Restaurant Project

March 11, 2024

1 Identifying and Recommending Best Restaurants

[1]:
```
### importing libraries
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
print('all lib loaded')
```

```
all lib loaded
```

[2]:
```
# loading the dataset
data = pd.read_excel('data.xlsx')
print('data loaded')
```

```
data loaded
```

[3]:
```
data.head()
```

[3]:
```
   Restaurant ID              Restaurant Name  Country Code     City  \
0        7402935                         Skye            94  Jakarta
1        7410290     Satoo - Hotel Shangri-La            94  Jakarta
2        7420899                   Sushi Masa            94  Jakarta
3        7421967               3 Wise Monkeys            94  Jakarta
4        7422489  Avec Moi Restaurant and Bar            94  Jakarta

                                             Address  \
0  Menara BCA, Lantai 56, Jl. MH. Thamrin, Thamri…
1               Hotel Shangri-La, Jl. Jend. Sudirman
2                   Jl. Tuna Raya No. 5, Penjaringan
3                 Jl. Suryo No. 26, Senopati, Jakarta
4  Gedung PIC, Jl. Teluk Betung 43, Thamrin, Jakarta

                      Locality                    Locality Verbose  \
0  Grand Indonesia Mall, Thamrin  Grand Indonesia Mall, Thamrin, Jakarta
1     Hotel Shangri-La, Sudirman     Hotel Shangri-La, Sudirman, Jakarta
2                    Penjaringan                  Penjaringan, Jakarta
3                       Senopati                     Senopati, Jakarta
```

```
4                      Thamrin                        Thamrin, Jakarta

    Longitude  Latitude                  Cuisines  Average Cost for two  \
0  106.821999 -6.196778      Italian, Continental                800000
1  106.818961 -6.203292  Asian, Indonesian, Western                800000
2  106.800144 -6.101298            Sushi, Japanese                500000
3  106.813400 -6.235241                  Japanese                450000
4  106.821023 -6.196270            French, Western                350000

             Currency Has Table booking Has Online delivery  Price range  \
0  Indonesian Rupiah(IDR)                No                  No            3
1  Indonesian Rupiah(IDR)                No                  No            3
2  Indonesian Rupiah(IDR)                No                  No            3
3  Indonesian Rupiah(IDR)                No                  No            3
4  Indonesian Rupiah(IDR)                No                  No            3

   Aggregate rating Rating color Rating text  Votes
0               4.1        Green   Very Good   1498
1               4.6   Dark Green   Excellent    873
2               4.9   Dark Green   Excellent    605
3               4.2        Green   Very Good    395
4               4.3        Green   Very Good    243
```

[4]:
```
# reading the dataset
cc = pd.read_excel('Country-Code.xlsx')
print('data read')
```

```
data read
```

[5]:
```
# merging two DataFrames 'data' and 'cc' based on Country Code column using␣
↪left join, and displaying the first few rows
df_rest = pd.merge(data,cc,on='Country Code',how='left')
df_rest.head()
```

[5]:
```
   Restaurant ID               Restaurant Name  Country Code     City  \
0        7402935                          Skye            94  Jakarta
1        7410290     Satoo - Hotel Shangri-La            94  Jakarta
2        7420899                    Sushi Masa            94  Jakarta
3        7421967               3 Wise Monkeys            94  Jakarta
4        7422489  Avec Moi Restaurant and Bar            94  Jakarta

                                            Address  \
0  Menara BCA, Lantai 56, Jl. MH. Thamrin, Thamri…
1              Hotel Shangri-La, Jl. Jend. Sudirman
2                  Jl. Tuna Raya No. 5, Penjaringan
3                Jl. Suryo No. 26, Senopati, Jakarta
4  Gedung PIC, Jl. Teluk Betung 43, Thamrin, Jakarta
```

```
                     Locality                            Locality Verbose  \
0  Grand Indonesia Mall, Thamrin  Grand Indonesia Mall, Thamrin, Jakarta
1     Hotel Shangri-La, Sudirman     Hotel Shangri-La, Sudirman, Jakarta
2                    Penjaringan                    Penjaringan, Jakarta
3                       Senopati                       Senopati, Jakarta
4                        Thamrin                        Thamrin, Jakarta

    Longitude  Latitude                    Cuisines  Average Cost for two  \
0  106.821999 -6.196778        Italian, Continental                800000
1  106.818961 -6.203292  Asian, Indonesian, Western                800000
2  106.800144 -6.101298             Sushi, Japanese                500000
3  106.813400 -6.235241                    Japanese                450000
4  106.821023 -6.196270             French, Western                350000

                  Currency Has Table booking Has Online delivery  Price range  \
0  Indonesian Rupiah(IDR)                No                  No            3
1  Indonesian Rupiah(IDR)                No                  No            3
2  Indonesian Rupiah(IDR)                No                  No            3
3  Indonesian Rupiah(IDR)                No                  No            3
4  Indonesian Rupiah(IDR)                No                  No            3

   Aggregate rating Rating color Rating text  Votes    Country
0               4.1        Green   Very Good   1498  Indonesia
1               4.6   Dark Green   Excellent    873  Indonesia
2               4.9   Dark Green   Excellent    605  Indonesia
3               4.2        Green   Very Good    395  Indonesia
4               4.3        Green   Very Good    243  Indonesia
```

[6]:
```python
df_rest.columns = df_rest.columns.str.replace(' ','_')
df_rest.columns
```

[6]:
```
Index(['Restaurant_ID', 'Restaurant_Name', 'Country_Code', 'City', 'Address',
       'Locality', 'Locality_Verbose', 'Longitude', 'Latitude', 'Cuisines',
       'Average_Cost_for_two', 'Currency', 'Has_Table_booking',
       'Has_Online_delivery', 'Price_range', 'Aggregate_rating',
       'Rating_color', 'Rating_text', 'Votes', 'Country'],
      dtype='object')
```

[7]:
```python
df_rest.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9551 entries, 0 to 9550
Data columns (total 20 columns):
 #   Column                Non-Null Count  Dtype
---  ------                --------------  -----
 0   Restaurant_ID         9551 non-null   int64
 1   Restaurant_Name       9550 non-null   object
 2   Country_Code          9551 non-null   int64
 3   City                  9551 non-null   object
 4   Address               9551 non-null   object
 5   Locality              9551 non-null   object
 6   Locality_Verbose      9551 non-null   object
 7   Longitude             9551 non-null   float64
 8   Latitude              9551 non-null   float64
 9   Cuisines              9542 non-null   object
 10  Average_Cost_for_two  9551 non-null   int64
 11  Currency              9551 non-null   object
 12  Has_Table_booking     9551 non-null   object
 13  Has_Online_delivery   9551 non-null   object
 14  Price_range           9551 non-null   int64
 15  Aggregate_rating      9551 non-null   float64
 16  Rating_color          9551 non-null   object
 17  Rating_text           9551 non-null   object
 18  Votes                 9551 non-null   int64
 19  Country               9551 non-null   object
dtypes: float64(3), int64(5), object(12)
memory usage: 1.5+ MB
```

[8]:
```
#finding total number of null entries per column
df_rest.isnull().sum()
```

[8]:
```
Restaurant_ID           0
Restaurant_Name         1
Country_Code            0
City                    0
Address                 0
Locality                0
Locality_Verbose        0
Longitude               0
Latitude                0
Cuisines                9
Average_Cost_for_two    0
Currency                0
Has_Table_booking       0
Has_Online_delivery     0
Price_range             0
Aggregate_rating        0
Rating_color            0
Rating_text             0
Votes                   0
Country                 0
dtype: int64
```

```
[9]: df_rest[df_rest['Restaurant_Name'].isnull()]
```

```
[9]:       Restaurant_ID Restaurant_Name  Country_Code       City  \
1646         113702             NaN             1  Ahmedabad

                                    Address  Locality  \
1646  Opposite Sindhu Bhawan, Bodakdev, Ahmedabad  Bodakdev

        Locality_Verbose  Longitude   Latitude  \
1646  Bodakdev, Ahmedabad  72.501764  23.040163

                                    Cuisines  Average_Cost_for_two  \
1646  North Indian, Continental, Mexican, Italian                  800

               Currency Has_Table_booking Has_Online_delivery  Price_range  \
1646  Indian Rupees(Rs.)                No                  No            3

      Aggregate_rating Rating_color Rating_text  Votes Country
1646               4.1        Green   Very Good    769   India
```

```
[10]: #Since the restaurant name is missing, we dropped the record and reset the␣
       ↪index.
      df_rest.dropna(axis=0,subset=['Restaurant_Name'],inplace=True)
      df_rest.reset_index(drop=True,inplace=True)
      df_rest[df_rest['Cuisines'].isnull()]
```

```
[10]:      Restaurant_ID                 Restaurant_Name  Country_Code  \
9082       17374552                  Corkscrew Cafe           216
9085       17501439                        Dovetail           216
9093       17059060                       Hillstone           216
9405       17284158               Jimmie's Hot Dogs           216
9493       17142698                Leonard's Bakery           216
9503       17616465         Tybee Island Social Club           216
9532       17284105                   Cookie Shoppe           216
9534       17284211  Pearly's Famous Country Cookng           216
9538       17606621               HI Lite Bar & Lounge           216

                City                                        Address  \
9082     Gainesville              51 W Main St, Dahlonega, GA 30533
9085           Macon                 543 Cherry St, Macon, GA 31201
9093         Orlando  215 South Orlando Avenue, Winter Park, FL 32789
9405          Albany               204 S Jackson St, Albany, GA 31701
9493  Rest of Hawaii            933 Kapahulu Ave, Honolulu, HI 96816
9503        Savannah          1311 Butler Ave, Tybee Island, GA 31328
9532          Albany               115 N Jackson St, Albany, GA 31701
9534          Albany            814 N Slappey Blvd, Albany, GA 31701
9538          Miller             109 N Broadway Ave, Miller, SD 57362
```

```
          Locality          Locality_Verbose   Longitude   Latitude Cuisines  \
9082     Dahlonega   Dahlonega, Gainesville  -83.985800  34.531800      NaN
9085         Macon             Macon, Macon  -83.627979  32.836410      NaN
9093   Winter Park     Winter Park, Orlando  -81.365260  28.596682      NaN
9405        Albany           Albany, Albany  -84.153400  31.575100      NaN
9493       Kaimuki  Kaimuki, Rest of Hawaii -157.813432  21.284586      NaN
9503  Tybee Island   Tybee Island, Savannah  -80.848297  31.995810      NaN
9532        Albany           Albany, Albany  -84.154000  31.577200      NaN
9534        Albany           Albany, Albany  -84.175900  31.588200      NaN
9538        Miller           Miller, Miller  -98.989100  44.515800      NaN

      Average_Cost_for_two   Currency Has_Table_booking Has_Online_delivery  \
9082                    40  Dollar($)                No                  No
9085                    40  Dollar($)                No                  No
9093                    40  Dollar($)                No                  No
9405                    10  Dollar($)                No                  No
9493                    10  Dollar($)                No                  No
9503                    10  Dollar($)                No                  No
9532                     0  Dollar($)                No                  No
9534                     0  Dollar($)                No                  No
9538                     0  Dollar($)                No                  No

      Price_range  Aggregate_rating Rating_color Rating_text  Votes  \
9082            3               3.9       Yellow        Good    209
9085            3               3.8       Yellow        Good    102
9093            3               4.4        Green   Very Good   1158
9405            1               3.9       Yellow        Good    160
9493            1               4.7   Dark Green   Excellent    707
9503            1               3.9       Yellow        Good    309
9532            1               3.4       Orange     Average     34
9534            1               3.4       Orange     Average     36
9538            1               3.4       Orange     Average     11

            Country
9082  United States
9085  United States
9093  United States
9405  United States
9493  United States
9503  United States
9532  United States
9534  United States
9538  United States
```

[11]:
```
#Since there were only 9 records without cuisines, we have replaced the null␣
↪values with 'Others'
```

```
df_rest['Cuisines'].fillna('Others',inplace=True)
```

[12]:
```
df_rest.isnull().sum()
df_rest.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9550 entries, 0 to 9549
Data columns (total 20 columns):
 #   Column                Non-Null Count  Dtype
---  ------                --------------  -----
 0   Restaurant_ID         9550 non-null   int64
 1   Restaurant_Name       9550 non-null   object
 2   Country_Code          9550 non-null   int64
 3   City                  9550 non-null   object
 4   Address               9550 non-null   object
 5   Locality              9550 non-null   object
 6   Locality_Verbose      9550 non-null   object
 7   Longitude             9550 non-null   float64
 8   Latitude              9550 non-null   float64
 9   Cuisines              9550 non-null   object
 10  Average_Cost_for_two  9550 non-null   int64
 11  Currency              9550 non-null   object
 12  Has_Table_booking     9550 non-null   object
 13  Has_Online_delivery   9550 non-null   object
 14  Price_range           9550 non-null   int64
 15  Aggregate_rating      9550 non-null   float64
 16  Rating_color          9550 non-null   object
 17  Rating_text           9550 non-null   object
 18  Votes                 9550 non-null   int64
 19  Country               9550 non-null   object
dtypes: float64(3), int64(5), object(12)
memory usage: 1.5+ MB
```

1.0.1 EDA-1

- Explore the geographical distribution of the restaurants.
- Finding out the cities with the max/min number of restaurants.

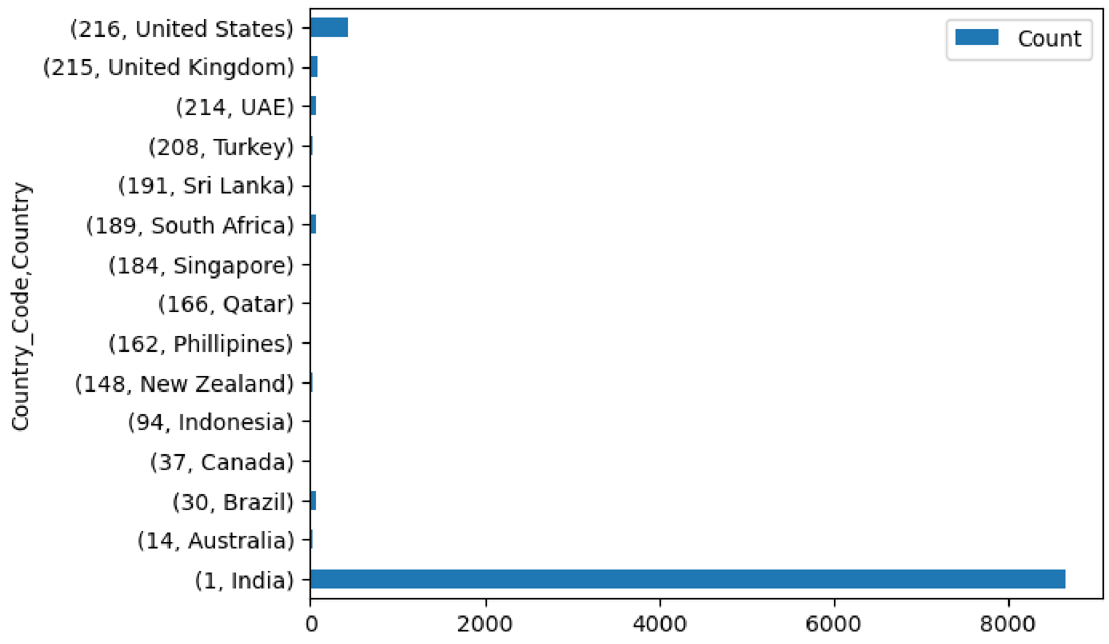
[13]:
```
#We observe that India has then highest number of restaurants with 8651␣
↪restaurants and USA is number 2 with 434 restaurants
cntry_dist = df_rest.groupby(['Country_Code','Country']).agg( Count =␣
↪('Restaurant_ID','count'))
cntry_dist.sort_values(by='Count',ascending=False)
```

[13]:
```
                              Count
Country_Code Country
1            India             8651
```

```
216         United States     434
215         United Kingdom     80
30          Brazil             60
189         South Africa       60
214         UAE                60
148         New Zealand        40
208         Turkey             34
14          Australia          24
162         Phillipines        22
94          Indonesia          21
166         Qatar              20
184         Singapore          20
191         Sri Lanka          20
37          Canada              4
```

[14]:
```
#showing it in a bar chart
cntry_dist.plot(kind='barh')
```

[14]:
```
<Axes: ylabel='Country_Code,Country'>
```



[15]:
```
#city with max restaurant has count = 5473
#city with min restaurant has count = 1
city_dist = df_rest.groupby(['Country','City']).agg(Count =␣
↪('Restaurant_ID','count'))
city_dist.describe()
```

[15]:
```
                Count
count    141.000000
mean      67.730496
std      476.723952
min        1.000000
25%        1.000000
50%       20.000000
75%       20.000000
max     5473.000000
```

[16]:
```
city_dist.sort_values(by='Count',ascending=False)
# we see that new Delhi has the maximum restaurant with 5473
# we observe that multiple cities have only one restaurant.
```

[16]:
```
                               Count
Country       City
India         New Delhi         5473
              Gurgaon           1118
              Noida             1080
              Faridabad          251
              Ghaziabad           25
…                                …
              Panchkula            1
Australia     Balingup             1
Indonesia     Bandung              1
Phillipines   Quezon City          1
United States Winchester Bay       1

[141 rows x 1 columns]
```

[17]:
```
min_cnt_rest = city_dist[city_dist['Count']==1]
min_cnt_rest.info()
min_cnt_rest
#There are 46 cities in 7 different countries with 1 restaurants
```

```
<class 'pandas.core.frame.DataFrame'>
MultiIndex: 46 entries, ('Australia', 'Armidale') to ('United States',
'Winchester Bay')
Data columns (total 1 columns):
 #   Column  Non-Null Count  Dtype
---  ------  --------------  -----
 0   Count   46 non-null     int64
dtypes: int64(1)
memory usage: 1.8+ KB
```

[17]:
```
                                 Count
Country       City
```

Australia	Armidale	1
	Balingup	1
	Beechworth	1
	Dicky Beach	1
	East Ballina	1
	Flaxton	1
	Forrest	1
	Huskisson	1
	Inverloch	1
	Lakes Entrance	1
	Lorn	1
	Macedon	1
	Mayfield	1
	Middleton Beach	1
	Montville	1
	Palm Cove	1
	Paynesville	1
	Penola	1
	Phillip Island	1
	Tanunda	1
	Trentham East	1
	Victor Harbor	1
Canada	Chatham-Kent	1
	Consort	1
	Vineland Station	1
	Yorkton	1
India	Mohali	1
	Panchkula	1
Indonesia	Bandung	1
Phillipines	Quezon City	1
	Tagaytay City	1
South Africa	Randburg	1
United States	Clatskanie	1
	Cochrane	1
	Fernley	1
	Lakeview	1
	Lincoln	1
	Mc Millan	1
	Miller	1
	Monroe	1
	Ojo Caliente	1
	Potrero	1
	Princeton	1
	Vernonia	1
	Weirton	1
	Winchester Bay	1

1.1 EDA-II

- Explore how ratings are distributed overall
- Evaluate the Highest Rated and Lowest Rated Restaurant of the City in all the countries.

[18]:
```
max_rate = df_rest.sort_values(by='Aggregate_rating',ascending=False).
  ↪groupby(['Country','City'],as_index=False).first()
#highest rating restaurants

min_rate = df_rest.sort_values(by='Aggregate_rating',ascending=False).
  ↪groupby(['Country','City'],as_index=False).last()
#lowest rating restaurants

df_max=max_rate[['Country','City','Restaurant_Name','Aggregate_rating']] #new␣
  ↪dataframe created for high rated restaurants

df_min=min_rate[['Country','City','Restaurant_Name','Aggregate_rating']] #new␣
  ↪dataframe created for low rated restaurants

rating_rest=df_max.merge(df_min,left_on='City',right_on='City',how='inner')␣
  ↪#merge into single dataframe
```

[19]:
```
rating_rest
```

[19]:
```
           Country_x            City                          Restaurant_Name_x  \
0          Australia        Armidale                            Whitebull Hotel
1          Australia        Balingup                          Taste of Balingup
2          Australia      Beechworth                        Bridge Road Brewers
3          Australia     Dicky Beach                           The Giggling Goat
4          Australia    East Ballina                           The Belle General
..               …               …                                          …
136    United States        Valdosta                             Smok'n Pig B-B-Q
137    United States        Vernonia                              Blue House Cafe
138    United States        Waterloo                        Four Queens Dairy Cream
139    United States         Weirton  Theo Yianni's Authentic Greek Restaurant
140    United States  Winchester Bay                   Fishpatrick's Crabby Cafe

     Aggregate_rating_x      Country_y  \
0                   3.5      Australia
1                   3.2      Australia
2                   4.6      Australia
3                   3.6      Australia
4                   4.1      Australia
..                    …              …
136                 4.1  United States
137                 4.3  United States
138                 3.9  United States
139                 3.9  United States
```

```
140                   3.2  United States

                           Restaurant_Name_y  Aggregate_rating_y
0                              Whitebull Hotel                 3.5
1                            Taste of Balingup                 3.2
2                          Bridge Road Brewers                 4.6
3                            The Giggling Goat                 3.6
4                            The Belle General                 4.1
..                                         …                   …
136               El Toreo Mexican Restaurant                 3.1
137                              Blue House Cafe                 4.3
138               Masala Grill & Coffee House                 3.2
139  Theo Yianni's Authentic Greek Restaurant                 3.9
140                   Fishpatrick's Crabby Cafe                 3.2

[141 rows x 7 columns]
```

[20]:
```
#dropping column Country_y and update the column names
rating_rest.drop(columns='Country_y',axis=1,inplace=True)
rating_rest.columns = ['Country','City','Highest Rated Restaurant','Rating␣
↪Max','Lowest Rated Restaurant','Rating Min']
rating_rest
```

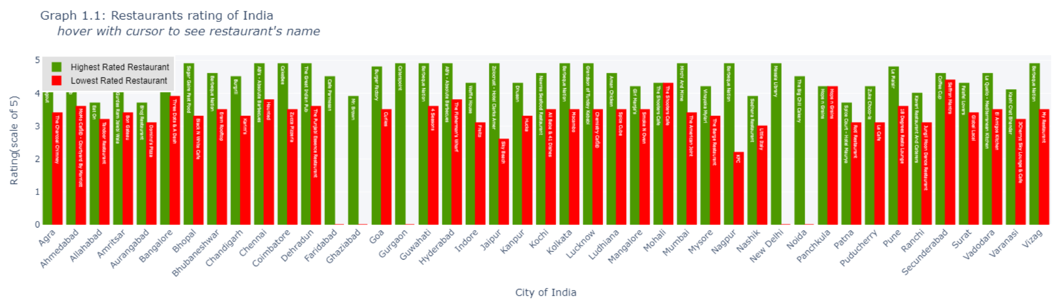
[20]:
```
           Country            City                  Highest Rated Restaurant  \
0        Australia        Armidale                           Whitebull Hotel
1        Australia        Balingup                         Taste of Balingup
2        Australia      Beechworth                       Bridge Road Brewers
3        Australia     Dicky Beach                         The Giggling Goat
4        Australia    East Ballina                         The Belle General
..             …               …                                         …
136  United States        Valdosta                           Smok'n Pig B-B-Q
137  United States        Vernonia                           Blue House Cafe
138  United States        Waterloo                    Four Queens Dairy Cream
139  United States         Weirton  Theo Yianni's Authentic Greek Restaurant
140  United States  Winchester Bay                 Fishpatrick's Crabby Cafe

     Rating Max                   Lowest Rated Restaurant  Rating Min
0           3.5                           Whitebull Hotel         3.5
1           3.2                         Taste of Balingup         3.2
2           4.6                       Bridge Road Brewers         4.6
3           3.6                         The Giggling Goat         3.6
4           4.1                         The Belle General         4.1
..            …                                         …           …
136         4.1               El Toreo Mexican Restaurant         3.1
137         4.3                           Blue House Cafe         4.3
138         3.9               Masala Grill & Coffee House         3.2
139         3.9  Theo Yianni's Authentic Greek Restaurant         3.9
```

```
140         3.2                  Fishpatrick's Crabby Cafe         3.2

[141 rows x 6 columns]
```

[21]:
```
#since India and USA has the most number of restaurants,
#we will try to see the distribution of restaurants ratings for these two␣
 ↪countries.

from plotly.offline import download_plotlyjs, init_notebook_mode, iplot
from plotly.graph_objs import *
init_notebook_mode()
import plotly.graph_objs as go #importing plotly or graphs
```

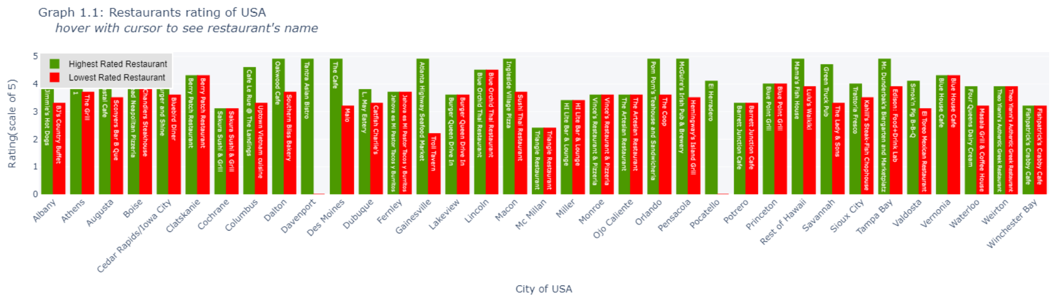
[22]:
```
rating_rest_city_india=rating_rest[rating_rest['Country']=='India'] #storing␣
 ↪the dataframe only for country 'India'
rating_rest_city_india #In India
city=rating_rest_city_india['City'].tolist()#converting the series to list
rate_max=rating_rest_city_india['Rating Max'].tolist()#converting the series to␣
 ↪list
rate_min=rating_rest_city_india['Rating Min'].tolist()#converting the series to␣
 ↪list
rest_name_high=rating_rest_city_india['Highest Rated Restaurant'].
 ↪tolist()#converting the series to list
rest_name_low=rating_rest_city_india['Lowest Rated Restaurant'].tolist()
```

[23]:
```
stack0 = go.Bar( # GroupBarChart 1 (Highest Rated Restaurant)
    x=city,#x axis label
    y=rate_max,# y axis label
    text=rest_name_high,# the value of the restaurant
    name='Highest Rated Restaurant',
     marker=dict(
        color='rgb(76,153,0)', #colour of the bar graph's marker
        line=dict(
            color='rgb(76,153,0)', #colour of the bar graph's line
            width=1.5, #width of the bar graph
        )
    ),
    opacity=1.0
)
stack1 = go.Bar( # GroupBarChart 2 (Lowest Rated Restaurant)
    x=city,
    y=rate_min,
    text=rest_name_low,
    name='Lowest Rated Restaurant',
     marker=dict(
        color='rgb(255,0,0)',#colour of the bar graph's marker
        line=dict(
            color='rgb(255,0,0)',#colour of the bar graph's line
            width=1.5, #width of the bar graph
        )
    ),
    opacity=1.0
)

data = [stack0,stack1]
layout = go.Layout(
    legend=dict( #the layout of the graph( beautification)
        x=0,
        y=1,
        traceorder='normal',
        font=dict(
            family='sans-serif',
            size=12,
            color='#000'
        ),
        bgcolor='#E2E2E2',
        bordercolor='#FFFFFF',
        borderwidth=2
    ),
    autosize=False,
    width=1000, # size of the graph
    height=450,
    barmode='group',
    title="Graph 1.1: Restaurants rating of India <br>\
    <i>hover with cursor to see restaurant's name</i>", #title of the graph
    plot_bgcolor='rgba(245, 246, 249, 1)',
    xaxis=dict(tickangle=-45,title= 'City of India'), #making the graphs label inclined at 45 deg
    yaxis= {'title': 'Rating(scale of 5)'} #label of y-axis
)
fig = go.Figure(data=data, layout=layout) #plotting the graph
iplot(fig, filename='style-barbar')
```



[24]:
```
#perform the same steps as above for Country='United States'
rating_rest_city_usa = rating_rest[rating_rest['Country']=='United States']
rating_rest_city_usa
cityu = rating_rest_city_usa['City'].tolist()
rate_maxu = rating_rest_city_usa['Rating Max'].tolist()
rate_minu = rating_rest_city_usa['Rating Min'].tolist()
rest_name_highu = rating_rest_city_usa['Highest Rated Restaurant'].tolist()
rest_name_lowu = rating_rest_city_usa['Lowest Rated Restaurant'].tolist()
```

[25]:
```
stack0 = go.Bar( # GroupBarChart 1 (Highest Rated Restaurant)
    x=cityu,#x axis label
    y=rate_maxu,# y axis label
    text=rest_name_highu,# the value of the restaurant
    name='Highest Rated Restaurant',
     marker=dict(
        color='rgb(76,153,0)', #color of the bar graph's marker
        line=dict(
            color='rgb(76,153,0)', #color of the bar graph's line
            width=1.5, #width of the bar graph
        )
    ),
    opacity=1.0
)
stack1 = go.Bar( # GroupBarChart 2 (Lowest Rated Restaurant)
    x=cityu,
    y=rate_minu,
    text=rest_name_lowu,
    name='Lowest Rated Restaurant',
     marker=dict(
        color='rgb(255,0,0)',#color of the bar graph's marker
        line=dict(
            color='rgb(255,0,0)',#color of the bar graph's line
            width=1.5, #width of the bar graph
        )
    ),
    opacity=1.0
)

data = [stack0,stack1]
layout = go.Layout(
    legend=dict( #the layout of the graph( beautification)
        x=0,
        y=1,
        traceorder='normal',
        font=dict(
            family='sans-serif',
            size=12,
            color='#000'
        ),
        bgcolor='#E2E2E2',
        bordercolor='#FFFFFF',
        borderwidth=2
    ),
    autosize=False,
    width=1000, # size of the graph
    height=450,
    barmode='group',
    title="Graph 1.1: Restaurants rating of USA <br>\
    <i>hover with cursor to see restaurant's name</i>", #title of the graph
    plot_bgcolor='rgba(245, 246, 249, 1)',
    xaxis=dict(tickangle=-45,title= 'City of USA'), #making the graphs label␣
↪inclined at 45 deg
    yaxis= {'title': 'Rating(scale of 5)'} #label of y-axis
)
fig = go.Figure(data=data, layout=layout) #plotting the graph
iplot(fig, filename='style-barbar')
```



[26]:
```
df_rest1 = df_rest.copy()
df_rest1.columns
```

[26]:
```
Index(['Restaurant_ID', 'Restaurant_Name', 'Country_Code', 'City', 'Address',
       'Locality', 'Locality_Verbose', 'Longitude', 'Latitude', 'Cuisines',
       'Average_Cost_for_two', 'Currency', 'Has_Table_booking',
       'Has_Online_delivery', 'Price_range', 'Aggregate_rating',
       'Rating_color', 'Rating_text', 'Votes', 'Country'],
      dtype='object')
```

[27]:
```
dummy = ['Has_Table_booking','Has_Online_delivery']
df_rest1 = pd.get_dummies(df_rest1,columns=dummy,drop_first=True)
df_rest1.head()
# 0 indicates 'NO'
# 1 indicates 'YES'
```

[27]:
```
   Restaurant_ID            Restaurant_Name  Country_Code     City  \
0        7402935                       Skye            94  Jakarta
1        7410290      Satoo - Hotel Shangri-La            94  Jakarta
2        7420899                 Sushi Masa            94  Jakarta
3        7421967              3 Wise Monkeys            94  Jakarta
4        7422489  Avec Moi Restaurant and Bar            94  Jakarta

                                             Address  \
0  Menara BCA, Lantai 56, Jl. MH. Thamrin, Thamri…
1               Hotel Shangri-La, Jl. Jend. Sudirman
2                   Jl. Tuna Raya No. 5, Penjaringan
3                Jl. Suryo No. 26, Senopati, Jakarta
4  Gedung PIC, Jl. Teluk Betung 43, Thamrin, Jakarta

                    Locality                          Locality_Verbose  \
0  Grand Indonesia Mall, Thamrin  Grand Indonesia Mall, Thamrin, Jakarta
1     Hotel Shangri-La, Sudirman     Hotel Shangri-La, Sudirman, Jakarta
2                    Penjaringan                    Penjaringan, Jakarta
3                       Senopati                       Senopati, Jakarta
4                        Thamrin                        Thamrin, Jakarta

    Longitude  Latitude                    Cuisines  Average_Cost_for_two  \
0  106.821999 -6.196778       Italian, Continental                800000
1  106.818961 -6.203292  Asian, Indonesian, Western                800000
2  106.800144 -6.101298             Sushi, Japanese                500000
3  106.813400 -6.235241                    Japanese                450000
4  106.821023 -6.196270            French, Western                350000

                Currency  Price_range  Aggregate_rating Rating_color  \
0  Indonesian Rupiah(IDR)            3               4.1        Green
1  Indonesian Rupiah(IDR)            3               4.6   Dark Green
2  Indonesian Rupiah(IDR)            3               4.9   Dark Green
3  Indonesian Rupiah(IDR)            3               4.2        Green
4  Indonesian Rupiah(IDR)            3               4.3        Green

  Rating_text  Votes    Country  Has_Table_booking_Yes  \
0   Very Good   1498  Indonesia                  False
1   Excellent    873  Indonesia                  False
2   Excellent    605  Indonesia                  False
3   Very Good    395  Indonesia                  False
4   Very Good    243  Indonesia                  False

   Has_Online_delivery_Yes
0                    False
1                    False
2                    False
3                    False
```

```
4                     False
```

1.1.1 EDA - III

- Ratio between restaurants that allow table booking vs that do not allow table booking.
- Percentage of restaurants providing online delivery.
- Difference in no. of votes for the restaurants that deliver and the restaurant that don't.

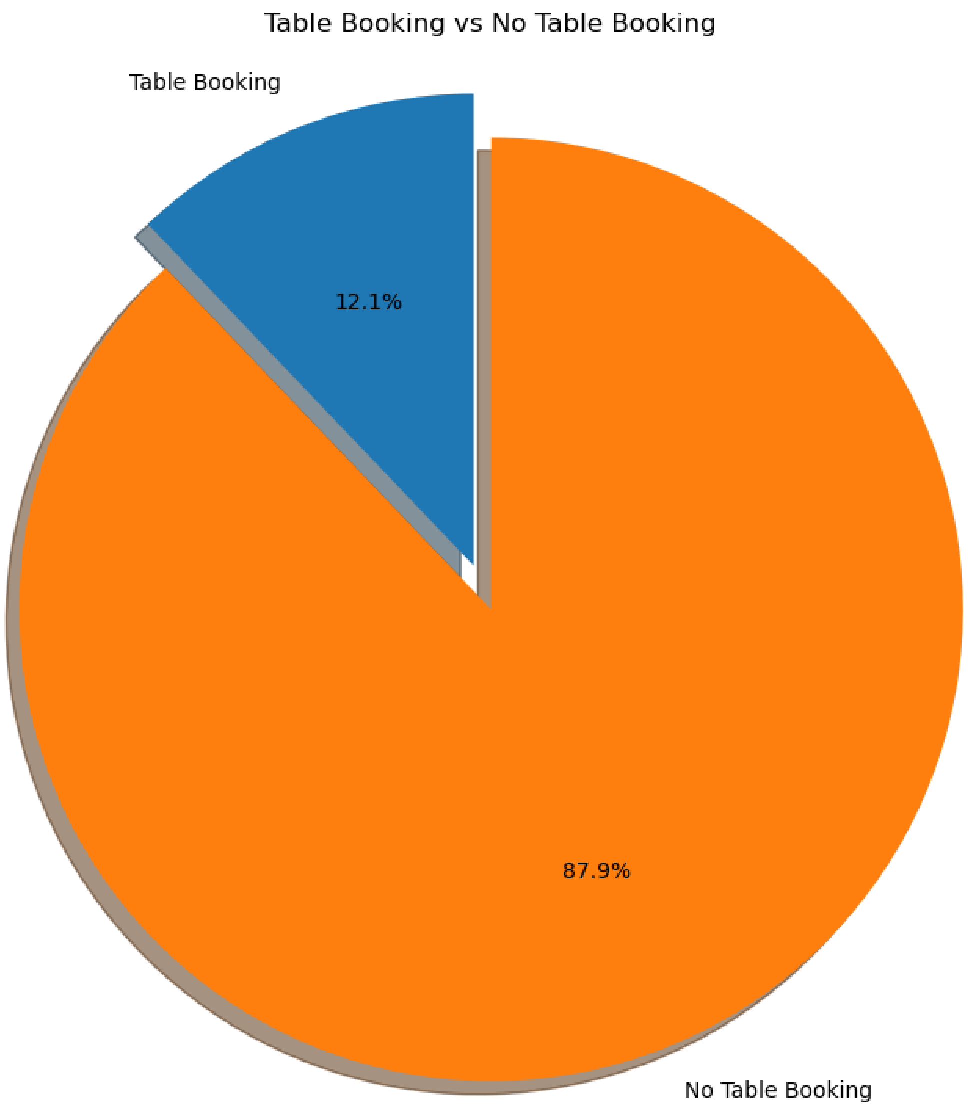
[28]:
```
#Ratio between restaurants allowing table booking and those which dont
table_booking = df_rest1[df_rest1['Has_Table_booking_Yes']==1]['Restaurant_ID'].
 ↪count()
table_nbooking =df_rest1[df_rest1['Has_Table_booking_Yes']==0]['Restaurant_ID'].
 ↪count()
print('Ratio between restaurants that allow table booking vs. those that do not␣
 ↪allow table booking: ',
      round((table_booking/table_nbooking),2))
```

```
Ratio between restaurants that allow table booking vs. those that do not allow
table booking:  0.14
```

[29]:
```
print(table_booking,table_nbooking)
```

```
1158 8392
```

[30]:
```
#Pie chart to show percentage of restaurants which allow table booking and␣
 ↪those which don't
labels = 'Table Booking', 'No Table Booking'
sizes = [table_booking,table_nbooking]
explode = (0.1, 0)  # only "explode" the 2nd slice (i.e. 'Hogs')

fig1, ax1 = plt.subplots(figsize=(9,9))
ax1.pie(sizes, explode=explode, labels=labels, autopct='%1.1f%%',shadow=True,␣
 ↪startangle=90)
ax1.set_title("Table Booking vs No Table Booking")
ax1.axis('equal')  # Equal aspect ratio ensures that pie is drawn as a circle.

plt.show()
```

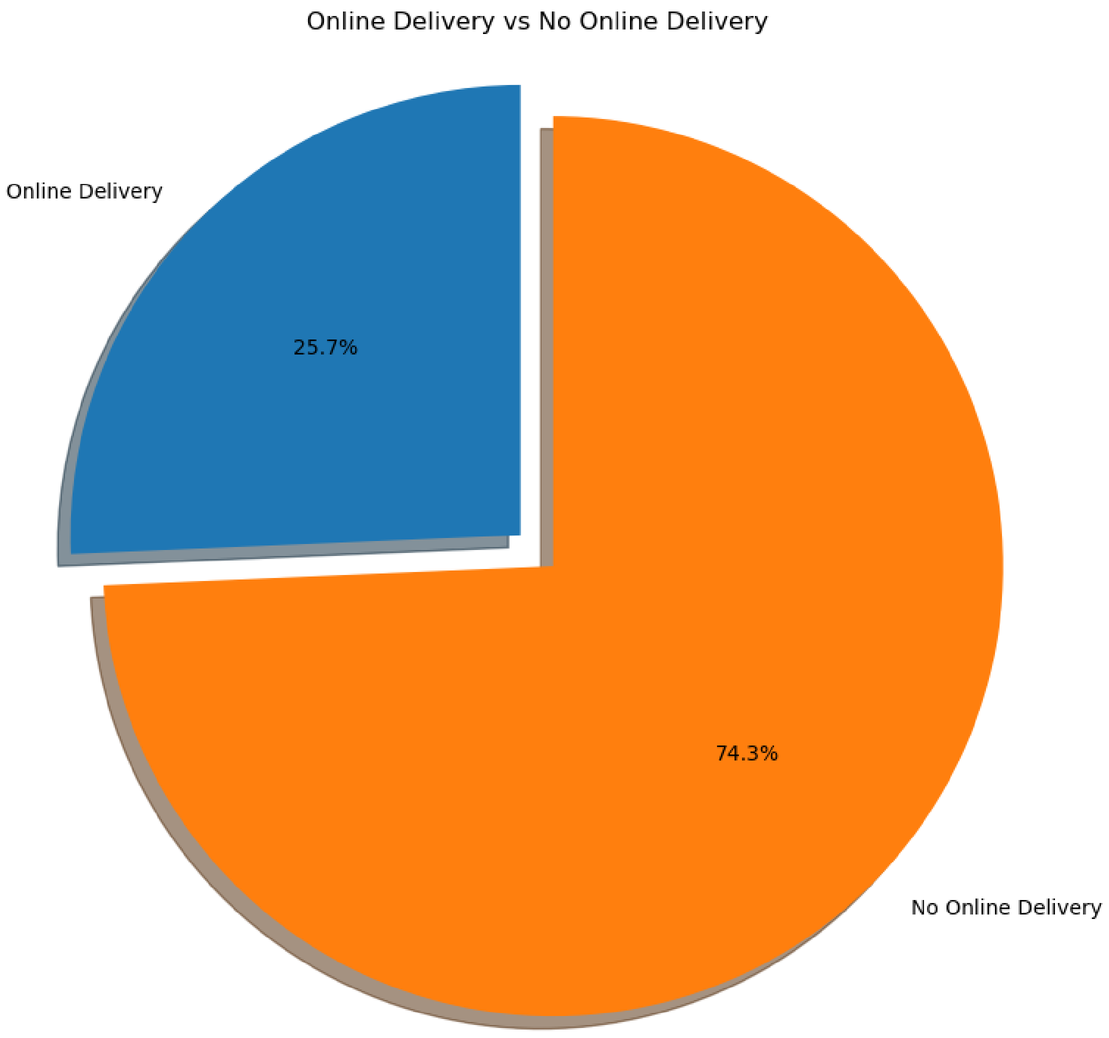


```
[31]: #Percentage of restaurant that has online delivery
      rest_od = df_rest1[df_rest1['Has_Online_delivery_Yes'] == 1]['Restaurant_ID'].
        ↪count()
      rest_nod = df_rest1[df_rest1['Has_Online_delivery_Yes'] == 0]['Restaurant_ID'].
        ↪count()
      print('Percentage of restaurants providing online delivery : {} %'.
        ↪format((round(rest_od/len(df_rest1),3)*100)))
```

```
Percentage of restaurants providing online delivery : 25.7 %
```

```
[32]: #pie chart to show percentages of restaurants allowing online delivery vs those␣
        ↪which do not have online delivery
```

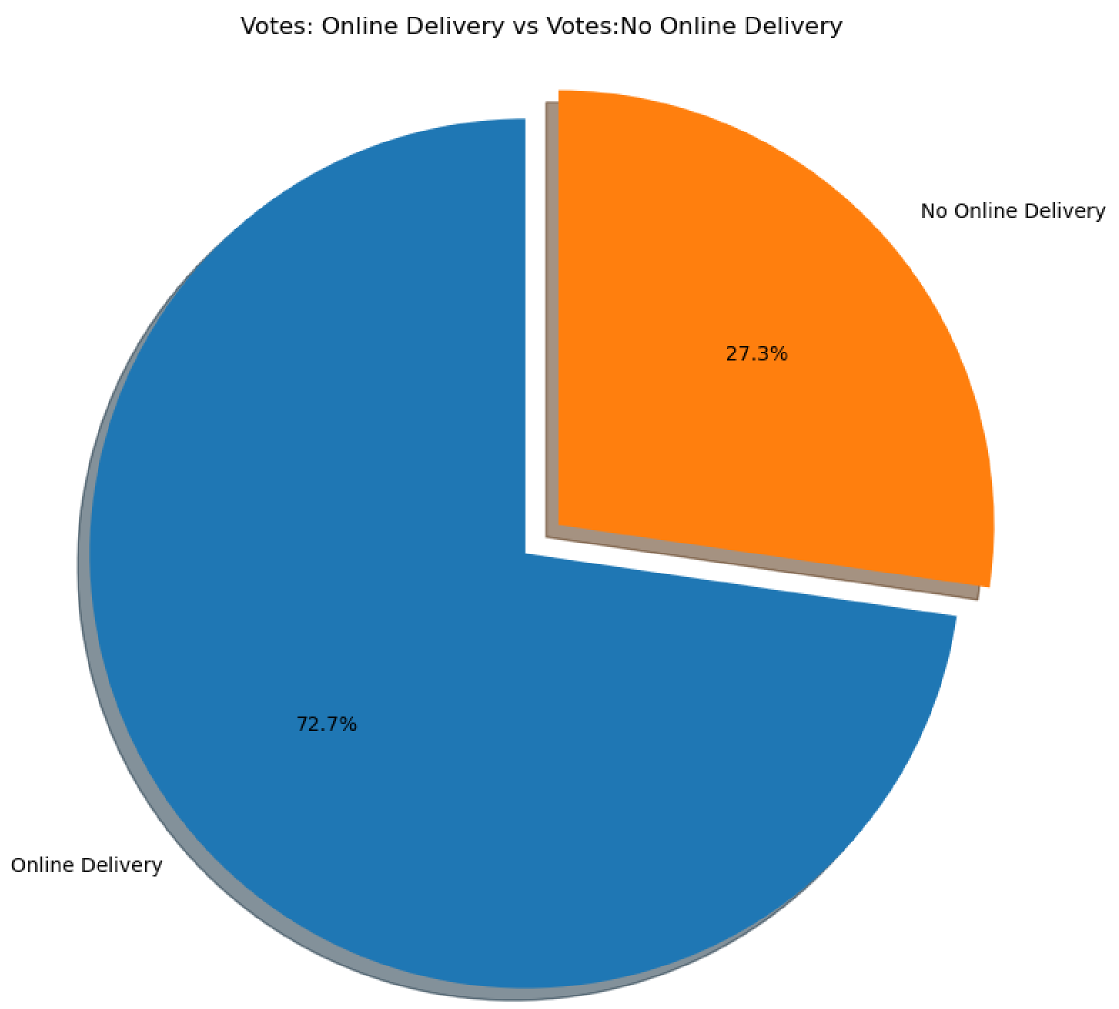
```
labels = 'Online Delivery','No Online Delivery'
size = [rest_od,rest_nod]
explode = (0.1,0)
fig1,ax1 = plt.subplots(figsize=(9,9))
ax1.pie(size,explode=explode,labels=labels,autopct='%1.
 ↪1f%%',shadow=True,startangle=90)
ax1.set_title("Online Delivery vs No Online Delivery")
ax1.axis('equal')
plt.show()
```



[33]:
```
rest_deliver = df_rest1[df_rest1['Has_Table_booking_Yes'] == 1]['Votes'].sum()
rest_ndeliver = df_rest1[df_rest1['Has_Table_booking_Yes'] == 0]['Votes'].sum()
print('Difference in number of votes for restaurants that deliver and dont␣
 ↪deliver: ',abs((rest_deliver - rest_ndeliver)))
```

```
Difference in number of votes for restaurants that deliver and dont deliver:
680082
```

[34]:
```
labels = 'Online Delivery','No Online Delivery'
size = [rest_ndeliver,rest_deliver]
explode = (0,0.1)
fig1,ax1 = plt.subplots(figsize=(9,9))
ax1.pie(size,explode=explode,labels=labels,autopct='%1.
 ↪1f%%',shadow=True,startangle=90)
ax1.set_title("Votes: Online Delivery vs Votes:No Online Delivery")
ax1.axis('equal')
plt.show()
#out of the total votes about 27.3% votes were given to restaurants that dont␣
 ↪have online delivery option
#out of the total votes about 72.7% votes were given to restaurants that do␣
 ↪have online delivery option
#This clearly shows that restaurants that have online delivery are more likely␣
 ↪to get a vote(feedback)
```



1.1.2 EDA - IV

- What are the top 10 cuisines served across cities?
- What is the maximum and minimum no. of cuisines that a restaurant serves?

[35]:
```
# splitting comma separated values in the Cuisines column, creating a DataFrame␣
↪where each cuisine is in its own column
df_rest.columns
cuisines = df_rest['Cuisines'].apply(lambda x: pd.Series(x.split(',')))
```

[36]:
```
cuisines.columns =␣
↪['Cuisine_1','Cuisine_2','Cuisine_3','Cuisine_4','Cuisine_5','Cuisine_6','Cuisine_7','Cuisi
cuisines.tail()
```

[36]:
```
        Cuisine_1     Cuisine_2    Cuisine_3   Cuisine_4 Cuisine_5  \
9545      Chinese  North Indian    Fast Food         NaN       NaN
9546       Indian       Chinese  Continental         NaN       NaN
9547         Cafe   Continental     Desserts   Ice Cream   Italian
9548  Street Food           NaN          NaN         NaN       NaN
9549      Chinese  North Indian          NaN         NaN       NaN

       Cuisine_6 Cuisine_7 Cuisine_8
9545         NaN       NaN       NaN
9546         NaN       NaN       NaN
9547   Beverages       NaN       NaN
9548         NaN       NaN       NaN
9549         NaN       NaN       NaN
```

[37]:
```
#concatenate DataFrames 'df_rest' with 'cuisines'
df_cuisines = pd.concat([df_rest,cuisines],axis=1)
df_cuisines.head()
```

[37]:
```
   Restaurant_ID              Restaurant_Name  Country_Code     City  \
0        7402935                         Skye            94  Jakarta
1        7410290     Satoo - Hotel Shangri-La            94  Jakarta
2        7420899                   Sushi Masa            94  Jakarta
3        7421967               3 Wise Monkeys            94  Jakarta
4        7422489  Avec Moi Restaurant and Bar            94  Jakarta

                                            Address  \
0  Menara BCA, Lantai 56, Jl. MH. Thamrin, Thamri…
1              Hotel Shangri-La, Jl. Jend. Sudirman
2                  Jl. Tuna Raya No. 5, Penjaringan
3                 Jl. Suryo No. 26, Senopati, Jakarta
4  Gedung PIC, Jl. Teluk Betung 43, Thamrin, Jakarta

                      Locality                        Locality_Verbose  \
0  Grand Indonesia Mall, Thamrin  Grand Indonesia Mall, Thamrin, Jakarta
1     Hotel Shangri-La, Sudirman     Hotel Shangri-La, Sudirman, Jakarta
2                    Penjaringan                    Penjaringan, Jakarta
3                       Senopati                       Senopati, Jakarta
4                        Thamrin                        Thamrin, Jakarta

    Longitude  Latitude                    Cuisines  …  Votes    Country  \
0  106.821999 -6.196778        Italian, Continental  …   1498  Indonesia
1  106.818961 -6.203292  Asian, Indonesian, Western  …    873  Indonesia
2  106.800144 -6.101298             Sushi, Japanese  …    605  Indonesia
3  106.813400 -6.235241                    Japanese  …    395  Indonesia
4  106.821023 -6.196270             French, Western  …    243  Indonesia

  Cuisine_1     Cuisine_2  Cuisine_3  Cuisine_4 Cuisine_5 Cuisine_6  \
0   Italian   Continental        NaN        NaN       NaN       NaN
1     Asian    Indonesian    Western        NaN       NaN       NaN
2     Sushi      Japanese        NaN        NaN       NaN       NaN
3  Japanese           NaN        NaN        NaN       NaN       NaN
4    French       Western        NaN        NaN       NaN       NaN

  Cuisine_7 Cuisine_8
0       NaN       NaN
1       NaN       NaN
2       NaN       NaN
3       NaN       NaN
4       NaN       NaN

[5 rows x 28 columns]
```

[38]:
```
# create new DataFrame 'cuisine_loc' by selecting columns from the DataFrame␣
↪'df_cuisines' to show info relating to country, city, locality, etc
cuisine_loc = pd.
↪DataFrame(df_cuisines[['Country','City','Locality_Verbose','Cuisine_1','Cuisine_2','Cuisine
                                                                       ␣
↪'Cuisine_4','Cuisine_5','Cuisine_6','Cuisine_7','Cuisine_8']])
```

[39]:
```
cuisine_loc_stack=pd.DataFrame(cuisine_loc.stack()) #stacking the columns
cuisine_loc.head()
```

[39]:
```
     Country     City                        Locality_Verbose Cuisine_1  \
0  Indonesia  Jakarta  Grand Indonesia Mall, Thamrin, Jakarta   Italian
1  Indonesia  Jakarta     Hotel Shangri-La, Sudirman, Jakarta     Asian
2  Indonesia  Jakarta                   Penjaringan, Jakarta     Sushi
3  Indonesia  Jakarta                      Senopati, Jakarta  Japanese
4  Indonesia  Jakarta                       Thamrin, Jakarta    French

     Cuisine_2 Cuisine_3 Cuisine_4 Cuisine_5 Cuisine_6 Cuisine_7 Cuisine_8
0  Continental       NaN       NaN       NaN       NaN       NaN       NaN
1   Indonesian   Western       NaN       NaN       NaN       NaN       NaN
2     Japanese       NaN       NaN       NaN       NaN       NaN       NaN
3          NaN       NaN       NaN       NaN       NaN       NaN       NaN
4      Western       NaN       NaN       NaN       NaN       NaN       NaN
```

[40]:
```
keys = [c for c in cuisine_loc  if c.startswith('Cuisine')]
a=pd.melt(cuisine_loc, id_vars='Locality_Verbose', value_vars=keys,␣
↪value_name='Cuisines')
#melting the stack into one row
max_rate=pd.DataFrame(a.groupby(by=['Locality_Verbose','variable','Cuisines']).
↪size().reset_index())
#find the highest restuarant in the city
max_rate
```

```
del max_rate['variable']
max_rate.columns=['Locality_Verbose','Cuisines','Count']
max_rate.head()
# In summary, this code snippet processes the DataFrame cuisine_loc to extract␣
↪information about the count of each cuisine
# offered in different localities, and it stores this information in the␣
↪DataFrame max_rate.
```

[40]:
```
                              Locality_Verbose      Cuisines  Count
0      ILD Trade Centre Mall, Sohna Road, Gurgaon          Cafe      1
1      ILD Trade Centre Mall, Sohna Road, Gurgaon  North Indian      1
2      ILD Trade Centre Mall, Sohna Road, Gurgaon     Beverages      1
3      ILD Trade Centre Mall, Sohna Road, Gurgaon       Mughlai      1
4  12th Square Building, Banjara Hills, Hyderabad       Mughlai      1
```

[41]:
```
#find the highest restuarant in the city
loc=max_rate.sort_values('Count', ascending=False).
↪groupby(by=['Locality_Verbose'],as_index=False).first()
loc.head()
```

[41]:
```
                              Locality_Verbose        Cuisines  Count
0      ILD Trade Centre Mall, Sohna Road, Gurgaon            Cafe      1
1  12th Square Building, Banjara Hills, Hyderabad         Mughlai      1
2                  A Hotel, Gurdev Nagar, Ludhiana         Chinese      1
3              ARSS Mall, Paschim Vihar, New Delhi    North Indian      1
4                           Aaya Nagar, New Delhi  Cuisine Varies      1
```

[42]:
```
rating_res=loc.
↪merge(df_rest,left_on='Locality_Verbose',right_on='Locality_Verbose',how='inner')
#inner join to merge the two dataframe
df=pd.
↪DataFrame(rating_res[['Country','City','Locality_Verbose','Cuisines_x','Count']])
#making a dataframe of rating restaurant
country=rating_res.sort_values('Count', ascending=False).
↪groupby(by=['Country'],as_index=False).first()
#grouping the data by country code
con=pd.DataFrame(country[['Country','City','Locality','Cuisines_x','Count']])
con.columns=['Country','City','Locality','Cuisines','Number of restaurants in␣
↪the country']
#renaming the columns
con1=con.sort_values('Number of restaurants in the country', ascending=False)
#sorting the restaurants on the basis of the number of restaurants in the␣
↪country
con1[:10]
final_con=con1.drop(con1.index[[7,10]])
```

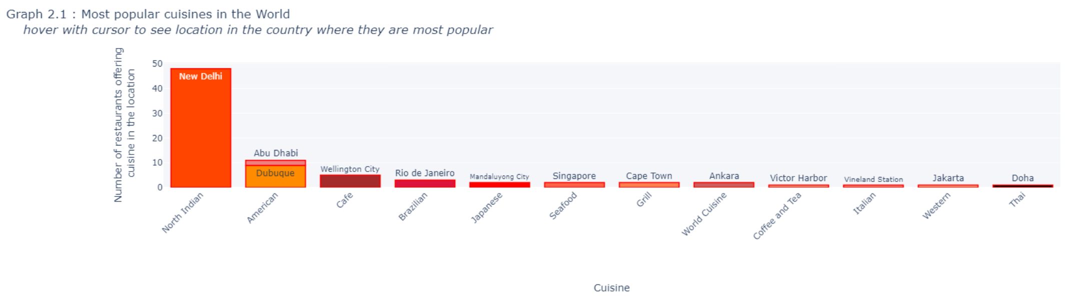
[43]:
```
final_con
```

[43]:
```
          Country              City  \
3           India         New Delhi   
14  United States           Dubuque   
5     New Zealand   Wellington City   
1          Brazil    Rio de Janeiro   
6     Phillipines  Mandaluyong City   
8       Singapore         Singapore   
9    South Africa         Cape Town   
11         Turkey            Ankara   
12            UAE         Abu Dhabi   
0       Australia     Victor Harbor   
2          Canada  Vineland Station   
4       Indonesia           Jakarta   
7           Qatar              Doha   

                                          Locality        Cuisines  \
3                                  Connaught Place    North Indian   
14                                         Dubuque        American   
5                                           Te Aro            Cafe   
1                                          Ipanema       Brazilian   
6             SM Megamall, Ortigas, Mandaluyong City        Japanese   
8                       Marina Centre, Downtown Core         Seafood   
9                                      Green Point           Grill   
11                                 Gazi Osman PaÅÙa   World Cuisine   
12  Abu Dhabi Mall, Tourist Club Area  (Al Zahiyah)        American   
0                                    Victor Harbor  Coffee and Tea   
2                                 Vineland Station         Italian   
4                                            Tebet         Western   
7   The Westin Doha Hotel & Spa, Fereej Bin Mahmoud            Thai   

    Number of restaurants in the country  
3                                     48  
14                                     9  
5                                      5  
1                                      3  
6                                      2  
8                                      2  
9                                      2  
11                                     2  
12                                     2  
0                                      1  
2                                      1  
4                                      1  
7                                      1  
```

```
[44]: loc_list=final_con['City'] #converting the series to dataframe
      a_list=loc_list.tolist()

      cui_list=final_con['Cuisines']# converting the series to dataframe
      b_list=cui_list.tolist()

      count_list=final_con['Number of restaurants in the country']# converting the␣
       ↪series to dataframe
      c_list=count_list.tolist()
```

```
[45]: trace0 = go.Bar(# BarChart 1 (Popular cuisines of the country)
          x=b_list, #x axis label
          y=c_list, # y axis label
          text=loc_list, # location of the cuisine
          name='Popular Cuisine',
           marker=dict(
              color=['rgb(255,69,0)',
                     'rgb(255,140,0)',
                     'rgb(165,42,42)',
                     'rgb(220,20,60)',
                     'rgb(255,0,0)',
                     'rgb(255,99,71)',
                     'rgb(255,127,80)',
                     'rgb(205,92,92)',
                     'rgb(240,128,128)',
                     'rgb(233,150,122)',
                     'rgb(250,128,114)',
                     'rgb(255,160,122)'],
              line=dict(
                  color='rgb(255,0,0)',#color of the bar graph's line
                  width=1.5, #width of the bar graph
              )
          ),
          opacity=1.0
      )
      data = [trace0]
      layout = go.Layout(

          legend=dict( #the layout of the graph( beautification)
              x=0,
              y=1,
              traceorder='normal',
              font=dict(
                  family='sans-serif',
                  size=12,
                  color='#000'
              ),
              bgcolor='#E2E2E2',
              bordercolor='#FFFFFF',
              borderwidth=20,
          ),
          autosize=False,
          width=1000, # size of the graph
          height=450,
          margin=Margin(r=20, l=300,
                        b=75, t=125),
          title="Graph 2.1 : Most popular cuisines in the World<br>\
          <i>hover with cursor to see location in the country where they are most␣
       ↪popular </i>", #title of the graph
          plot_bgcolor='rgba(245, 246, 249, 1)',
          xaxis=dict(tickangle=-45,title=␣
       ↪'<br>Cuisine<br>',mirror=True,showticklabels=True),
          #making the graphs label inclined at 45 deg
          yaxis= {'title': 'Number of restaurants offering<br> cuisine in the␣
       ↪location'},#label of y-axis
      )
      fig = go.Figure(data=data, layout=layout)#plotting the graph
      iplot(fig)
```

```
C:\Users\d_ben\anaconda3\Lib\site-
packages\plotly\graph_objs\_deprecations.py:405: DeprecationWarning:

plotly.graph_objs.Margin is deprecated.
Please replace it with one of the following more specific types
  - plotly.graph_objs.layout.Margin
```



```
[46]: rest_cuisine = pd.
 ↪DataFrame(df_cuisines[['Restaurant_Name','City','Cuisine_1','Cuisine_2','Cuisine_3','Cuisin
                                                                      ␣
 ↪'Cuisine_5','Cuisine_6','Cuisine_7','Cuisine_8']])
```

```
rest_cuisine_stack=pd.DataFrame(rest_cuisine.stack()) #stacking the columns
rest_cuisine.head()
```

```
[46]:                 Restaurant_Name     City Cuisine_1     Cuisine_2 Cuisine_3  \
      0                         Skye  Jakarta   Italian   Continental       NaN
      1     Satoo - Hotel Shangri-La  Jakarta     Asian    Indonesian   Western
      2                  Sushi Masa  Jakarta     Sushi      Japanese       NaN
      3              3 Wise Monkeys  Jakarta  Japanese           NaN       NaN
      4  Avec Moi Restaurant and Bar  Jakarta    French       Western       NaN

        Cuisine_4 Cuisine_5 Cuisine_6 Cuisine_7 Cuisine_8
      0       NaN       NaN       NaN       NaN       NaN
      1       NaN       NaN       NaN       NaN       NaN
      2       NaN       NaN       NaN       NaN       NaN
      3       NaN       NaN       NaN       NaN       NaN
      4       NaN       NaN       NaN       NaN       NaN
```

```
[47]: keys1 = [c for c in rest_cuisine  if c.startswith('Cuisine')]
      b=pd.melt(rest_cuisine, id_vars='Restaurant_Name', value_vars=keys,␣
       ↪value_name='Cuisines')
      #melting the stack into one row
      max_rate1=pd.DataFrame(b.groupby(by=['Restaurant_Name','variable','Cuisines']).
       ↪size().reset_index())
      #find the highest restuarant in the city
      max_rate1
      del max_rate1['variable']
      max_rate1.columns=['Restaurant_Name','Cuisines','Count']
      max_rate1.head(20)
```

```
[47]:           Restaurant_Name      Cuisines  Count
      0                   12212     Fast Food      1
      1             Let's Burrrp       Chinese      1
      2             Let's Burrrp  North Indian      1
      3                     #45          Cafe      1
      4             #Dilliwaala6  North Indian      1
      5             #InstaFreeze     Ice Cream      1
      6              #OFF Campus          Cafe      1
      7              #OFF Campus   Continental      1
      8              #OFF Campus       Italian      1
      9              #OFF Campus     Fast Food      1
      10             #Urban CafÌ©  North Indian      1
      11             #Urban CafÌ©       Chinese      1
      12             #Urban CafÌ©       Italian      1
      13                 #hashtag          Cafe      1
      14                    'Ohana      Hawaiian      1
      15        10 Downing Street  North Indian      2
      16        10 Downing Street       Chinese      2
```

```
17        10 To 10 In Delhi         Indian      1
18        10 To 10 In Delhi           Cafe      1
19  11th Avenue Cafe Bistro           Cafe      1
```

[48]:
```
max_rate1.sort_values('Count',ascending=False)
#Cafe Coffee Day has the max number of cuisines and The least number of␣
↪cuisines in a resaurant is 1.
```

[48]:
```
                Restaurant_Name       Cuisines  Count
2479            Cafe Coffee Day           Cafe     83
4596             Domino's Pizza          Pizza     79
4597             Domino's Pizza      Fast Food     78
12984                    Subway          Salad     63
12985                    Subway   Healthy Food     63
…                           …            …    …
5568   Gabbar's Bar & Kitchen        Chinese      1
5569   Gabbar's Bar & Kitchen        Mexican      1
5570   Gabbar's Bar & Kitchen        Italian      1
5571             Gaga Manjero  World Cuisine      1
15963      Ìàukura€Ùa Sofras€±         Izgara      1

[15964 rows x 3 columns]
```

[49]:
```
rating =␣
↪df_rest1[['Restaurant_ID','Restaurant_Name','Country','City','Aggregate_rating','Average_Co
```

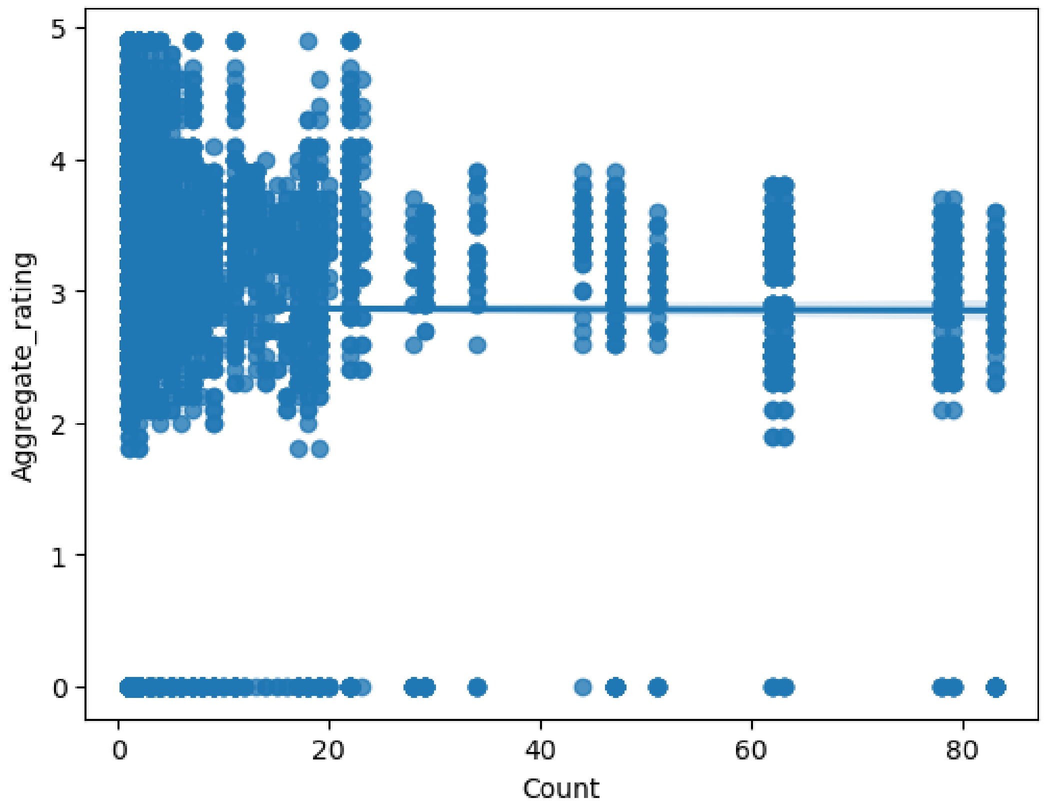
[50]:
```
rating = rating.
↪merge(max_rate1,left_on='Restaurant_Name',right_on='Restaurant_Name',how='left')
rating
```

[50]:
```
       Restaurant_ID           Restaurant_Name    Country      City  \
0            7402935                      Skye  Indonesia   Jakarta
1            7402935                      Skye  Indonesia   Jakarta
2            7410290  Satoo - Hotel Shangri-La  Indonesia   Jakarta
3            7410290  Satoo - Hotel Shangri-La  Indonesia   Jakarta
4            7410290  Satoo - Hotel Shangri-La  Indonesia   Jakarta
…                …                         …        …       …
23810       18312106                UrbanCrave      India    Kanpur
23811       18312106                UrbanCrave      India    Kanpur
23812        3900245        Deena Chat Bhandar      India  Varanasi
23813       18246202           VNS Live Studio      India  Varanasi
23814       18246202           VNS Live Studio      India  Varanasi

       Aggregate_rating  Average_Cost_for_two  Votes  Price_range  \
0                   4.1                800000   1498            3
1                   4.1                800000   1498            3
2                   4.6                800000    873            3
```

```
3                    4.6                 800000    873           3
4                    4.6                 800000    873           3
…                  …                   …    …          …
23810                3.9                      0    127           1
23811                3.9                      0    127           1
23812                3.8                      0     78           1
23813                3.5                      0    109           1
23814                3.5                      0    109           1

       Has_Table_booking_Yes  Has_Online_delivery_Yes       Cuisines  Count
0                      False                    False        Italian      1
1                      False                    False    Continental      1
2                      False                    False          Asian      1
3                      False                    False     Indonesian      1
4                      False                    False        Western      1
…                      …                       …            …     …
23810                  False                    False        Italian      1
23811                  False                    False      Beverages      1
23812                  False                    False    Street Food      1
23813                  False                    False        Chinese      1
23814                  False                    False   North Indian      1

[23815 rows x 12 columns]
```

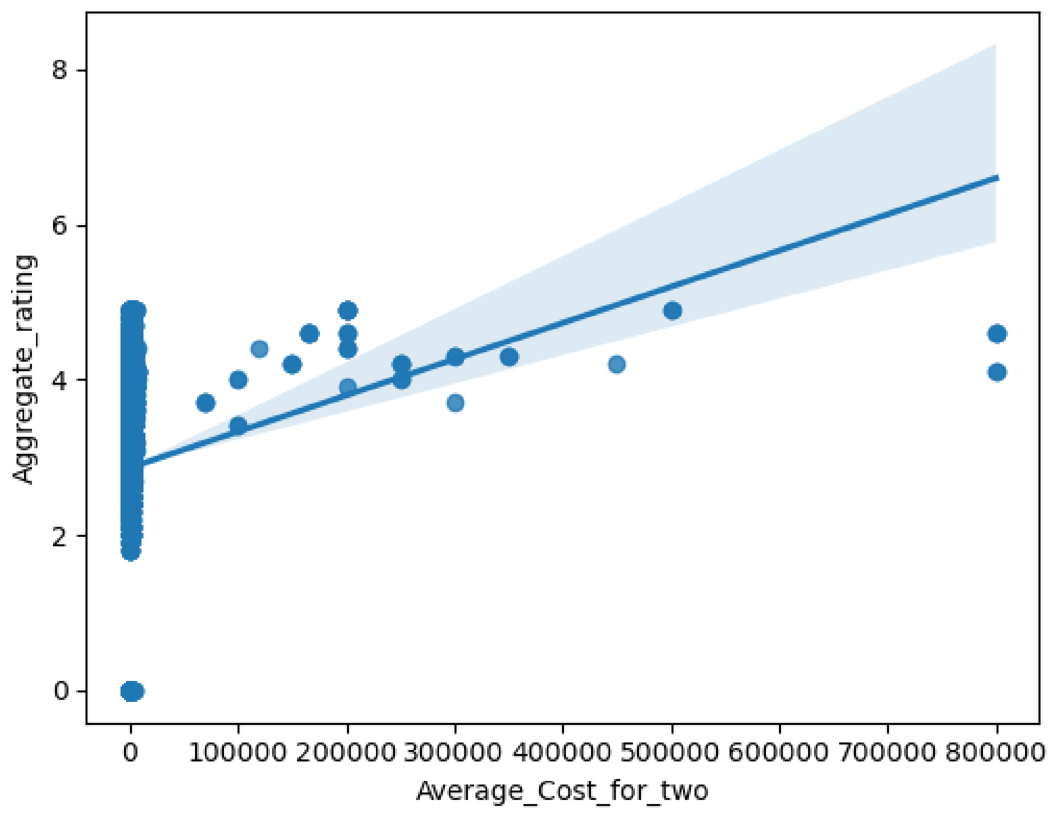
[51]:
```
sns.regplot(x='Count',y='Aggregate_rating',data=rating)
rating[["Count", "Aggregate_rating"]].corr()
#Number of cuisines is not a good factor to decide the rating of a restaurant
```

[51]:
```
                     Count  Aggregate_rating
Count             1.000000         -0.001642
Aggregate_rating -0.001642          1.000000
```



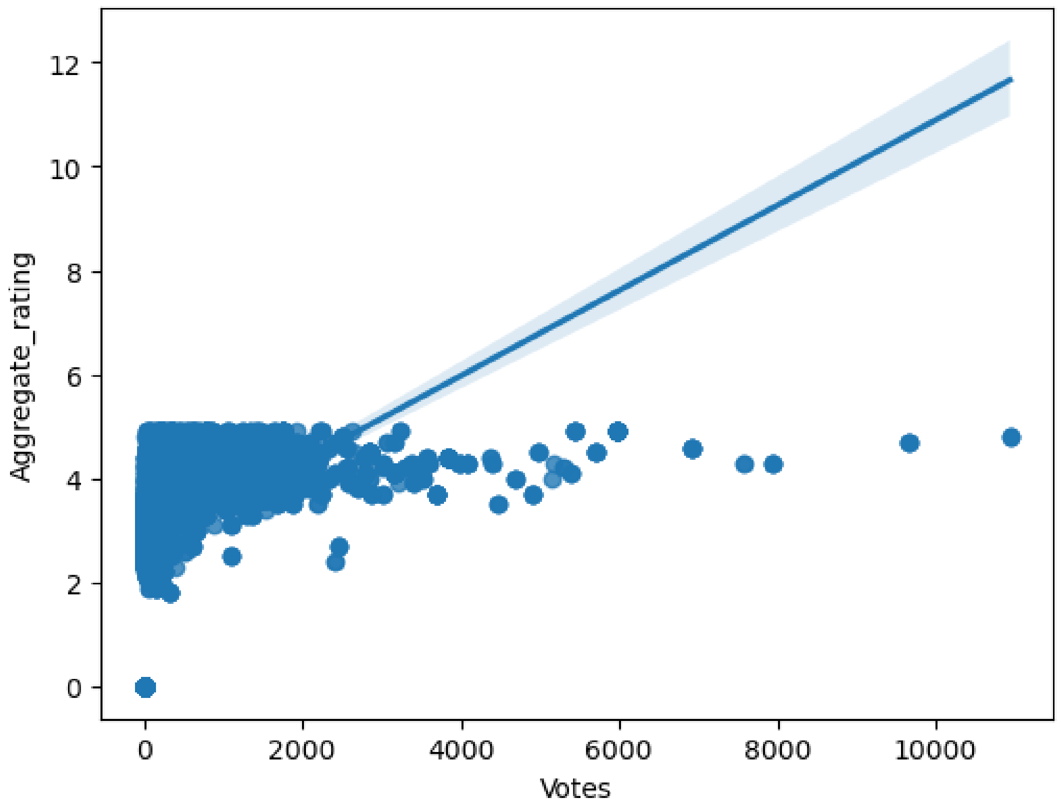
```
[52]: sns.regplot(x='Average_Cost_for_two',y='Aggregate_rating',data=rating)
      rating[["Average_Cost_for_two", "Aggregate_rating"]].corr()
      #Average cost for two is a weak positive factor to decide the rating of a␣
       ↪restaurant
```

```
[52]:                       Average_Cost_for_two  Aggregate_rating
      Average_Cost_for_two               1.00000           0.05011
      Aggregate_rating                   0.05011           1.00000
```



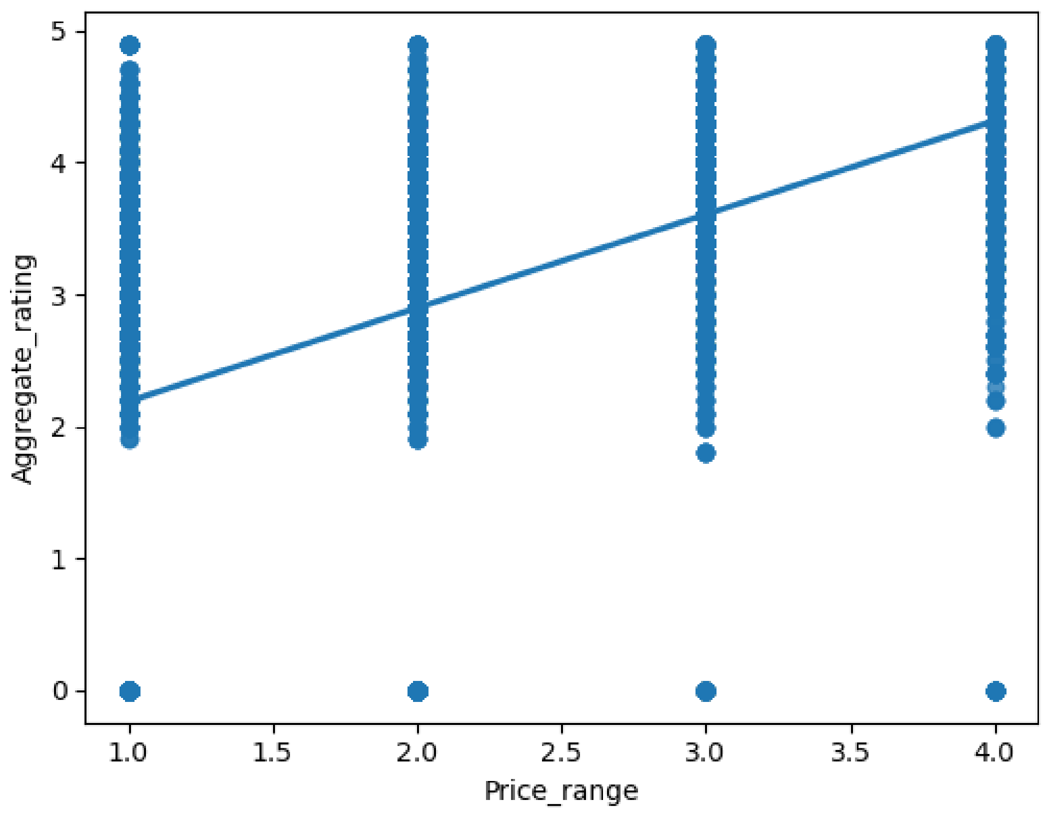
```
[53]: sns.regplot(x='Votes',y='Aggregate_rating',data=rating)
      rating[['Votes','Aggregate_rating']].corr()
      ##Average cost for two can be a factor to decide the rating of a restaurant
```

```
[53]:                      Votes  Aggregate_rating
      Votes             1.000000          0.318667
      Aggregate_rating  0.318667          1.000000
```



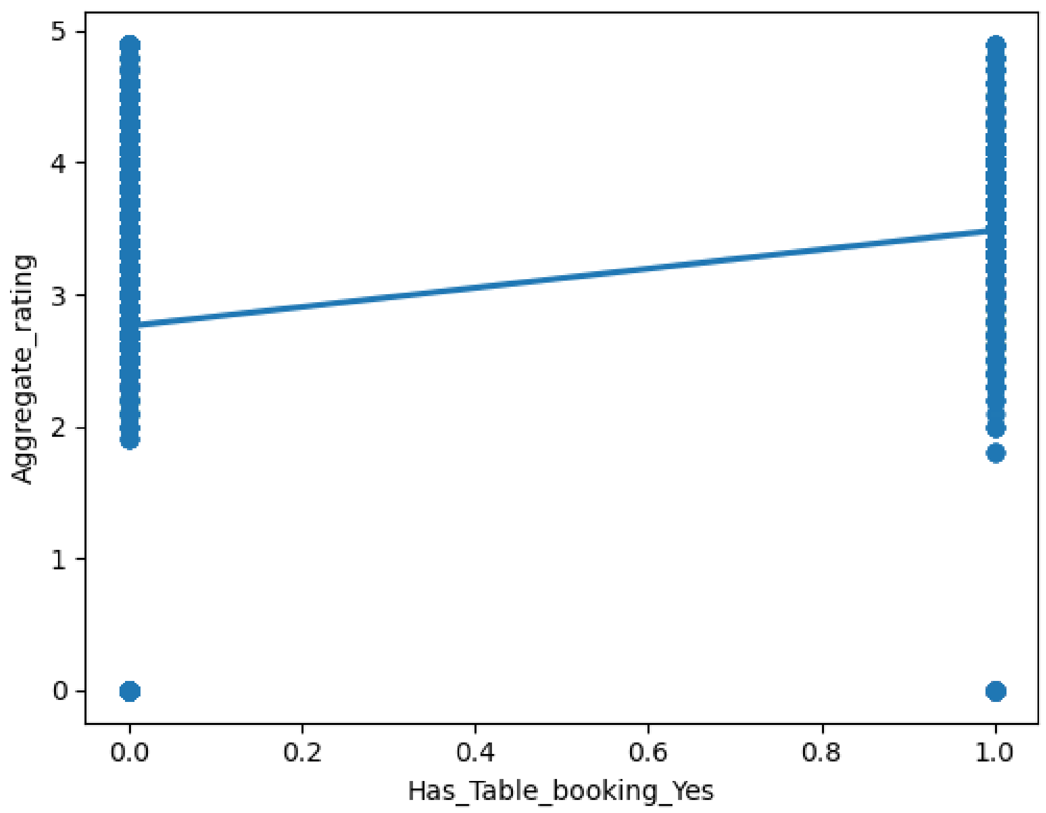
```
[54]: abc = df_rest1[df_rest1['Has_Online_delivery_Yes'] == 1]['Aggregate_rating'].
        ↪mean()
      xyz = df_rest1[df_rest1['Has_Online_delivery_Yes'] == 0]['Aggregate_rating'].
        ↪mean()
      sns.regplot(x='Price_range',y='Aggregate_rating',data=rating)
      rating[['Price_range','Aggregate_rating']].corr()
      ##Price range can be a factor to decide the rating of a restaurant
```

```
[54]:                   Price_range  Aggregate_rating
      Price_range          1.000000          0.462983
      Aggregate_rating     0.462983          1.000000
```



```
[55]: sns.regplot(x='Has_Table_booking_Yes',y='Aggregate_rating',data=rating)
      rating[['Has_Table_booking_Yes','Aggregate_rating']].corr()
      ##Table booking can be a factor to decide the rating of a restaurant
```

```
[55]:                        Has_Table_booking_Yes  Aggregate_rating
      Has_Table_booking_Yes               1.000000          0.181843
      Aggregate_rating                    0.181843          1.000000
```



It appears that no individual factor strongly influences the restaurant rating. However, elements such as table booking availability, online delivery services, average price for two, price range, and the number of votes received do have an impact on the restaurant's rating.

```
[ ]:
```