Public Health Surveillance Shortcourse
GIS for surveillance

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1 Background

In this demonstration we'll use the online working paper by Glynn (2011) at http://www.franklincenterhq.org/2541/geocoding-addresses-from-missouri-sex-offender-registry/ [1] and [2] to call Google's Geocoding API [3] for a set of example individuals given their street, city and state. The example data are sourced from the Missouri Sex Offender Registry. For further information see the 'Action News' article [4] or the Economist [5].

2 R codes

The worked example does the data manipulations using the R statistical analysis language http://www.r-project.org/. Download the R files from the website http://dl.dropbox.com/u/7075452/PHsurveillance_overview.org and store in a working directory.

3 Download example data

The source of the data is at the bottom of this website
http://www.mshp.dps.mo.gov/MSHPWeb/PatrolDivisions/CRID/SOR/SORPage.html

4 Load and clean

Glynn has provided a downloadable source code file for cleaning the data. All we need to do manually is to open the Excel file and delete the top 13 lines of summary information, after that deletion we saved the data to a new Excel file named Missouri-Sex-Offenders.xls. R would now read this file.

5 Do geocoding

This step takes some time. There is also the issue that Google restricts users to only geocoding 2500 addresses per day. Therefore the full 12174 addresses would take 4.9 days to complete.

6 Check outputs

An estimate of the precision of the geocode is given in the location_type feild. This stores additional data about the specified location. The following values are currently supported:

- ROOFTOP indicates that the returned result is a precise geocode for which we have location information accurate down to street address precision.
- RANGE_INTERPOLATED indicates that the returned result reflects an approximation (usually on a road) interpolated between two precise points (such as intersections).
- GEOMETRIC_CENTER indicates that the returned result is the geometric center of a result such as a polyline (for example, a street) or polygon (region).
- APPROXIMATE indicates that the returned result is approximate.

7 Find a specific offender

From the article in the Economist [5] we know that Janet Allison was found guilty because she let her 15-year-old daughter have sex with a boyfriend she later married. But Ms Allison will "spend the rest of her life publicly branded as a sex offender." So let's look her up.

ALLISON, CORD J	3655 PENNRIDGE DR APT 220	CHILD MOLEST-2ND DEGREE
ALLISON, EARNEST E	2737 US HWY 65	DEVIATE SEXUAL ASSAULT
ALLISON, JOE E	22123 AUDRAIN RD 9318	POSSESSION OF CHILD PORNOGRAP
ALLISON, STEVEN L	10390 HWY D	ENDANGERING WELFARE OF A CHIL
HOPSON, ALLISON M	4258 ST LOUIS AVE	RAPE

This person does not live in Missouri, but in Georgia.

8 Put somebody on the map

AARON, JEFFERY W	371 YEARGAN LN	SEXUAL ABUSE IN THE SECOND

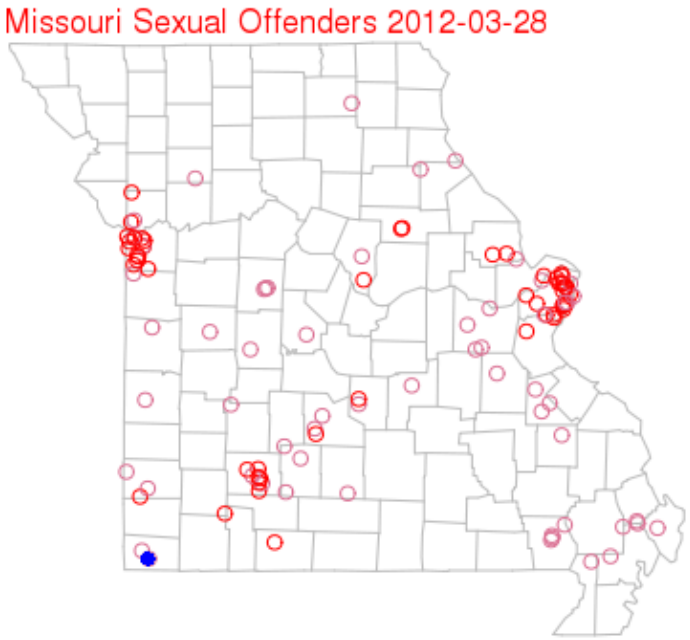

Figure 1: offenderIdentified.png

9 Write the final(ish) data

To facilitate using the data in a GIS package we'll write these points out to a ESRI Shapefile. The Shapefile is probably the most common format you find spatial data in; as Wikipedia points out it is 'a (mostly) open specification for data interoperability among GIS software'. The code also shows how to easily re-project the data into arbritrary coordinate systems (sometimes important for getting multiple data sources to relate) and we'll go for WGS84 as it is also common.

10 Next steps

The worked examples on this website continue through the steps required to set up an interactive web map so that the surveillance system can be utilised by the general public
http://batchgeo.com/map/356612ae67bb92de8c91dd9fb7e27029.

11 References

References

[1] Earl F Glynn. Geocoding addresses from Missouri Sex Offender Registry: Computer Assisted Reporting. http://www.franklincenterhq.org/2541/geocoding-addresses-from-missouri-sex-offender-registry/. Technical report, Franklin Center for Government and Public Integrity, Bismarck, ND, 2011.

[2] Earl F Glynn. GoogleGeocode.R, http://cdn.watchdogmedia.org/national/computer-assisted-reporting/project/geocoding-and-distances/missouri-sex-offenders/GoogleGeocode.R, 2010.

[3] Google. Google Geocoding API,
http://code.google.com/apis/maps/documentation/geocoding/index.html.

[4] Ryan Kath. Loophole in law allows hundreds of Missouri sex offenders to live near church day cares, http://www.kshb.com/dpp/news/local_news/investigations/loophole-in-law-allows-hundreds-of-missouri-sex-offenders-to-live-near-church-daycares. *KSHB NBC Action News*, 2011.

[5] The Economist. America's unjust sex laws, http://www.economist.com/node/14165460?story_id=14165460. *The Economist*, 2009.