinkexhibit/

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QUESTIONS?

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