03 Maps

Folium

- Folium is a powerful Python library that helps you create several types of Leaflet maps
- The fact that the Folium results are interactive makes this library very useful for dashboard building
- Folium builds on the data wrangling strengths of the Python ecosystem and the mapping strengths of the Leaflet.js library. Manipulate your data in Python, then visualize it in on a Leaflet map via Folium
- 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 Vincent/Vega visualizations as markers on the map
- The library has a number of built-in tilesets from OpenStreetMap, Mapbox, and Stamen, and supports custom tilesets with Mapbox or Cloudmade API keys. Folium supports both GeoJSON and TopoJSON overlays, as well as the binding of data to those overlays to create choropleth maps with color-brewer color schemes

```
import folium
```

```
# define the world map
world_map = folium.Map()

# display world map
world_map
```

```
# define the world map centered around India with a low zoom level
world_map = folium.Map(location=[20.5937, 78.9629], zoom_start=4)

# display world map
world_map
```

Stamen Toner Maps

- These are high-contrast B+W (black and white) maps
- They are perfect for data mashups and exploring river meanders and coastal zones

```
india_map = folium.Map(location=[20.5937, 78.9629], zoom_start=4,
tiles='Stamen Toner', attr='Stamen Toner')
```

```
india_map
```

Stamen Terrain Maps

- These are maps that feature hill shading and natural vegetation colors
- They showcase advanced labeling and linework generalization of dual-carriageway roads

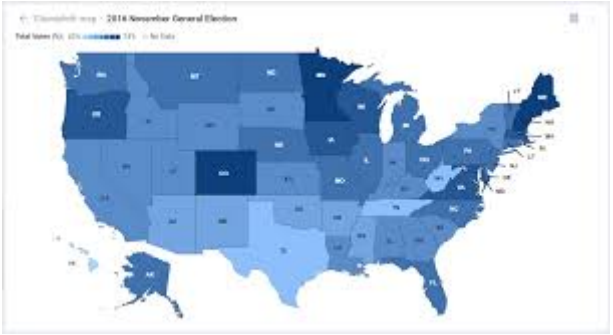
```
india_map = folium.Map(location=[20.5937, 78.9629], zoom_start=4,
tiles='Stamen Terrain', attr='Stamen Terrain')
```

Maps with Markers

```
# Create a map centered on India
india_map = folium.Map(location=[20.5937, 78.9629], zoom_start=5)
# Add markers to the map
folium.Marker(
        location=[8.5241, 76.9366],
        popup='Thiruvananthapuram',
        icon=folium.Icon(icon='cloud')
).add_to(kerala_map)
```

Choropleth Maps

- 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



```
import folium
import pandas as pd
```

```
import requests

# Sample data for state populations (example values)
data = {
    'State': ['Kerala', 'Maharashtra', 'Tamil Nadu', 'Karnataka', 'Uttar
Pradesh'],
    'Population_Density': [859, 365, 550, 319, 828]
}

# Create a DataFrame
df = pd.DataFrame(data)

# Create a base map centered on India
india_map = folium.Map(location=[20.5937, 78.9629], zoom_start=5)

# Download the GeoJSON data for Indian states
geojson_url =
'https://raw.githubusercontent.com/geohacker/india/master/state/india_tele
ngana.geojson'
geojson_data = requests.get(geojson_url).json()

# Add the Choropleth layer
choropleth = folium.Choropleth(
    geo_data=geojson_data,
    data=df,
    columns=['State', 'Population_Density'],
    key_on='feature.properties.NAME_1',
    fill_color='YlGnBu',  # Color palette
    fill_opacity=0.7,
    line_opacity=0.2,
    legend_name='Population Density (per sq. km)',
).add_to(india_map)

# Add layer control
folium.LayerControl().add_to(india_map)
india_map
```