# Running every street in Paris with Python and PostGIS 

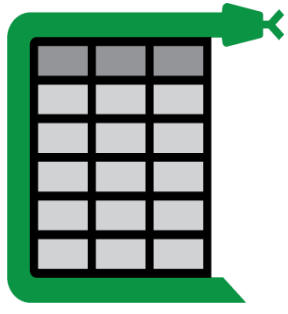
EuroPython 2025

Vinayak Mehta

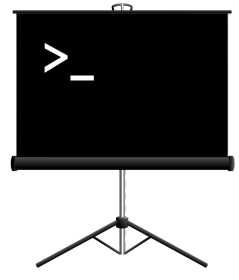
# Outline

- 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

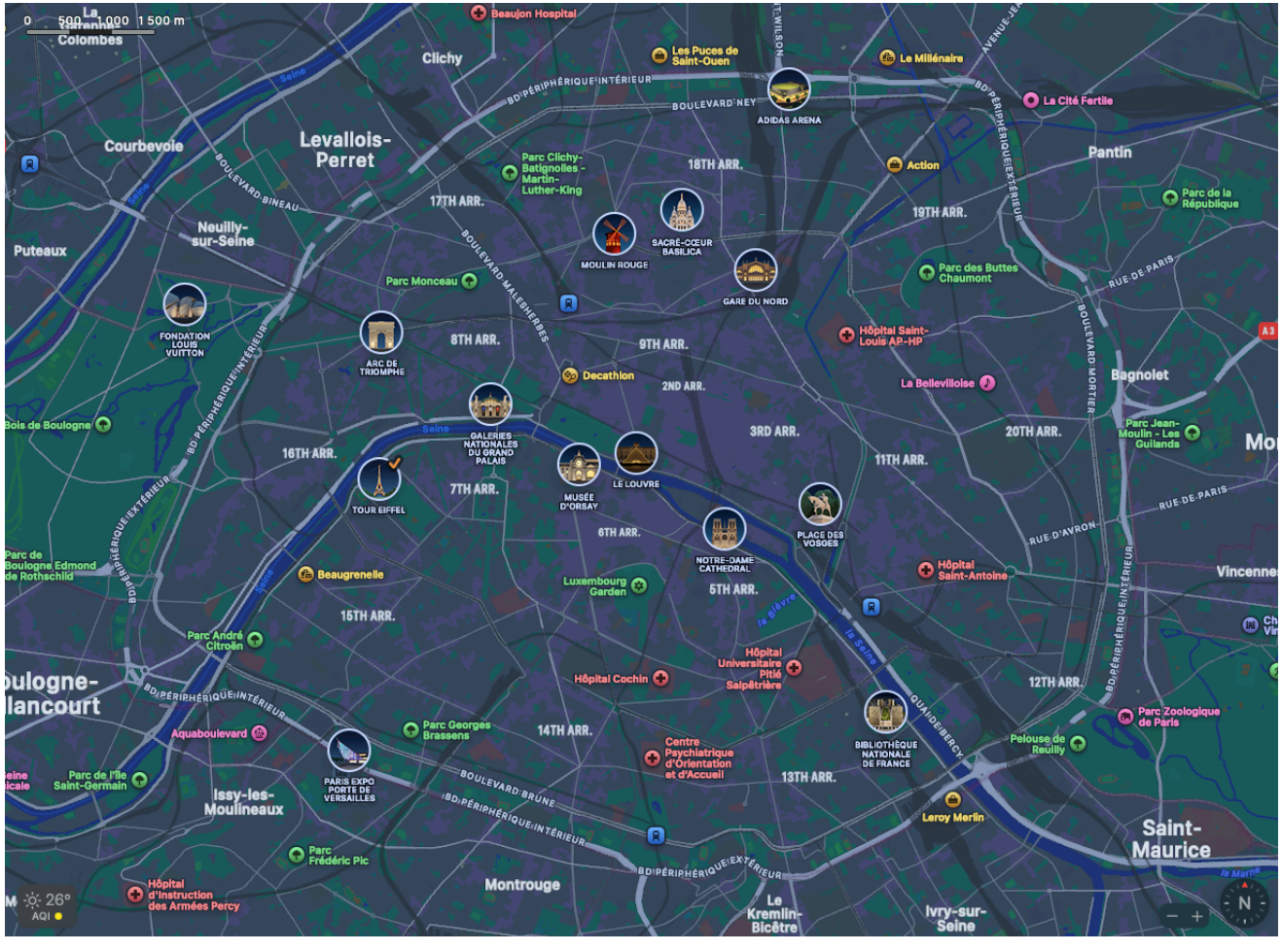



Present

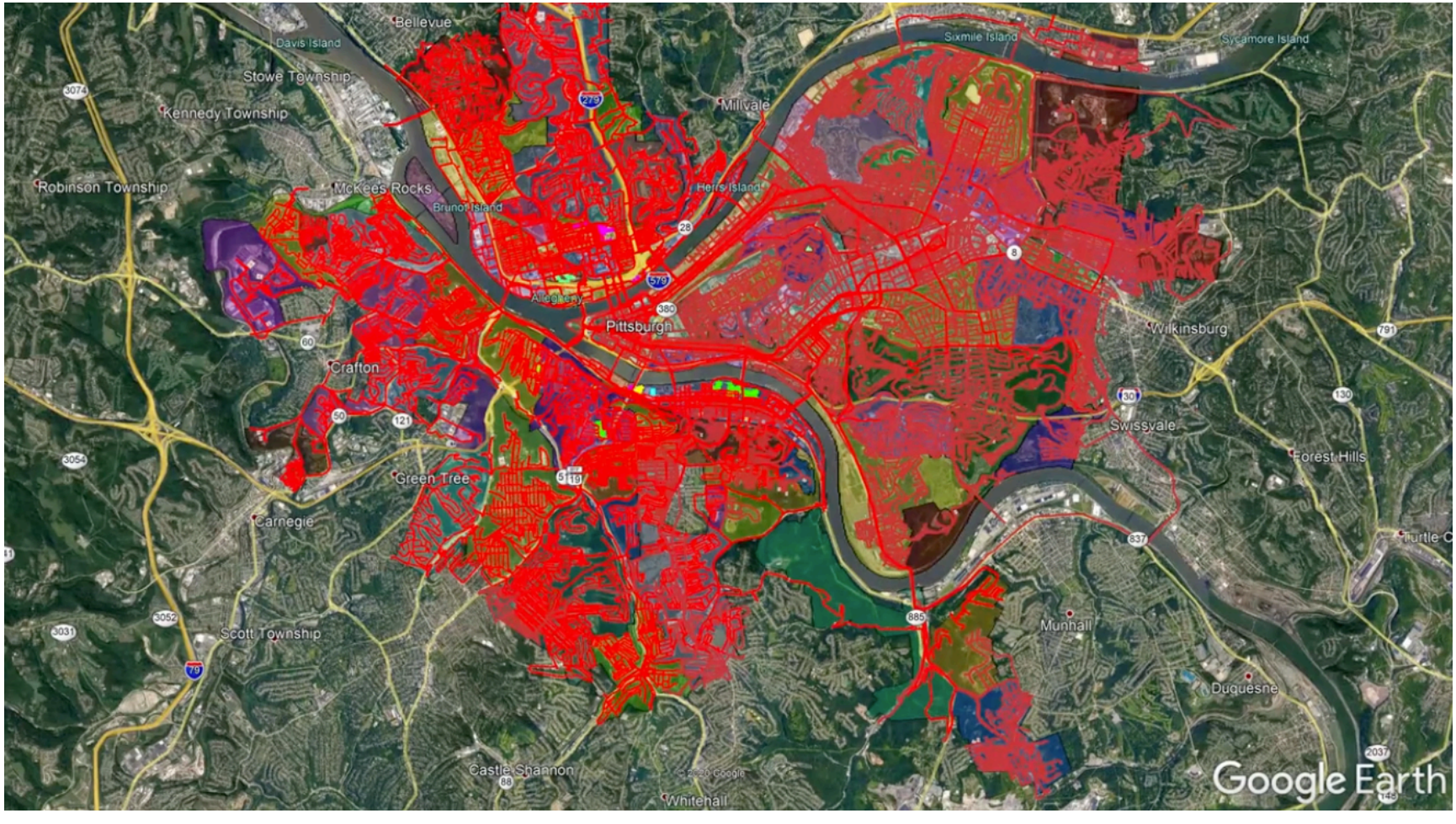
Fleur

# recurse.com

# Running every street in Paris

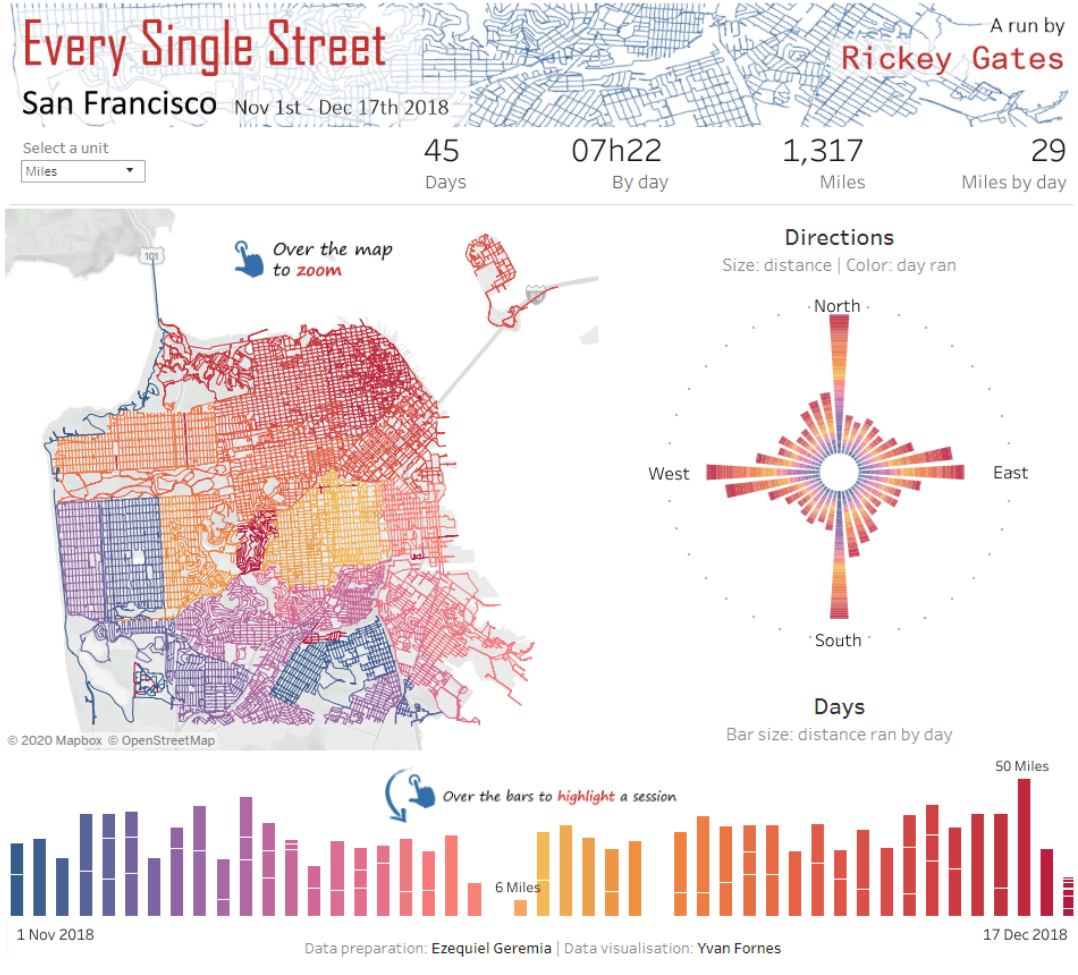


# Tom Murphy's PAC TOM project



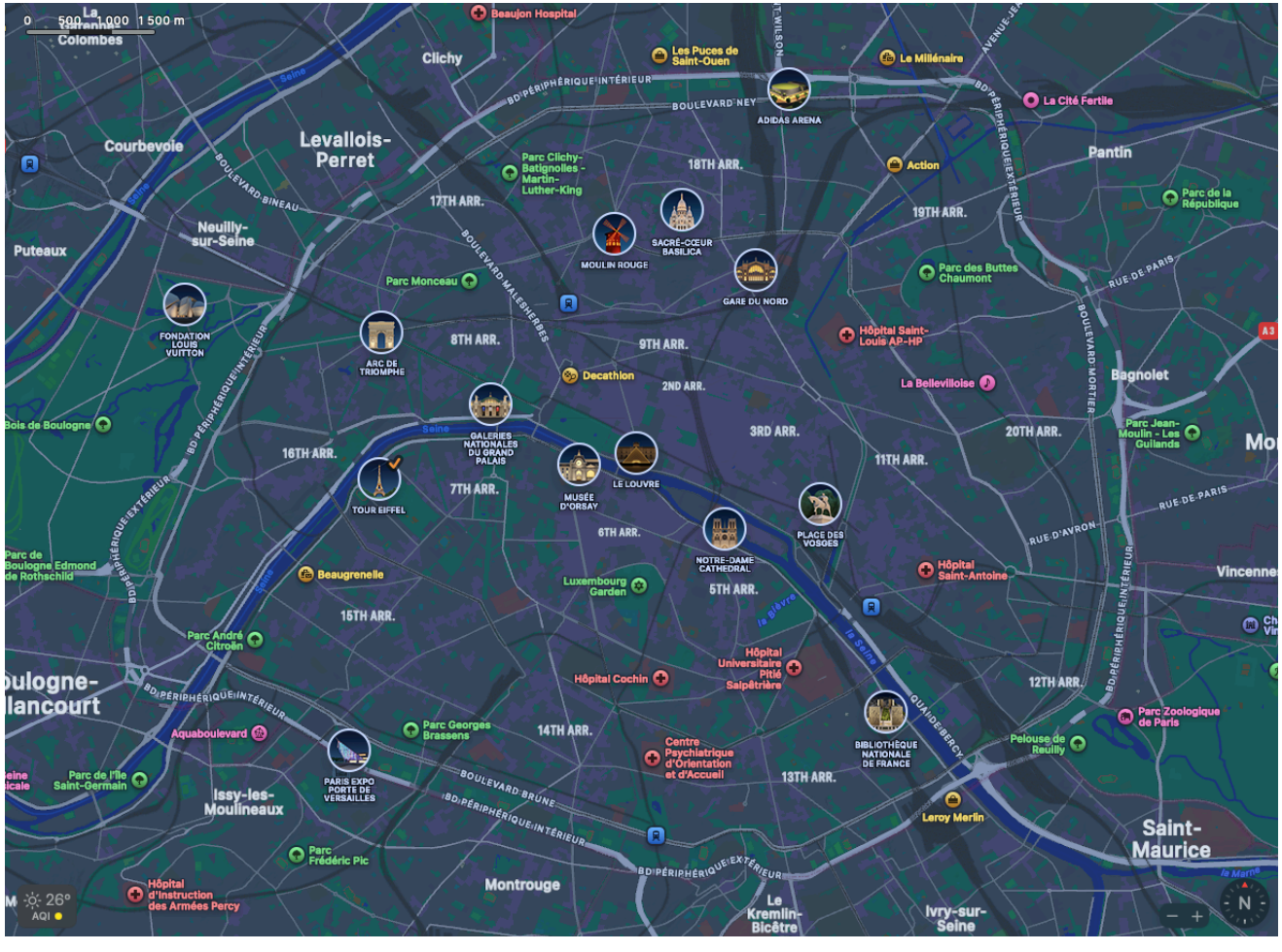

How I ran the length of every street in Pittsburgh: PAC TOM

# Rickey Gates' Every Single Street project




https://www.rickeygates.com/everysinglestreet

# "Could I do it in Paris?!"



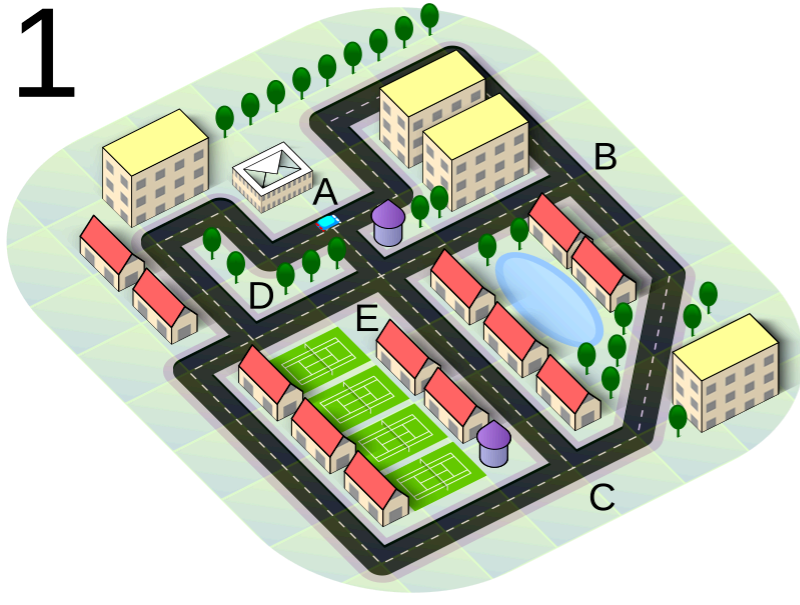
# Approach

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

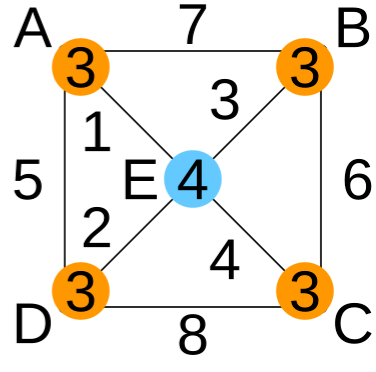
# OpenStreetMap

# Chinese postman problem

1




2



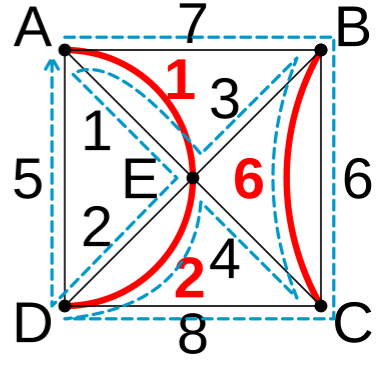

3

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

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

$A(E)D + BC = 3 + 6 = 9$ ✔

4




$L = 7+6+8+\mathbf{2}+4+$
$\mathbf{6}+3+\mathbf{1}+1+2+5$
$= 45$

# Approach (revised)

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

# Progress

**Vinayak Mehta**

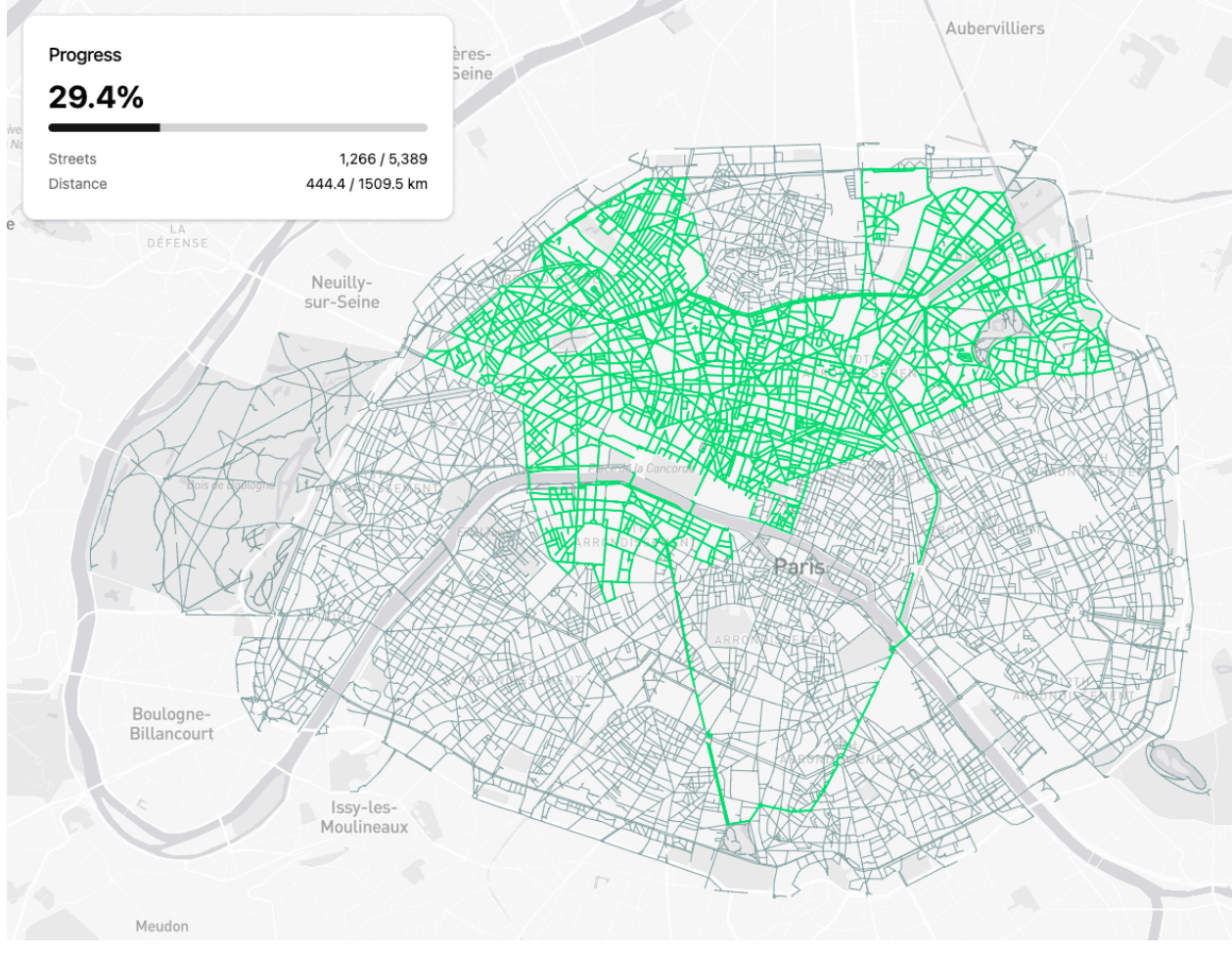
Today at 7:53 PM · Paris

## Evening Run

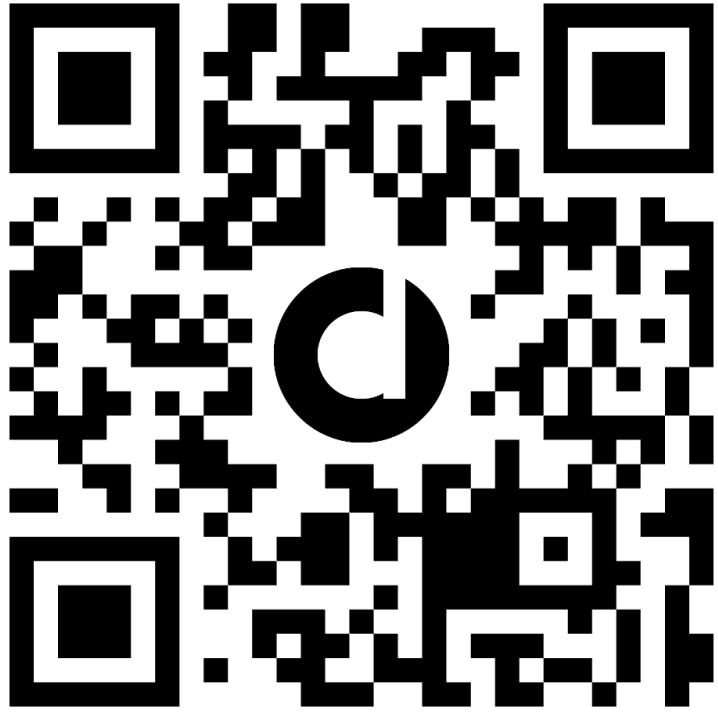
🗺️ Check out my progress at https://app.everystreet.run/vinayak/paris 🏃

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

# Progress

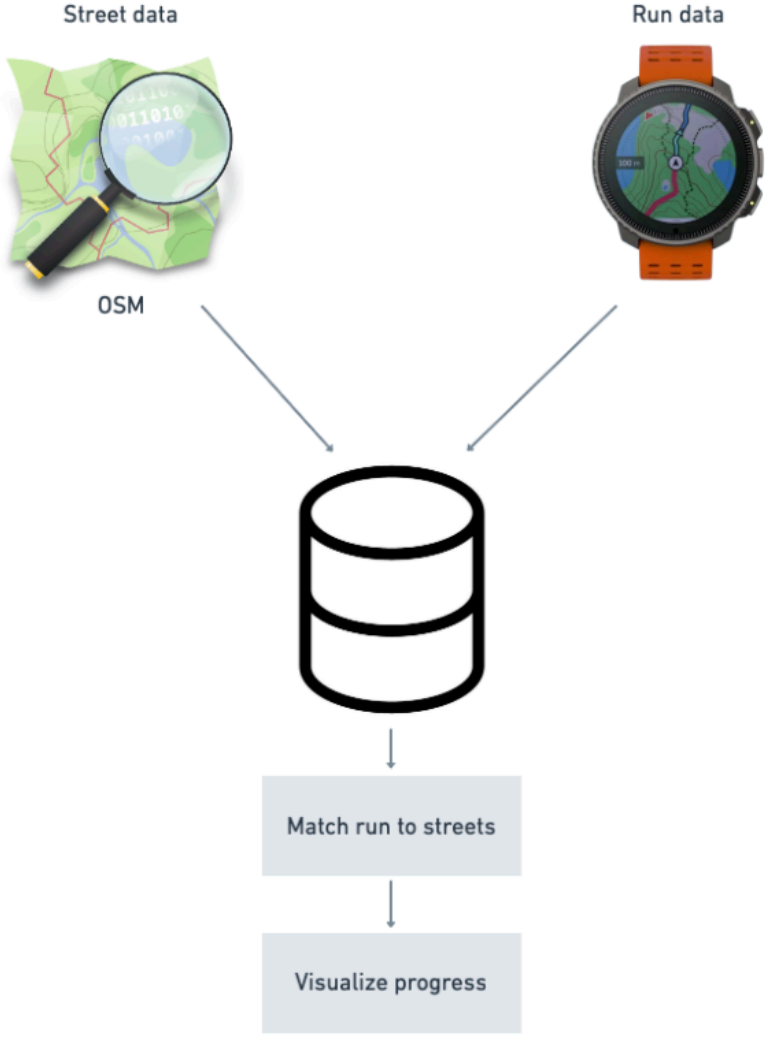

Progress
29.4%
Streets 1,266 / 5,389
Distance 444.4 / 1509.5 km
Aubervilliers
Neuilly-sur-Seine
Paris
Boulogne-Billancourt
Issy-les-Moulineaux
Meudon

# Progress



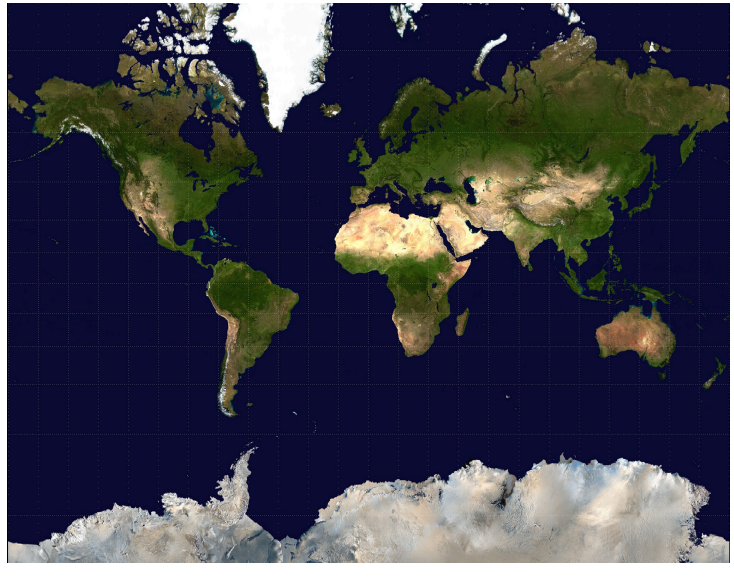
https://dub.sh/everystreet

# GIS

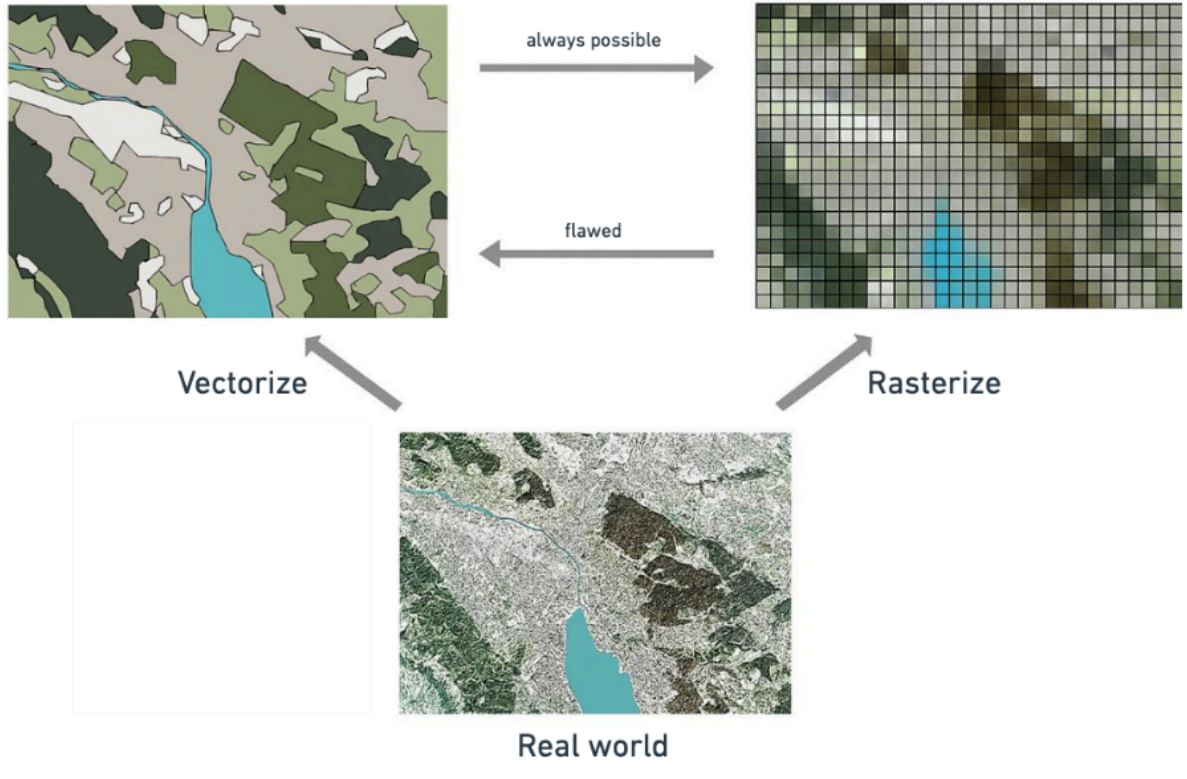

Street data
Run data
OSM
Match run to streets
Visualize progress

# Coordinate systems

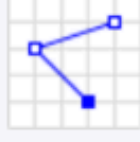
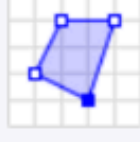
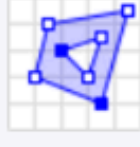
- Geographic coordinate systems (WGS 84, …)
- Projected coordinate systems (Mercator, …)



# 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

```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


9e Arr
RUE
MILTON
é • Fraternité
HOTEL
INTERNATIONAL VISUAL THEATRE

# Future work

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

# Questions

@vortex_ape | vinayak.io

https://dub.sh/everystreet

https://github.com/vinayak-mehta/2025-europython