The Maps Lecture

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Stamen

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CATEGORY 3 HURRICANE
Aug. 25, 2011, 2 p.m. EDT
Last updated about 50 minutes ago

Maximum wind speed 115 mph
Ground speed 14 mph
Pressure 951

Wind speed chart

Showing all currently active storms.
Show all storms from this year.

5-day storm forecast for your home

new york city  Search

Legend
Wind speed, mph  30+ 50+ 74+

Previous  Current  Forecast
Possible forecast error

Current location
Categories 1 - 5
Tropical storm
Tropical depression

Show/Hide Storms

Irene
Ten
Why Maps Now?
New uses for geodata
New sources for geodata
- Visualizing data on maps: Dots, more dots, continuous data, choropleths and cartograms
- Cartography: Projections, scale and data
- Publishing tools: Before Javascript, after Javascript
Visualizing Data On Maps
Dots
Dots can be symbols
Guessing Game
Dots can be good symbols
Dots should fit the map
Dots can include data
Dots are ubiquitous
More, Smaller Dots

Clusters and point density maps
“Red Dot Fever”
Mapping America: Every City, Every Block

Browse local data from the Census Bureau's American Community Survey, based on samples from 2005 to 2009. Because these figures are based on samples, they are subject to a margin of error, particularly in places with a low population, and are best regarded as estimates.

MAP KEY
One dot = 25 people
- White
- Black
- Hispanic
- Asian
- Other

Census tract 31
Population estimate: 2,847
Whites: 68%
Blacks: 3%
Hispanics: 4%
Asians: 23%
Other groups: 1%

Note: Dots are evenly distributed across each Census tract or county. Dollar amounts are adjusted for inflation.
This map is counting many small things.

the black lines show Chicago’s official community areas.

each dot represents twenty-five people. here, hispanic is exclusive of other categories.

block-level data from the U.S. census.

scale 1:200,000
Clustering, grouping
Three dimensions shown by color
One dimension shown by hue
Let patterns emerge
Continuous Data

Heat maps and isolines
Don’t hide the context
Try smooth gradations
Break data into buckets

The Gerris 2007 murder of Journalist Chauncey Bailey in Oakland, California, led Stamen partner Mike Miyasaka to make the city’s crime data more accessible. This heat map of downtown was data from CrimeWatch, a community website, to show the gaps between crimes at a given intersection: what is highcrime? Darker areas are safer. stamen.com
Meaningful buckets
“Iso” means “same”
Isolines for elevation
Isochrones are isolines for time.
Isolines for windspeed
Perpendicular lines show tidal phase
“Chorodots”
Choropleths
Five quantiles
"soda"

Map by Matthew T. Campbell
Spatial Graphics and Analysis Lab
Department of Cartography and Geography
East Central University (Oklahoma)

Survey data courtesy of
Alan McConchie
Visit www.popvssoda.com
to participate.

Respondents through
March 1, 2003

Map Template courtesy of www.mymaps.com
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Map Template courtesy of www.mymaps.com

Respondents through March 1, 2003
Generic names for Soft Drinks by county:

- "pop"
- "soda"
- "coke"

Most Popular Term Used:
- Pop: 30% - 50%, 50% - 80%, 80% - 100%
- Coke: 30% - 50%, 50% - 80%, 80% - 100%

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Map Template courtesy of www.mymaps.com

Respondents through March 1, 2003
The image presents a map of the United States showing the generic names for soft drinks by county. The map includes the following terms:

- **"pop"**
- **"soda"**
- **"coke"**
- **"other"**

The colors on the map indicate the percentage of respondents using each term, with the following color codes:

- Light blue: 30% - 50%
- Medium blue: 50% - 80%
- Dark blue: 80% - 100%
- Red: 50% - 80%
- Orange: 80% - 100%
- Green: 30% - 50%
- Yellow: 50% - 80%

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Respondents through March 1, 2003.
Choose colors well
Focus on the foreground
Cartograms

…and other spatial distortions
Progressive distortion
Harry Beck’s London tube diagram
People *love* the tube map
Tube map + isochrones
Major distortions can stay recognizable
Projection
Flattening the globe onto a flat screen
Latitude, Longitude

P = 40°N, 60°W
A sphere tears when you flatten it
There are interesting ways to tear spheres
What your favorite map projection says about you

Mercator

You’re not really into maps.

Van der Grinten

You’re not a complicated person. You love the Mercator projection; you just wish it weren’t square. The earth’s not a square, it’s a circle. You like circles. Today is gonna be a good day!
You think that when we look at a map, what we really see is ourselves. After you first saw Inception, you sat silent in the theater for six hours. It freaks you out to realize that everyone around you has a skeleton inside them. You have really looked at your hands.
Projections usually have a home.
Projections are usually designed for paper
Surveyors usually prefer cartesian math.
Three example ways to categorize projections...
Azimuthal
Preserves direction
Equal-Area
Preserves area
Conformal
Preserves local shapes
Spherical Mercator is ubiquitous on the web—why?
(the square will be important later)
One notable interesting way to tear a sphere
tetrahedron
cube
octahedron
dodecahedron
icosahedron
You can drag the map with your mouse, and use the +/- buttons to zoom. The circle in the center will always indicate North for that point, and when you stop dragging the map will re-orient itself automatically. Read more about this on my blog.
Scale

How big is your map?
This is not “scale”
Scale is an idea imported from print.
Choose the right content at different scales
Four maps, same area
Generalizing shapes
What shows at different scales?
Shapes change at different scales

Figure 11. Fragmentation of a river into polygons and lines with different thresholds leading to different results (c, d, e).
Data

Where data for maps comes from
Natural Earth Data

naturalearthdata.com
...for small to medium scales
...for large scales...
...and things mapped by no one else.
Our Awesome Government

nationalatlas.gov, census.gov, usgs.gov, etc.
Publishing Tools
<2005

WMS and related technologies
Tiles, Javascript
style
data
interaction
images
style
data
PostGIS
An open source spatial database,
postgis.refractions.net
TileStache

For serving tiles,
tilestache.org
Mapnik

For rendering tiles,
mapnik.org
OpenLayers, Modest Maps

For putting maps in a browser, openlayers.org — modestmaps.org
Polymaps

For the future,
polymaps.org
Put it all together...
• Visualizing data on maps: Dots, more dots, continuous data, choropleths and cartograms

• Cartography: Projections, scale and data

• Publishing tools: Before Javascript, after Javascript
Thank You!

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