OpenJS Foundation
Visualizing geospatial data with Python
Jesús Arroyo - Madrid 2022
CARTO

Setup environment

```
git clone https://github.com/CartoDB/deckgl-madrid-2022-workshop
cd deckgl-madrid-2022-workshop

python3 -m venv env
source env/bin/activate
pip install -r requirements.txt

jupyter nbextension install --sys-prefix --symlink --overwrite --py pydeck
jupyter nbextension enable --sys-prefix --py pydeck

jupyter notebook
```

Geospatial basics

What is geospatial data?

Geometry (cartesian)

Geography (geodetic), common WGS 84

Types Point, MultiPoint, LineString, MultiLineString, Polygon, MultiPolygon

Geospatial formats

Vector GeoJSON, WKT / WKB / TWKB, Shapefile, GeoPackage, MapInfo

Raster BMP, JPEG, GeoTIFF, ASCII Grid

Grid systems H3, S2, Geohash, Quadbin

Many more...

Geospatial formats

GeoJSON

```
{
  "type": "Feature",
  "geometry": {
    "type": "Polygon",
    "coordinates": [[
      [-3.7056434154510494,40.42105583228068],
      [-3.7063944339752197,40.42061476619444],
      [-3.705702424049377,40.42033705643435],
      [-3.7056434154510494,40.42105583228068]
    ]]
  },
  "properties": {"name": "Palacio de la Prensa"}
}
```

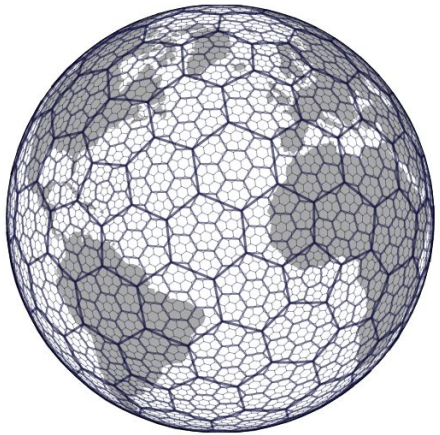
WKT / WKB

```
POLYGON((-3.7056434154510494
40.42105583228068,-3.7063944339752197
40.42061476619444,-3.705702424049377
40.42033705643435,-3.7056434154510494
40.42105583228068))
```

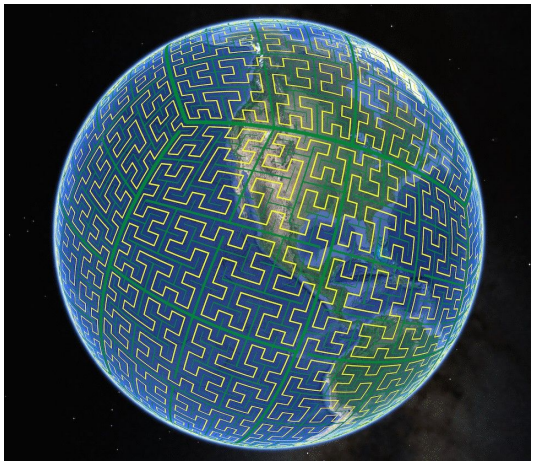
```
0103000000010000000400000ffffff5f28a50dc0c1b7522
8e535444000000020b2a60dc0898264b4d6354440ffffff4f
47a50dc05a57cb9acd354440ffffff5f28a50dc0c1b75228e
5354440
```

Grid systems

H3

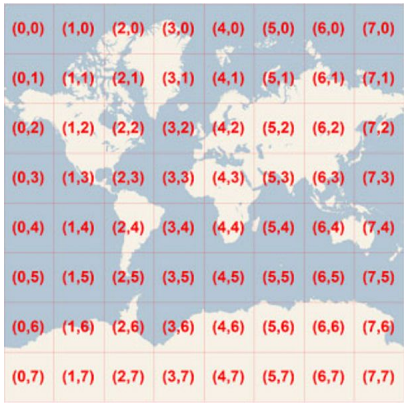


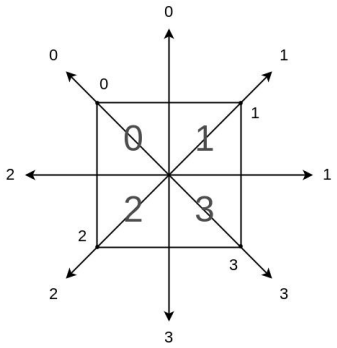
S2



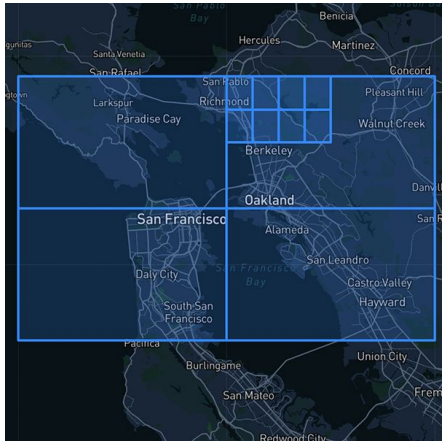
Grid systems

Quadbin (64-bit encoding for Bing Tiles)





Geohash



Geospatial in Python

Geopandas stack

GeoPandas

pandas

Shapely (GEOS)

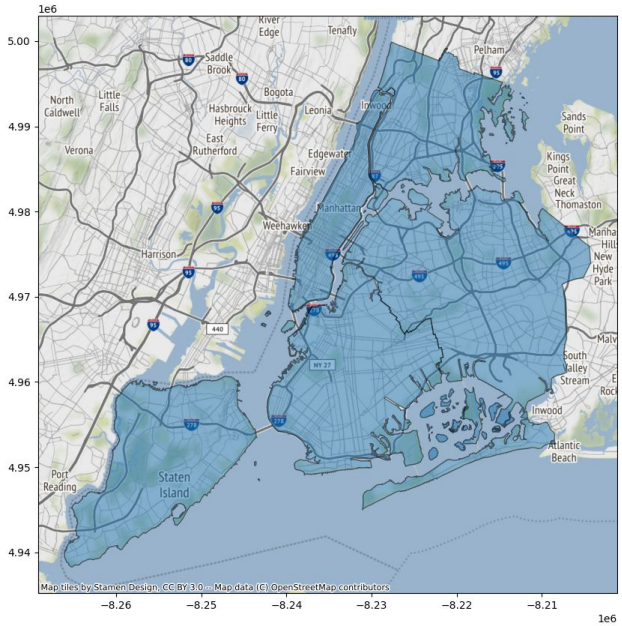
PYPROJ

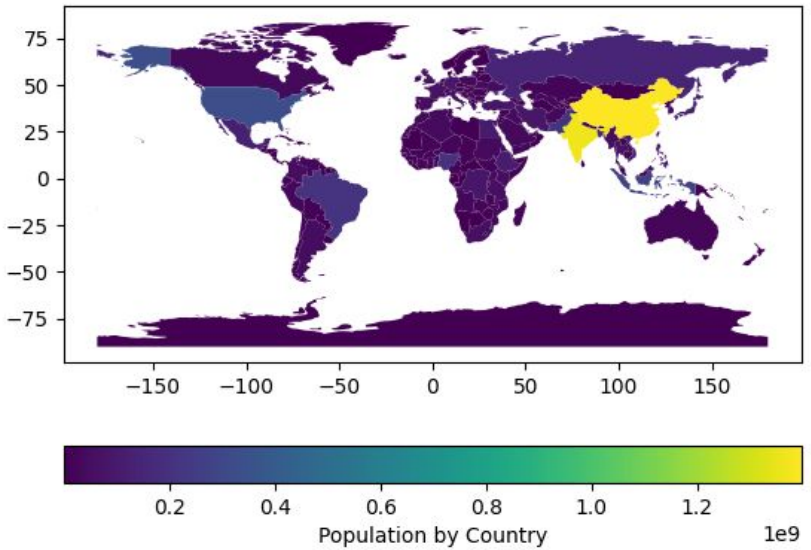
NumPy

Geospatial data visualization in Python

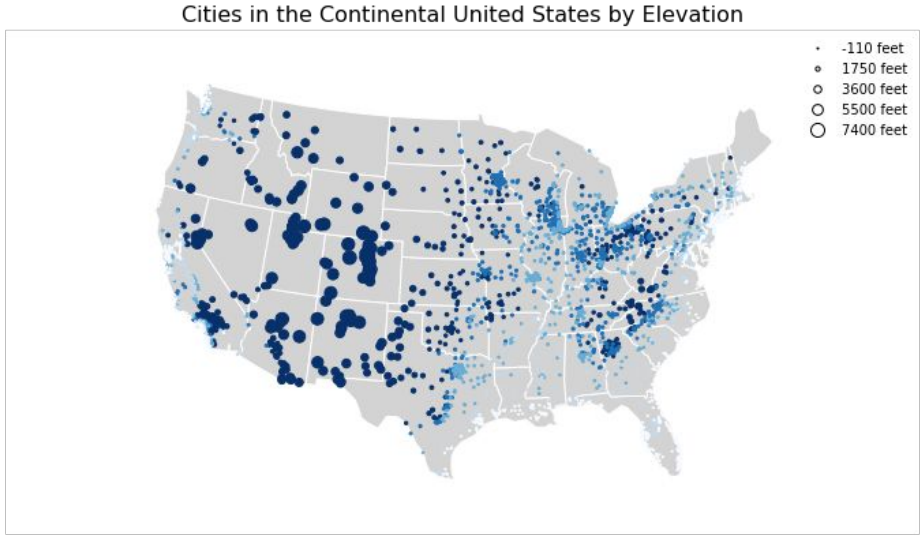
Notebook time

Matplotlib


1e6
5.00
4.99
4.98
4.97
4.96
4.95
4.94
River Edge
Tenafly
Pelham
Saddle Brook
Bogota
North Caldwell
Little Falls
Hasbrouck Heights
Little Ferry
Leonia
Inwood
Sands Point
Verona
East Rutherford
Edgewater
Fairview
Kings Point
Great Neck
Thomaston
Manhattan
Weehawken
Harrison
New Hyde Park
South Valley Stream
Inwood
Atlantic Beach
Port Reading
Staten Island
Map tiles by Stamen Design, CC BY 3.0 — Map data (C) OpenStreetMap contributors
−8.26
−8.25
−8.24
−8.23
−8.22
−8.21
1e6

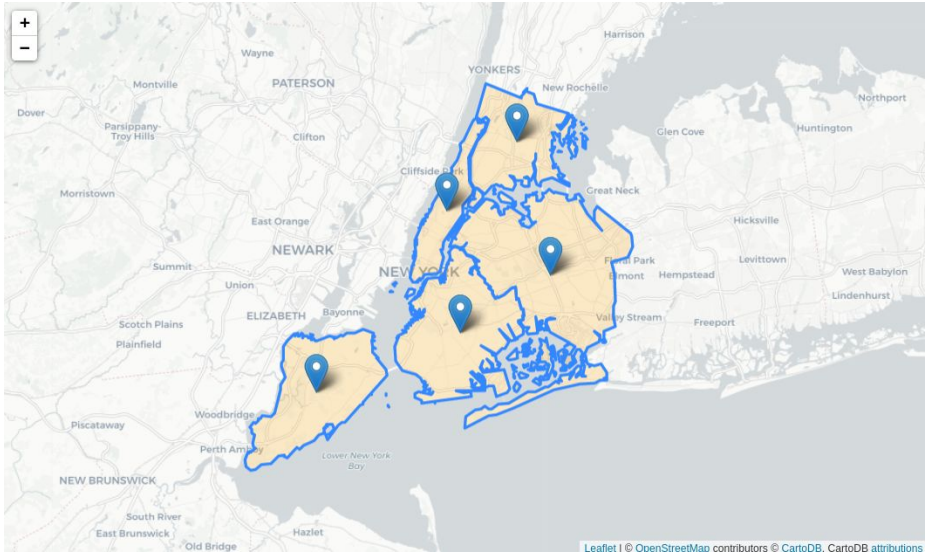

75
50
25
0
−25
−50
−75
−150
−100
−50
0
50
100
150
0.2
0.4
0.6
0.8
1.0
1.2
Population by Country
1e9

Geoplot

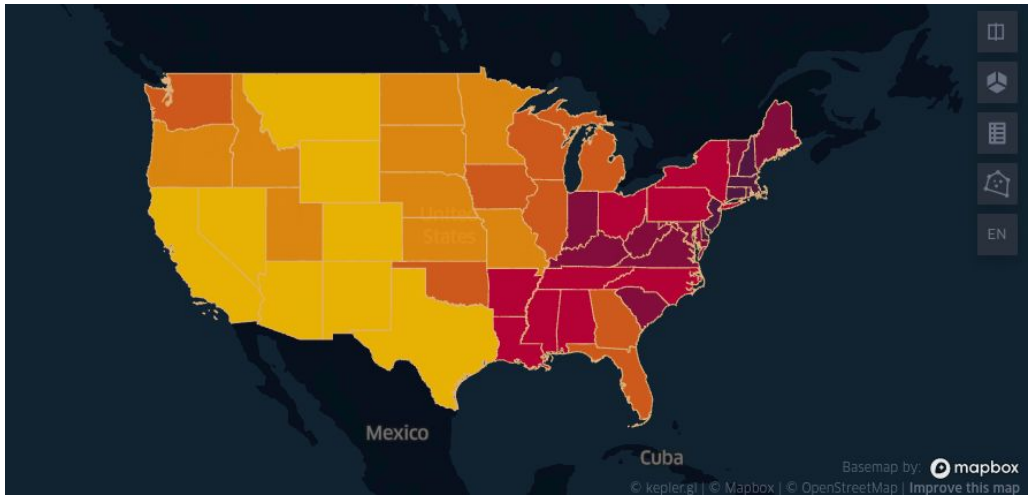


matplotlib

Folium - IpyLeaflet

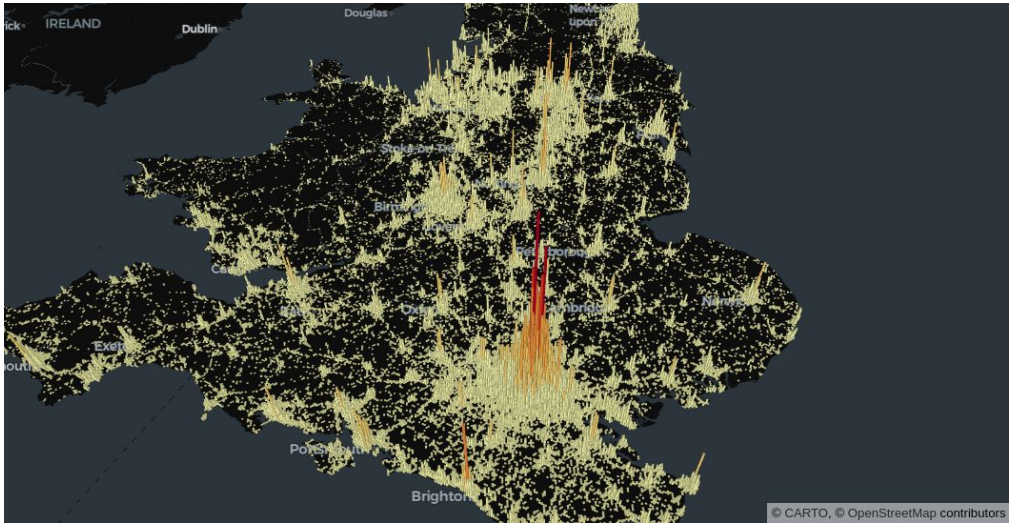


Kepler.gl

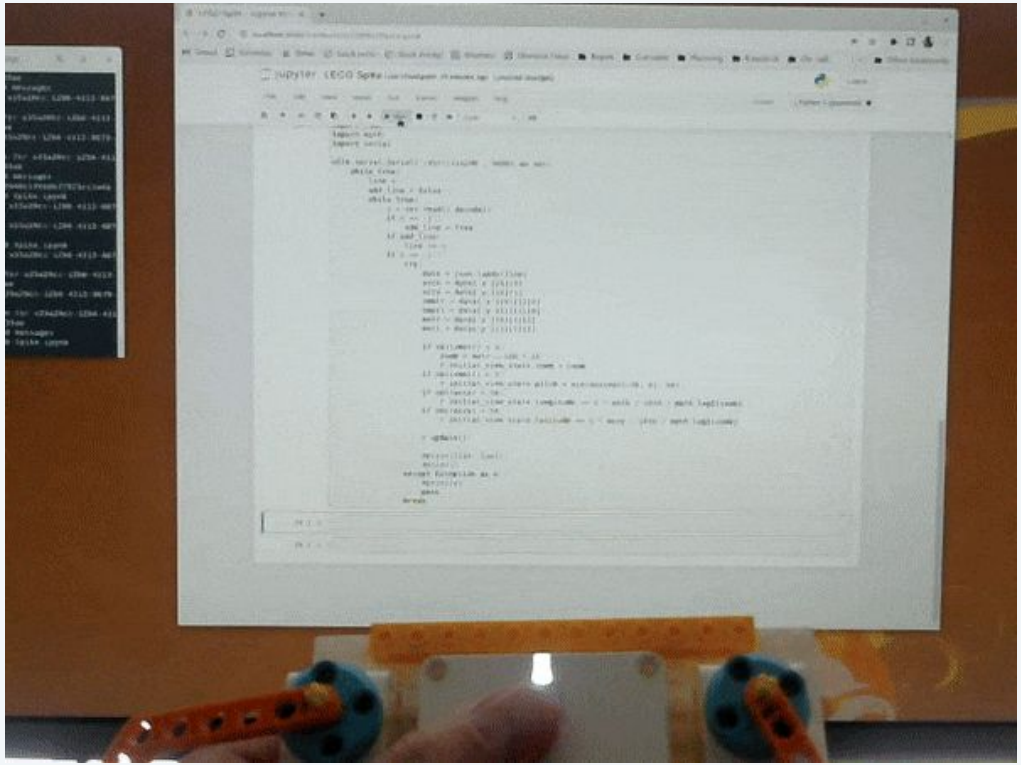


deck.gl 🎉

Pydeck



deck.gl 🎉

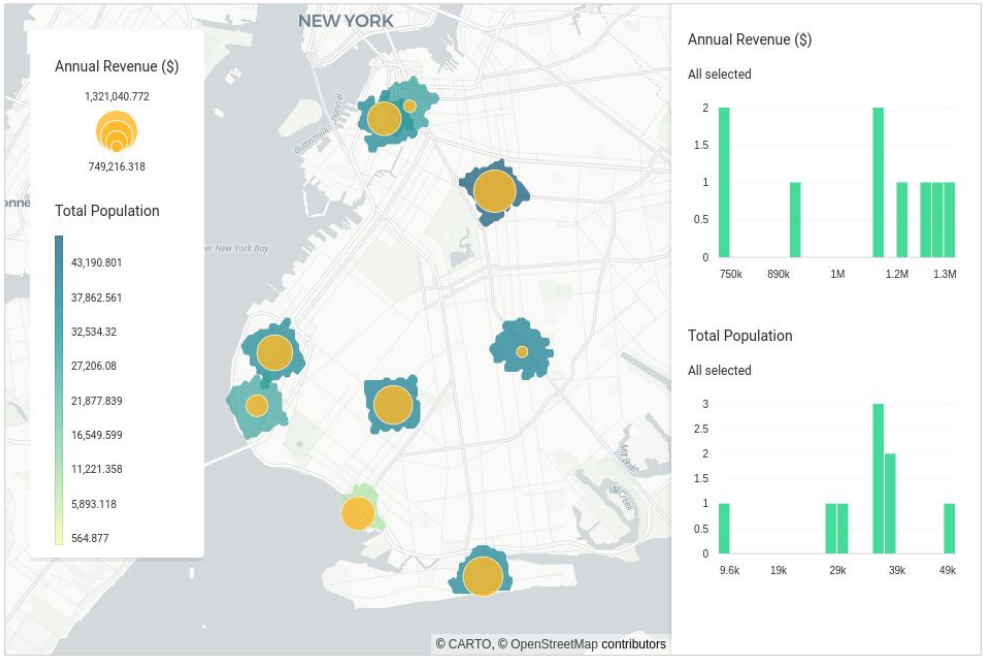


Others

CARTOframes

Basemap

GeoViews



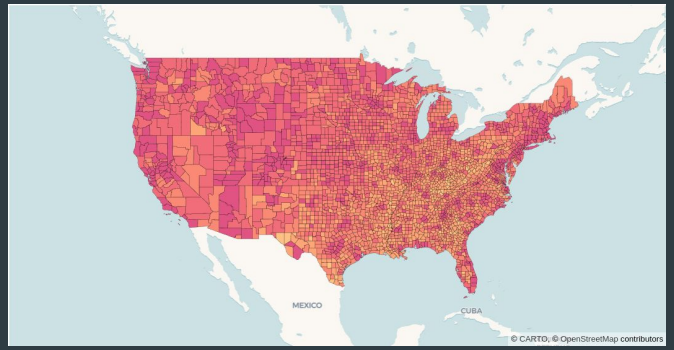
Geospatial Big Data visualization in Python

Data warehouses

CARTO

@deck.gl/carto

pydeck-carto



Notebook time

CARTO

Thanks !