Mapping with ggmap

EPIC R 2016

Why Spatial Analysis in R?

- A lot of data, particularly 'secondary' administrative data are spatially located

- Digression: My FOIL story

Why Spatial Analysis R?

- … so it turns out I found a CD in my mailbox with about 2000 Excel files, each of which has a traffic or pedestrian count

- This has potential to be interesting data for people doing pedestrian injury work
  - Esp. if counts are aligned with pre-existing web cameras?
  - But how do I know? I don't have money to pay for ArcGIS or geographer time

ggmap

- ggplot + mapping = ggmap*
- Interaction with online services to get mapping components = easy to get up and running

- Example of the data science-driven development of R – more into cool stuff we can do with Big Data than pure statistics

* Development credit to David Kahle and Hadley Wickham

Working with ggmap

- Install ggmap package and load the library

```
library(ggmap)
```

- You can get a map of any city with qmap, analogous to qplot

```
qmap("New York")
qmap("Toronto")
```

Getting a map

- Other options:
  - Stamen maps is a nice visualization layer on Open Street Map

```
map <- get_stamenmap(c(-74.1, 40.55, -73.8, 40.85), zoom=12,
maptype='toner')
ggmap(map)


map <- get_stamenmap(c(-74.1, 40.55, -73.8, 40.85), zoom=12,
maptype='watercolor')
ggmap(map)


map <- get_stamenmap(c(-74.1, 40.55, -73.8, 40.85), zoom=12,
maptype='terrain')
ggmap(map)
```

Adding segment data

- First, load the segments file

```
# Load and look at the segments file
segments <- read.csv('http://injuryepi.org/resources/R/SegmentSummary.csv')
str(segments)
```

- What columns will we use to find the segment locations?

Adding segments to the map

- Will use ggplot-like style to save a map as a plot, then add the segments as an additional layer

```
p <- ggmap(map)
# Note the ggplot-like syntax and style.
p <- p + geom_segment(data=correctly_geocoded_segments,
        aes(x=start_lon, y=start_lat,xend=end_lon, yend=end_lat),
        size=2, color='blue')
p
```

More ggmap resources

- R Journal article:
  - https://journal.r-project.org/archive/2013-1/kahle-wickham.pdf

- Cheat sheet:
  - https://www.nceas.ucsb.edu/~frazier/RSpatialGuides/ggmap/ggmapCheatsheet.pdf

More spatial analysis resources

- Charlie's slides
  - http://injuryepi.org/styled-4/code-16/

- Charlie's book
  - http://injuryepi.org/resources/spatialEpiBook.pdf

- The canonical book
  - Bivand, Pebesma, and Gomez-Rubio, *Applied Spatial Data Analysis with R* (Available on Amazon)