

Spatial Visualisations

Think spatial

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Monday, October 13, 2014



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The big picture

What is it all about

Global Peace Index



Source: Defense Intelligence Unit

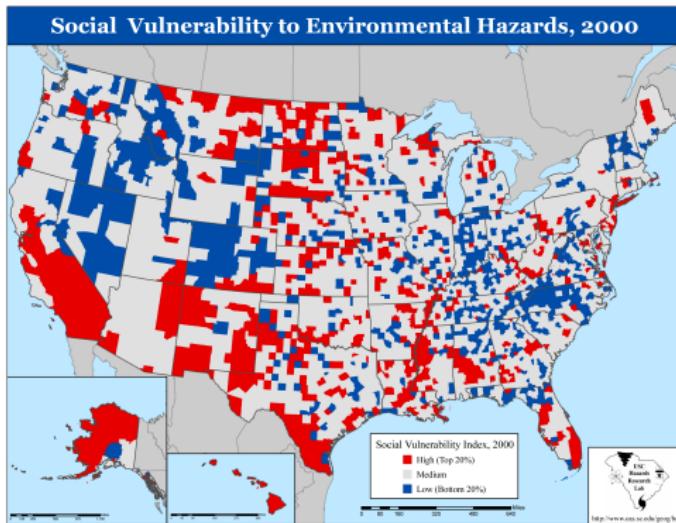
http://www.huffingtonpost.com/jim-luce/most-peaceful-states_b_1498090.html

The global peace index

- ▶ The level of organised conflict
- ▶ Relations with neighboring countries
- ▶ The level of perceived criminality in society
- ▶ Political instability
- ▶ Terrorist activity
- ▶ The number of homicides per 100,000 persons
- ▶ The level of violent crime
- ▶ Likelihood of violent demonstrations
- ▶ The number of jailed population per 100,000 persons
- ▶ Nuclear and heavy weapons capability
- ▶ Ease of access to small arms and light weapons

Social vulnerability

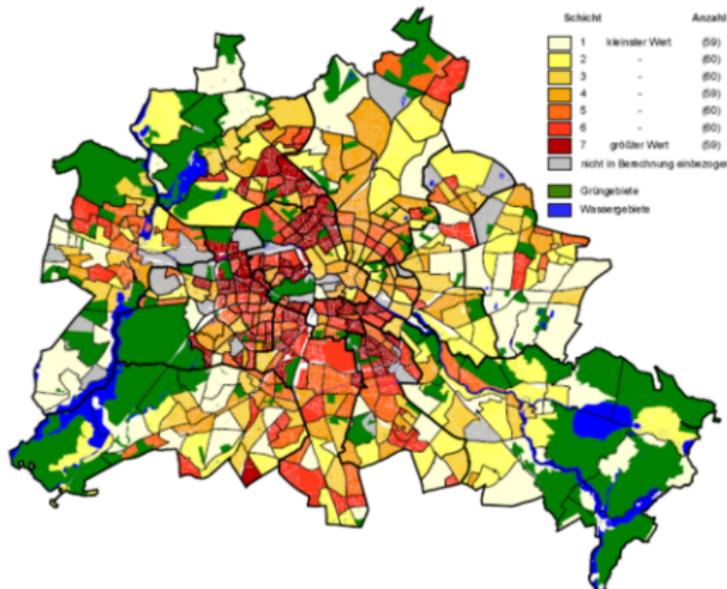
- ▶ culmination of economic/demographic/housing characteristics
- ▶ influence a community's ability to respond to, cope with, recover from, and adapt to **environmental hazards**.



http://webra.cas.sc.edu/hvri/products/sovi_42/sovi.aspx

Social index

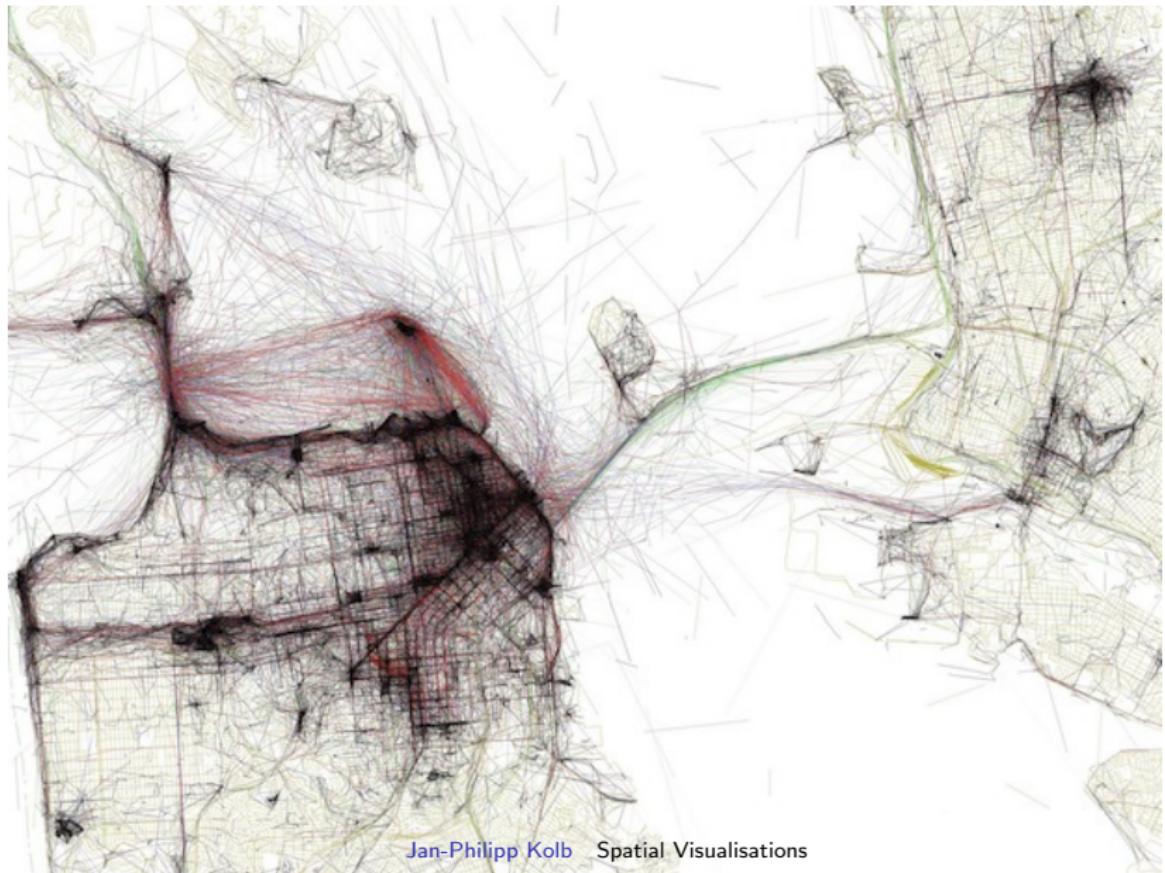
Proportion of social benefit recipients in Berlin



[http://www.tagesspiegel.de/mediacenter/fotostrecken/berlin/sozialindex-berlin/1487202.html?
p1487202=13](http://www.tagesspiegel.de/mediacenter/fotostrecken/berlin/sozialindex-berlin/1487202.html?p1487202=13)

The spatial perspective...

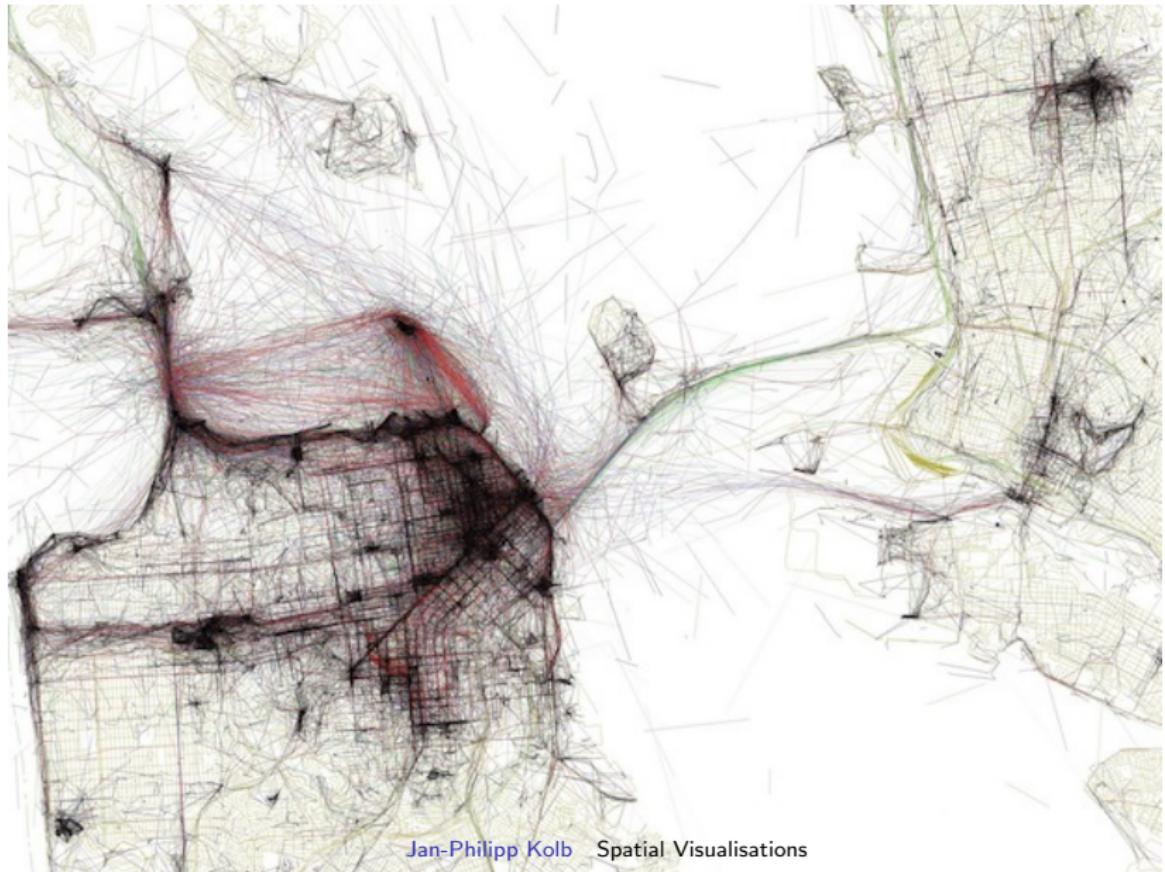
- ▶ ... is relevant to understand circumstances.



A hint



<http://de.wikipedia.org/wiki/Kalifornien>



flickr™

Spatial? - Motivation

- ▶ Massive amounts of data ... and growing!
- ▶ Often freely accessible on the web (e.g. through APIs)
- ▶ Often unstructured or semi-structured (e.g. web documents, news archives), often heterogeneous
- ▶ Often not intended for geographic purposes, but implicitly containing geographic info implicitly (Web 2.0)
- ▶ Often with little or no metadata

Targets

I want to....

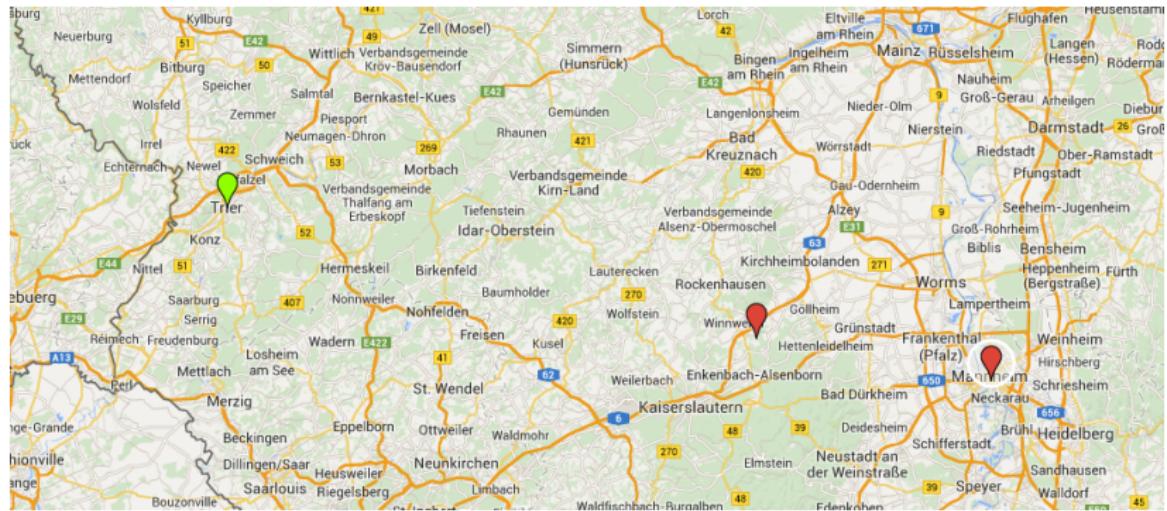
- ▶ ... show you examples of useful and less useful visualisations and applications.
- ▶ ... talk about the developments of maps/geography.
- ▶ ... clarify, why it is important for social sciences.
- ▶ ... show you how to produce your own maps/visualisations.
- ▶ ... tell you where you can find data.

Who I am?



Spatial Visualisations

Background





<http://www.uni-trier.de/index.php?id=17322>



Erasmus in Lyon

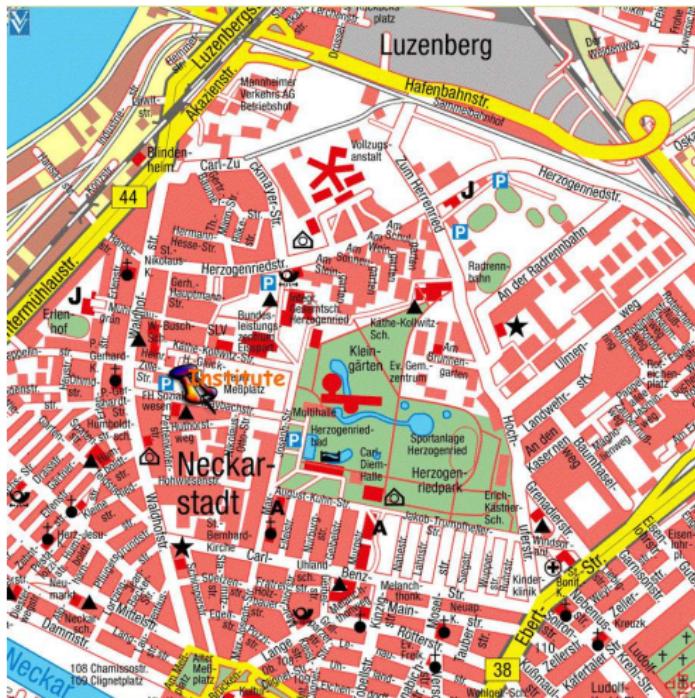


PhD in Trier



<http://www.orangesmile.com/reiseinfos/lyon/ausfuhrliche-karten.htm>

GESIS Mannheim



<http://www.orangesmile.com/reiseinfos/mannheim/ausfuhrliche-karten.htm>

Organisation Gesis

Five departments

- ▶ Survey Design and Methodology
- ▶ Monitoring Society and Social Change
- ▶ Data Archive for the Social Sciences
- ▶ Computational Social Science
- ▶ Knowledge Technologies for the Social Sciences

GESIS

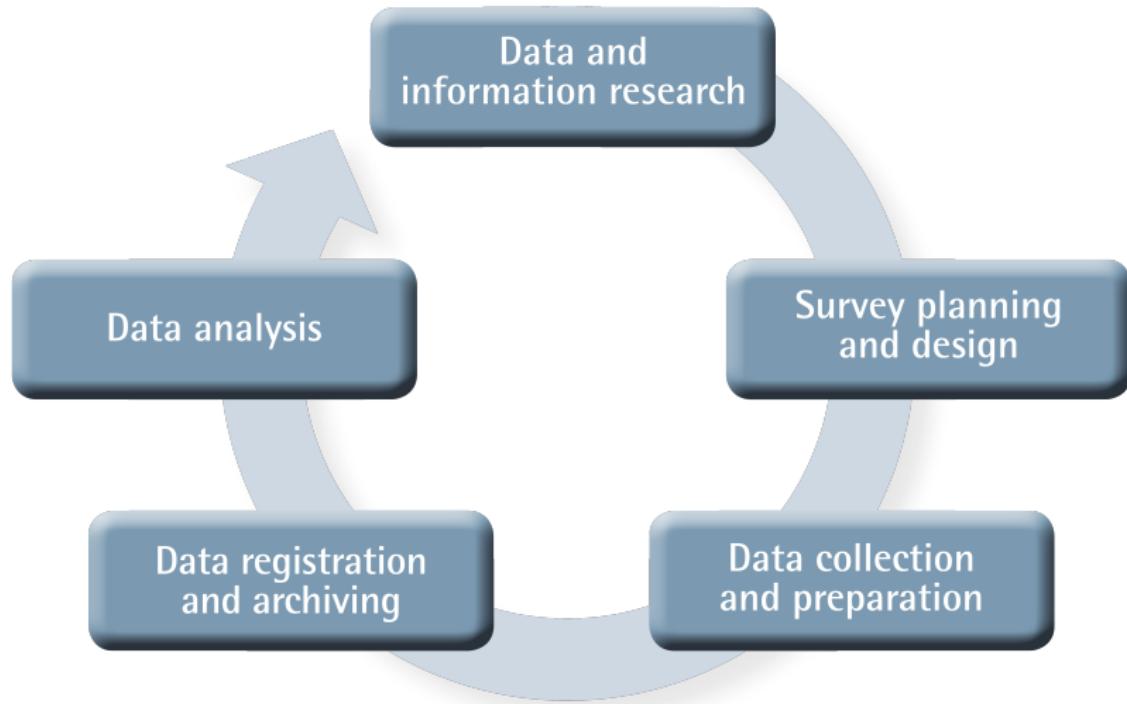
GESIS is:

- ▶ Infrastructure Services for social sciences
- ▶ over 250 employees at three sites (Mannheim, Kln, Berlin)

GESIS offers:

- ▶ Consulting for research projects in all phases
- ▶ Research based services

Presentation of GESIS



Tasks GESIS-Team Statistics:

Consulting and research on ...

- ▶ Planning of survey designs
- ▶ Development of sample designs for face-to-face, written, and telephone-assisted surveys
- ▶ Data analysis and visualisation

Outline

The big picture

Targets

Background

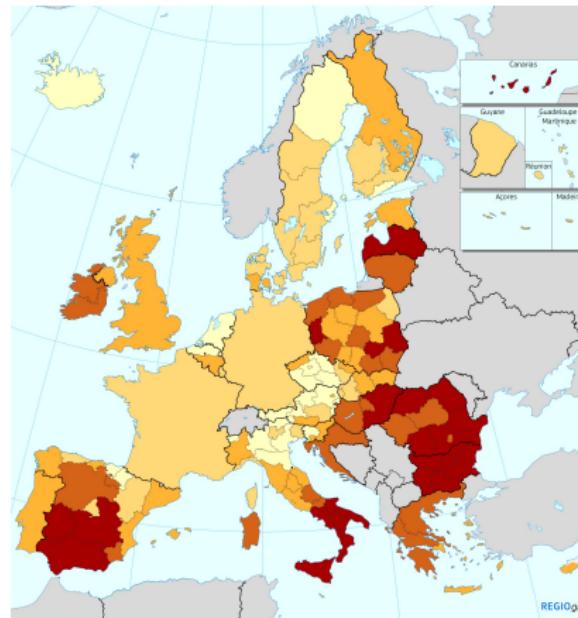
Geo use cases

Private interests

Tools

Organisation

Geo-use-case 1 - At risk of poverty rate



Population at-risk of poverty or social exclusion, 2011

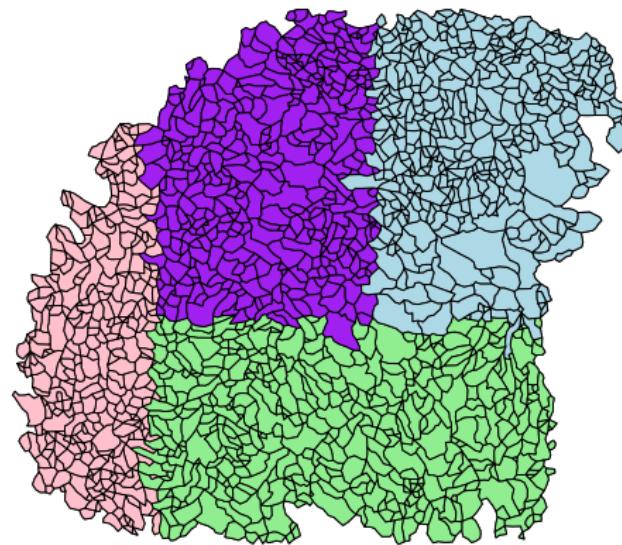
percentage points

- < 18.1
- 18.1 - 20.1
- 20.1 - 25.7
- 25.7 - 33.9
- ≥ 33.9

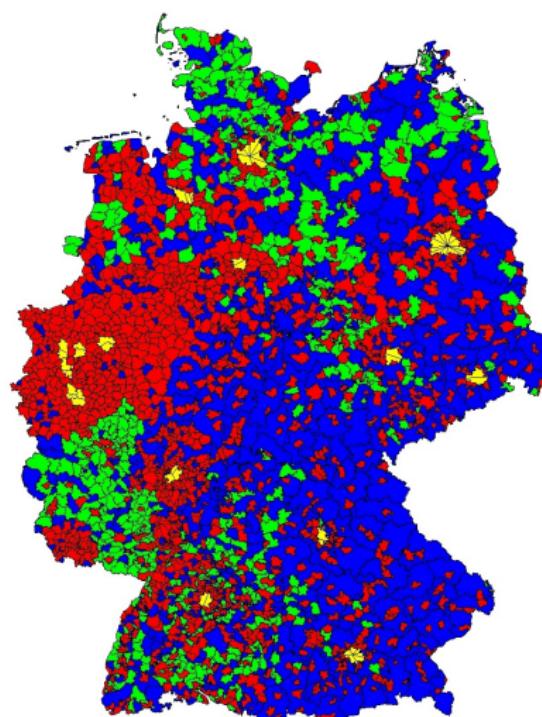
EU27 = 24.2
EU, IE: 24.0

Source: Eurostat

Ameli - poverty measurement

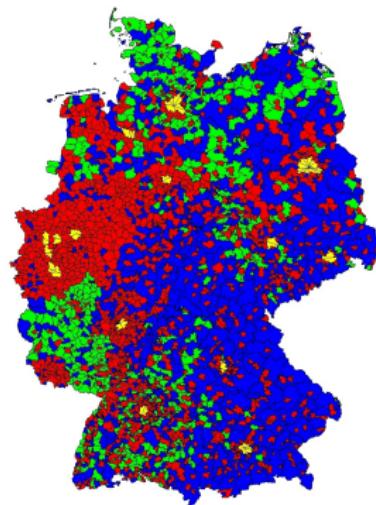


Example of map - German Census



Geo-use-case 2 - Visualisation

German register-based Census 2011



SMPtypes

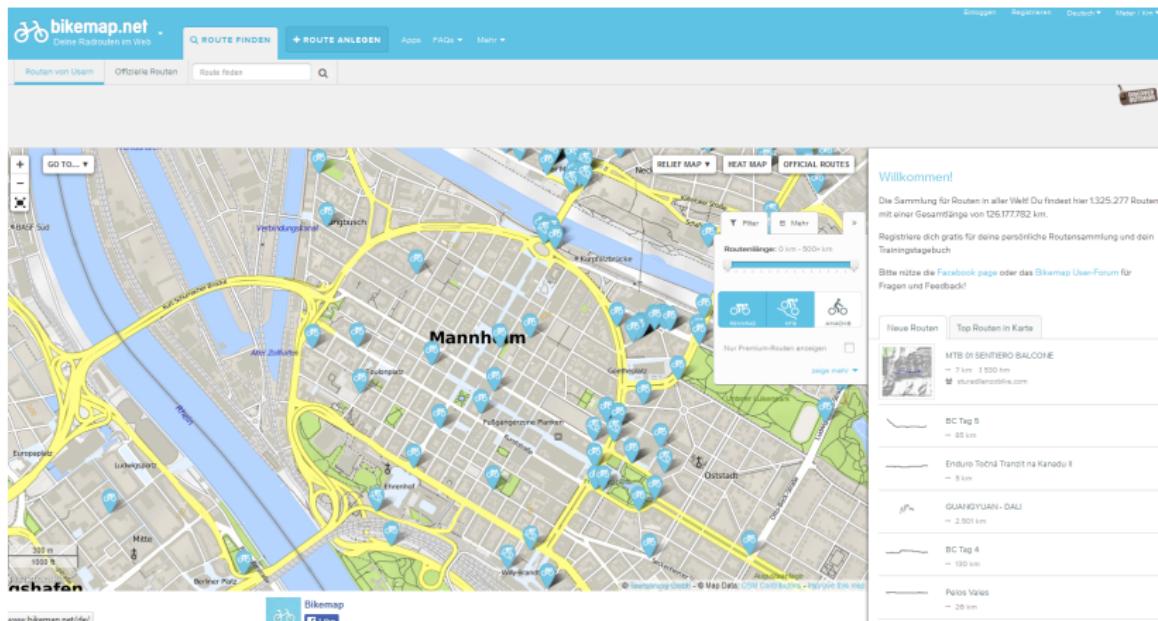
- ▶ Less than 10.000 inhabitants
- ▶ Less than 10.000 inhabitants
- ▶ More than 10.000 inhabitants
- ▶ More than 400.000 inhabitants

Source: Mnich, Gabler et al. (2012): Stichprobenoptimierung und Schtzung im Zensus 2011

Private Interests

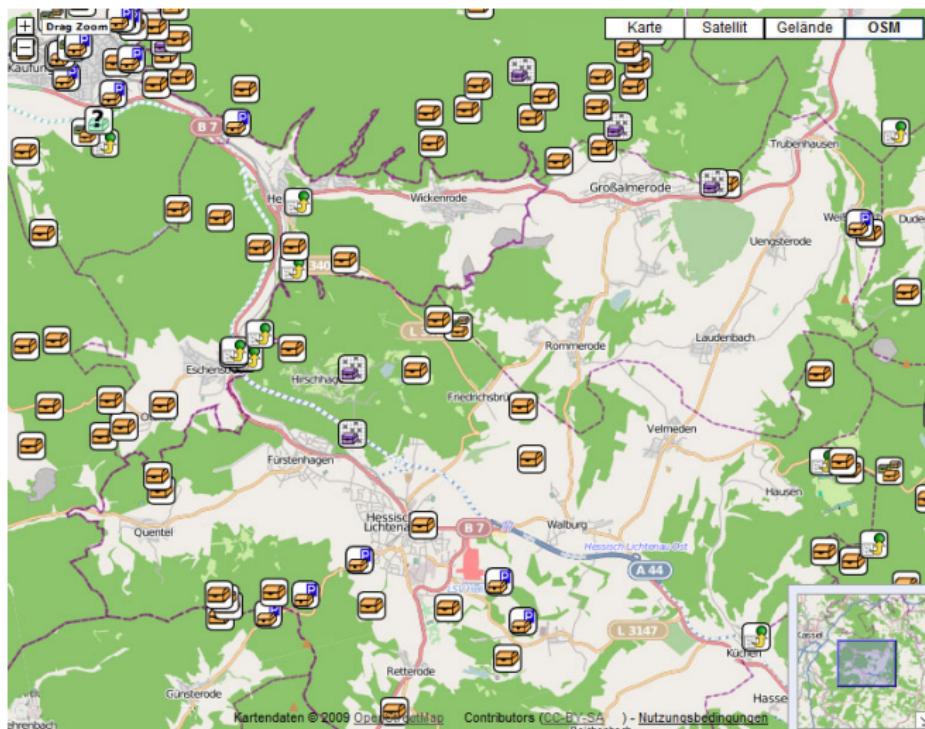


Private Interest - biking



<http://www.bikemap.net>

Private Interest - geocaching



Private Interest - collect information

yelp Find tacos Near Los Angeles, CA Sign Up Log In

tacos Los Angeles, CA Showing 1-10 of 16032

Hide Filters ▾

| Sort By | Neighborhoods | Distance | Price | Features | Category |
|---------------|---|-----------------|-----------------------------------|---|--------------------------------------|
| Best Match | <input type="checkbox"/> Downtown | Bird's-eye View | <input type="checkbox"/> \$ | <input type="checkbox"/> Offering a Deal | <input type="checkbox"/> Mexican |
| Highest Rated | <input type="checkbox"/> Boyle Heights | Driving (5 mi.) | <input type="checkbox"/> \$\$ | <input type="checkbox"/> Open Now 3:05 PM | <input type="checkbox"/> Food |
| Most Reviewed | <input type="checkbox"/> Pasadena | Biking (2 mi.) | <input type="checkbox"/> \$\$\$ | <input type="checkbox"/> Take-out | <input type="checkbox"/> Fast Food |
| | <input type="checkbox"/> East Los Angeles | Walking (1 mi.) | <input type="checkbox"/> \$\$\$\$ | <input type="checkbox"/> Good for Kids | <input type="checkbox"/> Food Stands |
| | More Neighborhoods | Within 4 blocks | | | More Categories |

Taco Bell Mexican, Fast Food, Tex-Mex Mid-City 1601 Crenshaw Blvd, Los Angeles, CA 90019 (323) 735-7702

This review is not for the restaurant, but for the newly introduced Kentucky Grilled Chicken. The restaurant this review is under is the location where I tried my first KGC, but I wouldn't...

1. Gusados Mexican 1278 reviews Boyle Heights 2100 E Cesar Chavez Ave, Los Angeles, CA 90033 (323) 254-7201

Got the sampler tacos which was a good deal. All the meats were stewed which was a bit of a disappointment. I added the chile taco which was a very bad idea - hottest thing I have ever eaten...

2. El Chato Taco Truck Mexican, Latin American, Food Trucks Mid-Wilshire 5300 W Olympic Blvd, Los Angeles, CA 90019 (323) 202-6936

Ultimate favorite taco truck! Tacos go for \$1 each and they may be small but these small bite-sized delights are full of flavor! One bite and it's game over, you'll be like damn, I've finally...

More Map Redo search when map moved Sun Valley La Crescenta Monrovia Van Nuys Burbank Glendale Pasadena Sherman Oaks North Hollywood North Los Angeles San Fernando Valley Santa Monica Venice Park-Windsor Hills Inglewood Westwood Hawthorne Lynwood Downey Map Data Terms of Use Report a map error

Ads by Google related to: tacos Los Angeles

Taco Trucks La www.com/Taco+Trucks+La
Search for Taco Trucks La Look Up Quick Results Now!

Love to Run the Beach? www.startly.com
Surf Sand and Fun Run Highway 1

<http://www.yelp.com>

Who are you?

Your background?

- ▶ Where do you come from?
- ▶ What are you studying?
- ▶ What are your main research interests?

Outline

The big picture

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Tools

GIS

A geographic information system (GIS) is a computer system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical data.

http://en.wikipedia.org/wiki/Geographic_information_system

Commercial GIS



⇒ good software but quite expensive

Tools

Online-GIS

Google Maps/Google Earth, Bing Maps, HERE, YandexMaps and OpenStreetMap



Open-Source-GIS

GRASS GIS, QGIS, and DIVA-GIS.





R and the geographic information systems

- ▶  and QGIS

<http://decisionstats.com/2011/02/14/qgis-and-r/>

- ▶  and GRASS GIS

http://grasswiki.osgeo.org/wiki/R_statistics

- ▶  and DIVA GIS

<http://cran.r-project.org/web/packages/divagis/index.html>

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Steps

- ▶ Show examples for spatial visualisations
- ▶ Clarify different types of maps
- ▶ Explain the theoretic foundations
- ▶ Show data sources
- ▶ Show how to create own maps

Division into three

Every session will be divided into three parts:

1. Lecture
2. Applied R-session
3. Assisted exercises

Target: Every participant should present his/her own map.

- ▶ Presentation of toolbox (R, Google API, OpenStreetMap etc.)
- ▶ Learning by doing is very important

Outline - Monday 13 October 2014

Lecture

- ▶ Introduction
- ▶ Background
- ▶ Motivation
- ▶ Organisation

R-session

- ▶ Why use R?
- ▶ Introduction to R

Outline - Monday 20. October 2014

Lecture - Map types

- ▶ Good examples - bad examples
- ▶ examples in newspapers, websites, books, articles ...
- ▶ Development of mapping - from historic maps to modern mash-ups

R-session - Choropleths

- ▶ Download information from GADM
- ▶ Visualization - Choropleths
- ▶ The `maptools`-package

Outline - Monday 27. October 2014

Lecture - Neogeography

- ▶ Interesting projects OpenStreetMap, mapping Wikipedia / Flickr
- ▶ Application programming interface (API)
- ▶ Geolocation/ Representation of Coordinates/ Latitude and Longitude
- ▶ Geocoding/geotagging (Example of a map)
- ▶ Easy-to-use mapping tools

R-session - Usage of APIs

- ▶ Data through APIs
- ▶ The googleMaps/ osmar/ ggmap-package

Outline - Monday 03. October 2014

Lecture - Advanced spatial visualizations

- ▶ Rich blocks poor blocks
- ▶ Heat maps/ Dot density maps
- ▶ One dot per person/Every River/ Flight patterns
- ▶ Examples Flickr
- ▶ Visualizations of distances
- ▶ Where people run (Spatial-time data)

R-session - Advanced spatial visualizations with R

- ▶ The sp-package
- ▶ Color coding
- ▶ Dot maps/heat maps

Outline - Monday 10. November 2014

Lecture - More Data Sources/ Further Reading

- ▶ New developments Web 2.0
- ▶ Terra Incognita
- ▶ Visualizing.org
- ▶ Nasa World Wind
- ▶ Emotional Map
- ▶ Geo Blog

R-session - Data processing

- ▶ How to integrate symbols in visualizations
- ▶ How to use maps as background for visualization
- ▶ The `raster`-package

Outline - Monday 17./24. November 2014

- ▶ 20 minutes presentation
- ▶ 10 minutes discussion

Your turn

Do you have ideas for spatial visualisations?