SESSIONS 5

Folium

Data Science Program

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Outline

- Introduction to Folium
- Folium use case
- Types of Map
- Folium Installation
- Generating Maps using Folium

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Introduction to Folium

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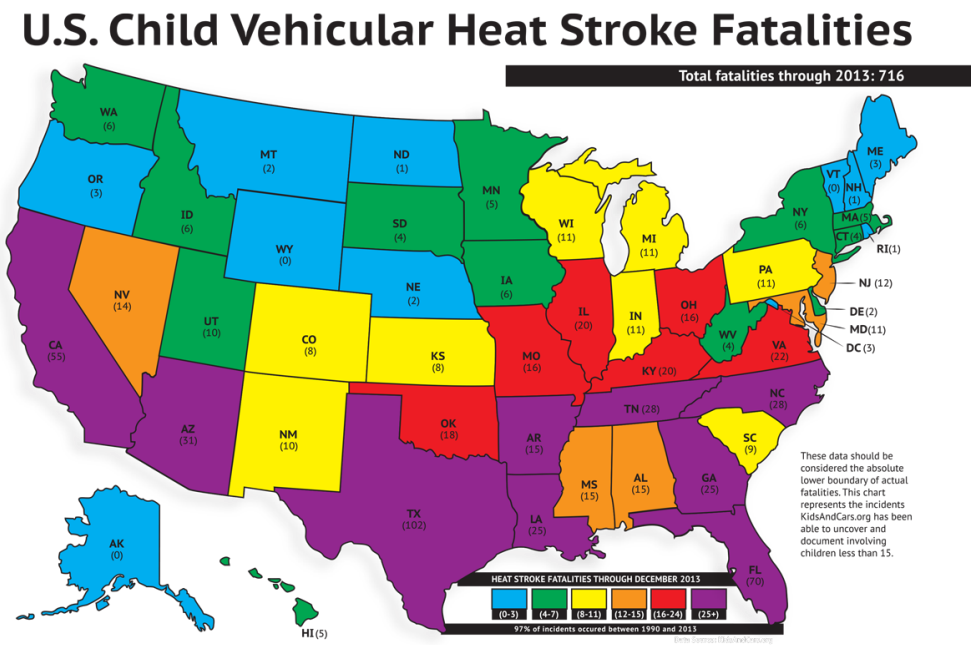
Introduction to Folium

- Folium is a Python library used for visualizing geospatial data. It is easy to use and yet a powerful library. Folium is a Python wrapper for Leaflet. js which is a leading open-source JavaScript library for plotting interactive maps.
- Folium makes it easy to visualize data that's been manipulated in Python on an interactive leaflet map.
- It enables both the binding of data to a map for choropleth visualizations as well as passing rich vector/raster/HTML visualizations as markers on the map.



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Folium Installation

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Folium Installation

- **Requirements**: branca, jinja2 and requests.
- Some functionalities may require extra dependencies
  numpy, pandas, geopandas, altair, etc.

- **Installation**
- `$ pip install folium`
- or
- `$ conda install folium -c conda-forge`

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Folium Use Case

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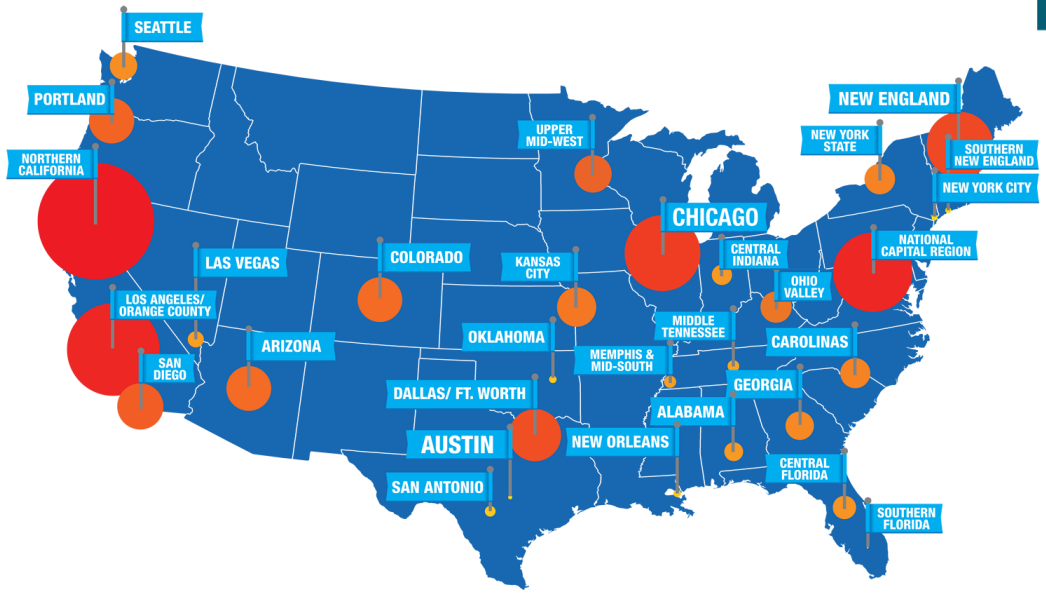
Folium Use Case

- There are so many use case with Folium. For example:

1. Visualizing COVID-19 Hotspots,
2. Visualizing Bus Traffic,
3. Visualizing Team Performance in every regional branch,
4. Visualizing Car Accident
5. etc.



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Types of Map

Types of Map

1. **Stamen Toner Maps**

- These are high-contrast Black and White maps. They are used for data mashups and for exploring and visualizing river meanders and coastal zones.

2. **Stamen Terrain Maps**

- These maps are used to highlight hill shading and natural vegetation colors. They showcase advanced labeling features and linework generalization of dual carriageway roads.

3. **Mapbox Bright Maps**

- These are maps that similar to the default style, except that the borders are not visible with a low zoom level. They differ form the default style because default style displays country names in each country's native language whereas Mapbox Bright style tile displays all country names in English.

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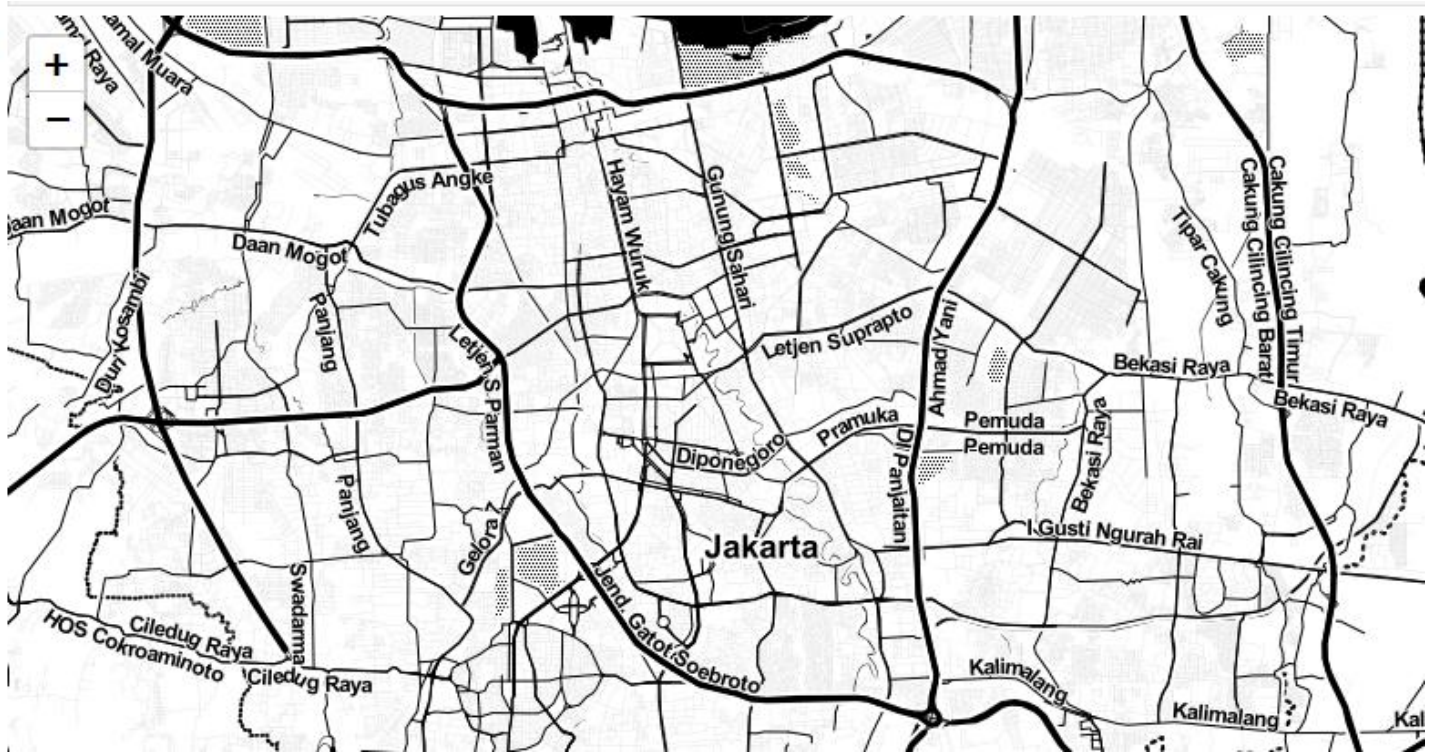

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Types of Map

2. Stamen Terrain Maps

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Types of Map

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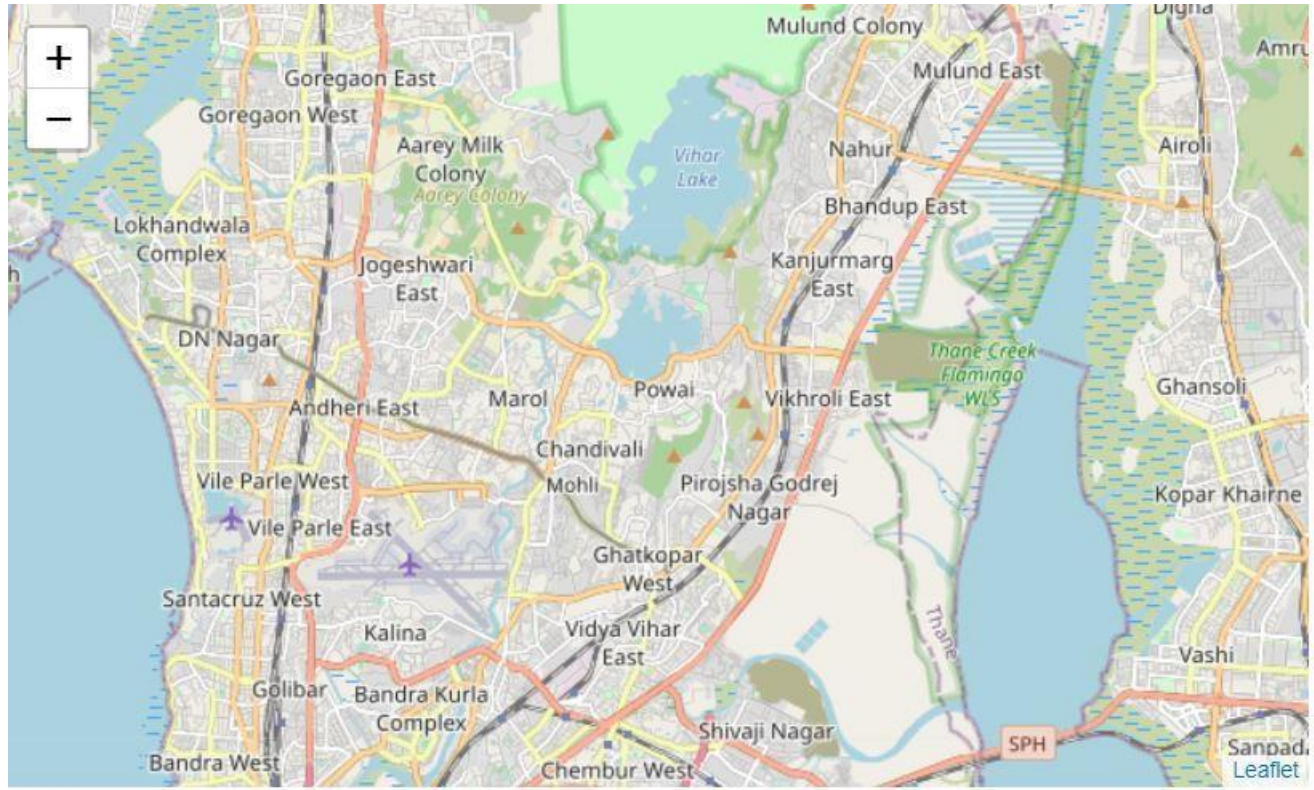

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Generating Maps using Folium

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World Map

```
[4]: # define the world map
world_map = folium.Map()

# display world map
world_map
```

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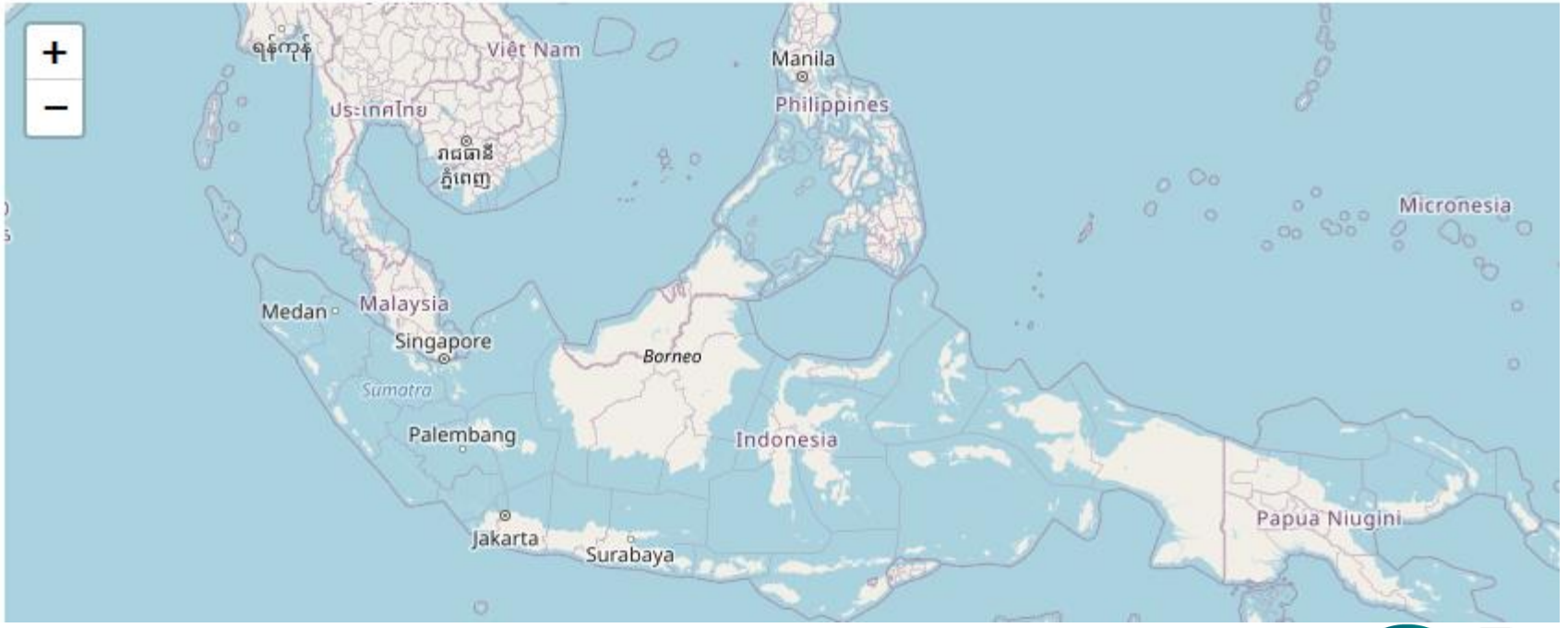
Jakarta Map

[3]:
```
# define the world map centered around JAKARTA with a low zoom level
world_map = folium.Map(location=[-6.2, 106.816666], zoom_start=4)

# display world map
world_map
```

[3]:


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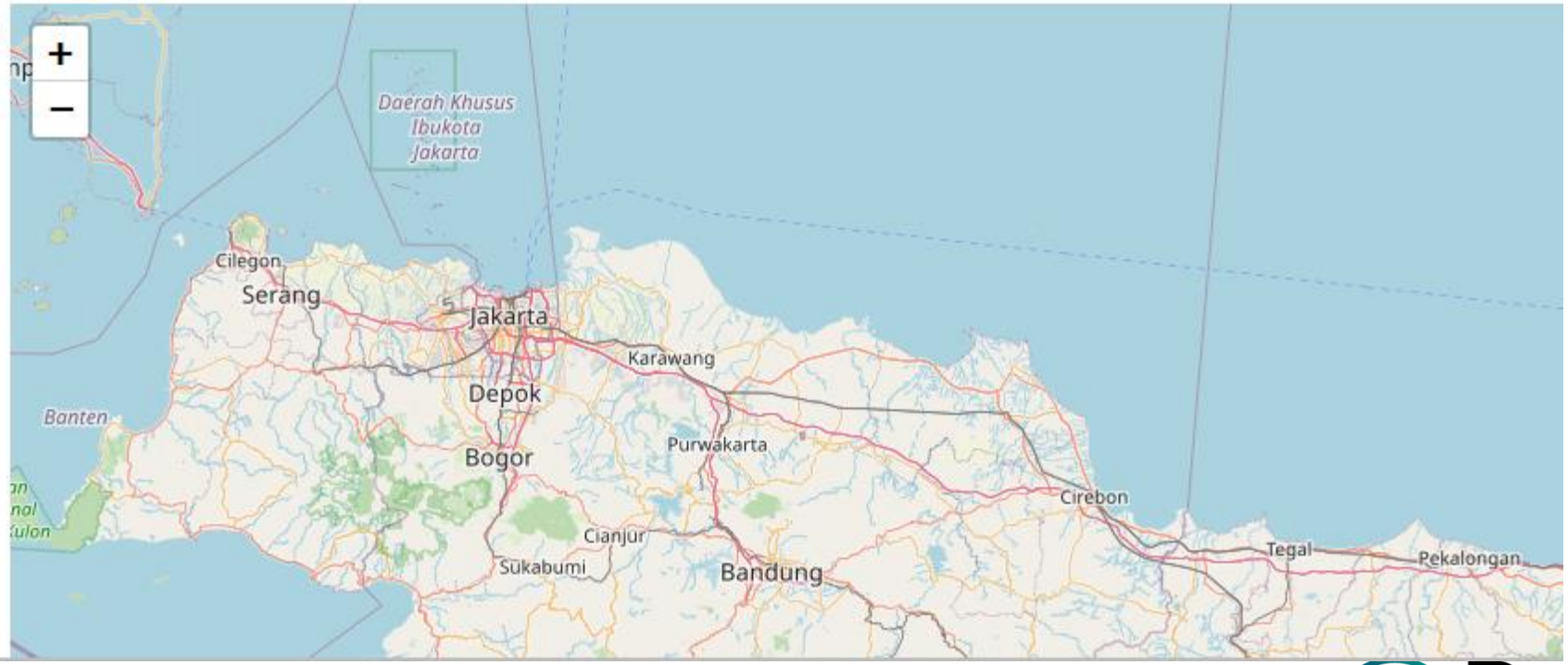
Jakarta Map

[13]:
```
# define the world map centered around JAKARTA with a higher zoom level
world_map = folium.Map(location=[-6.2, 106.816666], zoom_start=8)

# display world map
world_map
```

[13]:


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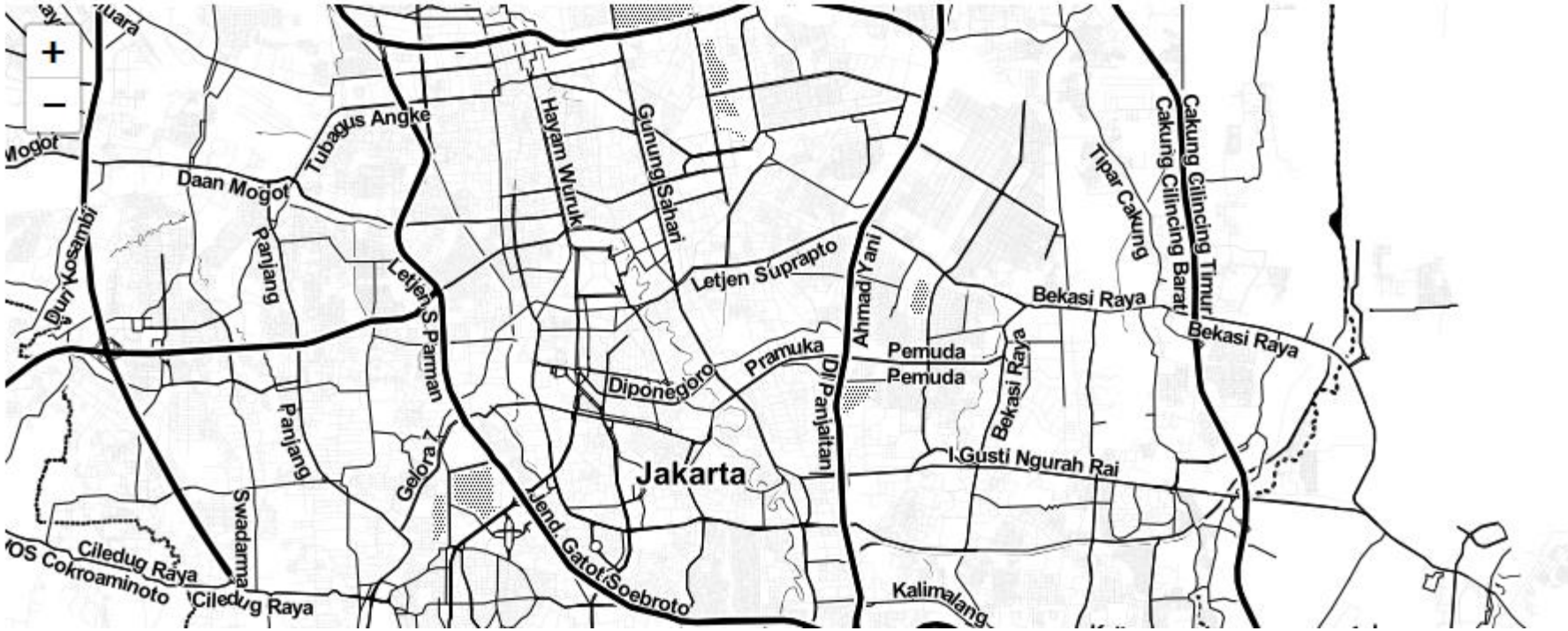
Jakarta Map: Stamen Toner Map

[8]:
```
# create a Stamen Toner map of the world centered around JAKARTA
world_map = folium.Map(location=[-6.2, 106.816666], zoom_start=12, tiles='Stamen Toner')

# display map
world_map
```

[8]:


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Jakarta Map: Stamen Terrain Map

[10]:
```
# create a Stamen Toner map of the world centered around JAKARTA
world_map = folium.Map(location=[-6.2, 106.816666], zoom_start=12, tiles='Stamen Terrain')

# display map
world_map
```

[10]:

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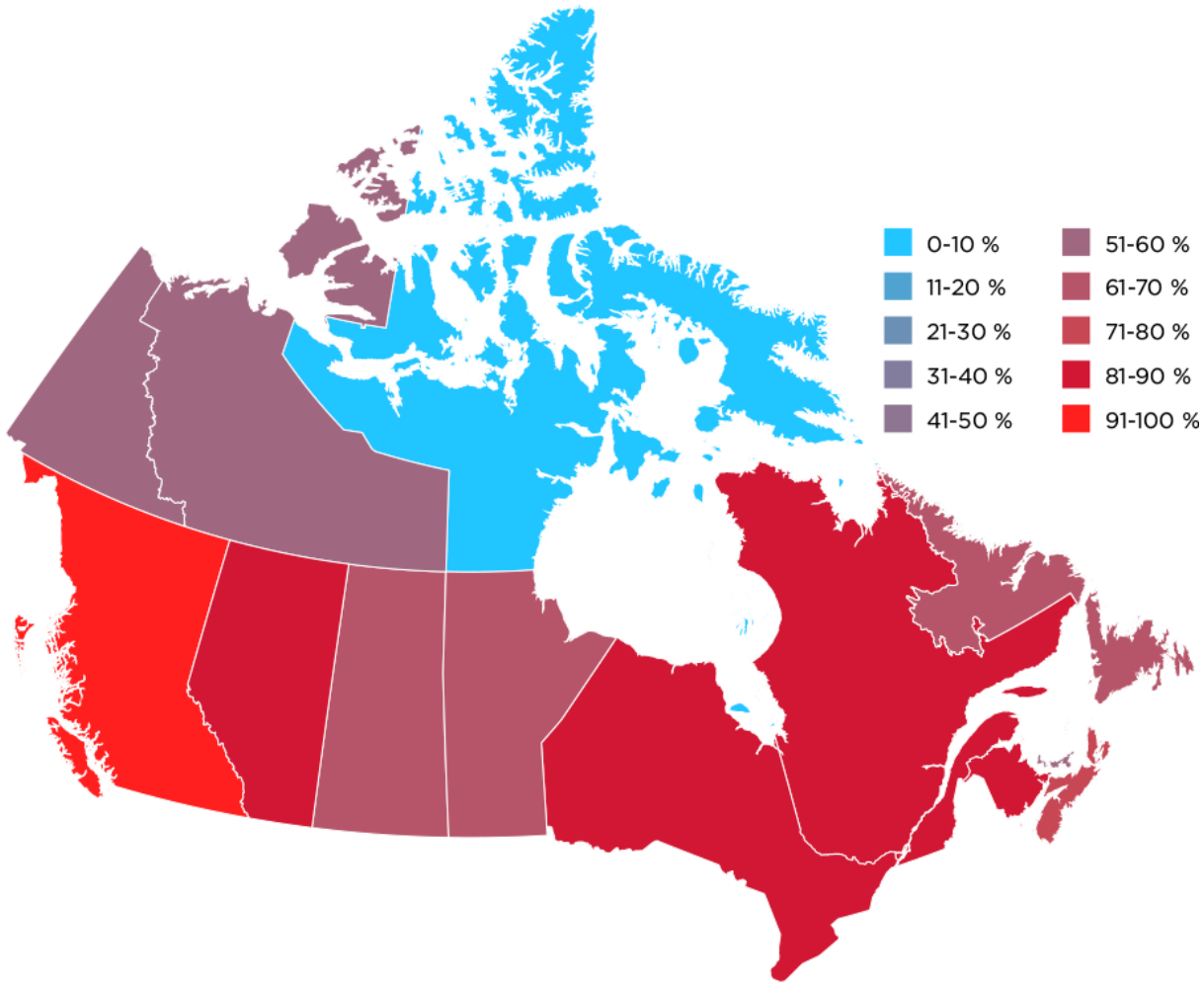
Choropleth Map

- A Choropleth map is a thematic map in which areas are shaded or patterned in proportion to the measurement of the statistical variable being displayed on the map, such as population density or per-capita income.
- The choropleth map provides an easy way to visualize how a measurement varies across a geographic area or it shows the level of variability within a region.



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Trans migrant Map in Jakarta

[19]:
```
import pandas as pd
import folium
```

[20]:
```
df = pd.read_csv('pendatang_DKI_Maret_2020.csv')
df.head()
```

[20]:

	tahun	bulan	kota_kabupaten	kecamatan	kelurahan	jenis_kelamin	jumlah
0	2020	3	ADM. KEPULAUAN SERIBU	KEPULAUAN SERIBU UTARA	PULAU PANGGANG	Laki-Laki	0.0
1	2020	3	ADM. KEPULAUAN SERIBU	KEPULAUAN SERIBU UTARA	PULAU KELAPA	Laki-Laki	2.0
2	2020	3	ADM. KEPULAUAN SERIBU	KEPULAUAN SERIBU UTARA	PULAU HARAPAN	Laki-Laki	1.0
3	2020	3	ADM. KEPULAUAN SERIBU	KEPULAUAN SERIBU SELATAN	PULAU UNTUNG JAWA	Laki-Laki	3.0
4	2020	3	ADM. KEPULAUAN SERIBU	KEPULAUAN SERIBU SELATAN	PULAU TIDUNG	Laki-Laki	3.0

Trans migrant Map in Jakarta

[21]:
```
df_kel = df[['kelurahan', 'jumlah']]
df_kel.head()
```

[21]:

	kelurahan	jumlah
0	PULAU PANGGANG	0.0
1	PULAU KELAPA	2.0
2	PULAU HARAPAN	1.0
3	PULAU UNTUNG JAWA	3.0
4	PULAU TIDUNG	3.0

[22]:
```
jakarta = r'jakarta_by_kelurahan_geo.geojson'
jkt_location = [-6.2, 106.816666]
jkt_map = folium.Map(location=jkt_location, zoom_start=12)
folium.Choropleth(geo_data=jakarta, data=df_kel, columns=['kelurahan', 'jumlah'], key_on='feature.properties.name',
                  fill_color='YlOrRd', fill_opacity=0.7, line_opacity=0.2, legend_name='Transmigrant Rate in Jakarta'
).add_to(jkt_map)
jkt_map
```

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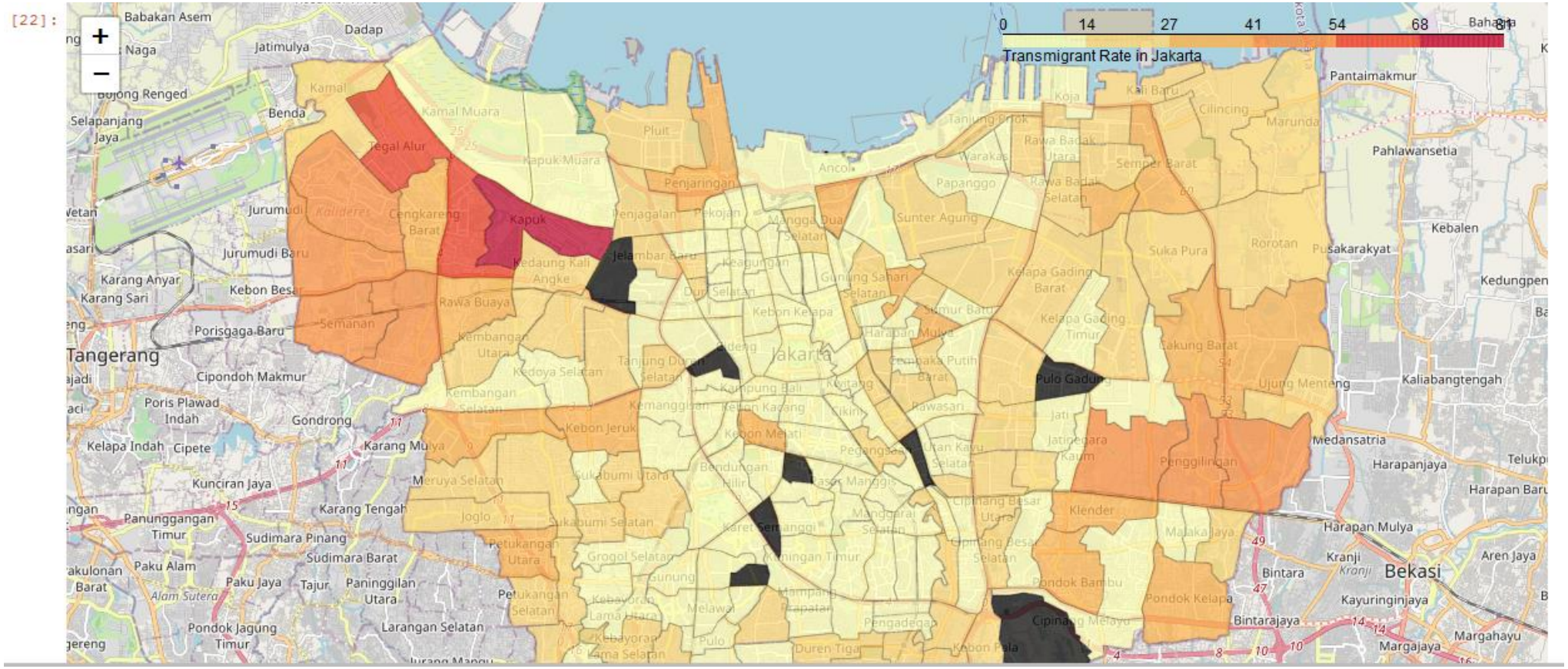
Trans migrant Map in Jakarta



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Reference

- Folium, https://python-visualization.github.io/folium/
- GeeksforGeeks, https://www.geeksforgeeks.org/stamen-toner-stamen-terrain-and-mapbox-bright-maps-in-python-folium/
- https://data.jakarta.go.id/dataset/pelaporan-perpindahan-penduduk-keluar-provinsi-dki-jakarta-tahun-2020-berdasarkan-kelurahan/resource/134253ff-2915-44b8-a1b3-2b1869366ed0
- https://pstyd.carto.com/tables/jakarta_by_kelurahan_geo/public

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