

Running every street in Paris with Python and PostGIS



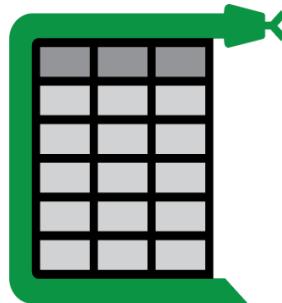
EuroPython 2025

Vinayak Mehta

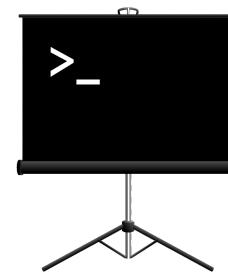
Outline

- Motivation
- GIS and related concepts
- OpenStreetMap and street networks
- Storing data in Postgres with PostGIS
- Map matching runs and visualizing progress

vinayak.io/code



Camelot

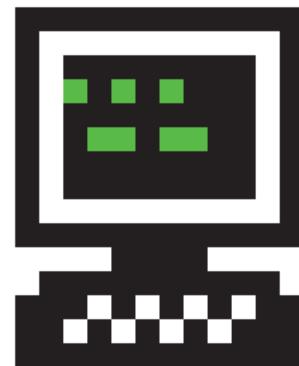


Present

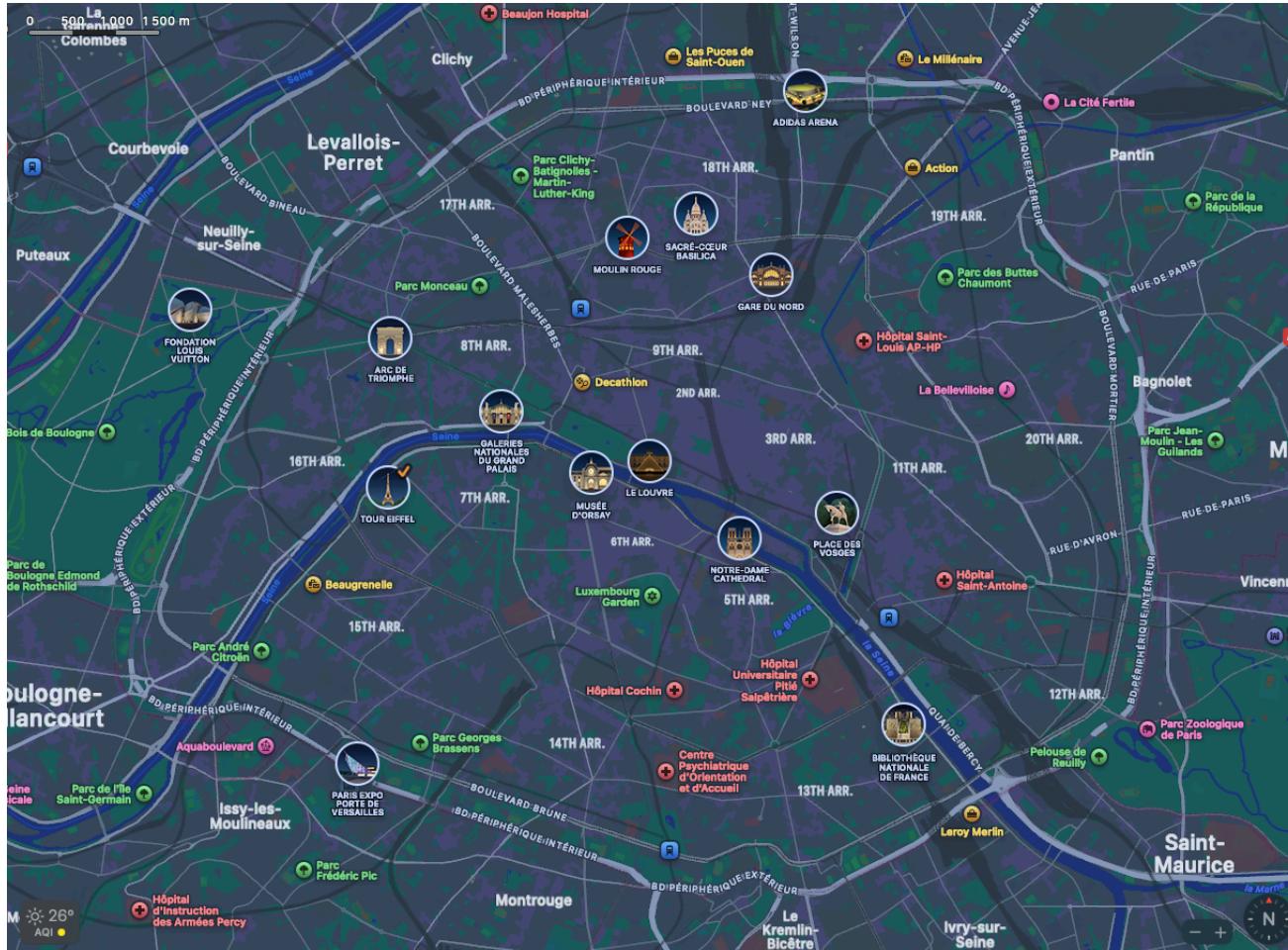


Fleur

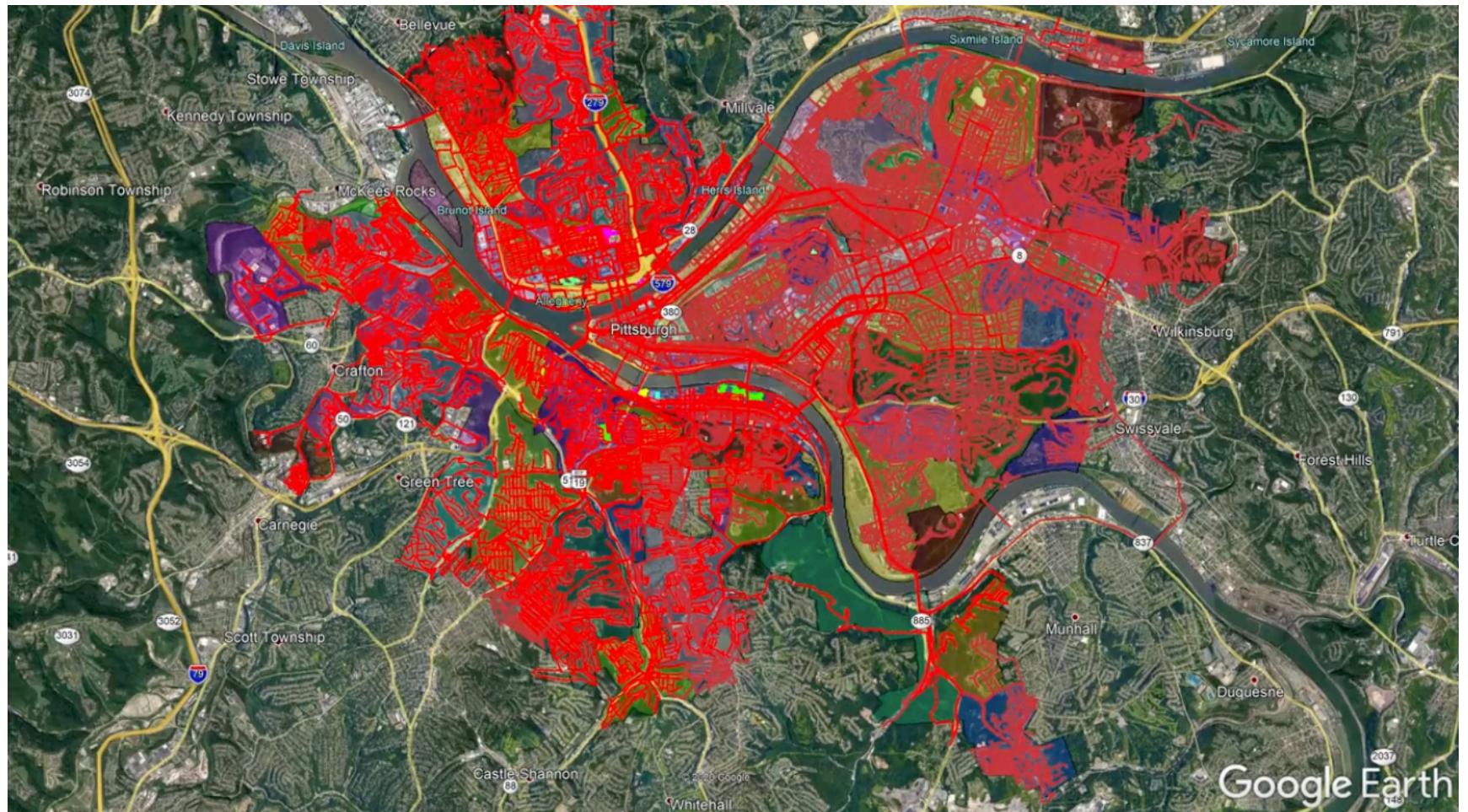
recurse.com



Running every street in Paris

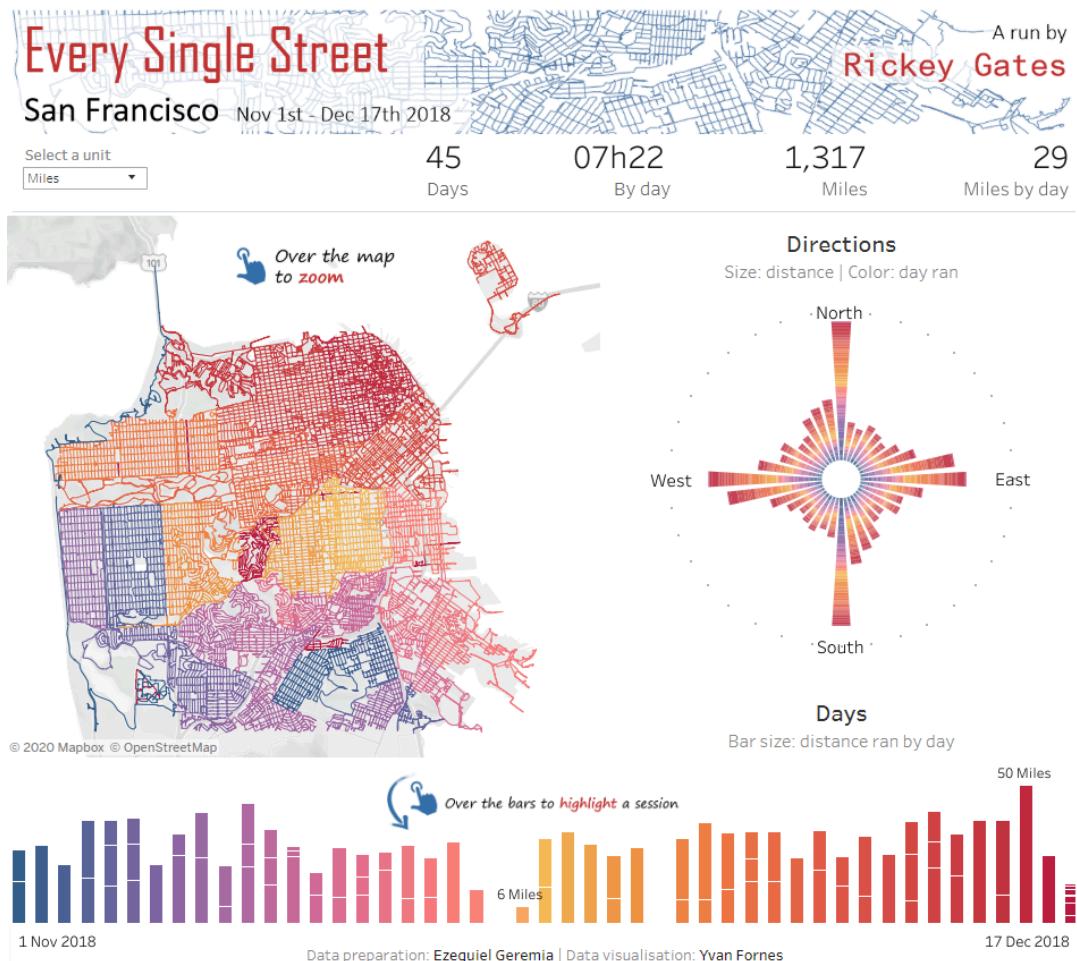


Tom Murphy's PAC TOM project



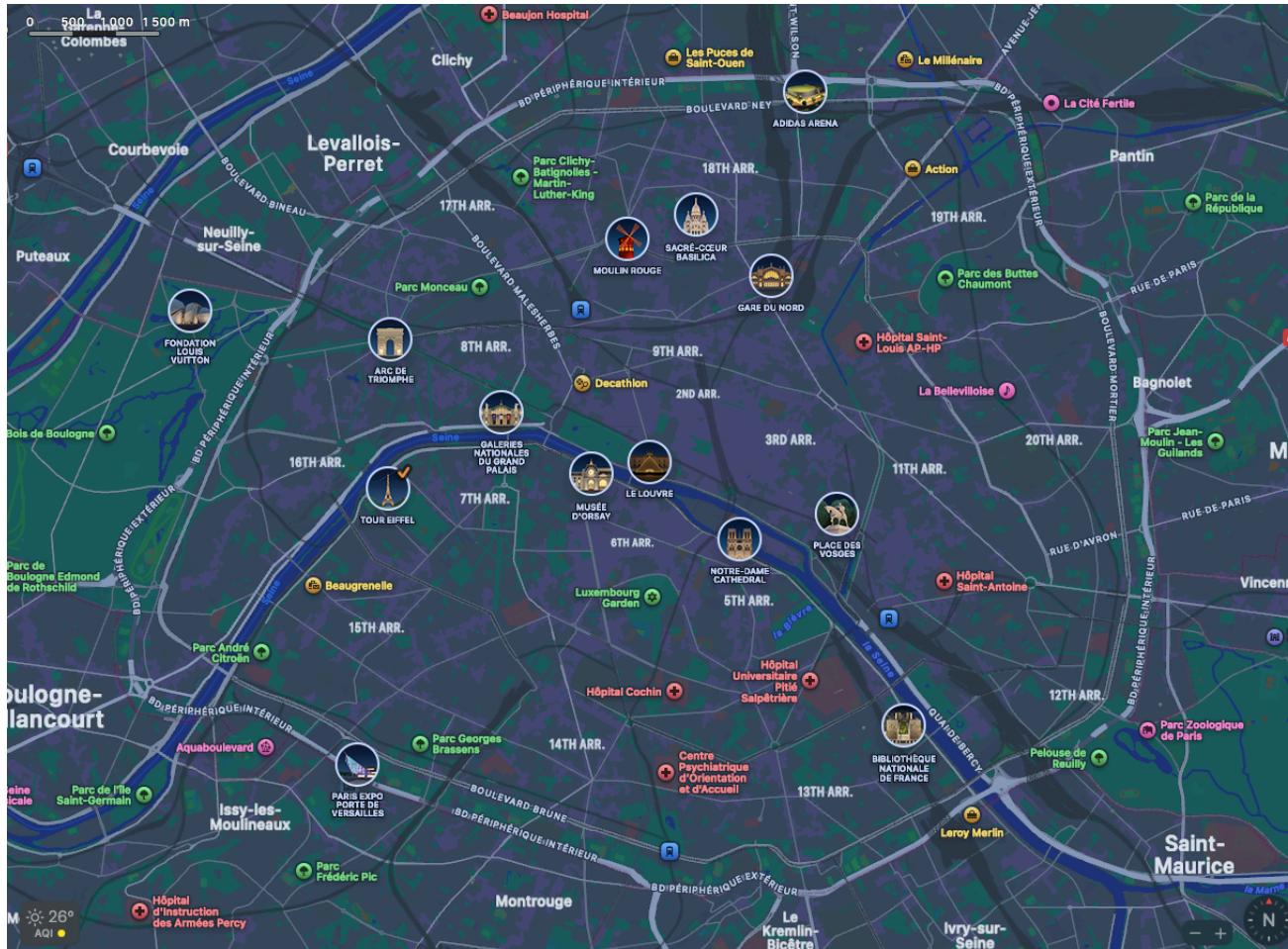
How I ran the length of every street in Pittsburgh: PAC TOM

Rickey Gates' Every Single Street project



<https://www.rickeygates.com/eversinglestreet>

"Could I do it in Paris?!"



Approach

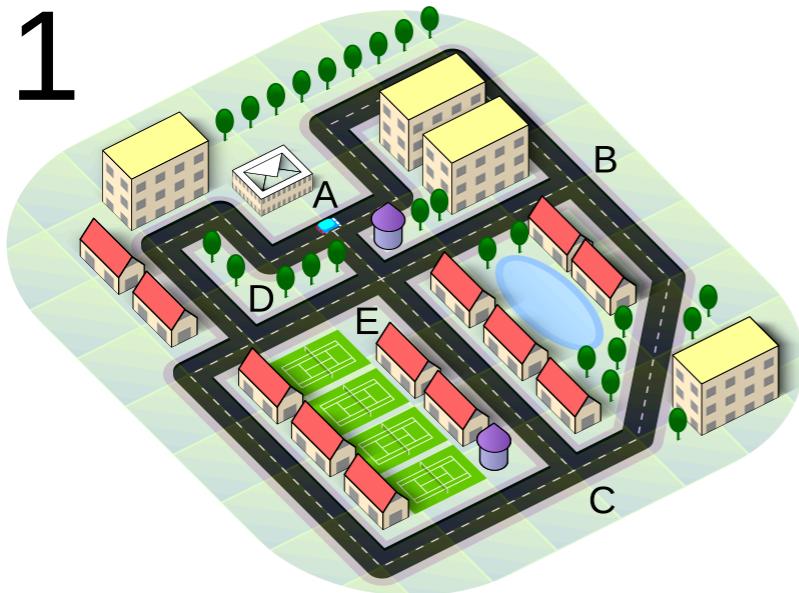
- Fetch OSM data
- Compute routes
- Run 
- Map match
- Visualize progress

OpenStreetMap



Chinese postman problem

1



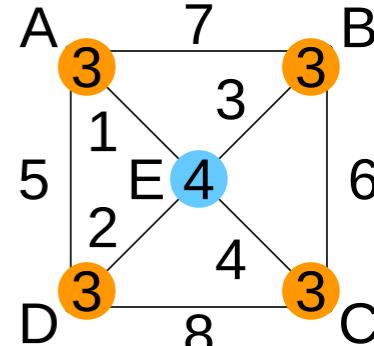
3

$$A(E)B + C(E)D = 4 + 6 = 10$$

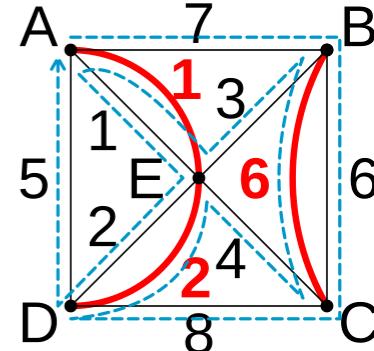
$$A(E)C + B(E)D = 5 + 5 = 10$$

$$A(E)D + BC = 3 + 6 = 9 \checkmark$$

2



4



$$\begin{aligned}L &= 7+6+8+2+4+ \\&\quad 6+3+1+1+2+5 \\&= 45\end{aligned}$$

Approach (revised)

- Fetch OSM data
- ~~Compute routes~~ Draw routes
- Run 
- Map match
- Visualize progress

Progress



Vinayak Mehta



Today at 7:53 PM · Paris

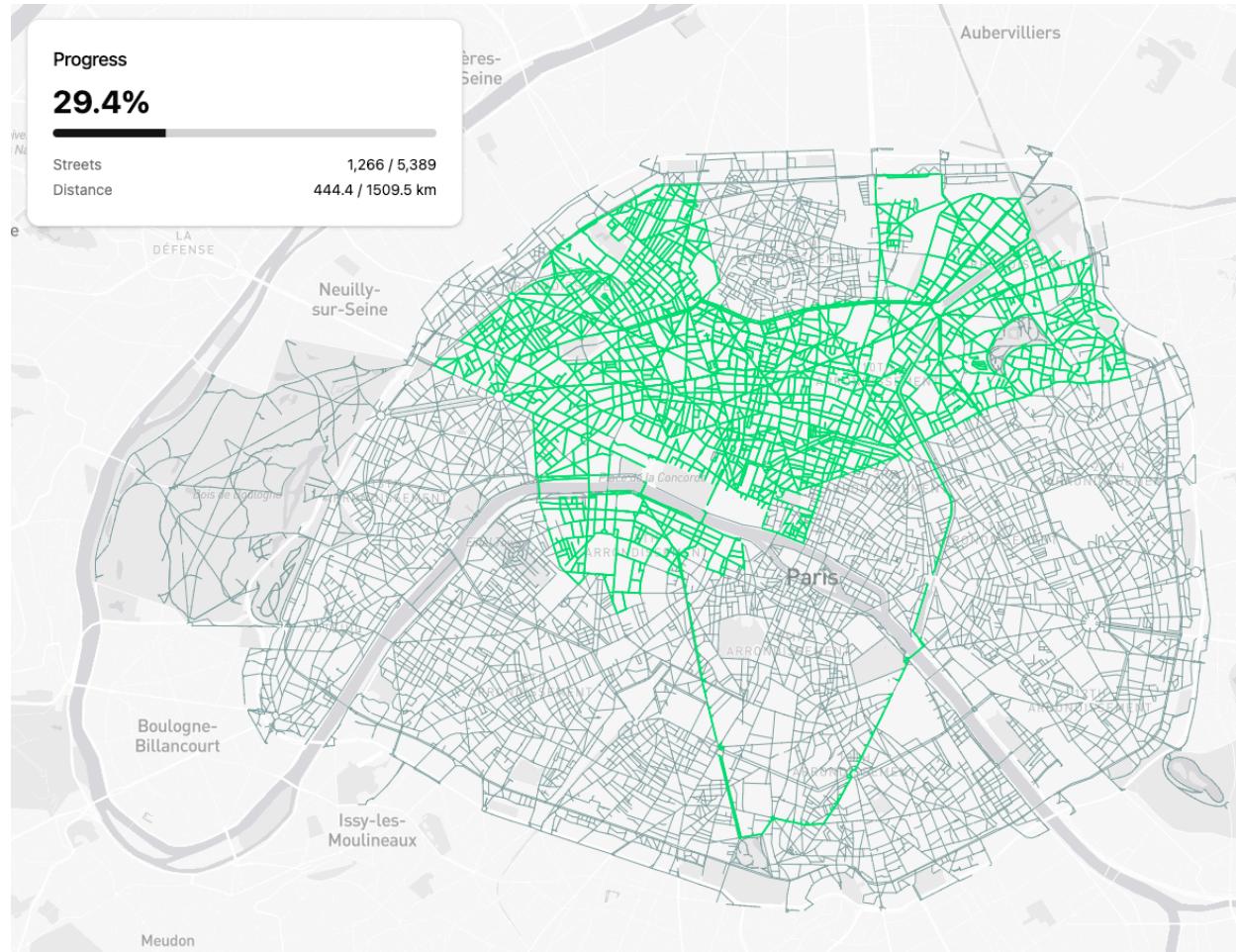
Evening Run



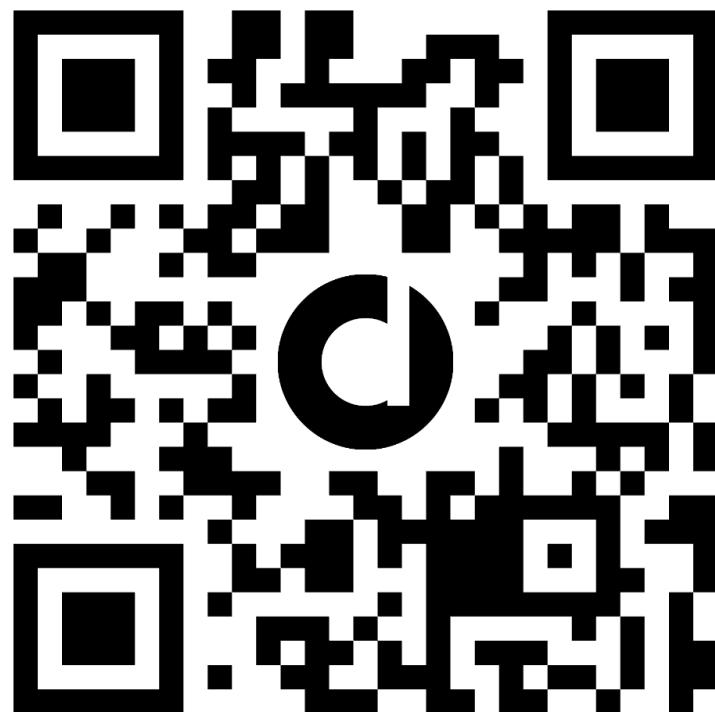
Check out my progress at <https://app.everystreet.run/vinayak/paris> 🏃

- Streets completed: 1,266 / 5,389
- Progress: 29.4% (+0.9%)
- City: Paris

Progress



Progress



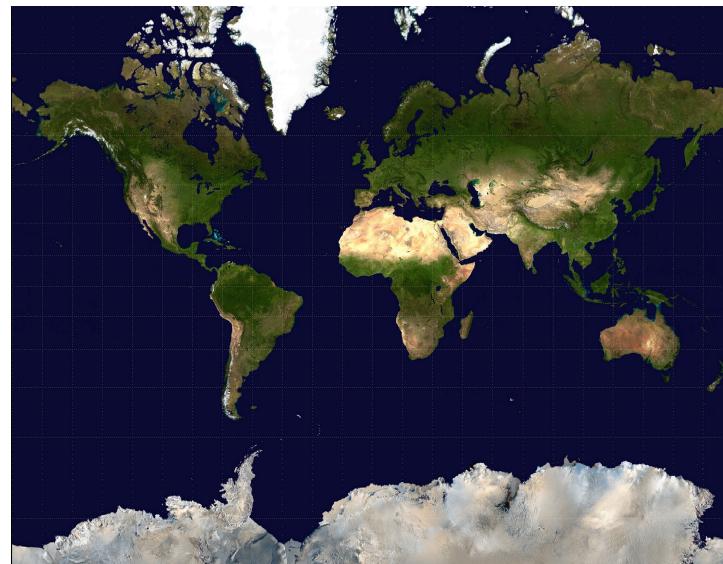
<https://dub.sh/everystreet>

GIS

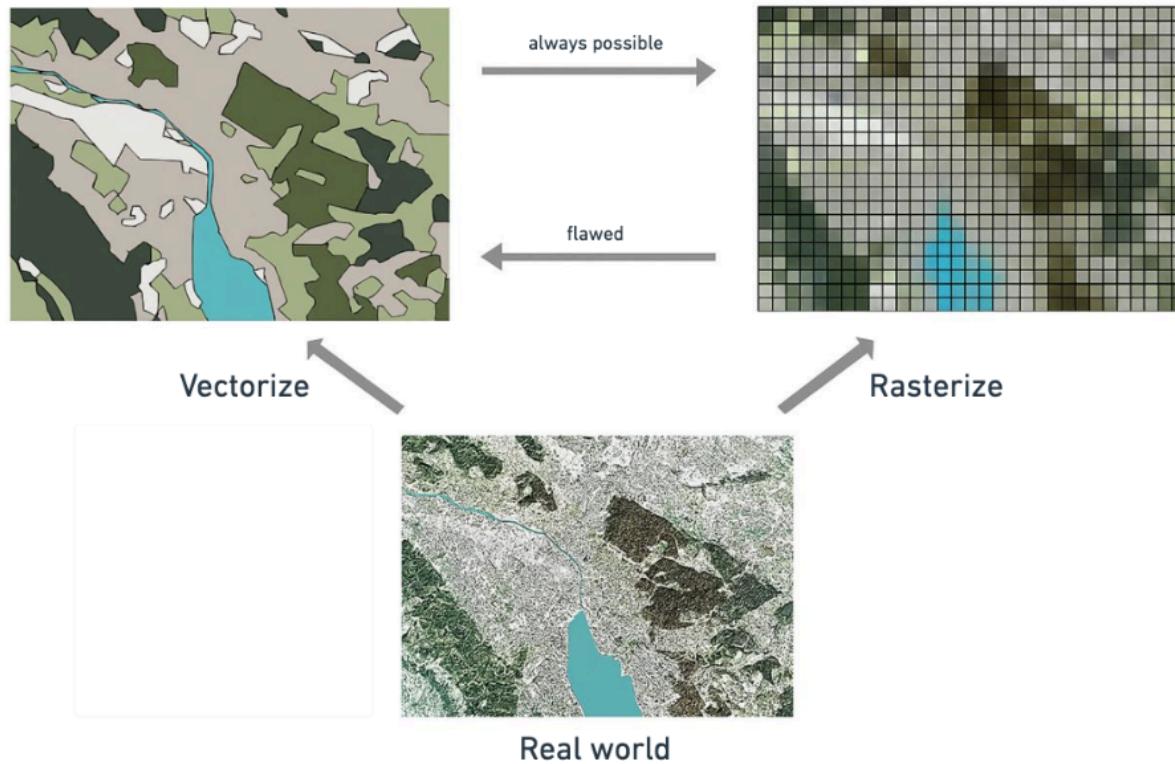


Coordinate systems

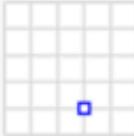
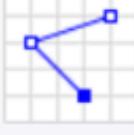
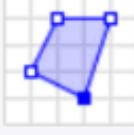
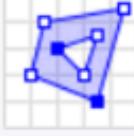
- Geographic coordinate systems (WGS 84, ...)
- Projected coordinate systems (Mercator, ...)



Vector and raster data



Geometries

Type	Examples
Point	 POINT (30 10)
LineString	 LINESTRING (30 10, 10 30, 40 40)
Polygon	 POLYGON ((30 10, 40 40, 20 40, 10 20, 30 10))
	 POLYGON ((35 10, 45 45, 15 40, 10 20, 35 10), (20 30, 35 35, 30 20, 20 30))

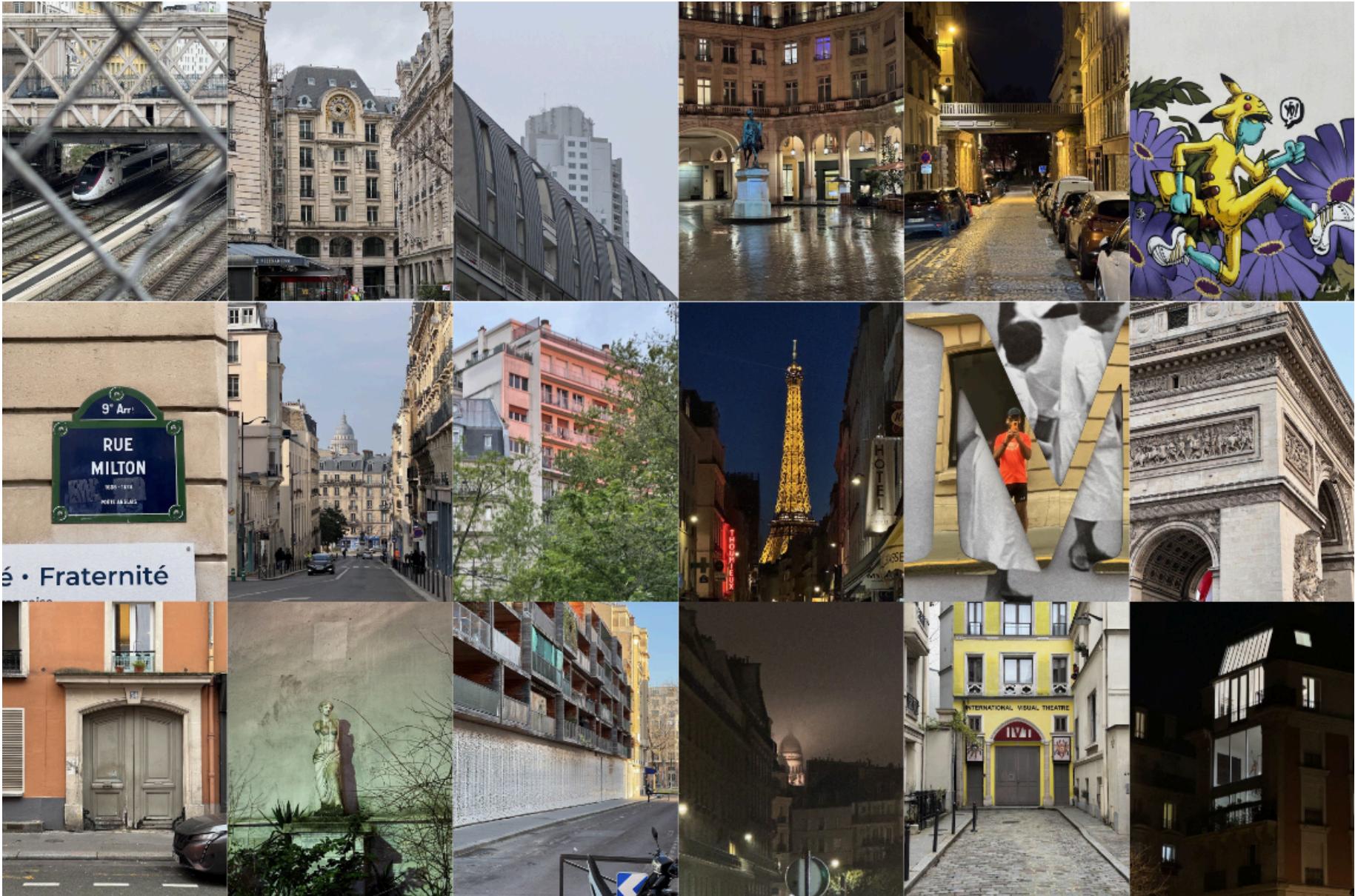
GPX

```
<!--?xml version="1.0" encoding="UTF-8"?-->
<gpx version="1.1" creator="Strava">
  <metadata>
    <name>Morning Run</name>
    <time>2025-07-10T22:00:00Z</time>
  </metadata>
  <trk>
    <name>Sample Track</name>
    <trkseg>
      <trkpt lat="48.8566" lon="2.3522">
        <ele>35.0</ele>
        <time>2025-07-10T22:00:00Z</time>
      </trkpt>
      <trkpt lat="48.8570" lon="2.3530">
```

Postgres and PostGIS

```
-- Enable PostGIS extension  
CREATE EXTENSION postgis;
```

Let's look at some code



Future work

- Viterbi algorithm
- ~~Draw routes~~ Compute routes
- Full coverage by this time next year

Questions

@vortex_ape | vinayak.io

<https://dub.sh/everystreet>