

Spatial Visualisations

Advanced Visualisations

Jan-Philipp Kolb

Monday, November 03, 2014



Outline

Choropleth Maps

Heatmaps

Dot maps

Line maps

More sources for data

Outline

Choropleth Maps

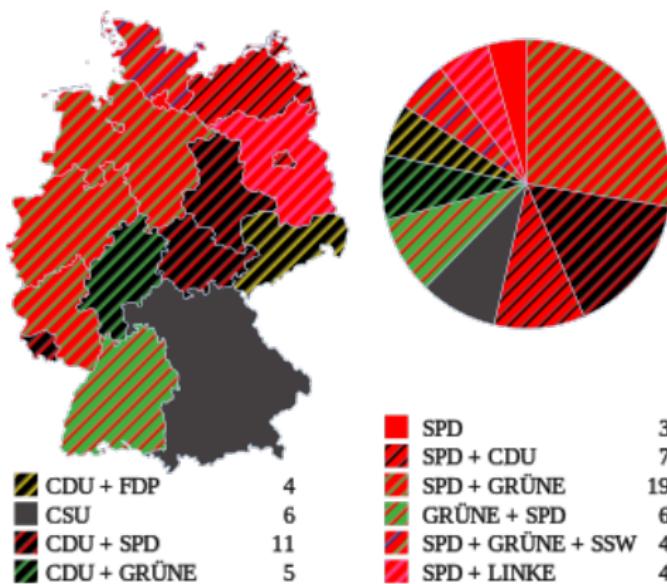
Heatmaps

Dot maps

Line maps

More sources for data

Example: Wikipedia



Source: http://de.wikipedia.org/wiki/Land_%28Deutschland%29

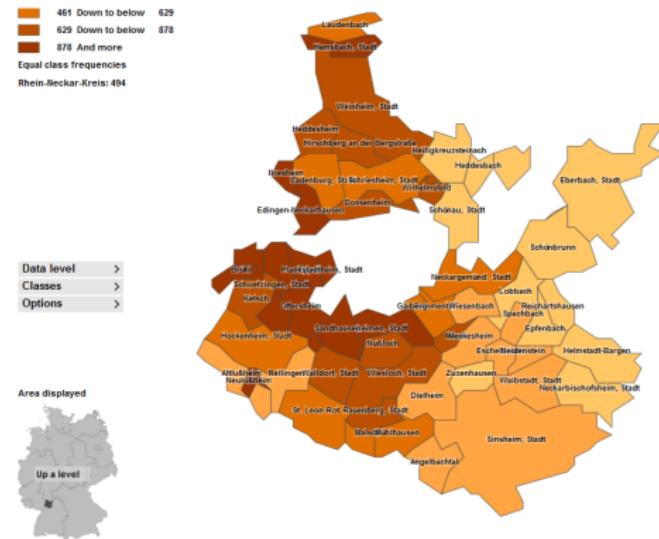
Example Wikipedia

Wirtschaft

Wappen	Land	BIP in Mrd. € ^[16]	Pro Kopf in € ^[16]	EK/K in € ^[17]	Schulden (2007) in Mrd. € ^[18]	Pro Kopf (2007) in € ^[18]	Schulden (2012) in Mrd. € ^[19]	Pro Kopf (2012) in € ^[20]	AQ ^[21]
	BW	407,2	37.472	19.261	44.113	4.109	67.471	6.255	3,7
	BY	488,0	38.429	18.775	23.075	1.857	42.794	3.397	3,4
	BE	109,2	30.642	14.797	61,0 ^[22]	17.968 ^[23]	61.220	17.482	12,0
	BB	59,1	23.751	14.634	16,4 ^[22]	6.640 ^[22]	21.336	8.549	9,8
	HB	28,6	43.085	19.933	13,4 ^[22]	20.178 ^[22]	19.660	29.729	11,0
	HH	97,7	53.611	22.908	20.045	15.417	24.256	13.484	7,4
	HE	235,7	38.490	18.658	32.289	5.300	55.497	9.110	5,6
	MV	37,1	22.817	13.953	10.894	6.417	12.222	7.476	11,2
	NI	239,0	30.149	17.105	51.332	6.425	69.557	8.790	6,2
	NW	599,8	33.621	18.724	115,0 ^[22]	6.398 ^[22]	237.497	13.311	8,0
	RP	121,6	30.420	17.101	27.485	6.771	44.097	11.027	5,2
	SL	32,1	31.834	17.138	9.346	8.880	16.015	15.804	6,6

http://de.wikipedia.org/wiki/Land_%28Deutschland%29

Census results - Germany



<https://ergebnisse.zensus2011.de/>

Census results - Germany

Welcome to the census database of the Census 2011

How do you want to get the results?

Easy way to results	Dynamic and individual results	Results cartographically and visually
		

[Important information](#)

<https://ergebnisse.zensus2011.de/>

Census results - Germany

The tables available have to be adapted:

	A	B	C	D	
1	Gebiet	Anteil des selbst genutzten Wohneigentums	Leerstandsquote (Wohnungen)	Anteil des zu Wohnzwecken vermieteten Wohneigentums (auch mietfrei)	
2	Baden-Württemberg	51,3	4,1	44,7	
3	Bayern	49,1	3,7	47,2	
4	Berlin	15	3,5	81,5	
5	Brandenburg	42,3	5,6	52	
6	Bremen	37,8	3,6	58,6	
7	Hamburg	23,7	1,5	74,8	
8	Hessen	47,1	3,7	49,2	
9	Mecklenburg-Vorpommern	36,2	6,2	57,7	
10	Niedersachsen	52,4	3,6	44	
11	Nordrhein-Westfalen	41,4	3,6	55	
12	Rheinland-Pfalz	54,7	4,3	41	
13	Saarland	59,4	5,7	34,9	
14	Sachsen	30	9,8	60,2	
15	Sachsen-Anhalt	38,3	9,4	52,3	
16	Schleswig-Holstein	49,2	2,7	48,1	
17	Thüringen	42,8	6,8	50,4	
18					

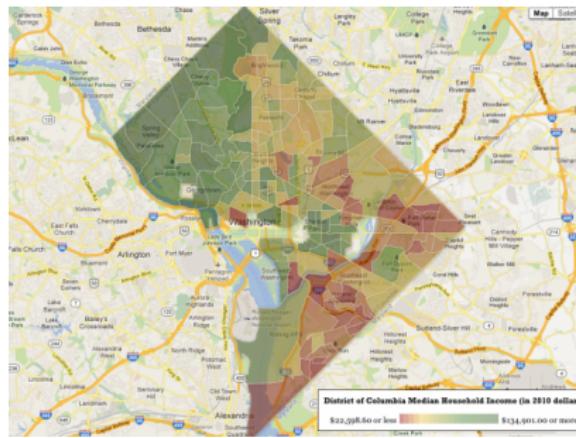
<https://ergebnisse.zensus2011.de/>

Rich Blocks Poor Blocks



Rich Blocks Poor Blocks

- ▶ information about income in their neighborhoods,
- ▶ using the 2006-2010 American Community Survey estimates
- ▶ compiled by the U.S. Census Bureau.
- ▶ map of Washington, D.C., which is segregated by race, educational attainment and income:



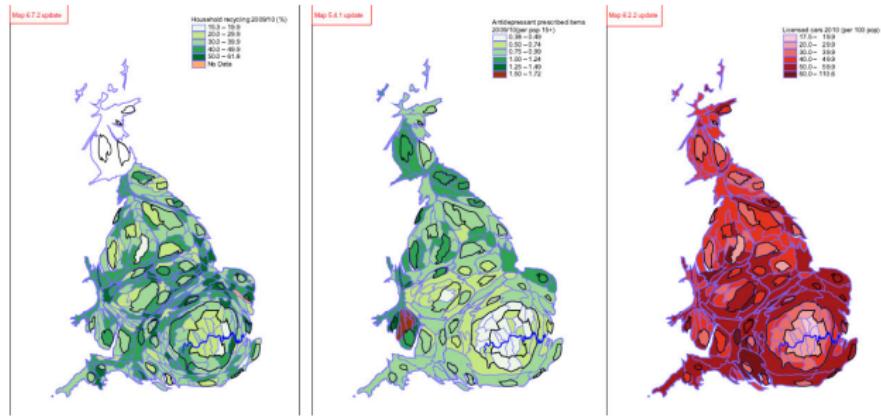
American Community Survey

Data for the American Community Survey:



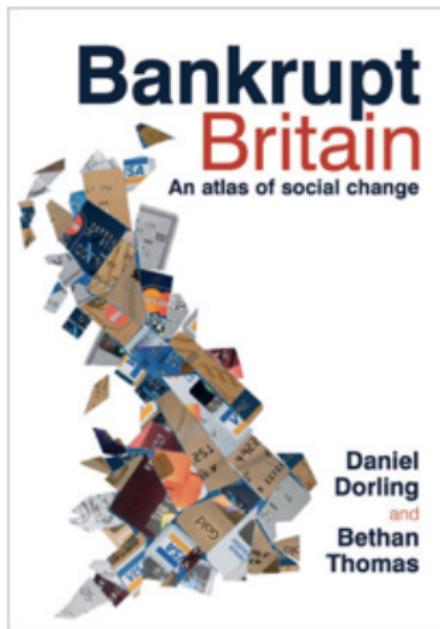
<http://www.census.gov/acs/www/>

Bankrupt Britain - An Atlas of Social Change



<http://www.thingsmagazine.net/oaks-wrecks-and-social-change/>

Bankrupt Britain - An Atlas of Social Change

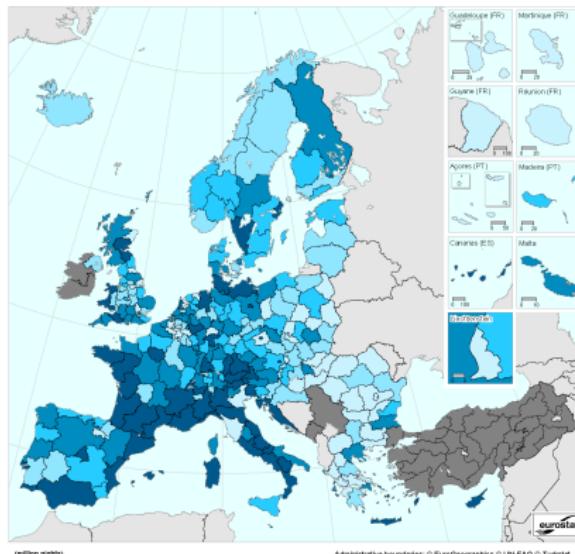


<http://sasi.group.shef.ac.uk/bankruptbritain/Material.html>

Eurostat maps

Nights spent in hotel, campsites etc.

Nights spent in hotels, campsites and other collective accommodation establishments,
by NUTS 2 regions, 2010 (*)
(million nights)



Data from Eurostat

The screenshot shows the Eurostat website's statistics search database interface. At the top, there is a navigation bar with links for Register, Cookies, Links, Contact, Important legal notice, and English (en). Below the navigation bar, the main content area has a header "Browse / Search Database". On the left, a sidebar titled "Statistics" contains links for Statistics by theme, Statistics A - Z, Browse / Search database, Bulk download, SDMX Web Services, Access to microdata, GISCO:Geographical Information and maps, Metadata (with sub-links for Concepts and definitions, Legislation and methodology, Classifications, Glossaries and thesauri, National methodologies, Euro-SDMX Metadata Structure, Standard code lists, Statistical Data and Metadata eXchange (SDMX), and Data validation), and Data validation.

The main content area features a search bar with placeholder text "Type a keyword, the code of a dataset..." and a "Search" button. Below the search bar are buttons for "Create Custom Tree", "Table of Content", and "Information". The central part of the page displays a "Data Navigation Tree" with two main categories: "Database by themes" and "Tables by themes". Each category is expanded to show sub-themes such as General and regional statistics, Economy and finance, Population and social conditions, Industry, trade and services, Agriculture, forestry and fisheries, International trade, Transport, Environment and energy, and Science and technology.

http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

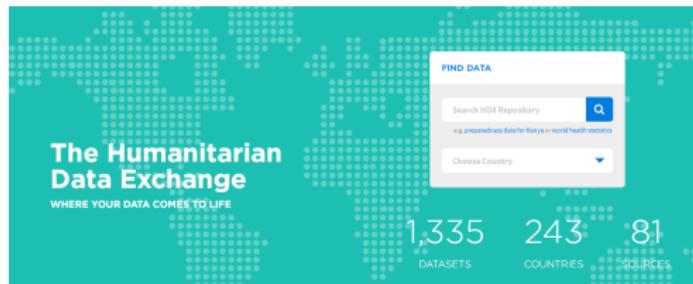
GeoData from Eurostat

Administrative or Statistical unit	Scale	Coverage	Feature type	Format	Period	Coordinate reference system	Size (MB)	File to download
Countries 2014	1:3 Million	World	Point / Line / Polygon	Personal GDB	2014	ETRS89	11.2	CNTR_2014_03M.zip
	1:3 Million	World	Point / Line / Polygon	Shapefile	2014	ETRS89	10.4	CNTR_2014_03M_SH.zip
	1:10 Million	World	Point / Line / Polygon	Personal GDB	2014	ETRS89	7.1	CNTR_2014_10M.zip
	1:10 Million	World	Point / Line / Polygon	Shapefile	2014	ETRS89	6.8	CNTR_2014_10M_SH.zip
	1:20 Million	World	Point / Line / Polygon	Personal GDB	2014	ETRS89	4.0	CNTR_2014_20M.zip
	1:20 Million	World	Point / Line / Polygon	Shapefile	2014	ETRS89	3.8	CNTR_2014_20M_SH.zip
	1:60 Million	World	Point / Line / Polygon	Personal GDB	2014	ETRS89	3.3	CNTR_2014_60M.zip
	1:60 Million	World	Point / Line / Polygon	Shapefile	2014	ETRS89	3.1	CNTR_2014_60M_SH.zip

http://epp.eurostat.ec.europa.eu/portal/page/portal/gisco_Geographical_information_maps/popups/references/administrative_units_statistical_units_1

The Humanitarian Data Exchange

data.hdx.rwlabs.org



Ebola

<https://data.hdx.rwlabs.org/dataset/rowca-ebola-cases>

London Datastore

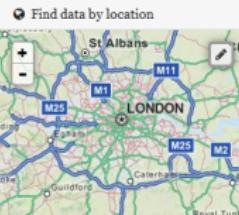
GREATER LONDON AUTHORITY MAYOR OF LONDON LONDON ASSEMBLY

[Back to LONDON.GOV.UK](#)

LONDON DATASTORE

Blog Data Topics Developers ▾ Boroughs ▾ GLA Analysis ▾ More ▾ [Search for data...](#)

_datasets

Find data by location 
Map data © OpenStreetMap contributors.
Tiles by MapQuest.

Search datasets...

591 datasets found Order by: Relevance

Monthly Mix-Adjusted Average House Prices, London Modified 2 days ago
Mix-adjusted house prices, by new/pre-owned dwellings, type of buyer and region, from February 2002 for London and UK, and average mix-adjusted prices by UK region. The data...
[XLS](#)

Index of Private Housing Rental Prices, Region Modified 2 days ago
The Index of Private Housing Rental Prices (IPHRP) is a quarterly experimental price index. It tracks the prices paid for renting property from private landlords in Great...
[XLS](#)

<http://data.london.gov.uk/dataset>

Outline

Choropleth Maps

Heatmaps

Dot maps

Line maps

More sources for data

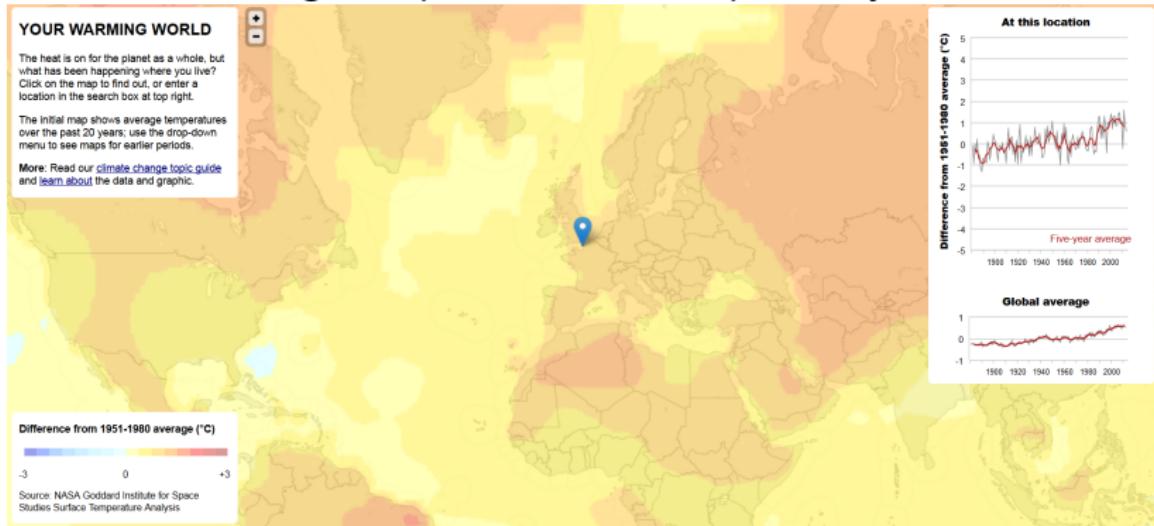
Heatmaps

- ▶ A heat map is a graphical representation of data where the individual values contained in a matrix are represented as colors.
- ▶ Fractal maps and tree maps often use a similar system of color-coding

Source: http://en.wikipedia.org/wiki/Heat_map

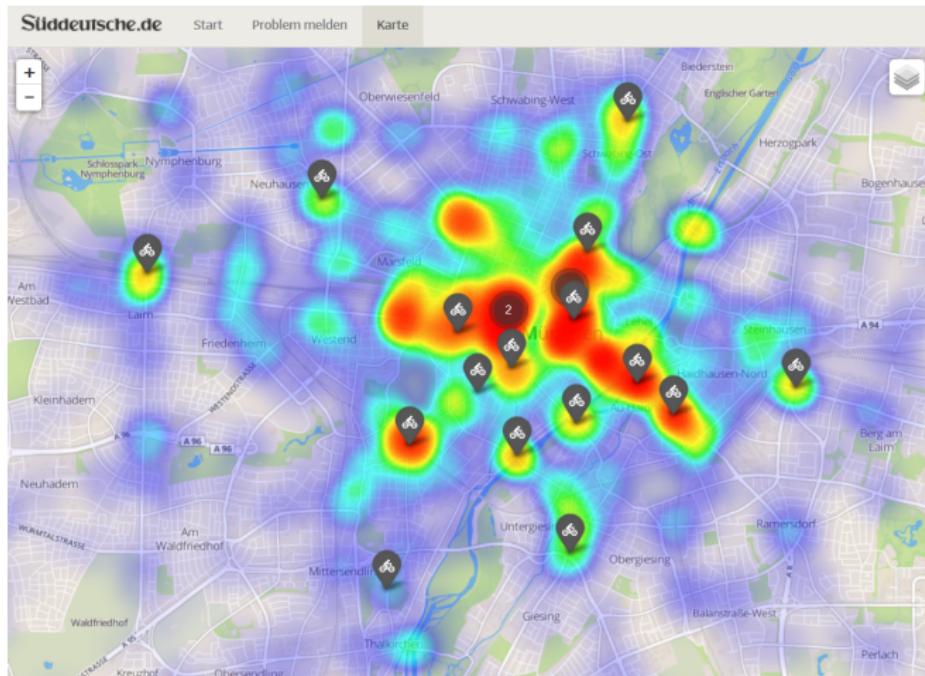
Heatmaps

Average temperature over the past 20 years.



Source: <http://warmingworld.newscientistapps.com/>

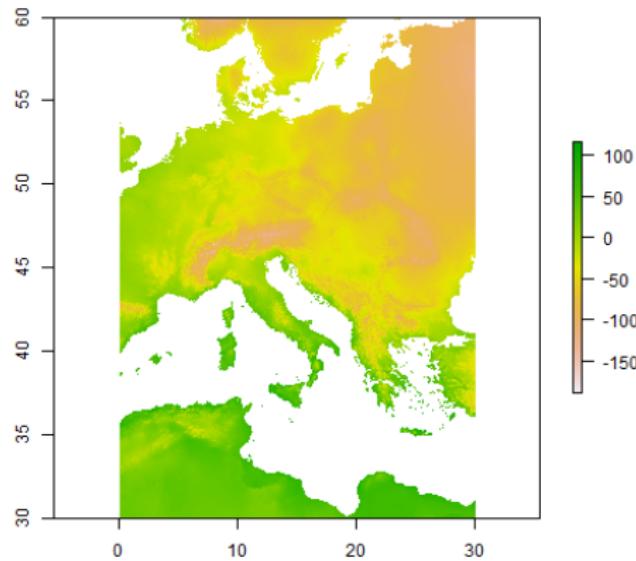
Heatmaps



Source: <http://www.sueddeutsche.de>

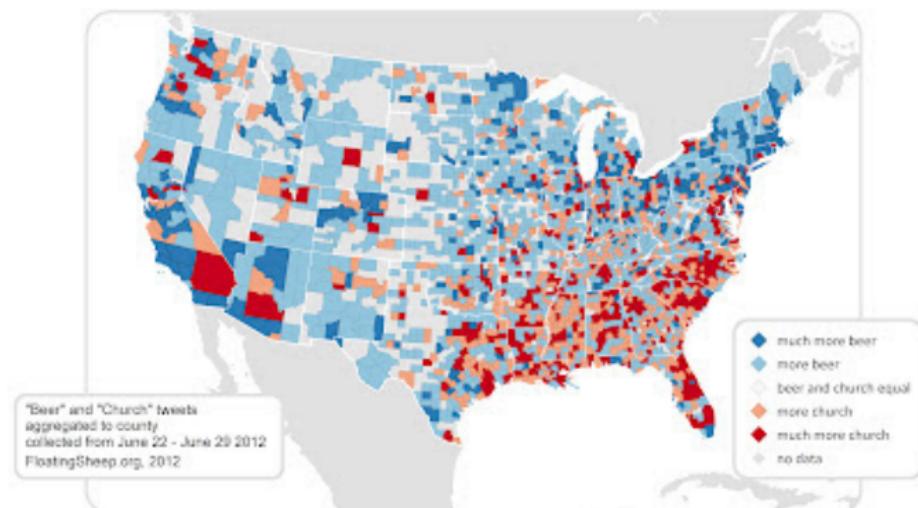
Heatmaps - package raster

Using raster climate data



Heatmaps - many topics are possible

Relative Number of Tweets containing the terms "church" or "beer" aggregated to the county level, June 22-28, 2012



Source: <http://www.floatingsheep.org/2012/07/church-or-beer-americans-on-twitter.html>

Outline

Choropleth Maps

Heatmaps

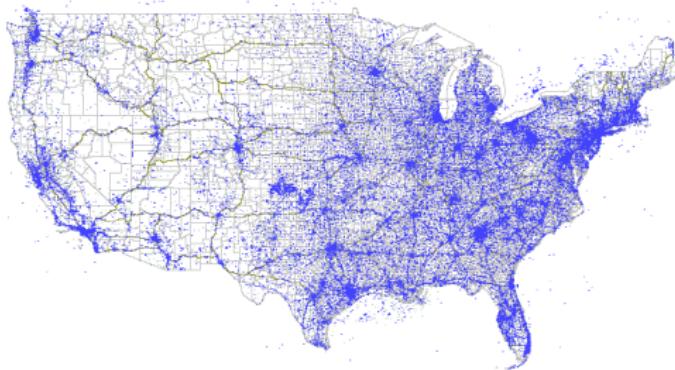
Dot maps

Line maps

More sources for data

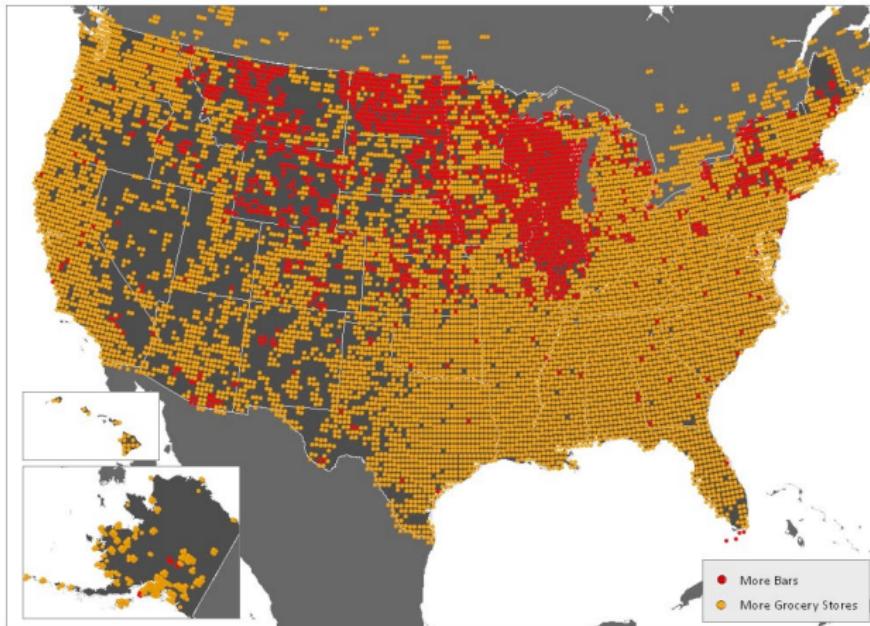
Dotmaps

- ▶ Used to represent themes that vary smoothly over space but are discrete,
- ▶ dot maps create a visual impression of density
- ▶ by placing a dot in the approximate location of one or more instances of the variable being mapped.
- ▶ Dot maps help to show patterns and go along with raw data.



Source: http://lewishistoricalsociety.com/wiki2011/tiki-read_article.php?articleId=6

Total Number of Bars vs. Grocery stores



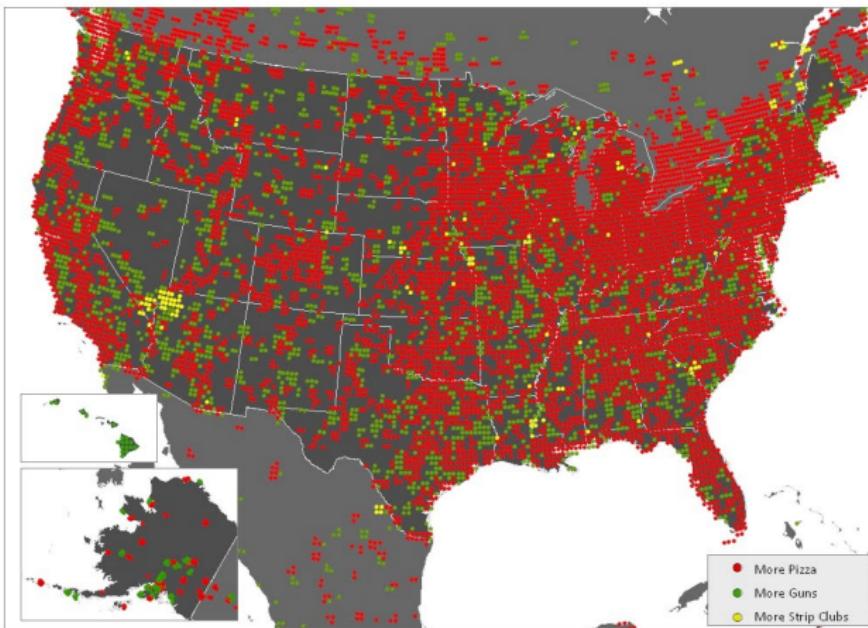
BARS AND GROCERY STORES: Shading represents more references to one search term in the Google Maps directory at a particular location, e.g., a red circle indicates more references to bars than grocery stores. Data collected in August 2008.

Copyright FloatingSheep.org, 2010

Source: <http://www.floatingsheep.org/2010/02/beer-belly-of-america.html>

Jan-Philipp Kolb Spatial Visualisations

The great American "Pizza" Map



GUNS, PIZZA AND STRIP CLUBS: Shading represents more references to one search term in user-generated Google Maps placemarks at a particular location, e.g., a red circle indicates more references to pizza than guns or churches. Data collected in August 2008.
Copyleft FloatingSheep.org, 2010

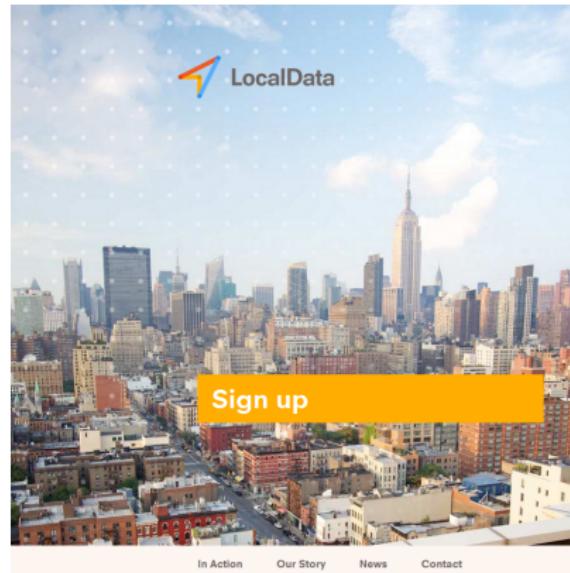
Source: <http://www.floatingsheep.org/2010/02/great-american-pizza-map.html>

Coffee Place Geography

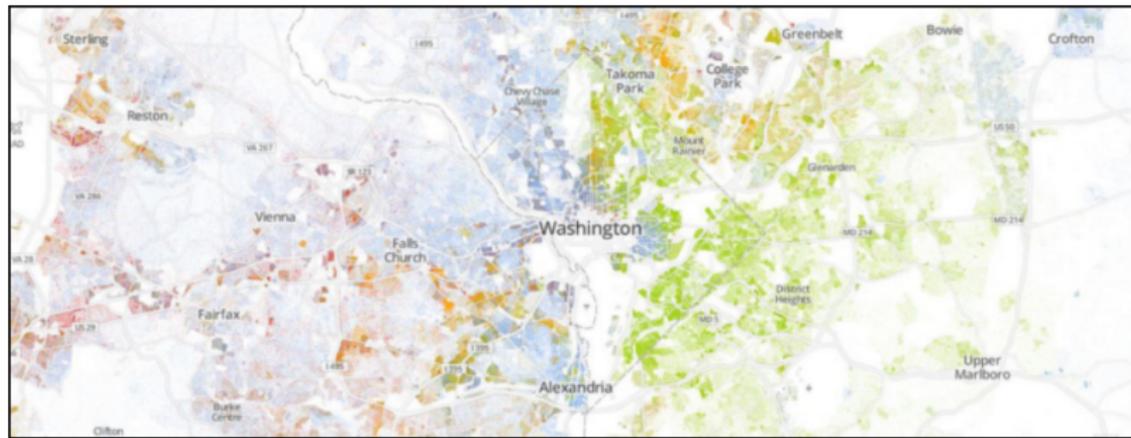


Source: <http://flowingdata.com/2014/03/18/coffee-place-geography/>

<http://localdata.com/>

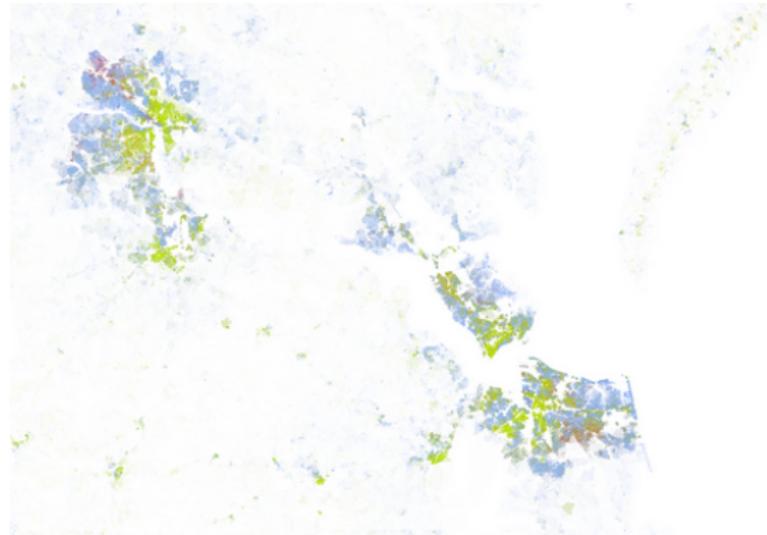


One dot per person



Source: <http://demographics.coopercenter.org/DotMap/index.html>

One dot per person



2010 Census Block Data

1 Dot = 1 Person

- White
- Black
- Asian
- Hispanic
- Other Race / Native American / Multi-racial

What am I looking at...?

One dot per person



Download Bulk Census Data

CENSUS.IRE.ORG

<http://census.ire.org/data/bulkdata.html>

The package ggmap

Georeferencing with R-Package ggmap

```
> geocode("zeltingen")
Information from URL :
http://maps.googleapis.com/maps/api/geocode/json?
address=zeltingen&sensor=false
Google Maps API Terms of Service :
http://developers.google.com/maps/terms
      lon     lat
1 7.013036 49.95489
```

Measuring distance with R-package ggmap

```
> mapdist("Trier","zeltingen")
Information from URL :
http://maps.googleapis.com/maps/api/distancematrix/json?
origins=Trier&destinations=Zeltingen&mode=driving&sensor=false
Google Maps API Terms of Service :
http://developers.google.com/maps/terms
      from        to      m      km    miles seconds minutes     hours
1 Trier zeltingen 48467 48.467 30.11739      2323 38.71667 0.6452778
```

Code-Point Open Linked Data

Dataset Summary	
	
License:	OS Open Data License
Created	October 25th, 2010
Updated	May 10th, 2013
Size	33,750,456 triples

<http://data.ordnancesurvey.co.uk/datasets/code-point-open/downloads>

Data on the forest in New Zealand



<http://www.stats.govt.nz/searchresults.aspx?q=forest>

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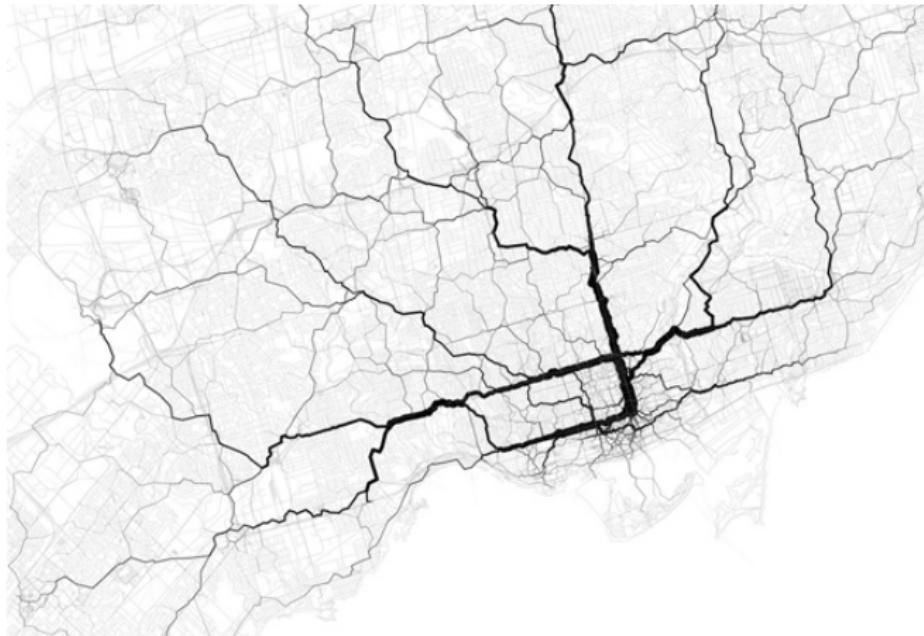
Every River in America



Source: <http://demographics.coopercenter.org/DotMap/index.html>

Tracking Smartphone users

Track the paths that smartphone-toting people take



http://www.blogto.com/tech/2012/02/towards_a_map_of_toronto_desire_lines/

Where People Run in Paris



Source: <http://flowingdata.com/2014/02/05/where-people-run/>

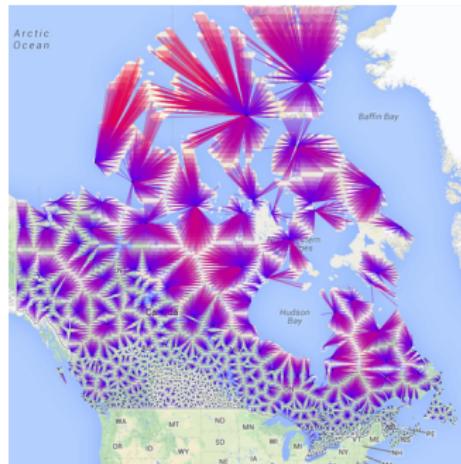
Flight patterns



<http://www.michaeljkramer.net/cr/?p=5212>

The Small Towns and Deserts of Canada

- ▶ What makes areas with high population density different from places with so few people



Source: <http://www.visualizing.org/galleries/>

Outline

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Forschungsdatenzentrum.de

Using the german Microcensus for geographic visualisation:



STATISTISCHE ÄMTER
DES BUNDES UND DER LÄNDER
FORSCHUNGSDATENZENTREN

Startseite Impressum Wir über uns English

Datenangebot

Datenangebot | Mikrozensus 2002

Datenzugang

Metadaten | Ansprechpartner

Nutzungsbedingungen

Amtliche Firmendaten

CAMPUS-File

Das CAMPUS-File zum Mikrozensus 2002 ist eine 3,5%-Wohnungsstichprobe des Originalmaterials des Mikrozensus 2002, der speziell für Lehr- und Übungszwecke erstellt wurde. Die Daten wurden durch Vergrößerung und Löschung einzelner Merkmale anonymisiert. Weitere Informationen zur Methodik und zur Anonymisierung sind in der Methodenbeschreibung aufbereitet. Das CAMPUS-File wird in den Formaten SPSS, SAS und STATA sowie als ASCII-CSV angeboten.

CAMPUS-Files

Veranstaltungen

Veröffentlichungen

Kontakt

Die Nutzung dieses CAMPUS-Files ist unentgeltlich.

Fälle	Variablen	Hochrechnung
25.137 Personen 11.655 Haushalte 11.788 Wohnungen	335	Bund, Länder

Metadaten zum Download

Datei	Format	Größe
Daten: SAS (mit Labels)	zip	3.050 KB

THE WORLD FACTBOOK



cia.gov/library/publications/the-world-factbook/

datahub

the free, powerful data management platform from the Open Knowledge Foundation

datahub.io



More sources for data

- ▶ ZACAT - GESIS Online Study Catalogue
<http://zacat.gesis.org/webview/index.jsp>
- ▶ More examples like rich blocks poor blocks
<http://thedataviz.com/tag/mapping/>
- ▶ Examples on R-bloggers
<http://www.r-bloggers.com/wp-content/uploads/2010/01/mamaps.zip>
- ▶ Factfinder
<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>
http://www.udel.edu/johnmack/frec682/census/census_lab2.html

Now you should search for a dataset you want to use for visualisation.