

Spatial Visualisations

Neogeography

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Outline



Outline

Introduction
Mapping tools
APIs
Example Wikipedia
Example Flickr
Further Reading

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Mapping tools

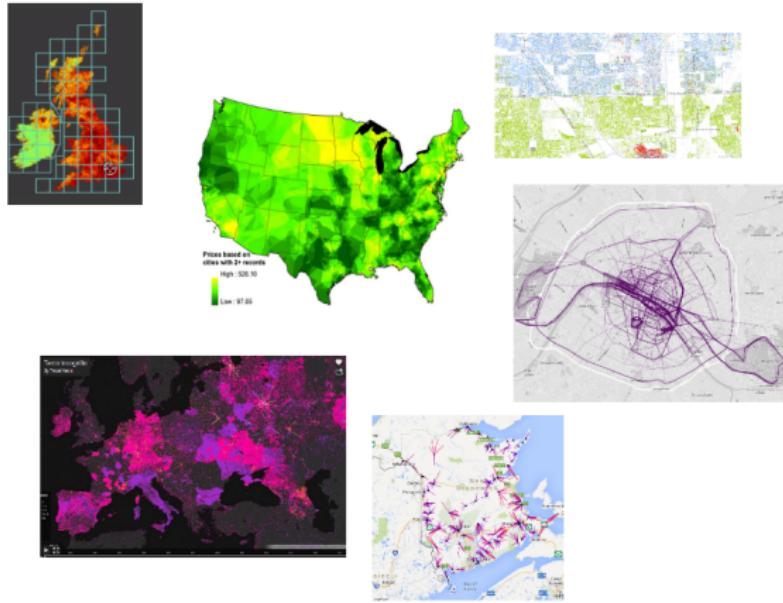
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Examples



Buzz words

- ▶ Collaborative mapping
- ▶ Wikification of GIS
- ▶ Location-Based Services
- ▶ Mapping mashups
- ▶ Geotagging

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Easy-to-use mapping tools

- ▶ MapQuest
- ▶ Yahoo!Maps
- ▶ Google Maps
- ▶ gEarth

Maps with google



In February 2005 Google Maps was introduced which offered a fast-loading, tiled map display and a deep user interface.

Maps with google

Wikification of GIS

Google's KML brought the Wikification of GIS

Mount, N., Harvey, G., Aplin, P., & Priestnall, G. (Eds.). (2008). Representing, modeling, and visualizing the natural environment. CRC Press.

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

OpenStreetMap

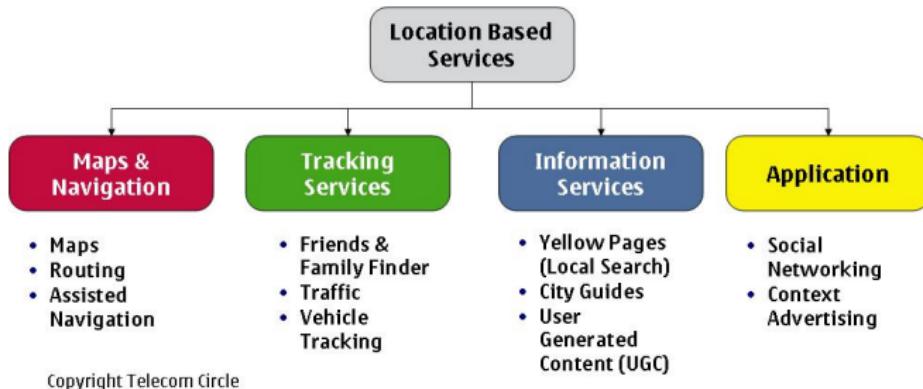
OpenStreetMap (OSM) is a collaborative project to create a free editable map of the world.

Two major driving forces:

- ▶ restrictions on use or availability of map information across much of the world and
- ▶ the advent of inexpensive portable satellite navigation devices.

<http://en.wikipedia.org/wiki/OpenStreetMap>

Location-Based Services



<http://www.telecomcircle.com/wp-content/uploads/2009/06/Location-Based-Services-Segments.JPG>

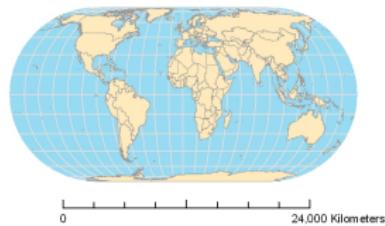
Projection

- ▶ A projection is required in order to display the three-dimensional Earth, which isn't a sphere but actually an oblate spheroid bulging in the center, onto any other shape.
- ▶ Typically, this is projection onto a two-dimensional map display, where Mercator and Rectangular (i.e., no transformation) projections are the most common.
- ▶ E.g. Google Maps uses the Mercator Projection, which is good for zoomed-in viewing, but causes distortions when zoomed out.
- ▶ It is important to understand the implication of various projections depending on application and also when mixing together mapping providers.

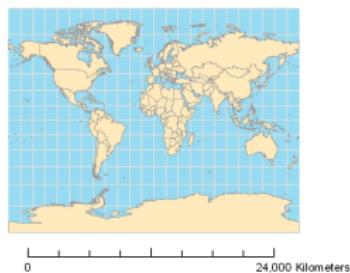
Different Projections

Four World Map Projections

Eckert IV



Gall Stereographic



Polyconic

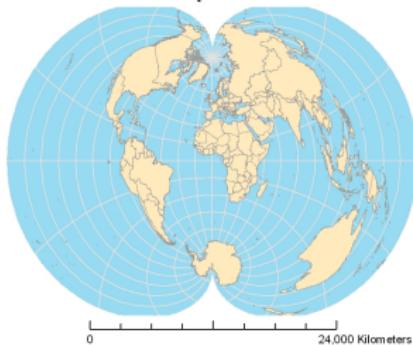
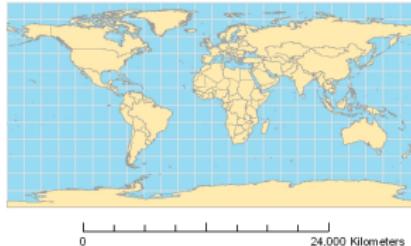


Plate Carrée



Created by: Clinton Kitzmiller, 09/28/2009 Source: ESRI Data, 2008

Mercator map projection



Source: <http://geography.about.com/od/understandmaps/f1/Gerardus-Mercator.htm>

Latitude and Longitude:

- ▶ A set of lines which form a grid system on a topographic map.
- ▶ Allows each place on the planet to have a unique set of coordinates.
- ▶ These lines represent the globe's east-west measurements, or longitude, and its north-south measurements, or latitude.
- ▶ These lines will be less important than contour lines in helping you navigate, but if you need to report your position to a search and rescue team, they will help you correctly report your location.

Coordinates

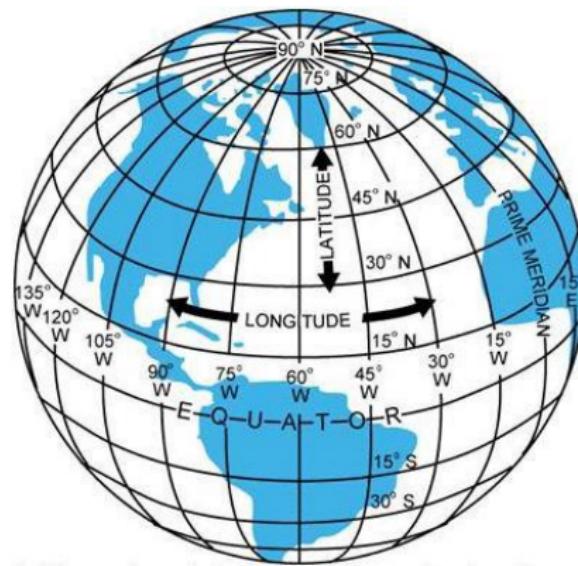
- ▶ Geographic coordinates are the absolute position on the Earth
- ▶ Typically these are Latitude and Longitude referenced to the WGS84 ellipsoid.
- ▶ **Latitude** varies North-South, with 0 degrees at the Equator, from 90 to -90 degrees towards the poles, and is positive North.
- ▶ **Longitude** varies East-West, with 0 degrees at the Prime Meridian, varies from 180 to -180 degrees and is positive to East.

Representation of Coordinates

- ▶ Decimal degrees (DD): 29.975
- ▶ Degrees-Minutes-Seconds (DMS): N29 58' 30"
- ▶ Degrees-Minutes (DM): 29 58.8'

The conversion is straightforward. There are 60 seconds in a minute, and 60 minutes in a degree.

Latitude and Longitude:



Source: <http://geolt44.wordpress.com/2012/01/06/summary-elements-of-geography/>

Geocoding

Geocoding is determining the position of a named location using automatic techniques.

It converts
Mannheim, B2, 1
to the coordinates
[49.48569, 8.462844]

latitude and longitude using a web service or application.

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Geolocation

- ▶ The technique of automatically determining the position of something based on measured data.
- ▶ E.g., it is possible to locate a computer given its IP address, or a mobile phone based on the observed cell towers.
- ▶ Geolocation is useful for determining where a user or device is without the user having to manually enter this information.
- ▶ GPS is a specific implementation of a geolocation technology.



Global Positioning System (GPS)

- ▶ GPS (Global Positioning System) really refers to the U.S. military owned and operated satellite network that provides three-dimensional location.
- ▶ GPS is also sometimes used to refer to any means of geolocation that provides geographic coordinates.
- ▶ GPS operates by a network of high-altitude space satellite broadcasting their position and time.
- ▶ Receivers use several of these observed broadcasts to determine its current position and time.
- ▶ space-based satellite navigation system that provides location and time information in all weather conditions

Application programming interface (API)

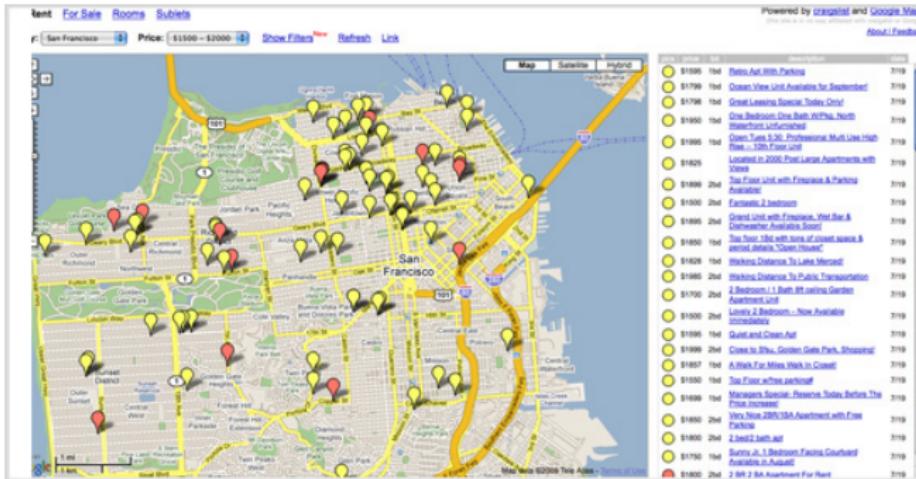
API's allow developers and users to quickly and easily show geographically based data on shareable maps.

→ **Mashups**

First examples of mapping mashups:

- ▶ Housing Maps
- ▶ ChicagoCrime.

Housing Maps



http://media.onsugar.com/files/ons1/192/1922507/29_2009/70e58c3087938704_Housing-Maps.jpg

Points of Interest

POI (Points of Interest)

- ▶ POI represents any significant locations such as public buildings, travelers services, or user-defined waypoints.
- ▶ These may be categorized: restaurant, trail head, friend's house, scenic overlook, or scuba diving site.

Areas of Interest (AOI)

AOI may include multiple POI or just a geographic area instead of a single point.

http://pcmlp.socleg.ox.ac.uk/sites/pcmlp.socleg.ox.ac.uk/files/Introduction_to_Neogeography.pdf

Geotag

- ▶ Adding location information to a document, photograph, audio sample, or some other type of data
- ▶ Geotagging formats are not uniform



http://blog.safetyweb.com/wp-content/uploads/2010/09/Geotag_IM.png

Keyhole Markup Language (KML)

- ▶ Keyhole Markup Language (KML) is an XML notation for expressing geographic annotation and visualization within Internet-based, two-dimensional maps and three-dimensional Earth browsers.
- ▶ KML was developed for use with Google Earth, which was originally named Keyhole Earth Viewer.
- ▶ It was created by Keyhole, Inc, which was acquired by Google in 2004.
- ▶ KML became an international standard of the Open Geospatial Consortium in 2008.

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

- New data sources (I won't even count RS imagery!)
 - geopositioning data: GPS, GSM, WLAN, RFID etc.
 - web content
 - high resolution vector data
- New business models
 - marginal costs vs. cost recovery
 - free data, paid by advertisers
 - volunteered geographic information (VGI)
- New networks
 - OGC, INSPIRE
 - Semantic web
 - VGI, Web 2.0, "Neogeography"



<http://www.dagstuhl.de/Materials/Files/09/09161/09161.WeibelRobert.Slides.pdf>

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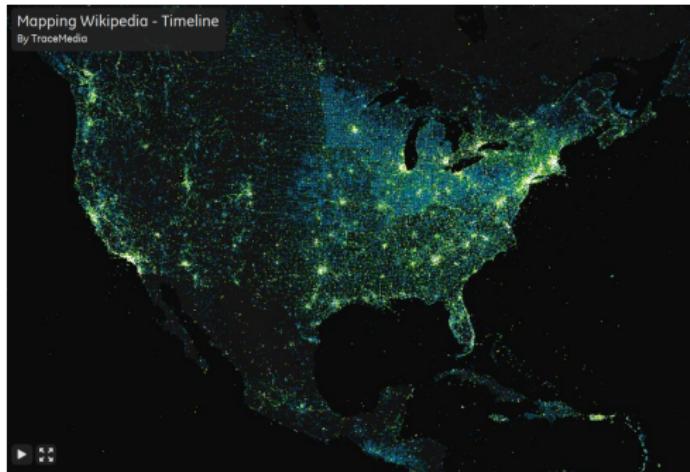
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Mapping Wikipedia

Mapping Wikipedia - Timeline visualises all the geo-located articles for a number of languages and maps article creation dates, showing how Wikipedia has evolved over time.



Source: <http://www.visualizing.org/visualizations/mapping-wikipedia-timeline>

Mapping Wikipedia

Mapping Wikipedia visualises all the geo-located articles for a number of languages.

This mapping highlights geo-linguistic contours and uneven geographies:

- ▶ regions that are densely populated with contested edits, and
- ▶ virtual deserts with sparse article coverage.

Mapping Wikipedia



Source: <http://www.visualizing.org/visualizations/mapping-wikipedia>

Mapping Wikipedia

Look at:

<http://tracemedia.co.uk/portfolio/mapping-wikipedia/>

for more details.

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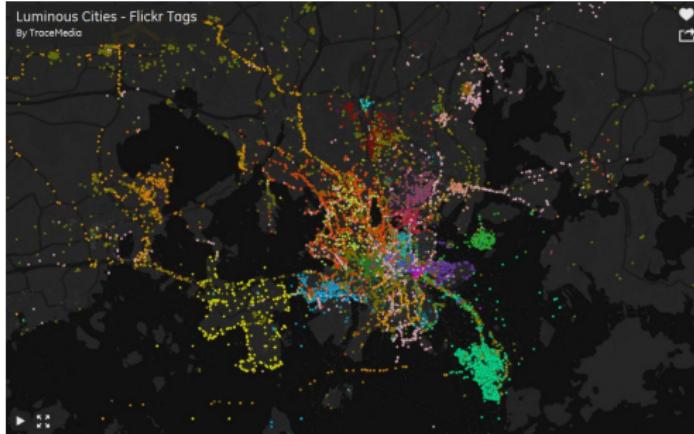
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Flickr Map

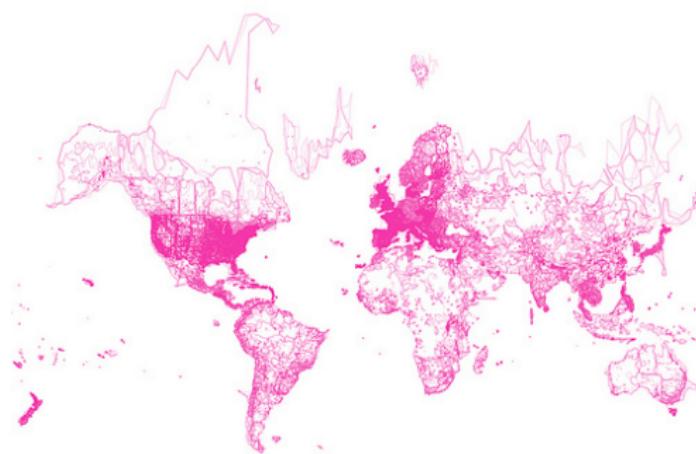
The Flickr API was used to generate temporal city level maps

This version of the project explores the spatial structures of Flickr tags.



Source: <http://www.visualizing.org/visualizations/luminous-cities-flickr-tags>

Flickr Map - Earth



Source: <http://shapetiles.spum.org/about/>

Flickr Map - Europe



Source: <http://shapetiles.spum.org/about/>

Flickr Map - Europe



Source: <http://shapetiles.spum.org/about/>

Flickr Map



Source: <http://kelsocartography.com/blog/?cat=54&paged=2>

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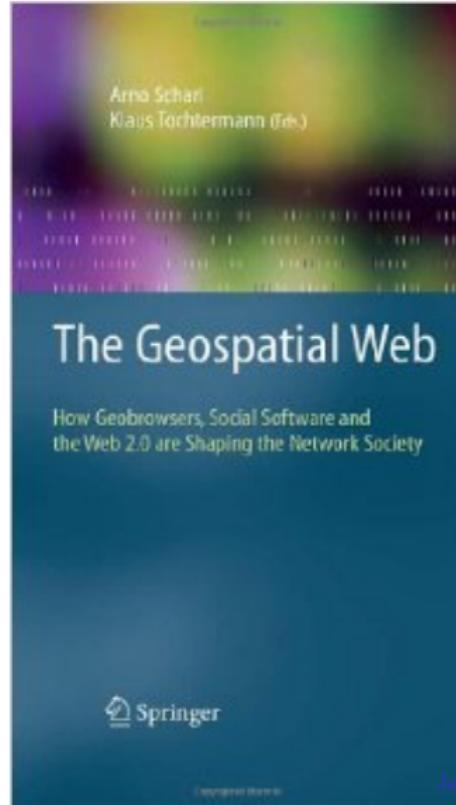
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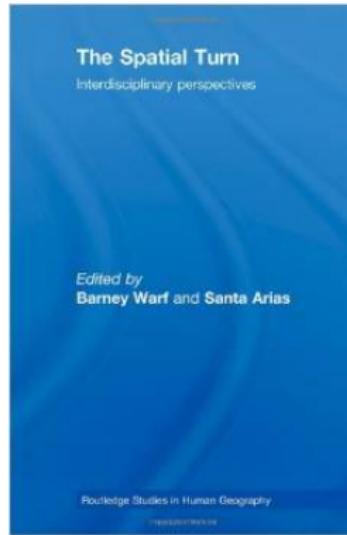
Further Reading

Literature - Collaborative Mapping



Persons are able to gather and add data to a central Web mapping.

Spatial turn



- ◊ Profound and sustained transformation in study of space across the disciplines.
 - ◊ Space, place, mapping, and geographical imaginations have become commonplace topics in a variety of analytical fields in part because globalization has accentuated the significance of location.
- ⇒ Renaissance in human geography

See also:

<http://spatial.scholarslab.org/spatial-turn/>

Neogeography



How Neogeography
Killed GIS

Andrew Turner
@ajturner

