Datahoods or Data-Driven Neighborhoods

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Using GIS to better understand neighborhoods
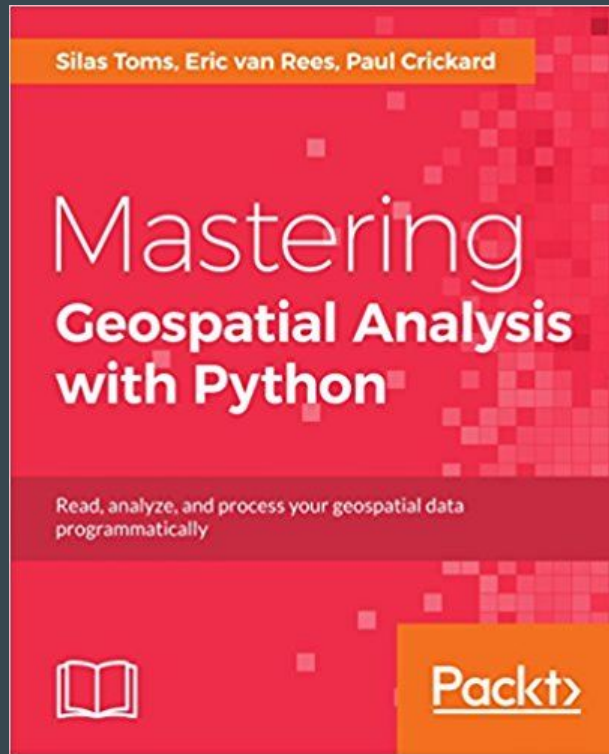
Who am I?

Silas Toms

President, Loki Intelligent Corporation

Author, ArcPy and ArcGIS (2 editions)

Co-Host of the Mappyist Hour Podcast

Newest book out this week: Mastering Geospatial Analysis with Python

Geospatial Modules for Python 3:

Esri, CARTO, Mapbox, QGIS and much more

Silas Toms, Eric van Rees, Paul Crickard

Mastering
Geospatial Analysis
with Python

Read, analyze, and process your geospatial data
programmatically

Packt>

Today's topics

- What is a neighborhood?
- How to define them?
- How to watch them change through time?
- Is there a better way?
- Can we use data - publicly available, well-defined - to craft "data-driven" neighborhoods, and watch them change through time?
- What GIS tech can we use to do so?

The Neighborhoods of Sacramento
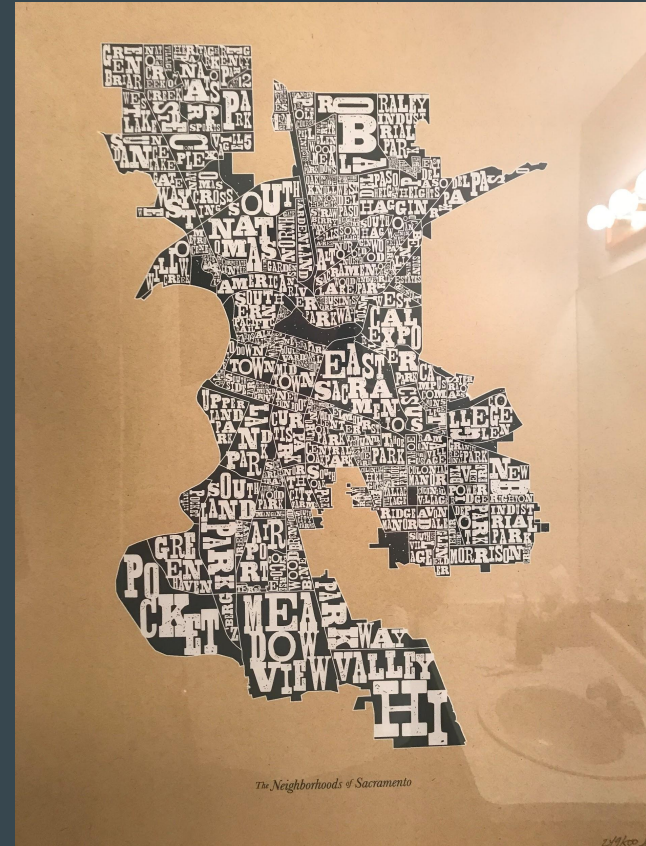
Problem

- Neighborhoods are unofficial and loosely defined
- Neighborhoods change constantly
    - Individuals
    - Demographics
    - Businesses
    - Transportation
- Multiple names exist for the same geographies
    - Realtors vs "reality"
    - Is there a reality?
- Defining "gentrification"
- "Locals" and "visitors" - what is the extent of the neighborhood?

Definition of a neighborhood

- A neighborhood is the most personal geography

- NIMBY vs YIMBY
  - Emotional battles

- But "you can never go back"

neigh·bor·hood

/ˈnābərˌho͝od/ 🔊

noun

a district, especially one forming a community within a town or city.
"she lived in a wealthy neighborhood of Boston"
synonyms: district, area, locality, locale, quarter, community; More

- neighborly feeling or conduct.
  "the importance of neighborhood to old people"
- the area surrounding a particular place, person, or object.
  "he was reluctant to leave the neighborhood of Butte"
  synonyms: vicinity, environs, purlieus, precincts, vicinage
 "in the neighborhood of Greensboro"

Top down or bottom up?

- Are neighborhoods defined by the government?
- Are they defined by the residents?
- Are they defined by the services and businesses they contain?
- How do we know what they offer to residents and visitors alike?

73 'OFFICIAL' NEW ORLEANS NEIGHBORHOODS

Source: New Orleans City Planning Commission

Dan Swenson, NOLA.com | The Times-Picayune

Introducing: Data-Driven Neighborhoods

- Concept: using GIS technology, social media, and government data to map and monitor change through time on a "neighborhood" scale
- Built around local businesses
- With APIs and ABCs, we can do this
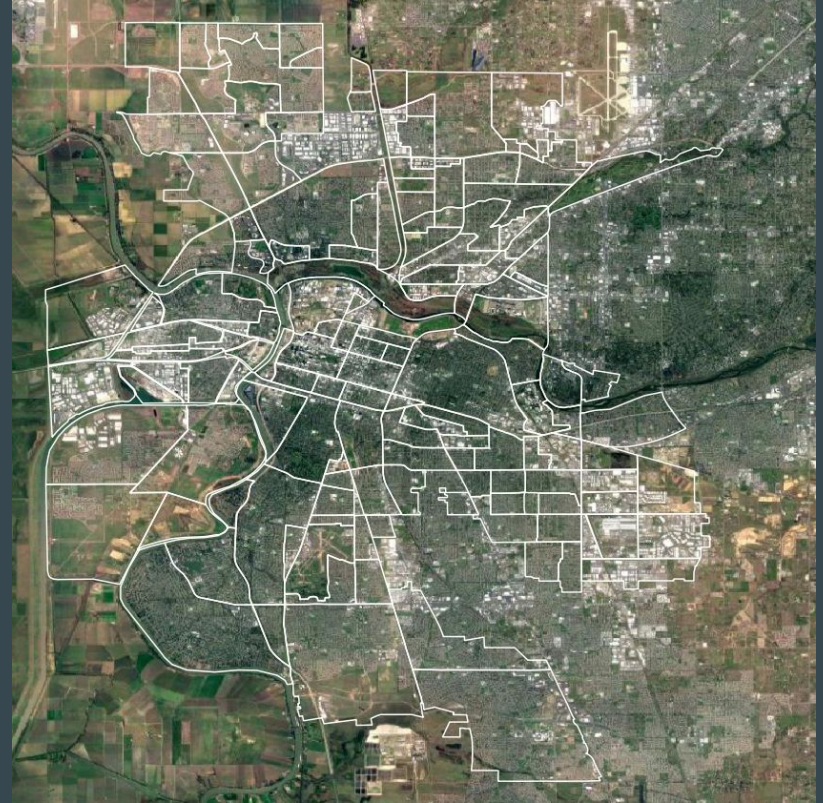
What kind of questions can it answer?

- What areas/hoods are receiving growth
- What areas are long established
- Who lives in the area, and who visits
- How is the hood changing through time
- How fluid are the 'boundaries'
- Leading indicator for fluctuations in home values
- Happiness indicators using text

Data sources available

- Open Street Map
- OpenAddresses
- Existing neighborhood shapefiles
- Census data at various scales
- Social Media
  - Location-based check-in data
- ABC: Alcohol Beverage Control data
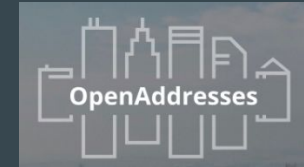
How it can be implemented

- Map all alcohol licenses for a neighborhood, city, county or state
- Find clusters of businesses to identify neighborhood cores
- Use license types (markets/restaurants/clubs/cafes/wineries, etc) to understand the services available
- Use social media check-in comparisons (in the cluster vs other areas) to understand who is visiting vs where else they are visiting
- Use census data demographics in the cluster and in the other areas to understand who the core cluster serves
- Monitor it through time to get a clearer picture of change
- Create neighborhood definitions based on proximity, demographics and autocorrelation

ABC data is at the core

- Incredible well regulated
  - over 80 types of licenses
- Publicly available
  - Daily Reports
  - Weekly downloads
- All kinds of businesses are included
  - Markets
  - Restaurants
  - Cafes
- Includes dates
- Includes address data
  - It can be mapped!!!!

number character varying	description character varying
30	Temporary Retail Permit (Only in conjunction with a Person to Person transfer)
31	Special Daily License (Temporary Beer or Wine)
32	Daily Beer
33	Daily Wine
34	Daily Beer and Wine
37	Daily On-Sale General
20	Off-Sale Beer and Wine
21	Off-Sale General
85	Limited Off-Sale Retail Wine License
40	On-Sale Beer
41	On-Sale Beer and Wine for Bona Fide Public Eating Place
42	On-Sale Beer and Wine for Public Premises
43	On-Sale Beer and Wine for Train
44	On-Sale Beer for Fishing Party Boat
45	On-Sale Beer and Wine for Boat
46	On-Sale Beer and Wine for Airplane
47	On-Sale General for Bona Fide Public Eating Place
48	On-Sale General for Public Premises
49	On-Sale General for Seasonal Business
50	On-Sale General for Club
51	Club
52	Veterans' Club
53	On-Sale General for Train
54	On-Sale General for Boat
55	On-Sale General for Airplane
56	On-Sale General for Vessel of more than 1,000 tons burden
57	Special On-Sale General
58	Caterer's Permit
59	On-Sale Beer and Wine for Seasonal Business

Combination of sources and techniques

- Must be mapped very accurately
  - OpenAddresses
  - Geocoding
- Social media check-ins in the area vs other areas that users check-in
- Census data to understand demographics of both residents and visitors
  - Must be up to date
- Time series
- Clustering
- Spatial autocorrelation
  - Helps to infer about visitors that don't check in

Does alcohol data define neighborhoods?

- A proxy for local tastes
- Up to date
- Consistently maintained and available
- Changes through time are easy to see and understand
- Not perfect, but it's very good
- Combined with other data sources, gives a very clear picture

Technology stack I am using

- Web-based analysis tool
- Python at the core
- Flask Web Framework
  - Python-based
- SQLAlchemy and GeoAlchemy2
  - Database ORM
  - Spatial component
- PostGIS
  - Spatial database extension to PostgreSQL
- Twitter Python bindings
- Machine Learning/Statistics
  - Tensorflow

Next steps

- Finish all of California
- Add other states
- Add in dispensaries?
- Tipple.press
  - Will be up this month
- A "news" site
  - Built for analysis as well as news
- Other data sources & change indicators:
  - Home sales
  - Transportation changes
  - Voting records
- Make your own!
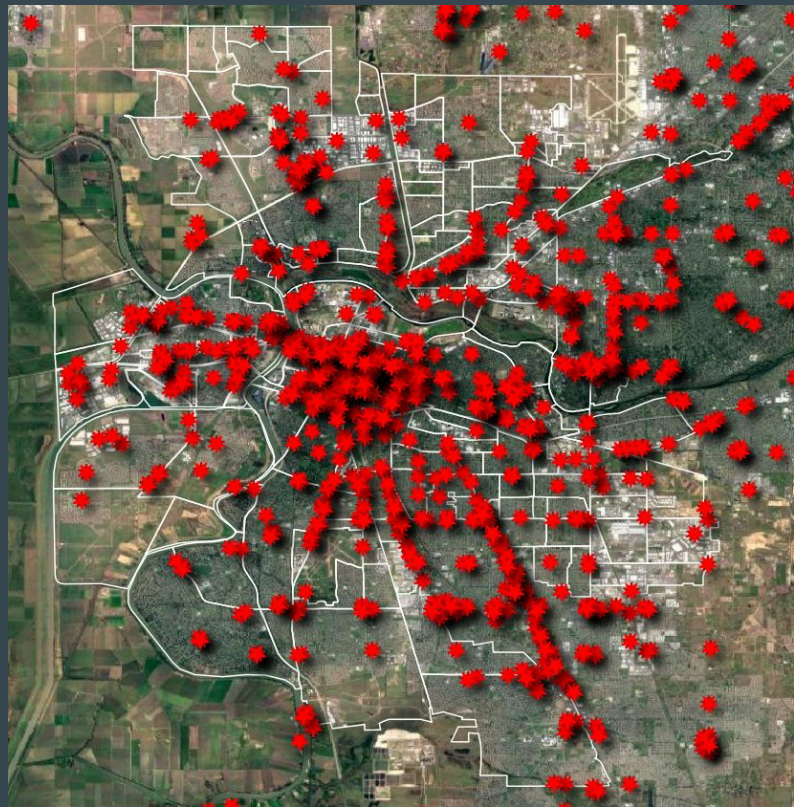
Questions?

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thanks for coming!