

5.2 Exercises: heat maps, spatial charts, and contour charts

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Course: DSC640-T301 Data Presentation & Visualization (2223-1)

Import common Data preparation & Visualization libraries:

```
import numpy as np import matplotlib.pyplot as plt import pandas as pd import squarify import seaborn as sns import plotly.express as px import matplotlib from matplotlib.colors import LogNorm import plotly.graph_objects as go
```

In [1]:

```
#### Import common Data preparation & visualization libraries:
```

```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import squarify
import seaborn as sns
import plotly.express as px
import matplotlib
from matplotlib.colors import LogNorm
import plotly.graph_objects as go
```

In [2]:

```
#### read source file costcos-geocoded into dataframe
costcos_df = pd.read_csv('C:/Users/21313711/Documents/DSC640/ex5-2/ex5-2/costcos-geocoded.csv')
#### display first 5 records
costcos_df.head(5)
```

Out[2]:

	Address	City	State	Zip Code	Latitude	Longitude
0	1205 N. Memorial Parkway	Huntsville	Alabama	35801-5930	34.743095	-86.600955
1	3650 Galleria Circle	Hoover	Alabama	35244-2346	33.377649	-86.812420
2	8251 Eastchase Parkway	Montgomery	Alabama	36117	32.363889	-86.150884
3	5225 Commercial Boulevard	Juneau	Alaska	99801-7210	58.359200	-134.483000
4	330 West Dimond Blvd	Anchorage	Alaska	99515-1950	61.143266	-149.884217

In [3]:

```
#### read source file ppg2008 into dataframe
ppg2008_df = pd.read_csv('C:/Users/21313711/Documents/DSC640/ex5-2/ex5-2/ppg2008.csv')
#### display first 5 records
ppg2008_df.head(5)
```

Out[3]:

	Name	G	MIN	PTS	FGM	FGA	FGP	FTM	FTA	FTP	...	3PA	3PP	ORB	DRB	TRB	AST	STL	BLK	TO	PF
0	Dwyane Wade	79	38.6	30.2	10.8	22.0	0.491	7.5	9.8	0.765	...	3.5	0.317	1.1	3.9	5.0	7.5	2.2	1.3	3.4	2.3
1	LeBron James	81	37.7	28.4	9.7	19.9	0.489	7.3	9.4	0.780	...	4.7	0.344	1.3	6.3	7.6	7.2	1.7	1.1	3.0	1.7
2	Kobe Bryant	82	36.2	26.8	9.8	20.9	0.467	5.9	6.9	0.856	...	4.1	0.351	1.1	4.1	5.2	4.9	1.5	0.5	2.6	2.3
3	Dirk Nowitzki	81	37.7	25.9	9.6	20.0	0.479	6.0	6.7	0.890	...	2.1	0.359	1.1	7.3	8.4	2.4	0.8	0.8	1.9	2.2
4	Danny Granger	67	36.2	25.8	8.5	19.1	0.447	6.0	6.9	0.878	...	6.7	0.404	0.7	4.4	5.1	2.7	1.0	1.4	2.5	3.1

5 rows × 21 columns

In [4]:

```
# setting name as index column
ppg2008_df.set_index("Name ", inplace = True)
```

In [5]:

```
ppg_mat = ppg2008_df.to_numpy()
```

In [6]:

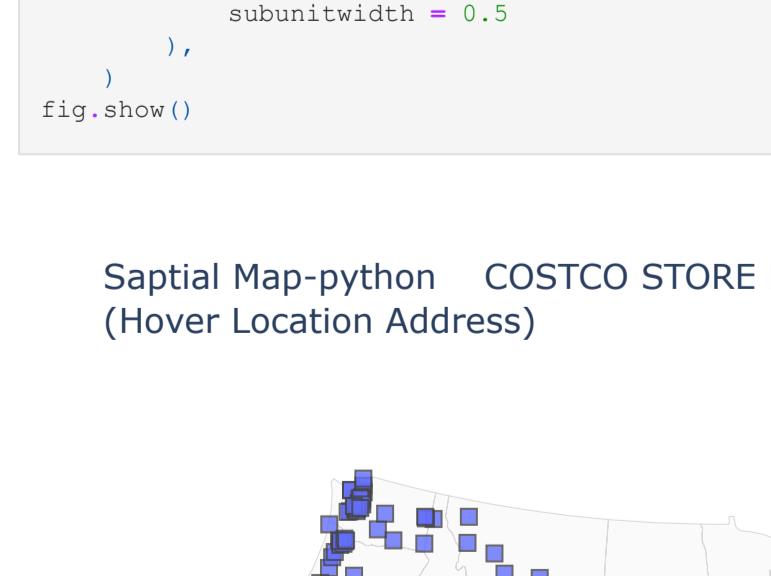
```
# Show all ticks and label them with the respective list entries
fig, ax = plt.subplots(1,1,figsize=(15,15))
im = ax.imshow(ppg_mat, norm=LogNorm(vmin=1, vmax=100), aspect='auto')
xd = ['G', 'MIN', 'PTS', 'FGM', 'FGA', 'FGP', 'FTM', 'FTA', 'FTP', '3PM', '3PA', '3PP', 'ORB', 'DRB', 'TRB', 'AST', 'STL', 'BLK', 'TO', 'PF']
yd = ['Dwyane Wade', 'LeBron James', 'Kobe Bryant', 'Dirk Nowitzki', 'Danny Granger', 'Kevin Durant', 'Kevin Martin', 'Al Jefferson', 'Chris Paul', 'Carmelo Anthony', 'Chris Bosh', 'Brandon Roy', 'Antawn Jamison', 'Tony Parker', 'Amare Stoudemire', 'Joe Johnson', 'Devin Harris', 'Michael Redd', 'David West', 'Zachary Randolph', 'Caron Butler', 'Vince Carter', 'Stephen Jackson', 'Ben Gordon', 'Dwight Howard', 'Paul Pierce', 'Al Harrington', 'Jamal Crawford', 'Yao Ming', 'Richard Jefferson', 'Jason Terry', 'Deron Williams', 'Tim Duncan', 'Monta Ellis', 'Rudy Gay', 'Pau Gasol', 'Andre Iguodala', 'Corey Maggette', 'O.J. Mayo', 'John Salmons', 'Richard Hamilton', 'Ray Allen', 'LaMarcus Aldridge', 'Josh Howard', 'Maurice Williams', 'Shaquille O neal', 'Rashard Lewis', 'Chauncey Billups', 'Allen Iverson', 'Nate Robinson']
ax.set_xticks(np.arange(len(xd)))
ax.set_yticks(np.arange(len(yd)))
ax.set_xticklabels(labels=xd)
ax.set_yticklabels(labels=yd)
# Rotate the tick labels and set their alignment.
plt.setp(ax.get_xticklabels(), rotation=45, ha="right",
         rotation_mode="anchor")
ax.set_title("Heat Map-python \n\n PPG DRUG TEST RESULT")
fig.tight_layout()
plt.show()
```



In [7]:

```
#contour map
x = ppg2008_df.FGP
y = ppg2008_df.FTP
x1,y1 = np.meshgrid(x,y)
z = np.sin(x1) * np.cos(y1)
cs = plt.contour(x1,y1,z)
plt.xticks([.35,.4,.45,.5,.55,.6,.65])
plt.yticks([.55,.6,.65,.7,.75,.8,.85,.9,.95])
plt.xticks()
plt.xlabel("Field Goal Percentage")
plt.ylabel("Free Throw Percentage")
plt.title("Contour Plot-python \n\n Contour Plot for FGP and FTP")
plt.show()
```

Contour Plot-python



In [8]:

```
#### Saptial Map
```

In [9]:

```
fig = go.Figure(data=go.Scattergeo(
    locationmode = 'USA-states',
    lon = costcos_df['Longitude'],
    lat = costcos_df['Latitude'],
    text = costcos_df['Address'],
    mode = 'markers',
    marker = dict(
        size = 8,
        opacity = 0.8,
        reversescale = True,
        autocolorscale = False,
        symbol = 'square',
        line = dict(
            width=1,
            color='rgba(102, 102, 102)'
        ),
        colorscale = 'Blues',
        cmin = 0,
        #color = df['cnt'],
        #cmax = df['cnt'].max(),
        colorbar_title="COSTCO STORE LOCATIONS"
    )))
fig.update_layout(
    title = 'Saptial Map-python \n\n COSTCO STORE LOCATIONS<br>(Hover Location Address)',
    geo = dict(
        scope='usa',
        projection_type='albers usa',
        showland = True,
        landcolor = "rgb(250, 250, 250)",
        subunitcolor = "rgb(217, 217, 217)",
        countrycolor = "rgb(217, 217, 217)",
        countrywidth = 0.5,
        subunitwidth = 0.5
    ),
)
fig.show()
```

Saptial Map-python COSTCO STORE LOCATIONS

(Hover Location Address)

COSTCO STORE LOCATIONS

6

5.5

5

4.5

4

3.5

3

