Information Visualization

Introduction

Jan 22, 2013 – Michael Porath (@poezn)
49ers vs Falcons
NFL.com (2013)
Pancakes!
Strings
Music Score Sculptures
Natalie Miebach (2009)
History

Just a little.
Planetary Movements
ca. 950
Weather Map

1686
William Playfair is credited with the invention of the pie chart. (1801)
William Playfair is credited with the invention of the pie chart. (1801)
William Playfair
... and the line / area chart based on time series
William Playfair
... and the bar chart
National Geographic
Pioneers using visualization in publishing (1893)
Willard Cope Brinton
Extensive collection of charts in his publication (1939)

http://www.archive.org/stream/graphicpresentat00brinrich#page/79/mode/1up
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http://www.archive.org/stream/graphicpresentat00brinrich#page/78/mode/1up
Semiology of Data
Jacques Bertin (1967)

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<th>Points</th>
<th>Lines</th>
<th>Areas</th>
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Box-And-Whisker Plot

Tukey (1977)

http://www.edu.gov.mb.ca/k12/tech/licit/let_me_try/g6/mh132.html
Visualizations Are Mainstream
Hans Rosling’s famous TED talk in 2007

Today

Data

Tools & Frameworks

More Access
More Resources
Bigger Community
Why do we create Visualizations?

Function And Objective
Three Functions

Record

Analyze

Communicate
Record
Record

Galloping Horse (Eadweard Muybridge, 1872)
Record
Record

Seismograph, 8.9-magnitude earthquake, Japan

Analyze

Cholera Outbreak

(John Snow, 1854)
Analyze

Cholera Outbreak

(John Snow, 1854)
Analyze
Graphical calculation: Visual Proofs

Pythagorean Theorem
Chinese proof by dissection

Sum of odd numbers
$1 + 3 + 5 + 7 + 9 = 5^2$
Analyze
Time Series (Here: Sunshine Intensity) on Spirals (Weber et al., 2001)
Communicate
“31 Days Later”, National Post (2013)

31 DAYS LATER

How many people have died by guns in America since the shooting deaths at Sandy Hook Elementary School in Newtown, Conn. a month ago, that resulted in 20 children and eight adults being killed? The Slate news website and the twitter feed @GunDeaths have been collecting crowd sourced data on the number of people killed by guns. The following data is likely incomplete as some news reports probably escaped the attention of @GunDeaths and its followers. Also, suicides, estimated to make up about 60% of gun deaths, typically go unreported.

NUMBER OF AMERICANS KILLED BY FIREARMS SINCE THE NEWTOWN SCHOOL SHOOTING

Dec. 14, 2012: The Newtown school shooting - 20 children and eight adults are killed.

Dec. 15, Guthrie, OK: Three-year-old boy accidentally shoots himself in the head after getting hold of a gun.

Dec. 17, Kansas-City, MO: Four-year-old Aydan Perea is shot in the head in an apparent drive-by-shooting while his father was placing him into a car seat.
According to @gundeaths on Jan. 15, 2013, a total of 99 people have been killed by firearms since the massacre of the innocents in Newtown.

http://news.nationalpost.com/2013/01/15/graphic-31-days-later-u-s-gun-deaths-since-newtown/
Communicate
GE infographic “What’s an LED”

WHAT’S AN LED?

LEDs (or light-emitting diodes) are small sources of light that work when the movement from electrons illuminate semiconductor material. This longer lasting technology is usually found in traffic lights and exit signs, but now consumers can find options like LED light bulbs and even Christmas lights. Companies like GE are working to make LED technology more affordable and practical for homes. The Department of Energy estimates that rapid adoption of LED lighting in the U.S. over the next 20 years can reduce lighting electricity demand by 33% by 2027.

LED Benefits
- Directs light more efficiently
- Long lifetime
- Has compact size
- Turns instantly on
- Resists breakage
- No infrared or UV emissions

INCANDESCENT BULB
- 90% of the energy released from incandescent bulbs is heat.

CFL BULB
- 80% of the energy released from CFL bulbs is heat.

EnergySmart™ LED Bulb
- 75% of the energy released from an LED bulb is heat, which is channeled into a heat sink so it stays cool to the touch.

http://visualization.geblogs.com/visualization/led/
Analysis – Communication

What’s the objective?

- Discover
- Make Sense
- Simulate
- Record
- Educate
- Convince
- Entertain

Analysis - Exploratory

Communication - Explanatory
Analysis – Communication

What’s the objective?

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Analysis – Communication

What’s the objective?

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Communication

Explanatory

Record
Recap
About me
Your Tutor
Galen Panger
This Semester

Course Mechanics And Topics
Course Goals

Know the foundations
Learn the principles of information visualization

Critique
Learn how to critique and evaluate information visualizations

Build
Build your own visualizations
Apply theoretical foundations
Syllabus
and Class Website

http://blogs.ischool.berkeley.edu/i247s13/
Requirements

Assignments
4 Assignments throughout the course of the semester

Labs / Participation
- Attend and participate in labs
- Participate in class discussions
- Discuss on the class blog

Final Project
Build an interactive information visualization in groups
Participation on The Blog

• Submissions **must include a screenshot and link/embed**

• Minimum **one paragraph**
  • critiquing its effectiveness *and/or*
  • tying it into what we cover in class

• Use the **Visualization** category for your posts

*If you just want to share visualizations, use hashtag #i247 on your social network of choice.*
Assignments

| Assignment 1 | due Jan 29 |
| Assignment 2 | due Feb 12 |
| Assignment 3 | due Feb 26 |
| Assignment 4 | due Mar 19  
Data excerpt due Feb 5 |
Announcement
Assignment 1

**Task** Find and document 2 visualizations
- 1 online
- 1 “in the wild”

**Deliverable** 2 visualizations; 1 page writeup

**Due** Tuesday Jan 29, 3:00PM

More information on the class blog
Announcement
Assignment 4

**Task** (for now) start collecting 2 or more daily metrics of your everyday life

**Deliverable** Your data set (so far)

**Due** Tuesday Feb 5, 3:00PM

More information on the class blog
Other Textbooks

Selected chapters.
Through safaribooksonline.com (UC Berkeley Library Proxy)
Also Recommended

NATHAN YAU

VISUALIZE THIS
The Flowing Data Guide to Design, Visualization, and Statistics

Show Me the Numbers
Designing Tables and Graphs to Enlighten

Stephen Few
Software

Free license of Tableau for the course of the semester

Windows only

Check your email for instructions tonight
Contact

Office Hours

Michael
Tue/Thu 2-3PM
Room 211

Galen
Monday afternoon by appointment

Email

Michael
mike@ischool.berkeley.edu

Galen
gpanger@ischool.berkeley.edu
Labs
This Thursday: Data
Next Lecture
From Data to Visualization