

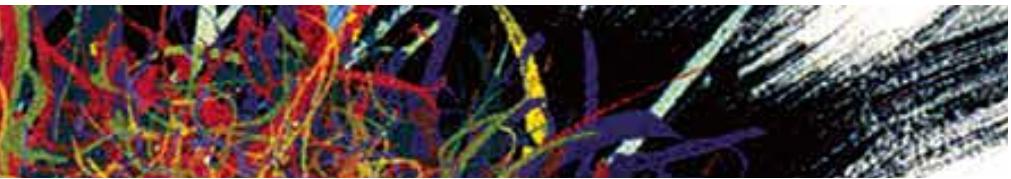
Terminology

What is Data Visualization?

WHAT IS VISUALIZATION?

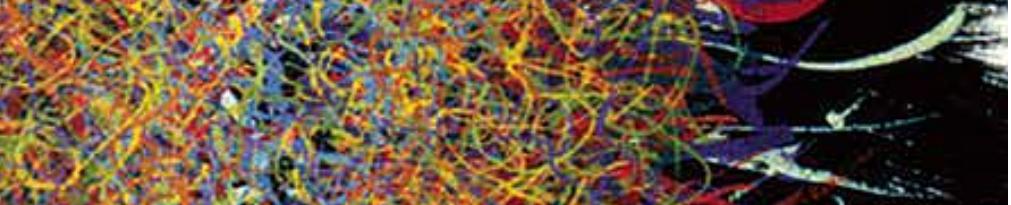


A K Peters Visualization Series



Visualization Analysis & Design

Tamara Munzner



Visualization Analysis & Design by Tamara Munzner, 2014 • <https://www.cs.ubc.ca/~tmm/vadbook/>

What is Visualization?

Computer-based **visualization** systems provide **visual representation of datasets** designed to help people carry out tasks more **effectively**.

Visualization is suitable when there is a **need to augment human capabilities** rather than replace people with computational decision-making methods.

Chapter 1.1, Visualization Analysis and Design by Tamara Munzner, 2014 • <https://www.cs.ubc.ca/~tmm/vadbook/>

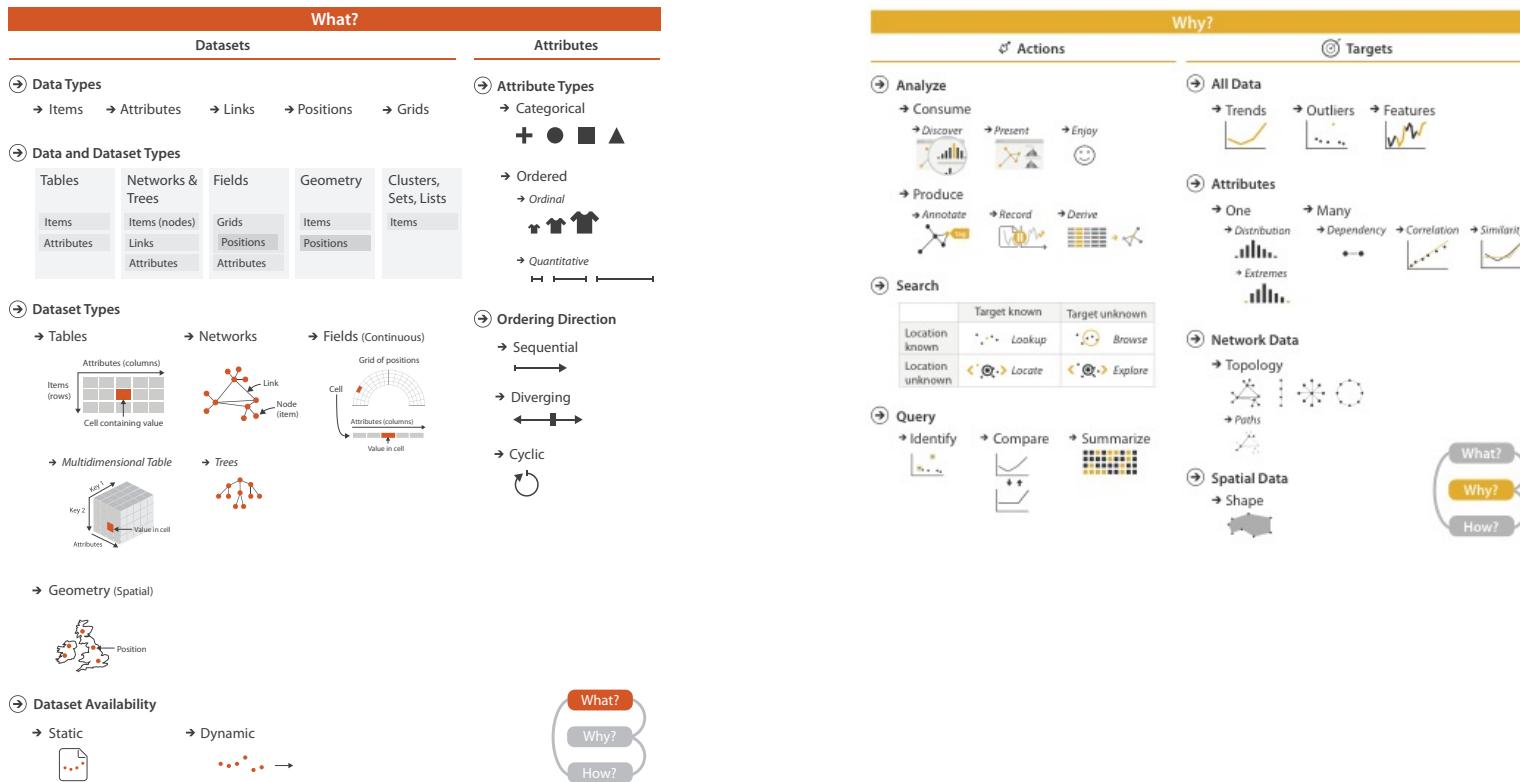
Related Terminology

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

Related 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/>



Figures 2.1, 3.1, Visualization Analysis and Design by Tamara Munzner, 2014 • <https://www.cs.ubc.ca/~tmm/vadbook/>

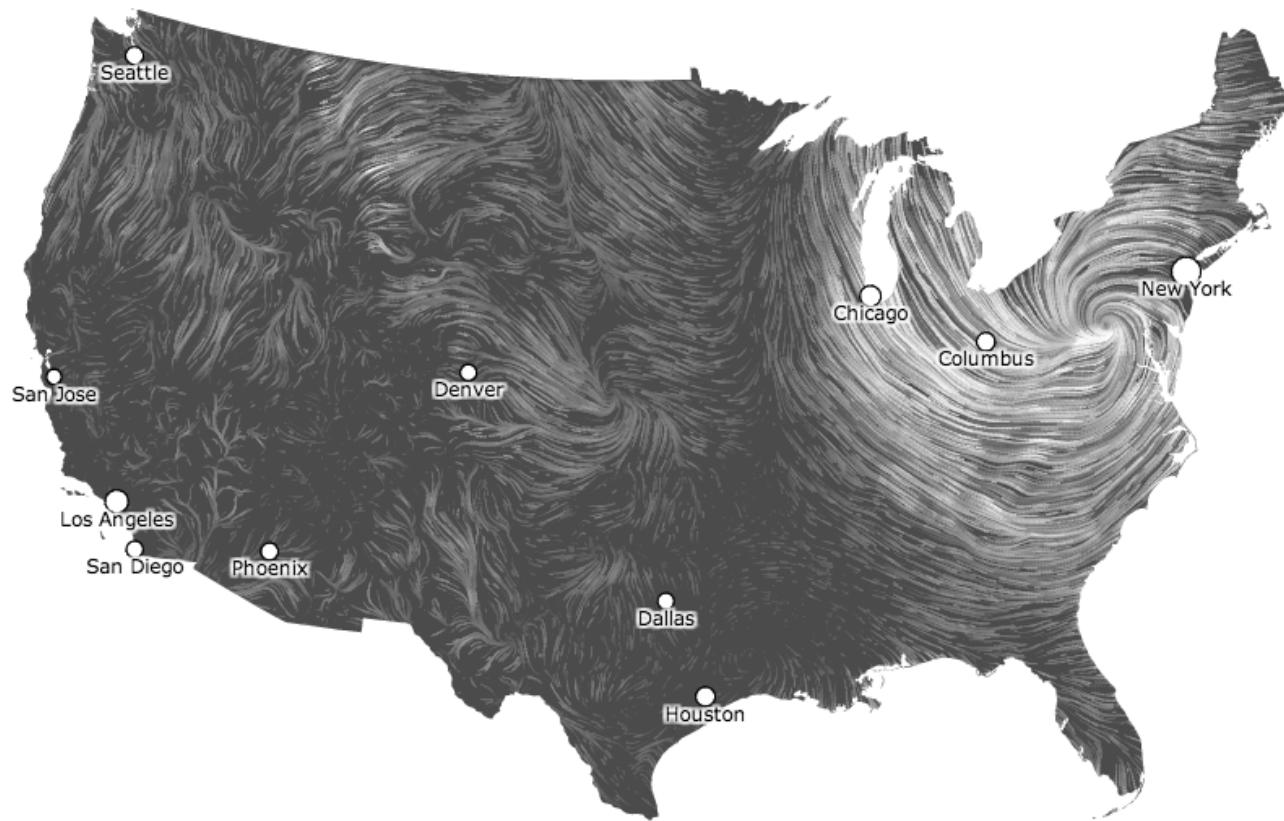
Data Visualization

- **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>



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

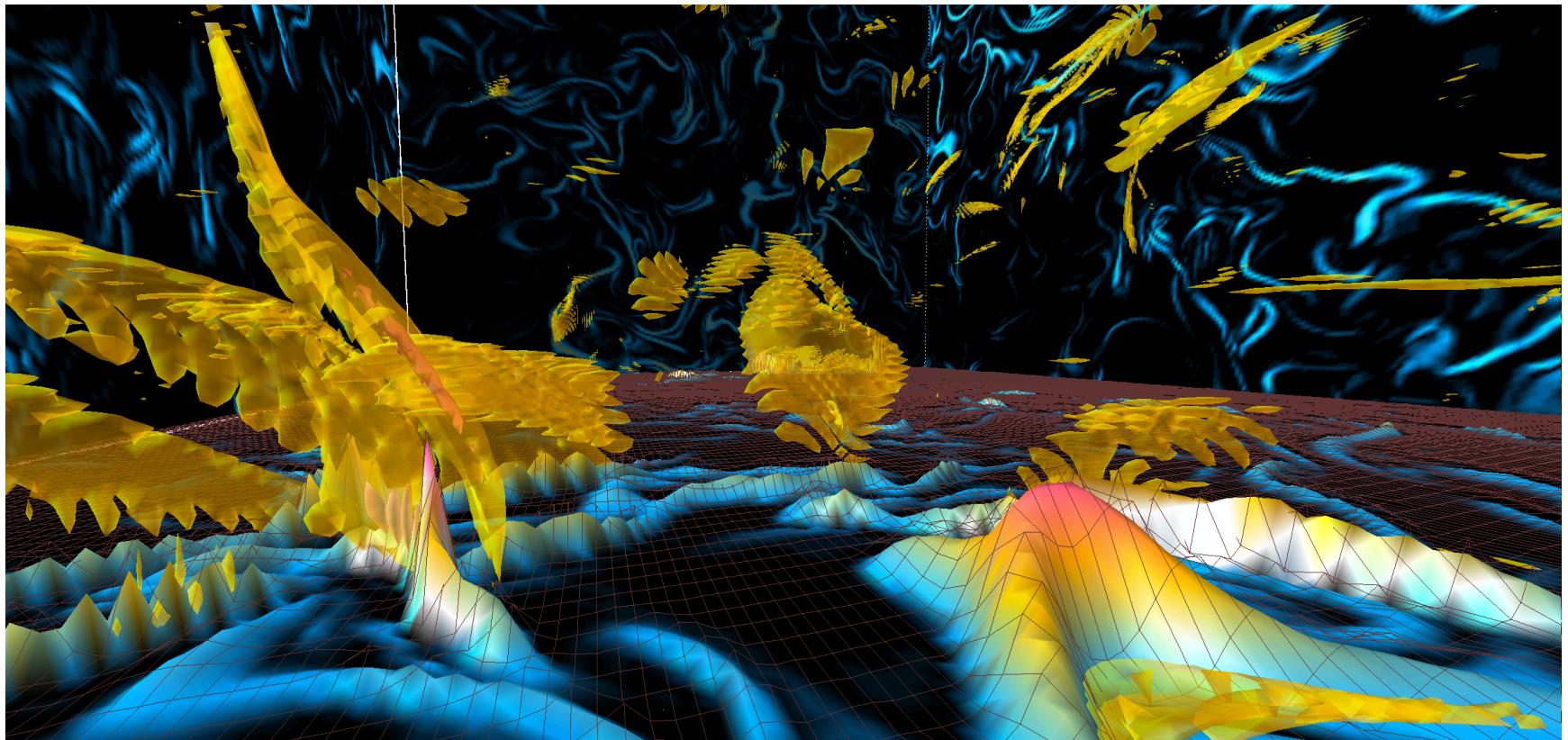


<http://hint.fm/wind/gallery/oct-30.js.html>

SCIENTIFIC VISUALIZATION

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)

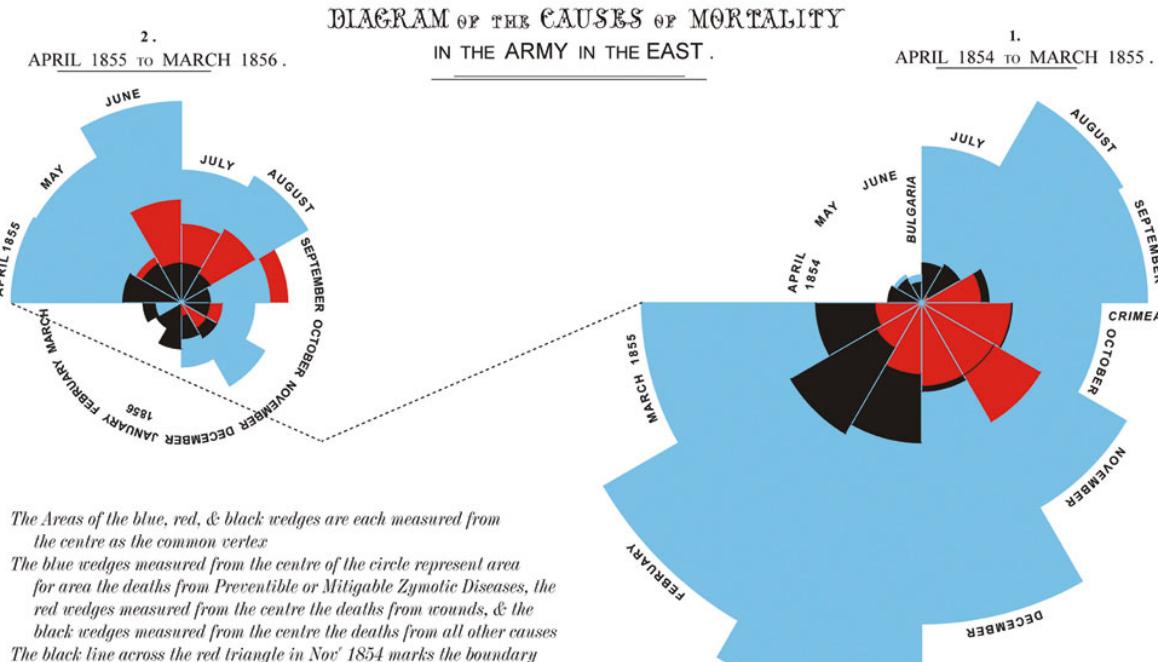


<http://vis.lbl.gov/Events/SC04/Incite3/index.html>

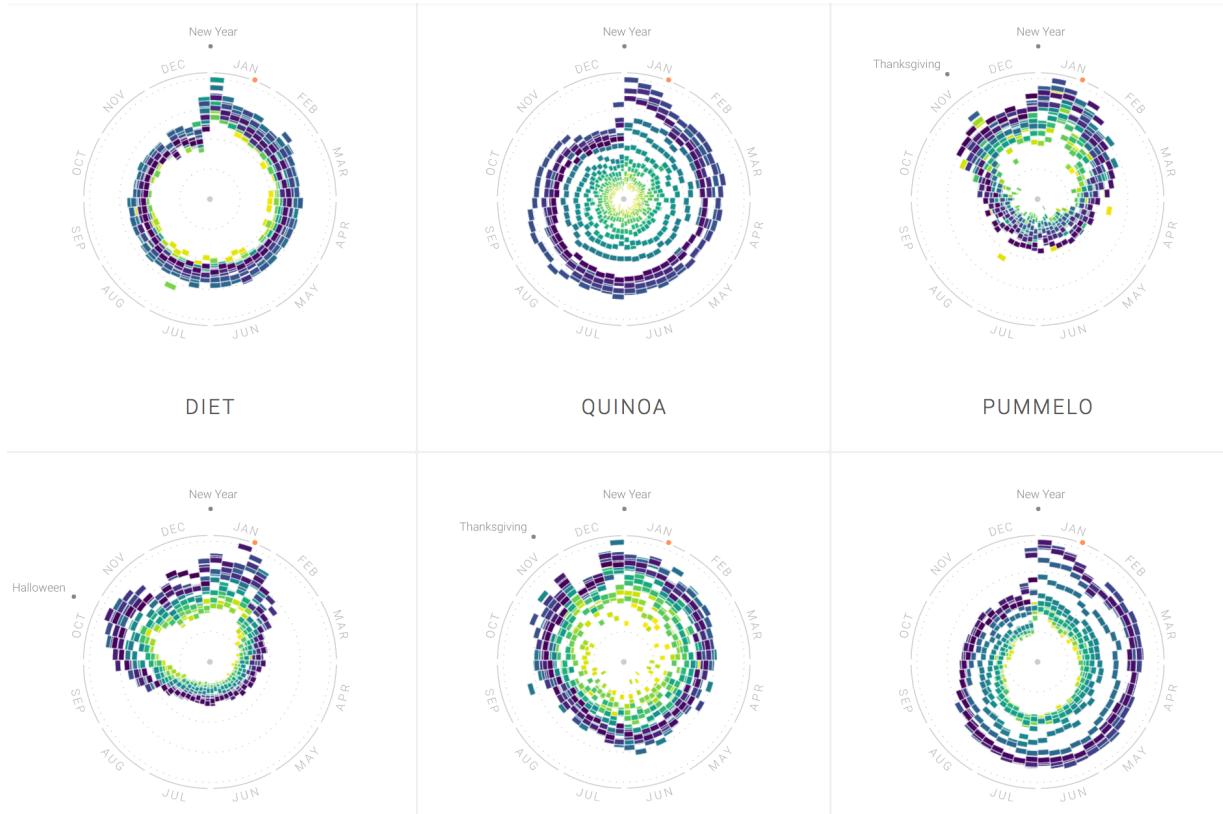
INFORMATION VISUALIZATION

Information Visualization

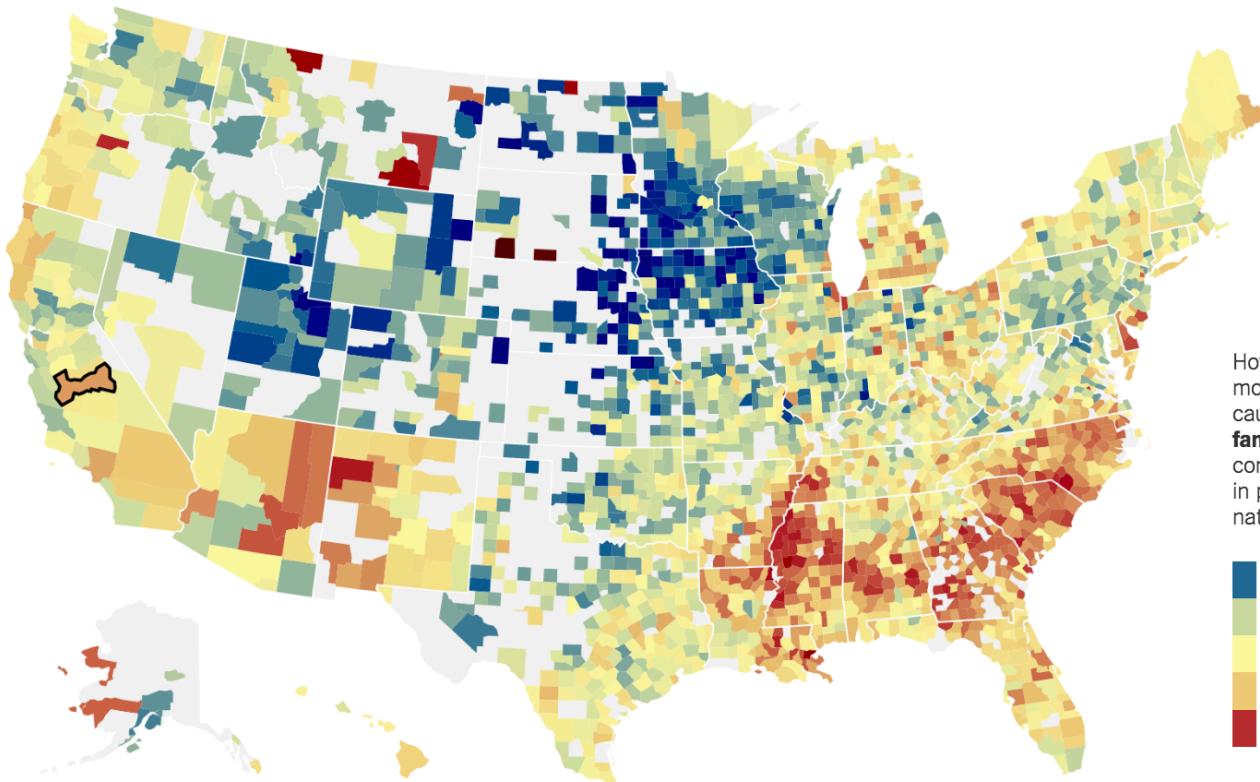
- Visualizes **abstract data** (has no inherent physical form)
- Data may be numerical, categorical, temporal, geospatial, or textual/unstructured
- Aims to convey abstract data **accurately**
- Aims to reveal underlying **structure** in data
- Aims to encourage **exploration** of data (interactivity)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



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



<http://rhythm-of-food.net/>



How much extra
money a county
causes **girls in poor
families** to make,
compared with girls
in poor families
nationwide.

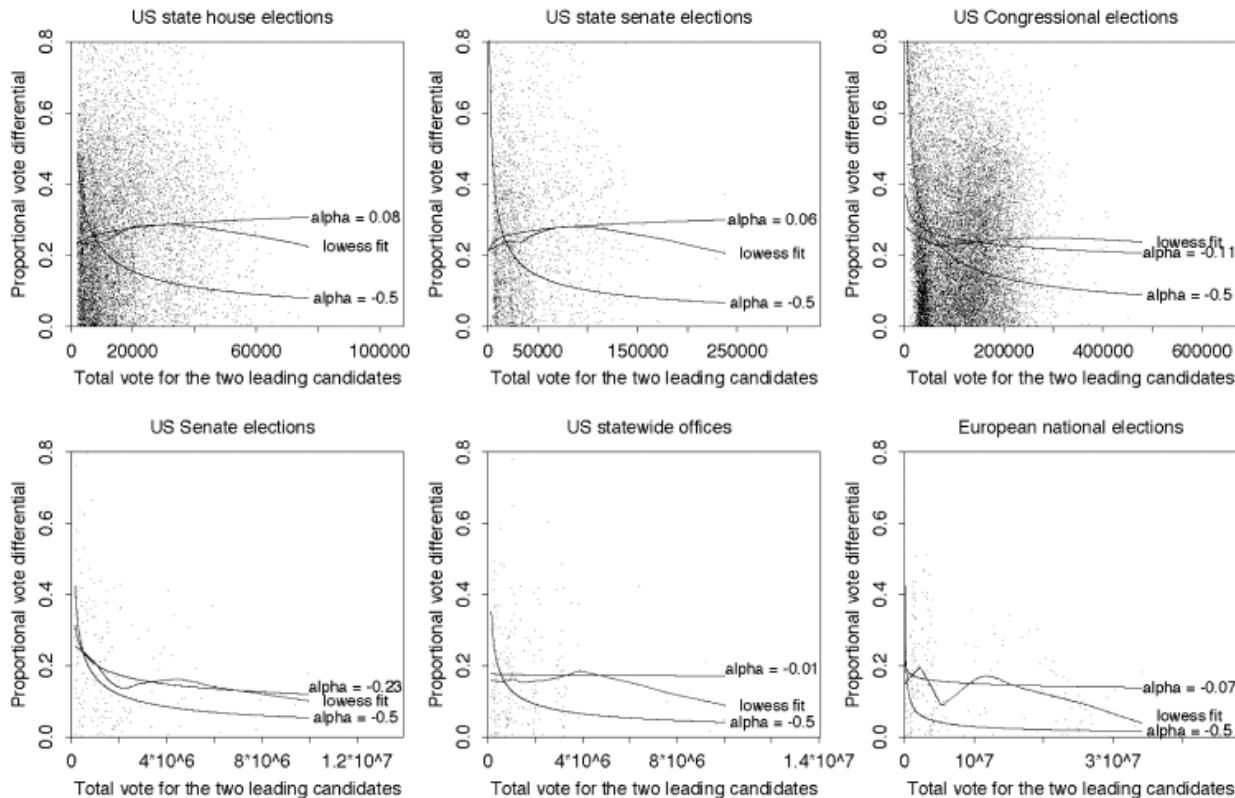
+\$4,500
+\$1,500
+\$0 U.S. avg.
-\$1,500
-\$4,500

<https://www.nytimes.com/interactive/2015/05/03/upshot/the-best-and-worst-places-to-grow-up-how-your-area-compares.html>

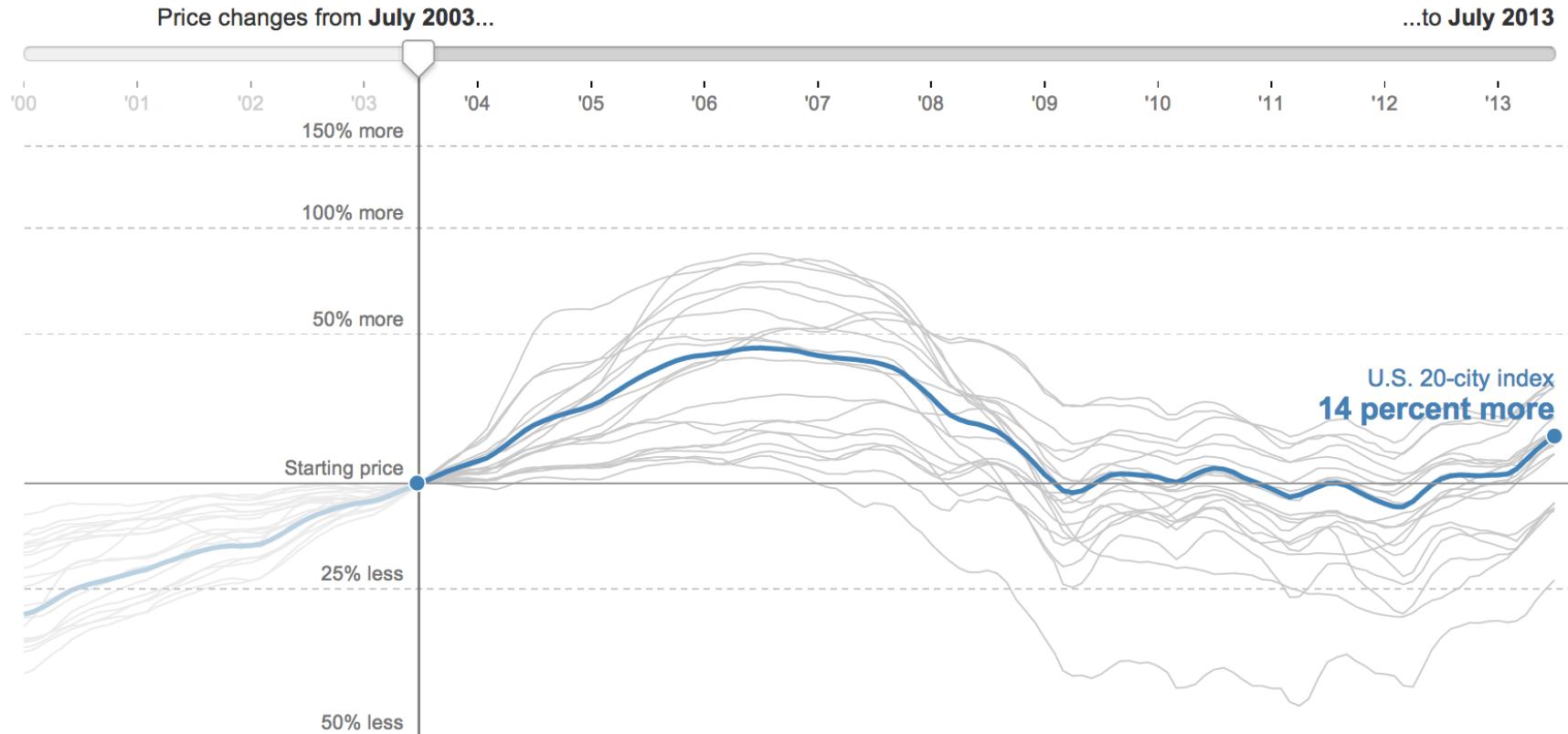
STATISTICAL GRAPHICS

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
- Less emphasis on *being aesthetically pleasing?*
- Less emphasis on *exploration and interactivity?*



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



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

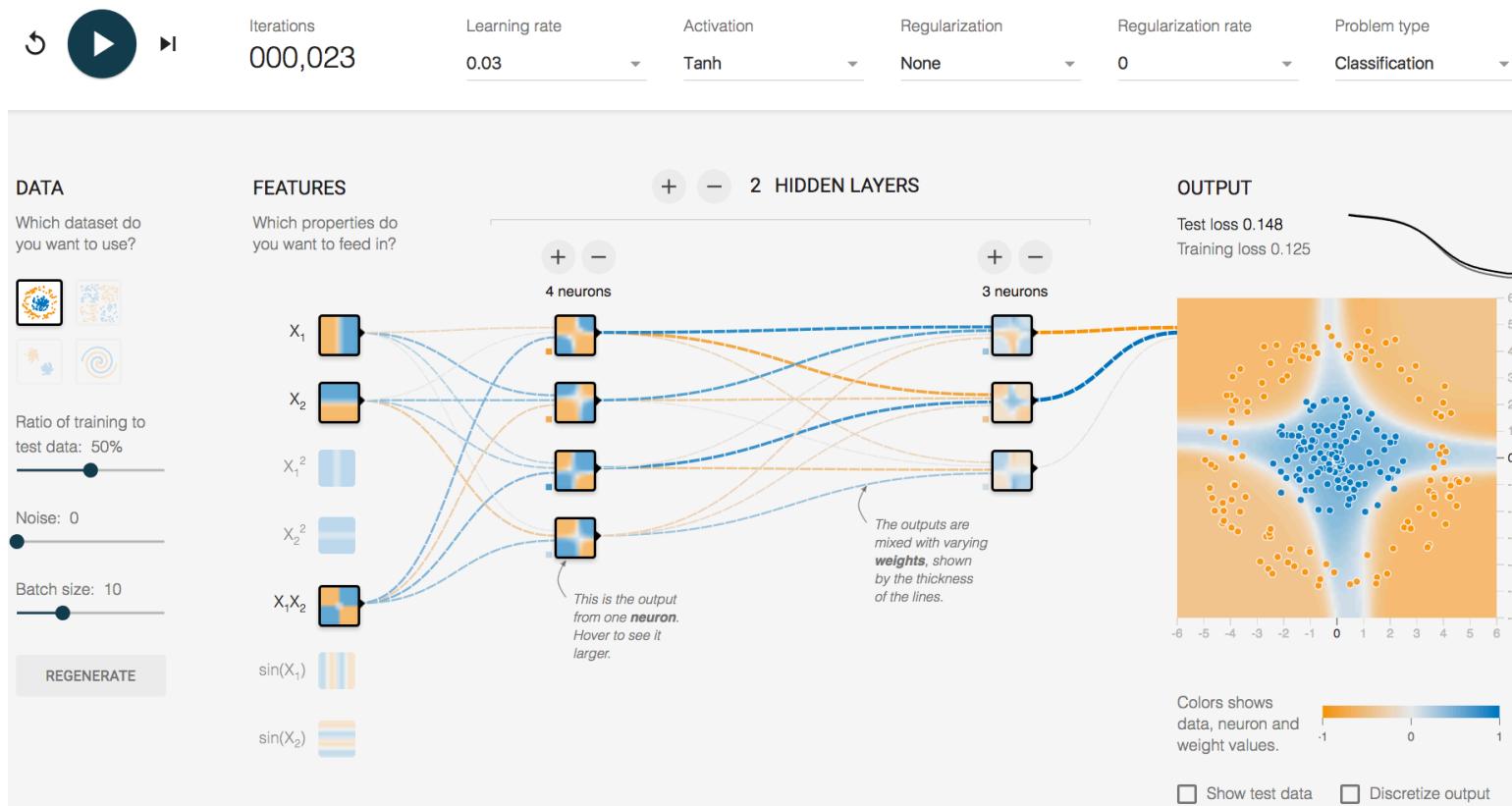
VISUAL ANALYTICS

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
- *Less emphasis on being aesthetically pleasing?*
- *May not be constrained by a single display?*



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

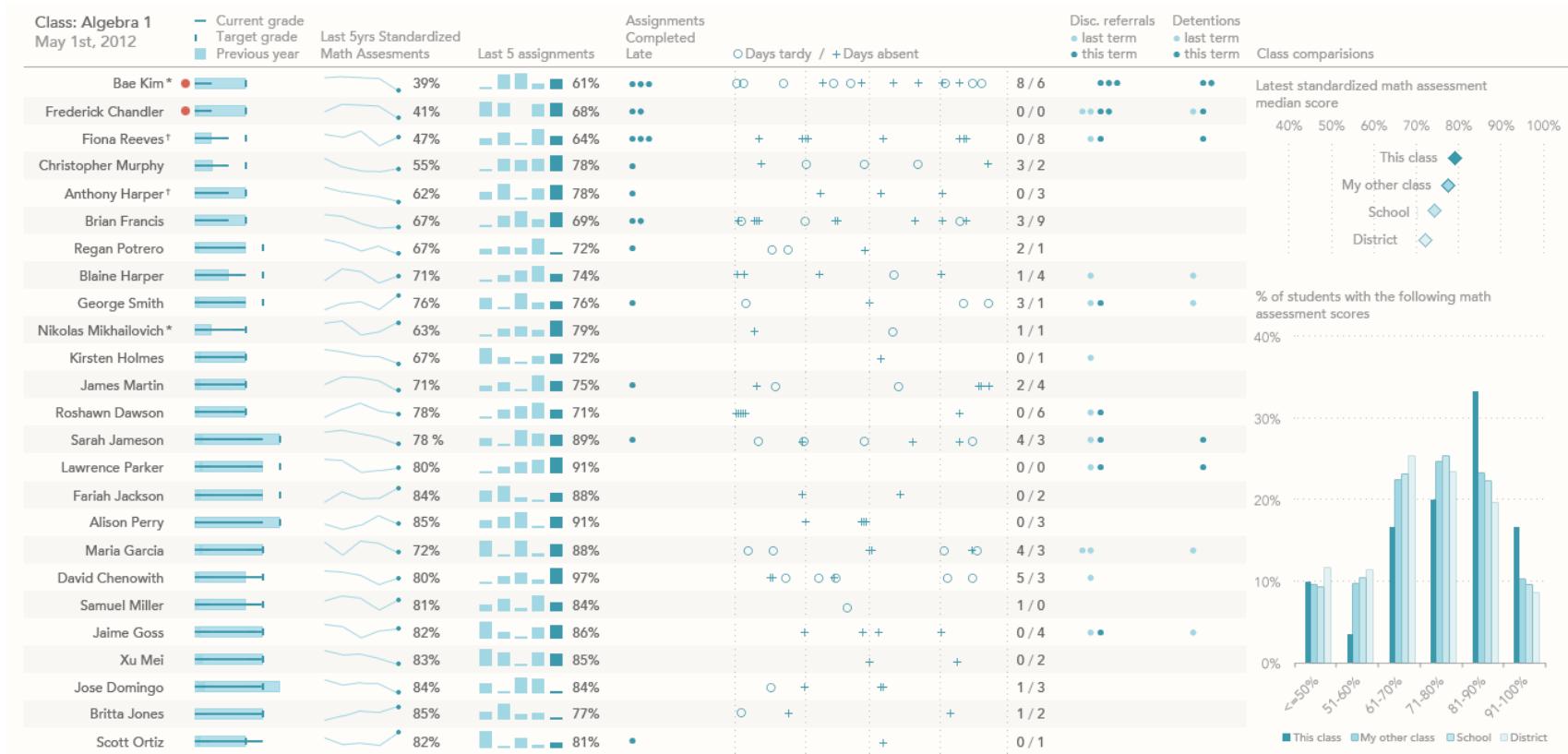


<http://playground.tensorflow.org/>

INFORMATION DASHBOARDS

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
- *Might not be interactive (view-only)*



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

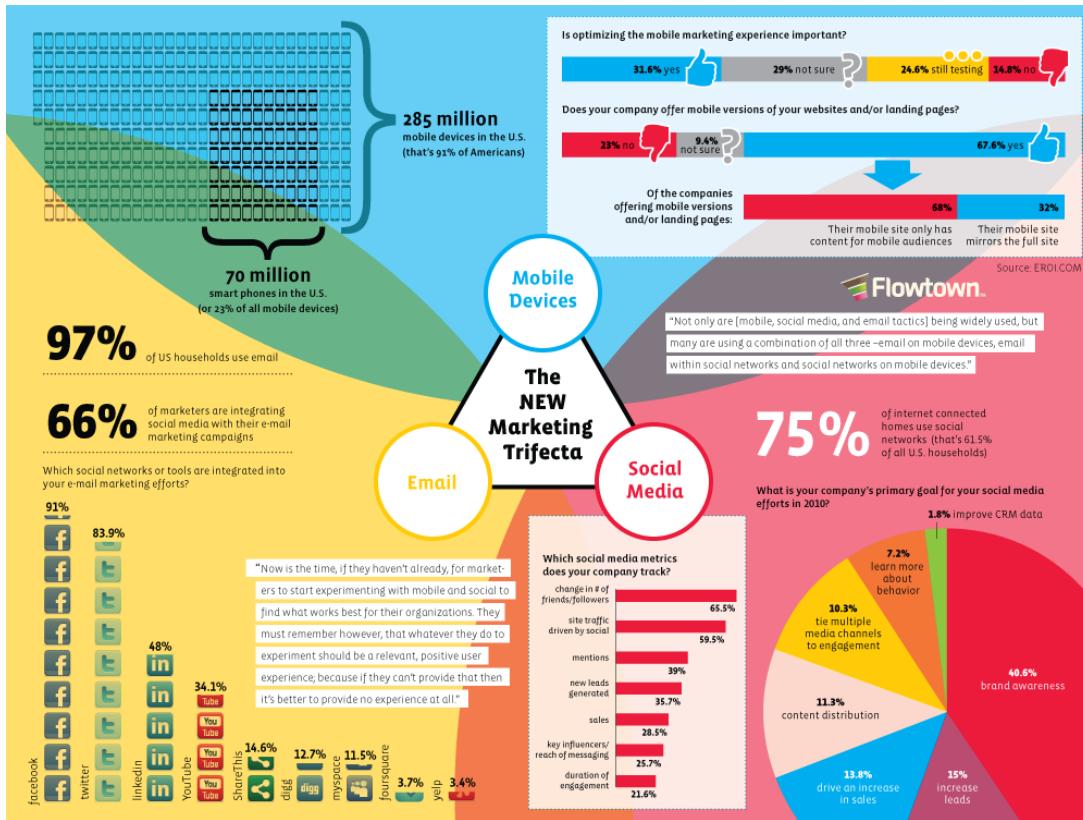


<http://tweetping.net>

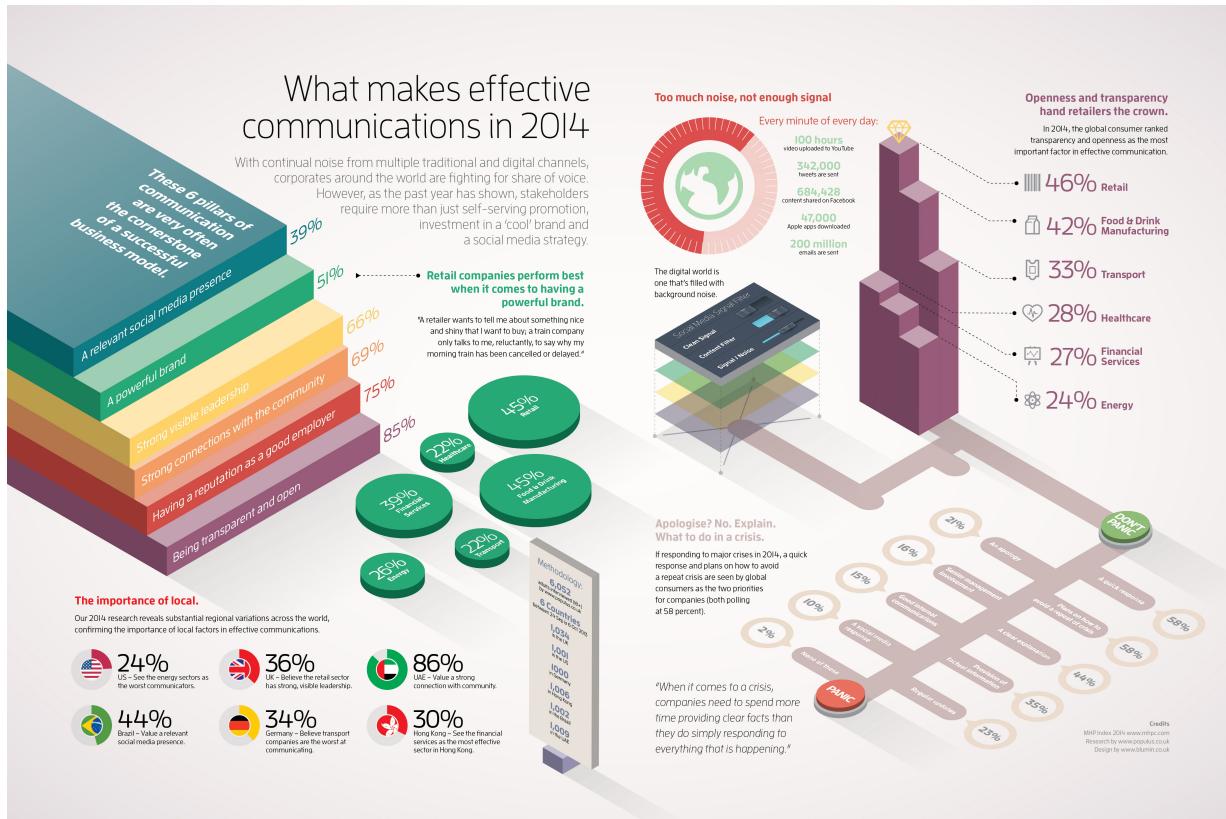
INFOGRAPHICS

Infographics

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



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

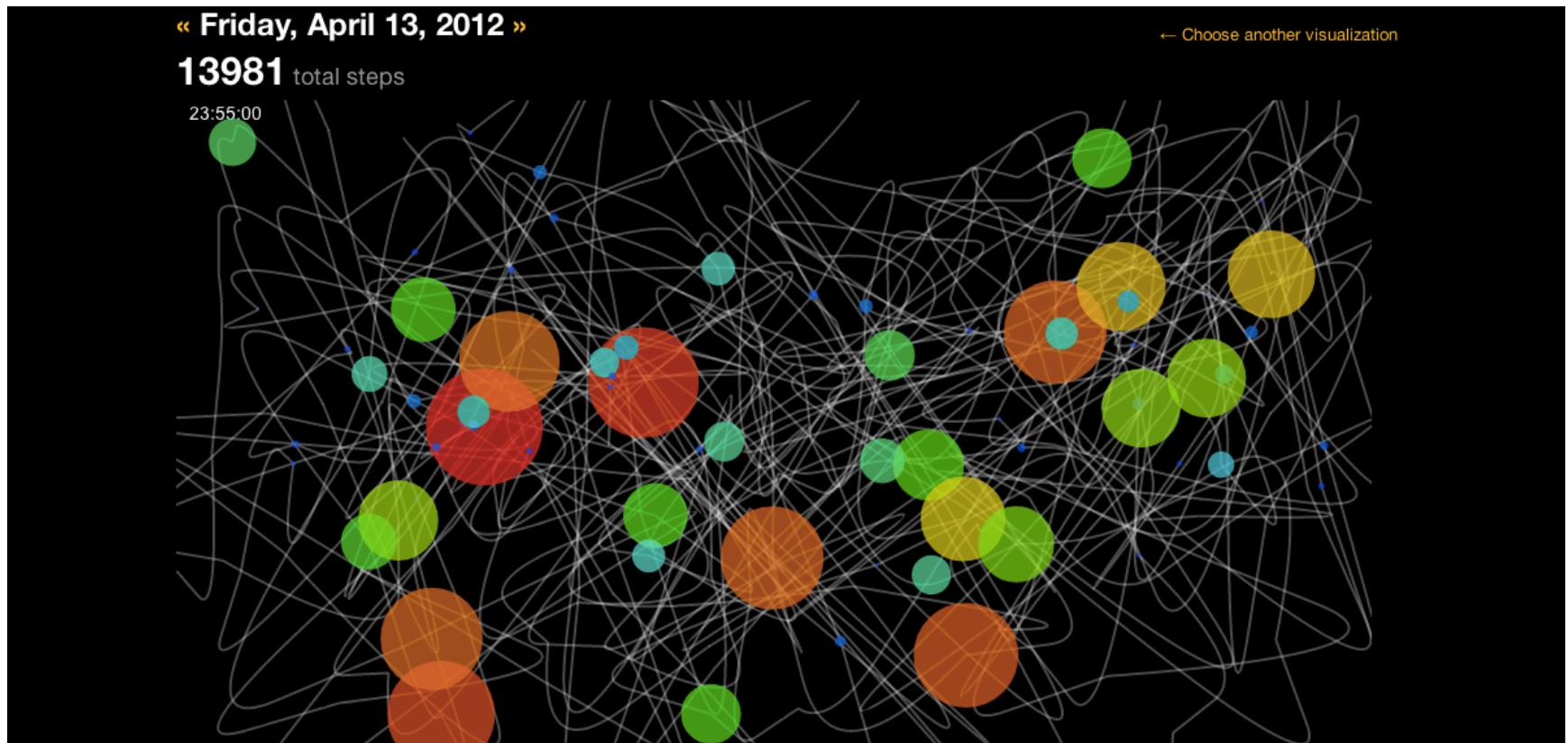


<http://visual.ly/what-makes-effective-communications-2014>

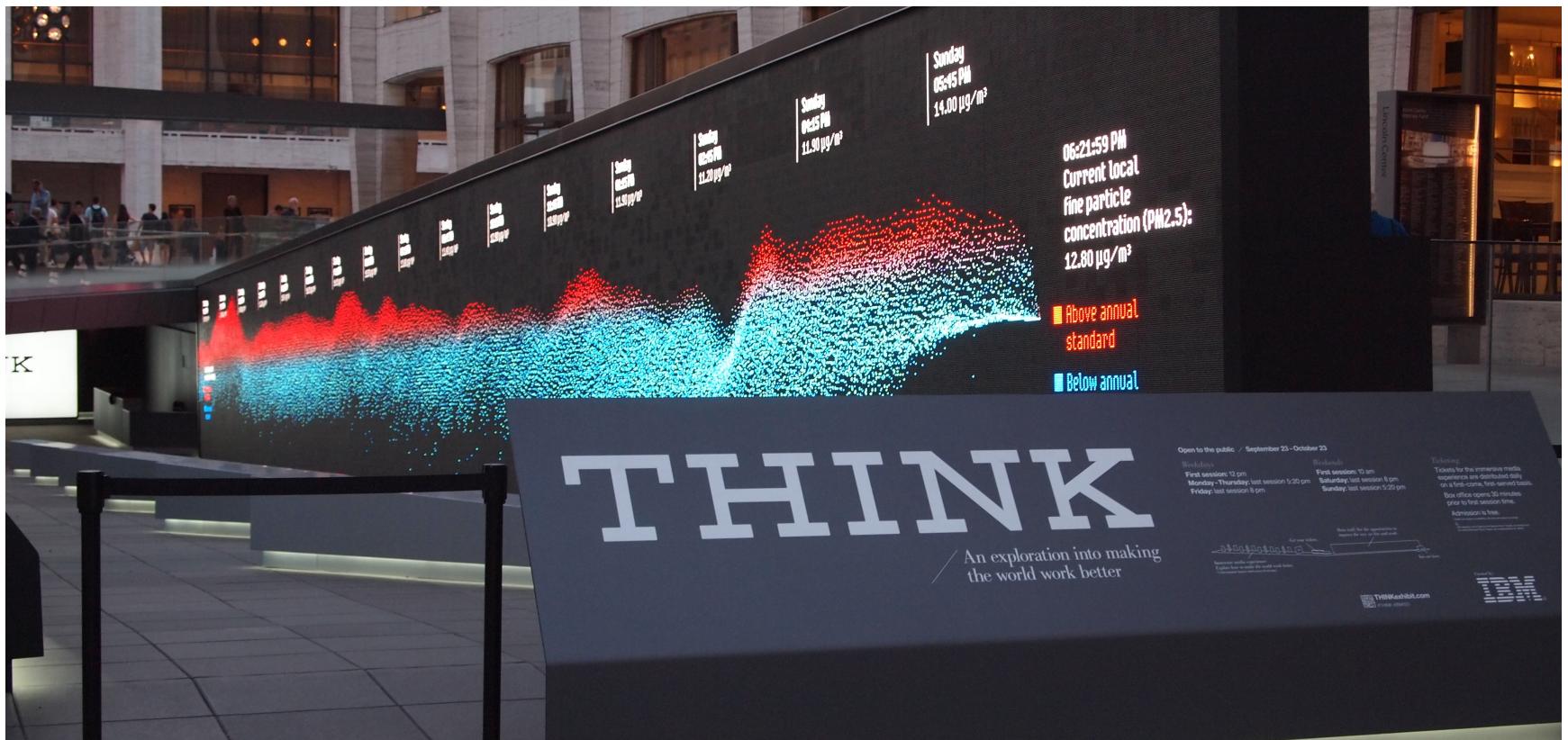
INFORMATIVE ART

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**
- *Might not be informative*
- *Might not be eye catching*



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



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

Dear Data

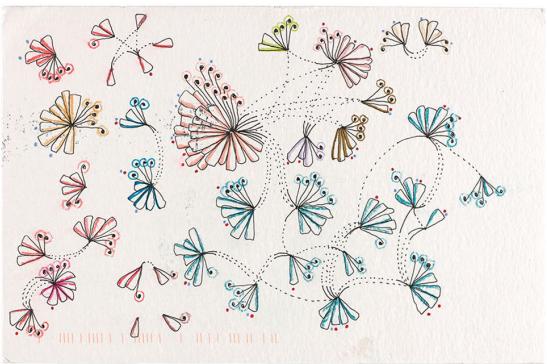


HAS BEEN ACQUIRED AS PART OF
THE PERMANENT COLLECTION OF

MoMA

<http://www.dear-data.com/>

GIORGIA



66 Dear Data WEEK 42: Laughters!

HOW TO READ IT

When data-gathering gets in the way: Giorgia laughs and then has to report it. So, is she fully enjoying her cheerful moments as they pop up?

SEN TO:

London ~~summertime~~

ENGLAND

卷之二十一

a week of laughters

Stefanie



DEAR DATA - WEEK 4a

A WEEK OF LAUGHTER FOR A CARD ABOUT
LAUGHTER I AM
ABOUT THE DATA: I TRIED TO CAPTURE MY
LAUGHS WHICH WAS REALLY HARD + GOT A
LOT OF THEM IN THE WAY OF ENJOYING LIFE, HENCE THE
S POSAVC

Stefanie was banned by her husband from gathering data at her birthday dinner in a posh restaurant (for about one reason). How do they do that?

<http://www.dear-data.com/the-project>



CHANGE THE WORLD FROM HERE