

evel-2-task-3-geographic-analysis

September 8, 2024

1 Level 2 Task 3. Geographic Analysis.ipynb

1.1 Import necessary libraries

```
[35]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import geopandas
from geodatasets import get_path
import folium
from folium.plugins import HeatMap
```

```
[36]: pip install folium
```

```
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: folium in
c:\users\dell\appdata\roaming\python\python39\site-packages (0.17.0)
Requirement already satisfied: requests in c:\programdata\anaconda3\lib\site-
packages (from folium) (2.28.1)
Requirement already satisfied: branca>=0.6.0 in
c:\users\dell\appdata\roaming\python\python39\site-packages (from folium)
(0.7.2)
Requirement already satisfied: numpy in
c:\users\dell\appdata\roaming\python\python39\site-packages (from folium)
(2.0.2)
Requirement already satisfied: xyzservices in
c:\users\dell\appdata\roaming\python\python39\site-packages (from folium)
(2024.9.0)
Requirement already satisfied: jinja2>=2.9 in
c:\users\dell\appdata\roaming\python\python39\site-packages (from folium)
(3.1.4)
Requirement already satisfied: MarkupSafe>=2.0 in
c:\programdata\anaconda3\lib\site-packages (from jinja2>=2.9->folium) (2.0.1)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in
c:\programdata\anaconda3\lib\site-packages (from requests->folium) (1.26.11)
Requirement already satisfied: idna<4,>=2.5 in
c:\programdata\anaconda3\lib\site-packages (from requests->folium) (3.3)
Requirement already satisfied: charset-normalizer<3,>=2 in
```

```
c:\programdata\anaconda3\lib\site-packages (from requests->folium) (2.0.4)
Requirement already satisfied: certifi>=2017.4.17 in
c:\programdata\anaconda3\lib\site-packages (from requests->folium) (2022.9.14)
Note: you may need to restart the kernel to use updated packages.
```

[37]: `pip install geopandas`

```
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: geopandas in
c:\users\dell\appdata\roaming\python\python39\site-packages (1.0.1)
Requirement already satisfied: packaging in c:\programdata\anaconda3\lib\site-
packages (from geopandas) (21.3)
Requirement already satisfied: pyogrio>=0.7.2 in
c:\users\dell\appdata\roaming\python\python39\site-packages (from geopandas)
(0.9.0)
Requirement already satisfied: pyproj>=3.3.0 in
c:\users\dell\appdata\roaming\python\python39\site-packages (from geopandas)
(3.6.1)
Requirement already satisfied: pandas>=1.4.0 in
c:\programdata\anaconda3\lib\site-packages (from geopandas) (1.4.4)
Requirement already satisfied: numpy>=1.22 in
c:\users\dell\appdata\roaming\python\python39\site-packages (from geopandas)
(2.0.2)
Requirement already satisfied: shapely>=2.0.0 in
c:\users\dell\appdata\roaming\python\python39\site-packages (from geopandas)
(2.0.6)
Requirement already satisfied: python-dateutil>=2.8.1 in
c:\programdata\anaconda3\lib\site-packages (from pandas>=1.4.0->geopandas)
(2.8.2)
Requirement already satisfied: pytz>=2020.1 in
c:\programdata\anaconda3\lib\site-packages (from pandas>=1.4.0->geopandas)
(2022.1)
Requirement already satisfied: certifi in c:\programdata\anaconda3\lib\site-
packages (from pyogrio>=0.7.2->geopandas) (2022.9.14)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in
c:\programdata\anaconda3\lib\site-packages (from packaging->geopandas) (3.0.9)
Requirement already satisfied: six>=1.5 in c:\programdata\anaconda3\lib\site-
packages (from python-dateutil>=2.8.1->pandas>=1.4.0->geopandas) (1.16.0)
Note: you may need to restart the kernel to use updated packages.
```

[38]: `pip install geodatasets`

```
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: geodatasets in
c:\users\dell\appdata\roaming\python\python39\site-packages (2024.8.0)
Requirement already satisfied: pooch in
c:\users\dell\appdata\roaming\python\python39\site-packages (from geodatasets)
(1.8.2)
```

Requirement already satisfied: packaging>=20.0 in
c:\programdata\anaconda3\lib\site-packages (from pooch->geodatasets) (21.3)
Requirement already satisfied: platformdirs>=2.5.0 in
c:\programdata\anaconda3\lib\site-packages (from pooch->geodatasets) (2.5.2)
Requirement already satisfied: requests>=2.19.0 in
c:\programdata\anaconda3\lib\site-packages (from pooch->geodatasets) (2.28.1)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in
c:\programdata\anaconda3\lib\site-packages (from
packaging>=20.0->pooch->geodatasets) (3.0.9)
Requirement already satisfied: certifi>=2017.4.17 in
c:\programdata\anaconda3\lib\site-packages (from
requests>=2.19.0->pooch->geodatasets) (2022.9.14)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in
c:\programdata\anaconda3\lib\site-packages (from
requests>=2.19.0->pooch->geodatasets) (1.26.11)
Requirement already satisfied: idna<4,>=2.5 in
c:\programdata\anaconda3\lib\site-packages (from
requests>=2.19.0->pooch->geodatasets) (3.3)
Requirement already satisfied: charset-normalizer<3,>=2 in
c:\programdata\anaconda3\lib\site-packages (from
requests>=2.19.0->pooch->geodatasets) (2.0.4)
Note: you may need to restart the kernel to use updated packages.

1.2 read csv file

```
[39]: df = pd.read_csv("D:\Data Analytics\Internships\Cognifyz\Dataset .csv")
df.head(3)
```

```
[39]:
```

	Restaurant ID	Restaurant Name	Country Code	City \
0	6317637	Le Petit Souffle	162	Makati City
1	6304287	Izakaya Kikufuji	162	Makati City
2	6300002	Heat - Edsa Shangri-La	162	Mandaluyong City

	Address \
0	Third Floor, Century City Mall, Kalayaan Avenu...
1	Little Tokyo, 2277 Chino Roces Avenue, Legaspi...
2	Edsa Shangri-La, 1 Garden Way, Ortigas, Mandal...

	Locality \
0	Century City Mall, Poblacion, Makati City
1	Little Tokyo, Legaspi Village, Makati City
2	Edsa Shangri-La, Ortigas, Mandaluyong City

	Locality Verbose	Longitude	Latitude \
0	Century City Mall, Poblacion, Makati City, Mak...	121.027535	14.565443
1	Little Tokyo, Legaspi Village, Makati City, Ma...	121.014101	14.553708
2	Edsa Shangri-La, Ortigas, Mandaluyong City, Ma...	121.056831	14.581404

	Cuisines	...	Currency	Has Table booking	\
0	French, Japanese, Desserts	...	Botswana Pula(P)	Yes	
1	Japanese	...	Botswana Pula(P)	Yes	
2	Seafood, Asian, Filipino, Indian	...	Botswana Pula(P)	Yes	

	Has Online delivery	Is delivering now	Switch to order menu	Price range	\
0	No	No	No	3	
1	No	No	No	3	
2	No	No	No	4	

	Aggregate rating	Rating color	Rating text	Votes
0	4.8	Dark Green	Excellent	314
1	4.5	Dark Green	Excellent	591
2	4.4	Green	Very Good	270

[3 rows x 21 columns]

1.3 1. Plot the locations of restaurants on a map using longitude and latitude coordinates.

```
[40]: print(df[["Longitude", "Latitude"]])
```

	Longitude	Latitude
0	121.027535	14.565443
1	121.014101	14.553708
2	121.056831	14.581404
3	121.056475	14.585318
4	121.057508	14.584450
...
9546	28.977392	41.022793
9547	29.041297	41.009847
9548	29.034640	41.055817
9549	29.036019	41.057979
9550	29.026016	40.984776

[9551 rows x 2 columns]

```
[41]: gdf = geopandas.GeoDataFrame(
        df, geometry=geopandas.points_from_xy(df.Longitude, df.Latitude),
        crs="EPSG:4326")
```

```
[42]: print(gdf.head(5))
```

	Restaurant ID	Restaurant Name	Country Code	City	\
0	6317637	Le Petit Souffle	162	Makati City	
1	6304287	Izakaya Kikufuji	162	Makati City	

2	6300002	Heat - Edsa Shangri-La	162	Mandaluyong City
3	6318506	Ooma	162	Mandaluyong City
4	6314302	Sambo Kojin	162	Mandaluyong City

Address \

0	Third Floor, Century City Mall, Kalayaan Avenu...
1	Little Tokyo, 2277 Chino Roces Avenue, Legaspi...
2	Edsa Shangri-La, 1 Garden Way, Ortigas, Mandal...
3	Third Floor, Mega Fashion Hall, SM Megamall, O...
4	Third Floor, Mega Atrium, SM Megamall, Ortigas...

Locality \

0	Century City Mall, Poblacion, Makati City
1	Little Tokyo, Legaspi Village, Makati City
2	Edsa Shangri-La, Ortigas, Mandaluyong City
3	SM Megamall, Ortigas, Mandaluyong City
4	SM Megamall, Ortigas, Mandaluyong City

Locality Verbose Longitude Latitude \

0	Century City Mall, Poblacion, Makati City, Mak...	121.027535	14.565443
1	Little Tokyo, Legaspi Village, Makati City, Ma...	121.014101	14.553708
2	Edsa Shangri-La, Ortigas, Mandaluyong City, Ma...	121.056831	14.581404
3	SM Megamall, Ortigas, Mandaluyong City, Mandal...	121.056475	14.585318
4	SM Megamall, Ortigas, Mandaluyong City, Mandal...	121.057508	14.584450

Cuisines ... Has Table booking \

0	French, Japanese, Desserts ...	Yes
1	Japanese ...	Yes
2	Seafood, Asian, Filipino, Indian ...	Yes
3	Japanese, Sushi ...	No
4	Japanese, Korean ...	Yes

Has Online delivery Is delivering now Switch to order menu Price range \

0	No	No	No	3
1	No	No	No	3
2	No	No	No	4
3	No	No	No	4
4	No	No	No	4

Aggregate rating Rating color Rating text Votes \

0	4.8	Dark Green	Excellent	314
1	4.5	Dark Green	Excellent	591
2	4.4	Green	Very Good	270
3	4.9	Dark Green	Excellent	365
4	4.8	Dark Green	Excellent	229

geometry

0	POINT (121.02754 14.56544)
---	----------------------------

```

1 POINT (121.0141 14.55371)
2 POINT (121.05683 14.5814)
3 POINT (121.05648 14.58532)
4 POINT (121.05751 14.58445)

```

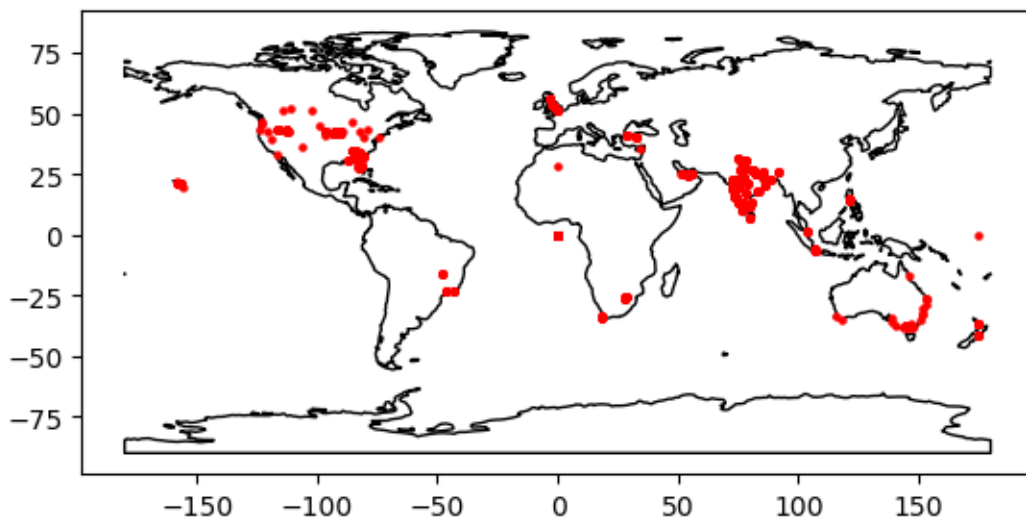
[5 rows x 22 columns]

```

[43]: world = geopandas.read_file(get_path("naturalearth.land"))
      ax = world.plot(color = 'white', edgecolor='black')
      gdf.plot(ax=ax, marker='o', color='red', markersize=5)

```

[43]: <AxesSubplot:>



1.4 2. Identify any patterns or clusters of restaurants in specific areas.

```

[44]: world_map = folium.Map(location=[df['Latitude'].mean(), df['Longitude'].
      ↪mean()], zoom_start=1, height='100%', width='100%')

```

```

[45]: heat_marker = [[row['Latitude'], row["Longitude"]] for i, row in df.iterrows()]
      HeatMap(heat_marker, radius=10).add_to(world_map)

```

[45]: <folium.plugins.heat_map.HeatMap at 0x16155291640>

```

[46]: world_map

```

[46]: <folium.folium.Map at 0x161557c35e0>