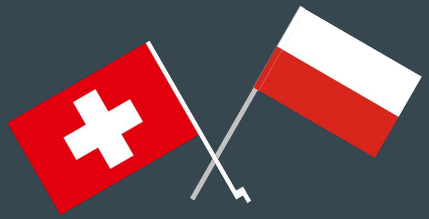
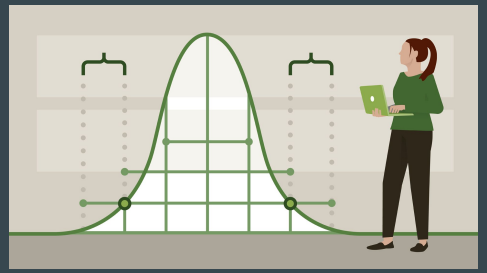
Python for Geographic Information System

Magdalena Surówka
Zazuko

About me



Born and raised in Poland
Living in Switzerland



Hands on experience in geospatial analytics
Working as Data Scientist
Studied Econometrics

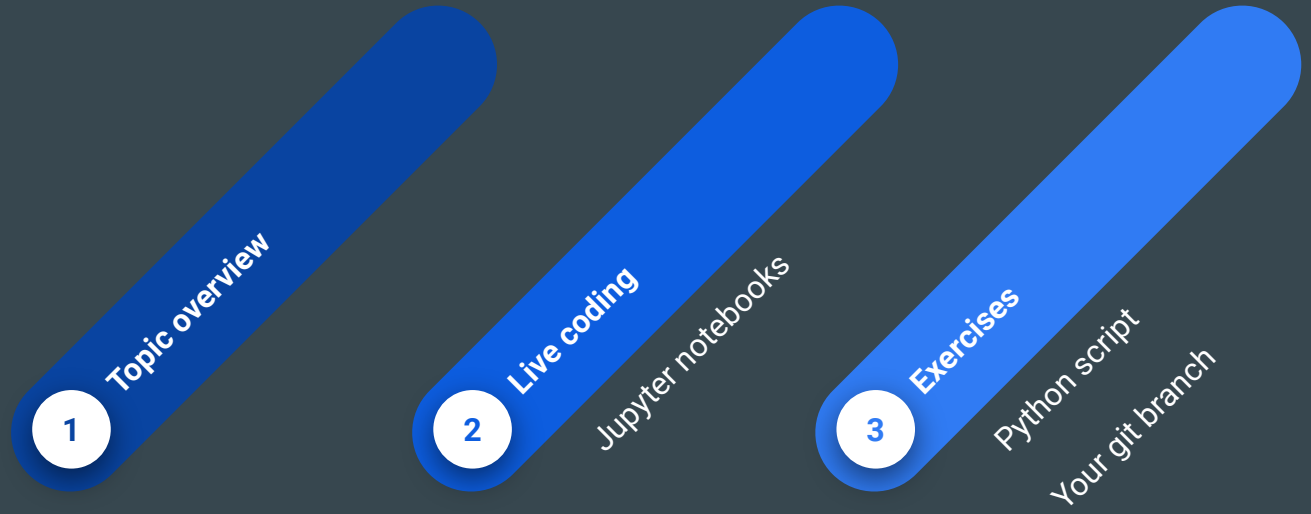
Focus on Linked Data
...also Geodata
Solving graph problems

About you

Goal

Develop geospatial thinking

Format


1
Topic overview
2
Live coding
Jupyter notebooks
3
Exercises
Python script
Your git branch

Agenda

Day 1

- Intro
- Shapely
- Geopandas
- Map projections

Day 2

- Geocoding
- Point in polygon
- Spatial join
- Geometric operations
- Classifiers

Day 3

- OSM data
- Network analysis
- Visualizations

Exercises

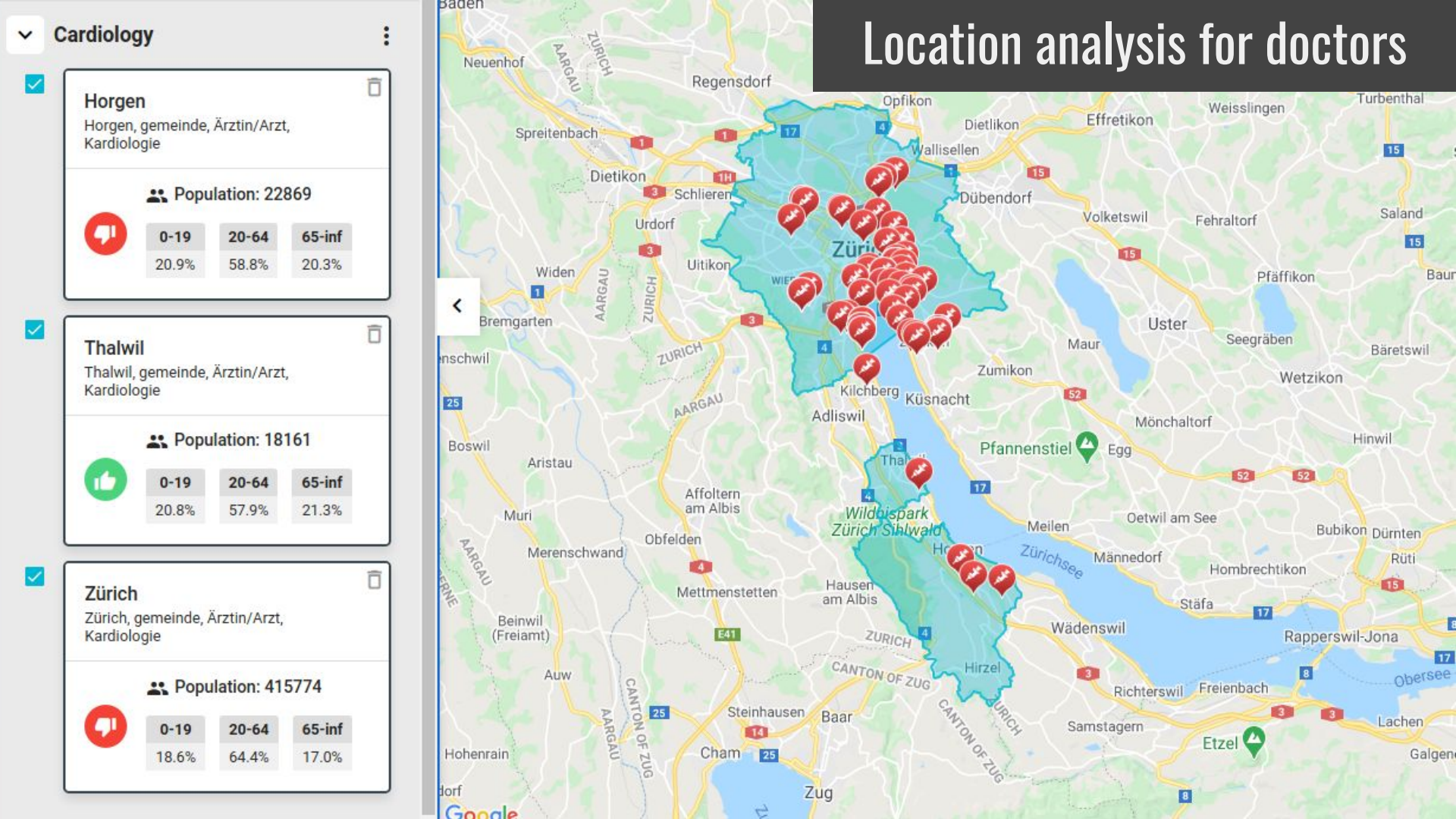
- 2x4 people groups
- Structure your code:
  - Each exercise as one .py file
  - Make your code modular => use functions
  - **Use type hints**
- Submit solutions to your git branch by the end of the day

Exercises

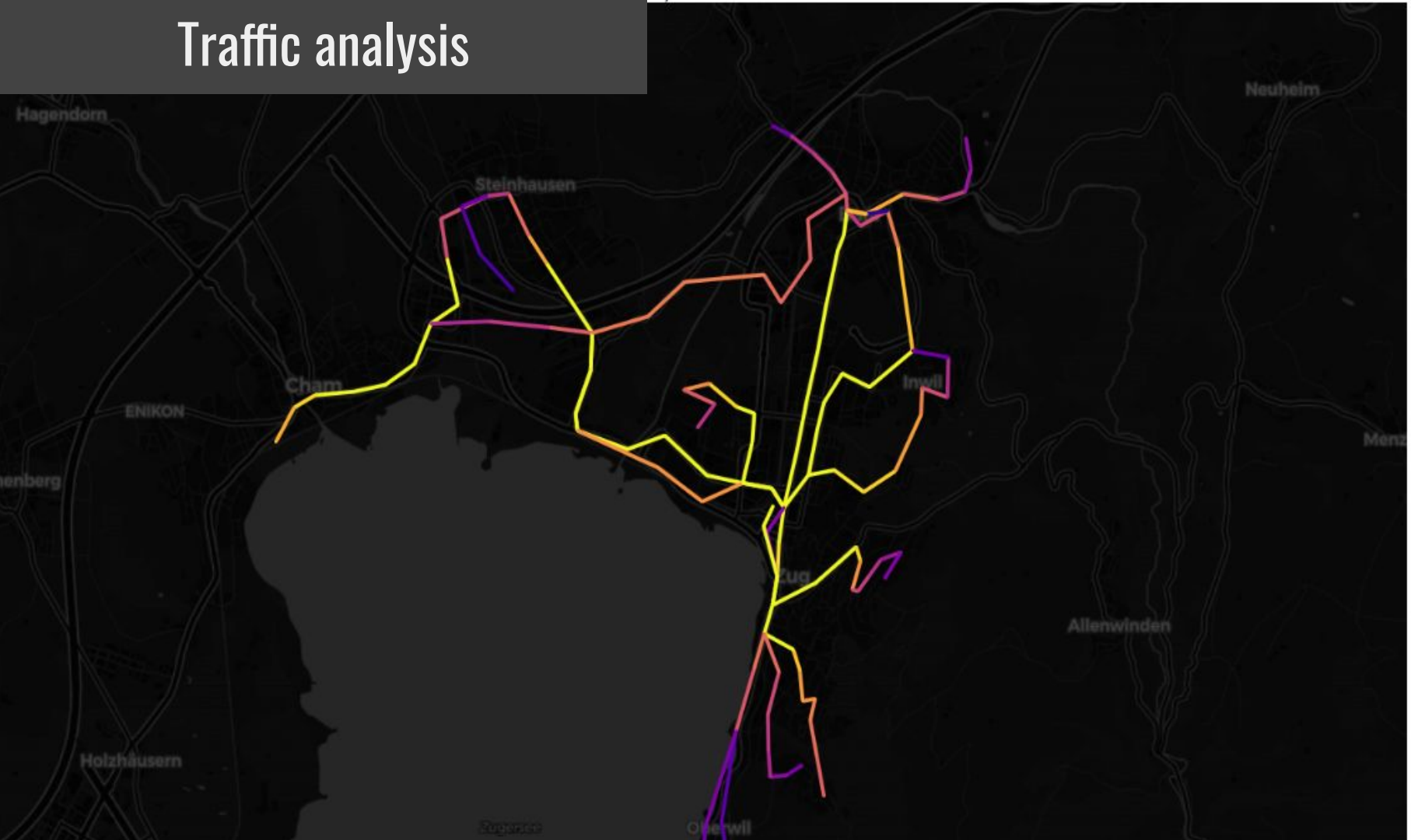
```
if not calm:
    keep_calm()
else:
    keep_coding()
```

Python for GIS examples

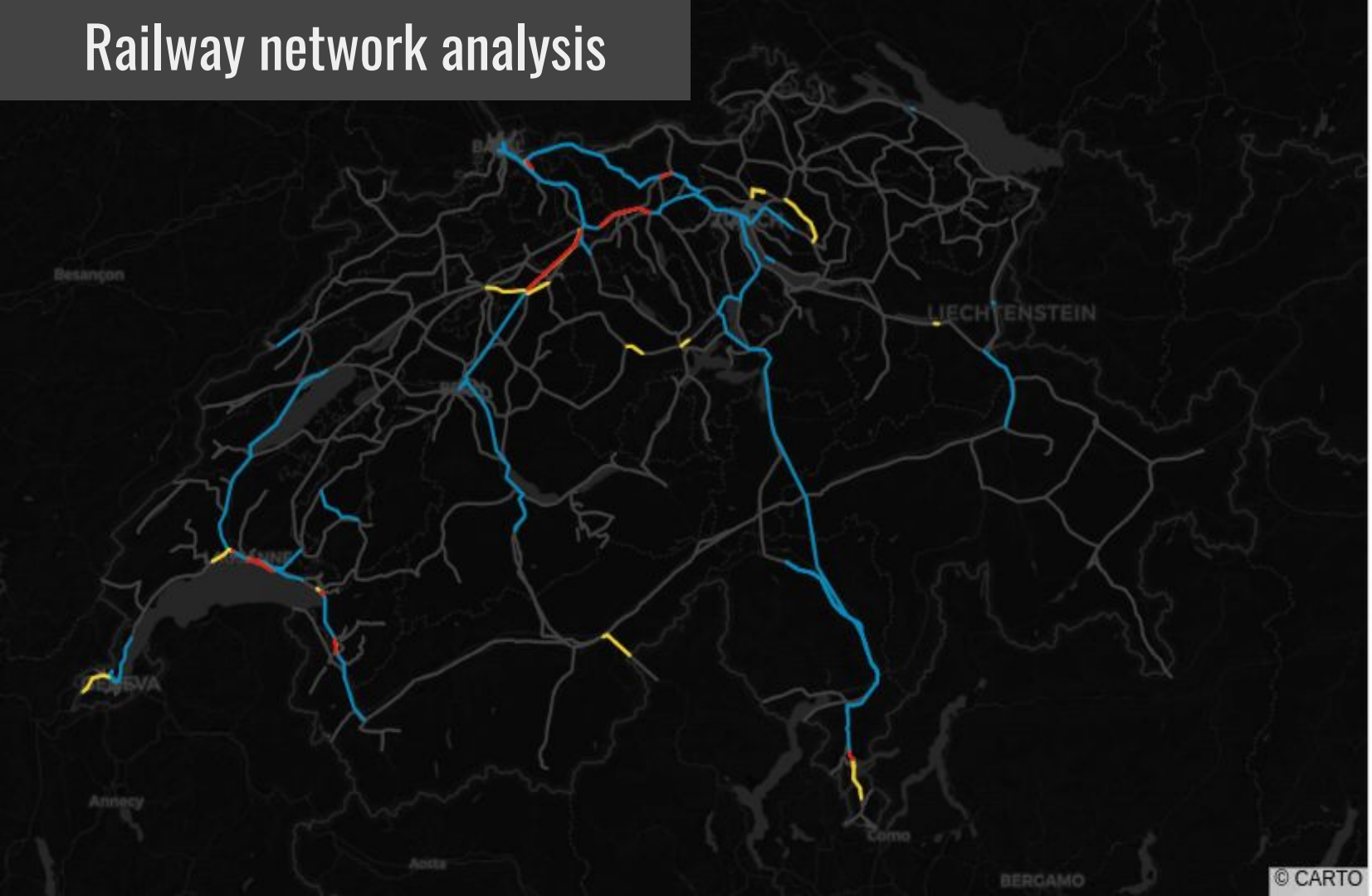
Location analysis for doctors



Traffic analysis



Railway network analysis



Municipality events

Your projects?

Python for GIS tools

GDAL, Geopandas, Shapely, Fiona, Pyproj, Pysal, Geopy, Contextily, GeoViews, Dash, OSMnx, Networkx, Cartopy, Scipy.spatial, Rtree, Rasterio, Rasterstats, RSGISLib, Matplotlib, Bokeh, Plotly, Pandas, Scipy, Basemap, Datashader, Folium, Mapclassify...

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Let’s get started!

Day 2. Agenda

9:30-9:45 Exercises review

9:45-11:30 Live coding:

- Geocoding
- Point in polygon
- Spatial join

11:30-12:30 Coding exercise

12:30-13:30 Lunch break

13:30-13:45 Exercise review

13:45-15:00 Live coding:

- Geometric operations
- Classification

15:00- ... Coding exercise => review tomorrow

Environment setup

Issues?

- Use virtual environment:
  - conda deactivate
  - Follow instructions:

    https://github.com/zazuko/gis-training#required-packages

- Today: use VM

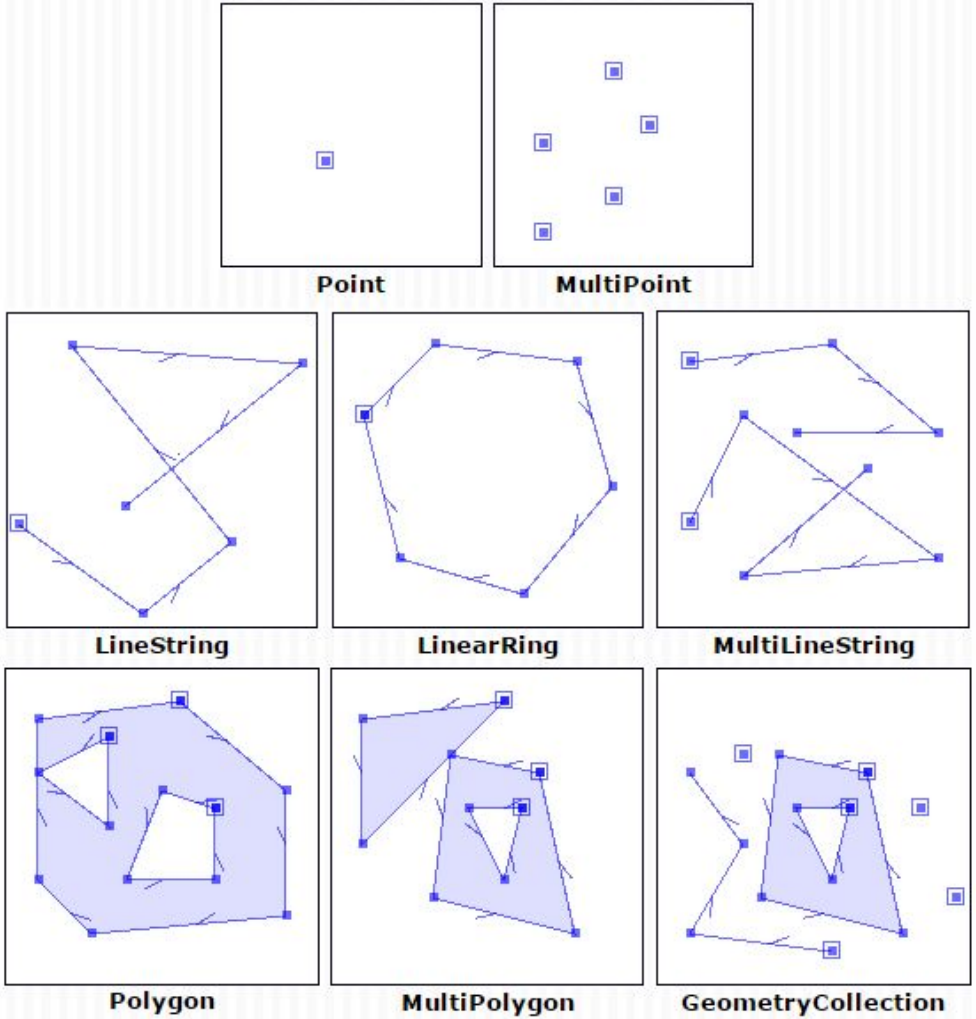
Day 3. Agenda

9:30-10:00	Exercises review
10:00-11:00	Live coding:
	- Retrieving OSM Data - Network analysis
11:00-11:45	Coding exercise
11:45-12:00	Exercise review
12:00-13:00	Lunch break
13:00-14:00	Live coding:
	- Map visualizations
14:00-16:00	Coding exercise
16:00-16:30	Exercise review, Wrap up

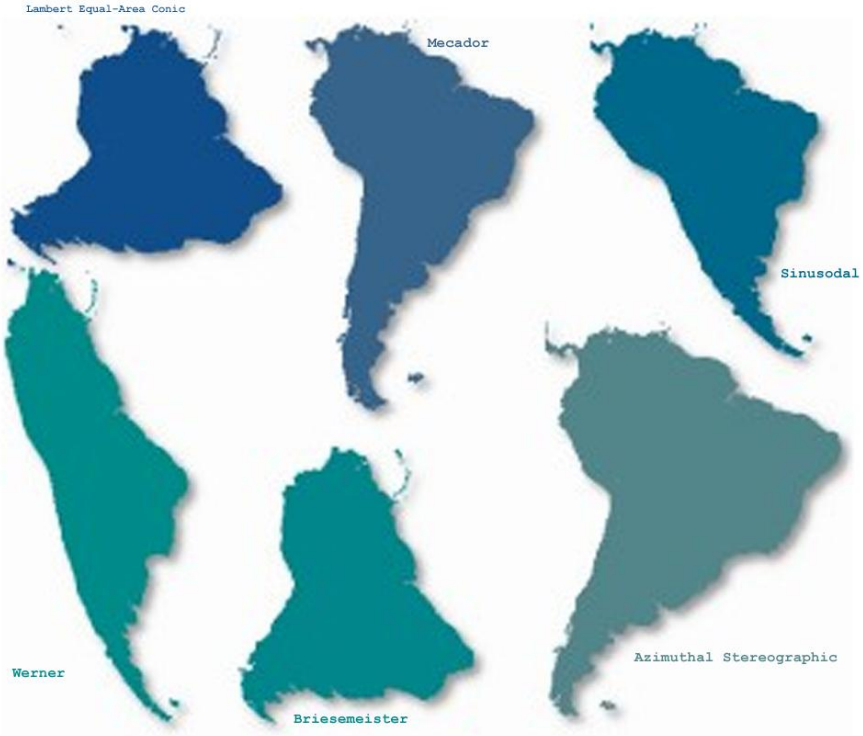
Let’s get started!

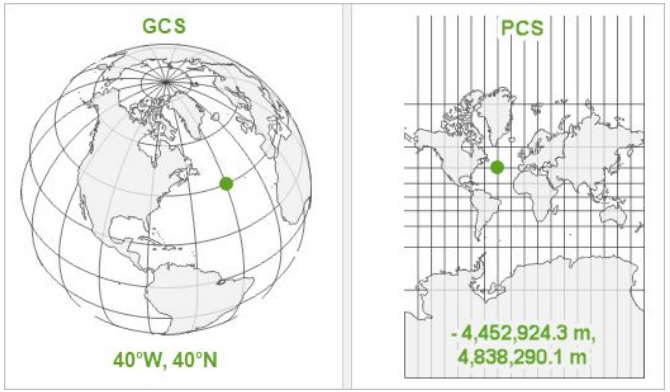
Wrap up

Spatial data model



Map projections and CRS

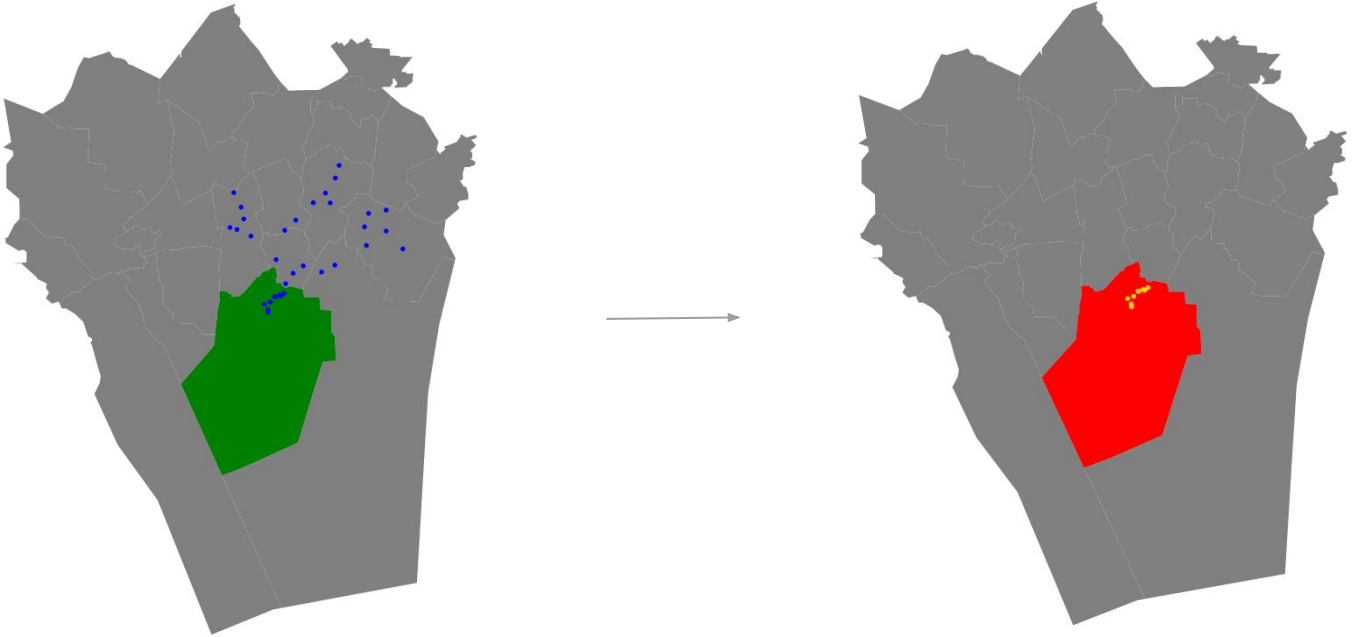




Geocoding

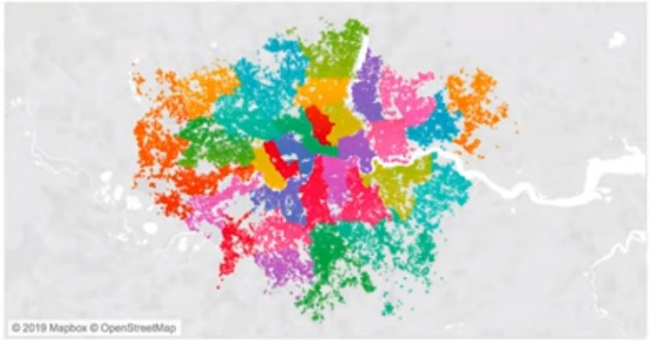

Haid- und Neu-Straße 15
76131 Karlsruhe
Germany
49° 0′ 24.804″ N
8° 24′ 13.15″ E

Point in polygon



Spatial join

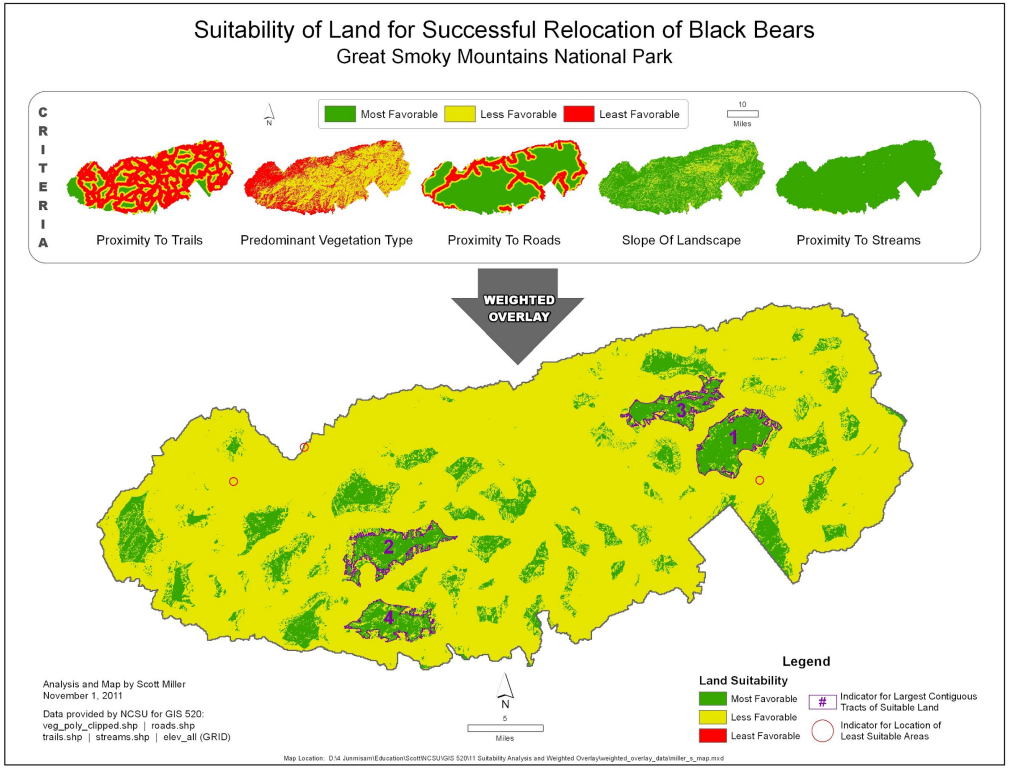
1. Crime Data for London



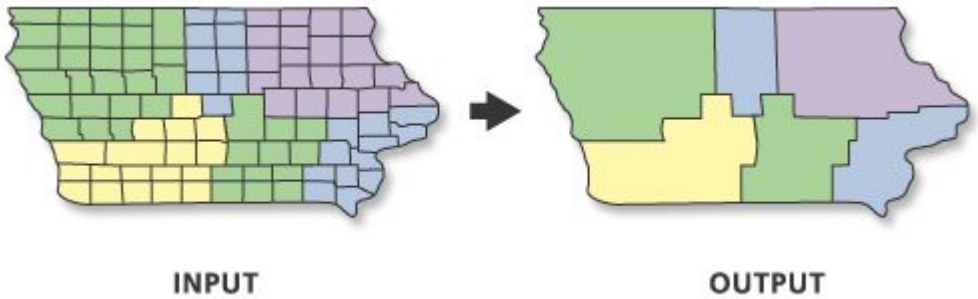
1. London Boroughs

Number of Crimes in London Boroughs

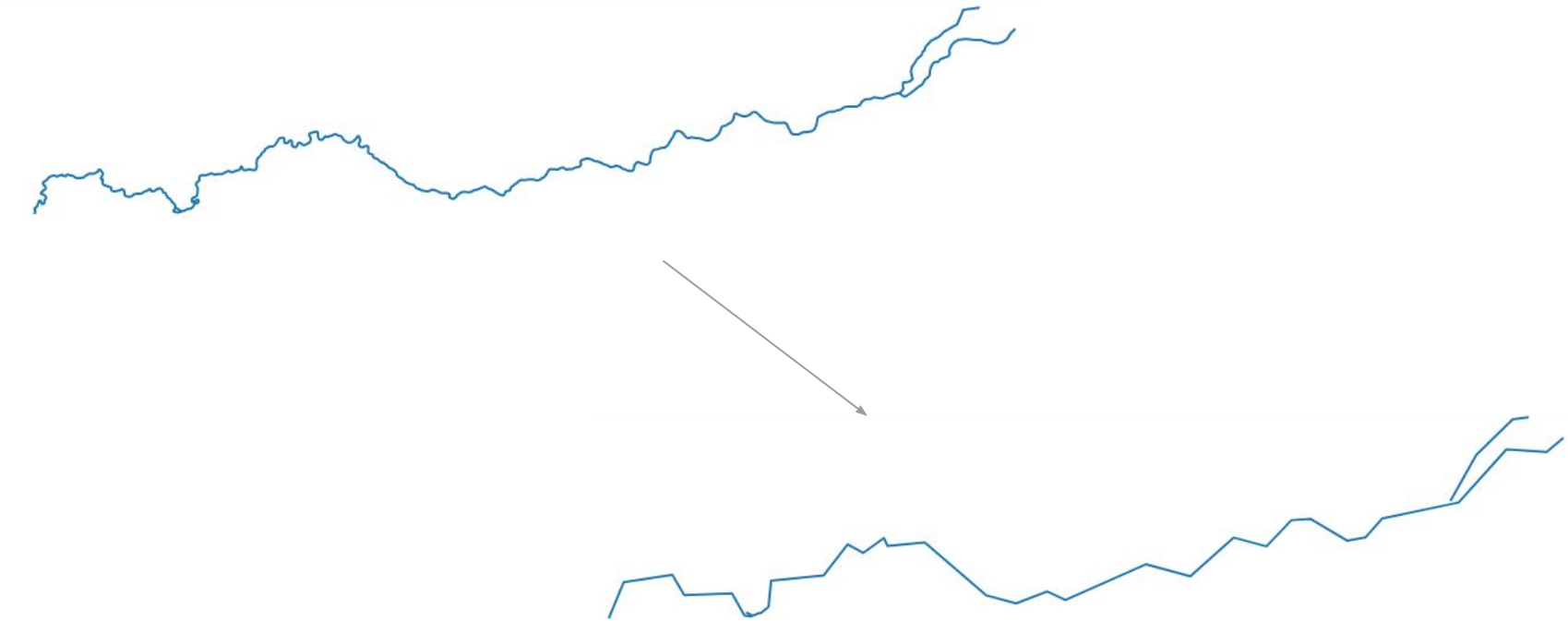
Overlay analysis



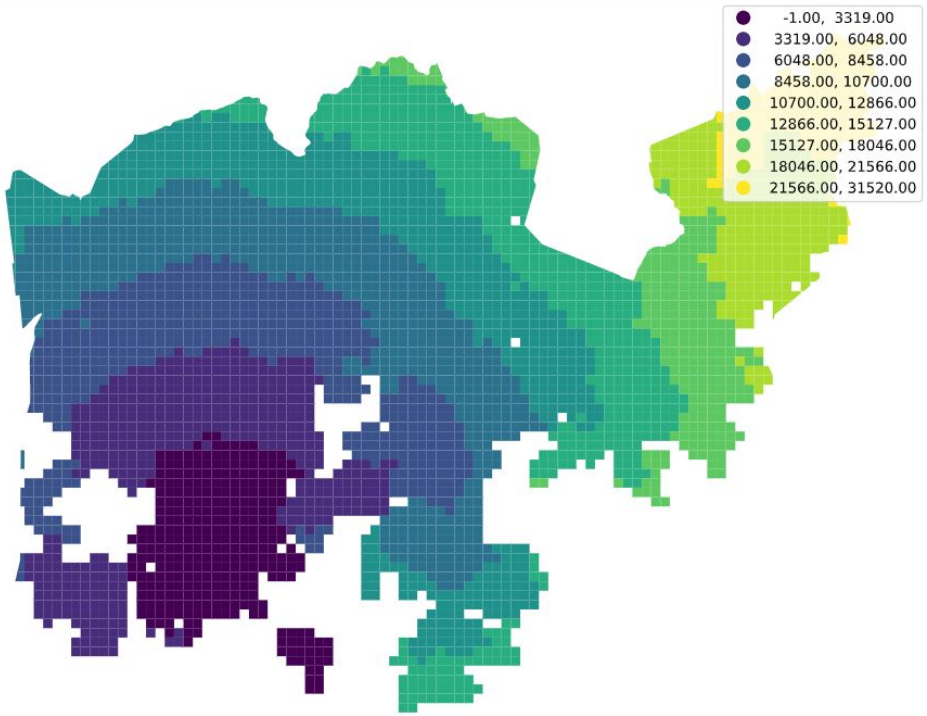
Data aggregation



Geometry simplification

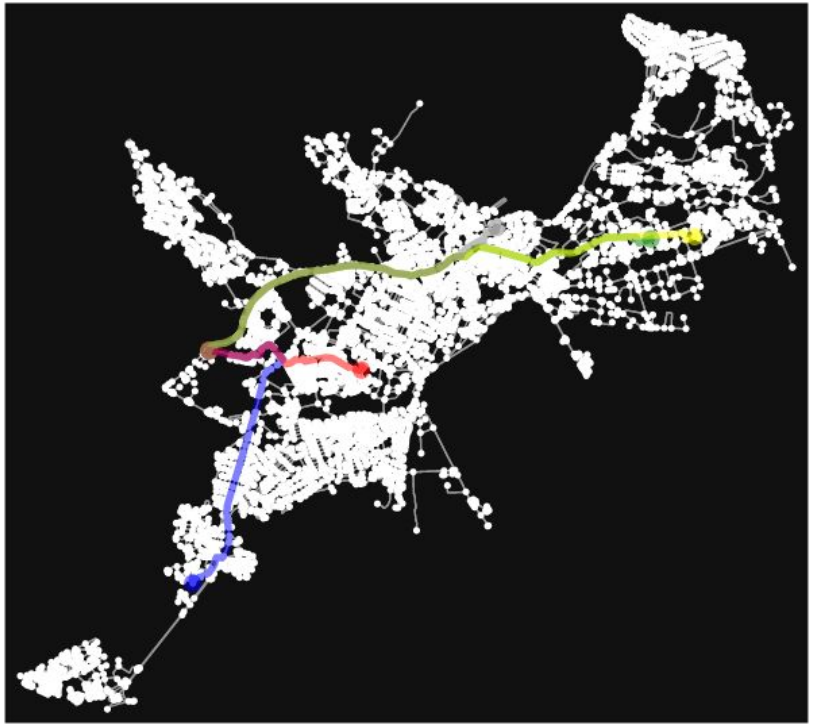


Data classification

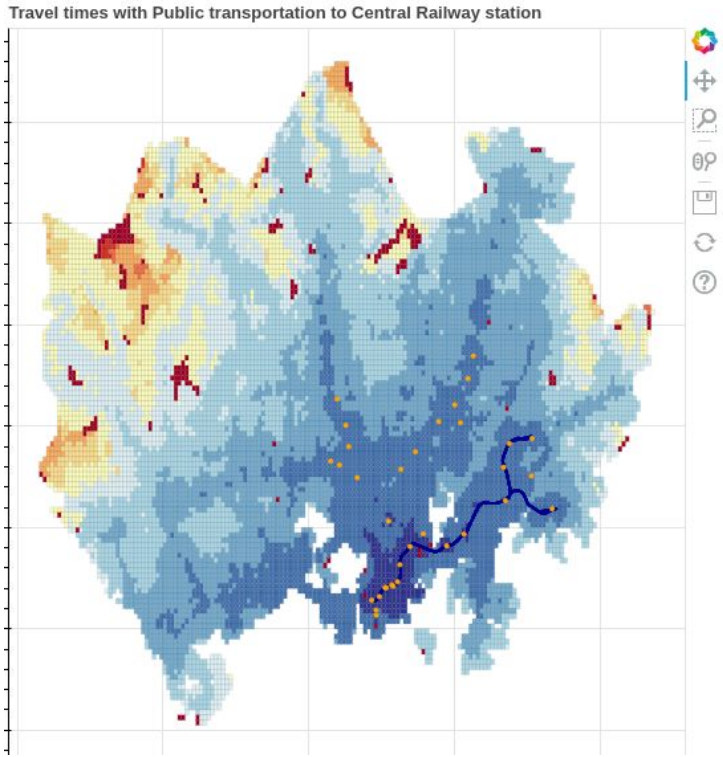


OSM data

Network analysis



Visualizations



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Questions?

Thank you!

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