# Restaurants Project

September 5, 2022

SIMPLILEARN CAPSTONE PROJECT
MARKETING DOMAIN
IDENTIFYING AND RECOMMENDING BEST RESTAURANTS

[1]:
```
#import all libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

[2]:
```
data=pd.read_excel('data.xlsx')
```

[3]:
```
data
```

[3]:

| | Restaurant ID | Restaurant Name | Country Code | City | Address |
|---|---|---|---|---|---|
| 0 | 7402935 | Skye | 94 | Jakarta | Menara BCA, Lantai 56, Jl. MH. Thamrin, Thamri… |
| 1 | 7410290 | Satoo - Hotel Shangri-La | 94 | Jakarta | Hotel Shangri-La, Jl. Jend. Sudirman |
| 2 | 7420899 | Sushi Masa | 94 | Jakarta | Jl. Tuna Raya No. 5, Penjaringan |
| 3 | 7421967 | 3 Wise Monkeys | 94 | Jakarta | Jl. Suryo No. 26, Senopati, Jakarta |
| 4 | 7422489 | Avec Moi Restaurant and Bar | 94 | Jakarta | Gedung PIC, Jl. Teluk Betung 43, Thamrin, Jakarta |
| … | … | … | … | … | … |
| 9546 | 18279289 | BMG - All Day Dining | 1 | Dehradun | 140 A, Rajpur Road, Jakhan, Dehradun |
| 9547 | 2300497 | Atmosphere Grill Cafe Sheesha | 1 | Kanpur | 8th Floor, J.S. Tower, 16/106 - Mall Road, Kan… |
| 9548 | 18312106 | UrbanCrave | 1 | Kanpur | 14/125, The Mall, Mall Road, Colonelganj, Para… |
| 9549 | 3900245 | Deena Chat Bhandar | 1 | Varanasi | D-47/184, Luxa Road, Dashaswmedh Road, Varanasi |
| 9550 | 18246202 | VNS Live Studio | 1 | Varanasi | Hotel Varuna Ground Floor, 22 Gulab Bagh, Sigr… |

```
                          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
…                                …                                       …
9546                         Jakhan                        Jakhan, Dehradun
9547                      Mall Road                      Mall Road, Kanpur
9548                         Parade                         Parade, Kanpur
9549               Dashaswmedh Road              Dashaswmedh Road, Varanasi
9550                          Sigra                          Sigra, Varanasi

       Longitude   Latitude  \
0     106.821999  -6.196778
1     106.818961  -6.203292
2     106.800144  -6.101298
3     106.813400  -6.235241
4     106.821023  -6.196270
…            …          …
9546   78.068890  30.362686
9547   80.354002  26.472001
9548   80.342796  26.474986
9549    0.000000   0.000000
9550   82.991694  25.318345

                                          Cuisines  Average Cost for two  \
0                                Italian, Continental                800000
1                           Asian, Indonesian, Western                800000
2                                     Sushi, Japanese                500000
3                                             Japanese                450000
4                                     French, Western                350000
…                                                 …                     …
9546                 Chinese, North Indian, Fast Food                     0
9547                     Indian, Chinese, Continental                     0
9548  Cafe, Continental, Desserts, Ice Cream, Italia…                     0
9549                                     Street Food                     0
9550                           Chinese, North Indian                     0

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

```
9546      Indian Rupees(Rs.)                 No                    No
9547      Indian Rupees(Rs.)                 No                    No
9548      Indian Rupees(Rs.)                 No                    No
9549      Indian Rupees(Rs.)                 No                    No
9550      Indian Rupees(Rs.)                 No                    No

      Price range  Aggregate rating Rating color Rating text  Votes
0               3               4.1        Green   Very Good   1498
1               3               4.6   Dark Green   Excellent    873
2               3               4.9   Dark Green   Excellent    605
3               3               4.2        Green   Very Good    395
4               3               4.3        Green   Very Good    243
…             …                 …          …         …     …
9546            1               4.3        Green   Very Good     63
9547            1               3.6       Yellow        Good     34
9548            1               3.9       Yellow        Good    127
9549            1               3.8       Yellow        Good     78
9550            1               3.5       Yellow        Good    109

[9551 rows x 19 columns]
```

[4]:
```
cc=pd.read_excel('Country-Code.xlsx')
cc
```

[4]:
```
    Country Code         Country
0              1           India
1             14       Australia
2             30          Brazil
3             37          Canada
4             94       Indonesia
5            148     New Zealand
6            162     Phillipines
7            166           Qatar
8            184       Singapore
9            189    South Africa
10           191       Sri Lanka
11           208          Turkey
12           214             UAE
13           215  United Kingdom
14           216   United States
```

[5]:
```
data1=pd.merge(data,cc,on='Country Code', how='left')
data1
```

[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
…             …                              …          …       …
9546       18279289            BMG - All Day Dining             1  Dehradun
9547        2300497   Atmosphere Grill Cafe Sheesha             1    Kanpur
9548       18312106                       UrbanCrave             1    Kanpur
9549        3900245              Deena Chat Bhandar             1  Varanasi
9550       18246202                 VNS Live Studio             1  Varanasi

                                              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
…                                                   …
9546               140 A, Rajpur Road, Jakhan, Dehradun
9547  8th Floor, J.S. Tower, 16/106 - Mall Road, Kan…
9548  14/125, The Mall, Mall Road, Colonelganj, Para…
9549    D-47/184, Luxa Road, Dashaswmedh Road, Varanasi
9550  Hotel Varuna Ground Floor, 22 Gulab Bagh, Sigr…

                           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
…                                  …                                       …
9546                         Jakhan                         Jakhan, Dehradun
9547                       Mall Road                       Mall Road, Kanpur
9548                          Parade                          Parade, Kanpur
9549                Dashaswmedh Road              Dashaswmedh Road, Varanasi
9550                           Sigra                          Sigra, Varanasi

       Longitude   Latitude  \
0     106.821999  -6.196778
1     106.818961  -6.203292
2     106.800144  -6.101298
3     106.813400  -6.235241
4     106.821023  -6.196270
…           …          …
9546   78.068890  30.362686
9547   80.354002  26.472001
9548   80.342796  26.474986
9549    0.000000   0.000000
```

```
9550   82.991694  25.318345

                                            Cuisines  Average Cost for two  \
0                                Italian, Continental                800000
1                             Asian, Indonesian, Western                800000
2                                       Sushi, Japanese                500000
3                                              Japanese                450000
4                                       French, Western                350000
…                                                  …                   …
9546                  Chinese, North Indian, Fast Food                     0
9547                      Indian, Chinese, Continental                     0
9548  Cafe, Continental, Desserts, Ice Cream, Italia…                    0
9549                                       Street Food                     0
9550                             Chinese, North Indian                     0

                    Currency Has Table booking Has Online delivery  \
0     Indonesian Rupiah(IDR)                No                    No
1     Indonesian Rupiah(IDR)                No                    No
2     Indonesian Rupiah(IDR)                No                    No
3     Indonesian Rupiah(IDR)                No                    No
4     Indonesian Rupiah(IDR)                No                    No
…                        …                …                     …
9546      Indian Rupees(Rs.)                No                    No
9547      Indian Rupees(Rs.)                No                    No
9548      Indian Rupees(Rs.)                No                    No
9549      Indian Rupees(Rs.)                No                    No
9550      Indian Rupees(Rs.)                No                    No

      Price range  Aggregate rating Rating color Rating text  Votes    Country
0               3               4.1        Green   Very Good   1498  Indonesia
1               3               4.6   Dark Green   Excellent    873  Indonesia
2               3               4.9   Dark Green   Excellent    605  Indonesia
3               3               4.2        Green   Very Good    395  Indonesia
4               3               4.3        Green   Very Good    243  Indonesia
…             …                 …            …          …    …        …
9546            1               4.3        Green   Very Good     63      India
9547            1               3.6       Yellow        Good     34      India
9548            1               3.9       Yellow        Good    127      India
9549            1               3.8       Yellow        Good     78      India
9550            1               3.5       Yellow        Good    109      India

[9551 rows x 20 columns]
```

[6]:
```
data1.head()
```

[6]:
```
   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
```

[7]:
```
data1.columns=data1.columns.str.replace(' ','_')
data1.columns
```

[7]:
```
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')
```

[8]:
```
data1.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 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
```

[9]:
```
data1.describe
```

[9]:
```
<bound method NDFrame.describe of       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
…             …                             …          …       …
9546       18279289           BMG - All Day Dining            1  Dehradun
9547        2300497  Atmosphere Grill Cafe Sheesha             1    Kanpur
9548       18312106                  UrbanCrave              1    Kanpur
9549        3900245            Deena Chat Bhandar            1  Varanasi
```

```
9550       18246202                VNS Live Studio              1  Varanasi

                                                  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
…                                                    …
9546               140 A, Rajpur Road, Jakhan, Dehradun
9547  8th Floor, J.S. Tower, 16/106 - Mall Road, Kan…
9548  14/125, The Mall, Mall Road, Colonelganj, Para…
9549    D-47/184, Luxa Road, Dashaswmedh Road, Varanasi
9550  Hotel Varuna Ground Floor, 22 Gulab Bagh, Sigr…

                            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
…                                  …                                       …
9546                          Jakhan                        Jakhan, Dehradun
9547                       Mall Road                       Mall Road, Kanpur
9548                          Parade                          Parade, Kanpur
9549                Dashaswmedh Road              Dashaswmedh Road, Varanasi
9550                           Sigra                          Sigra, Varanasi

       Longitude   Latitude  \
0     106.821999  -6.196778
1     106.818961  -6.203292
2     106.800144  -6.101298
3     106.813400  -6.235241
4     106.821023  -6.196270
…          …          …
9546   78.068890  30.362686
9547   80.354002  26.472001
9548   80.342796  26.474986
9549    0.000000   0.000000
9550   82.991694  25.318345

                                      Cuisines  Average_Cost_for_two  \
0                           Italian, Continental                800000
1                  Asian, Indonesian, Western                800000
2                              Sushi, Japanese                500000
3                                     Japanese                450000
4                              French, Western                350000
```

```
…                                                   …                   …
9546                  Chinese, North Indian, Fast Food                   0
9547                      Indian, Chinese, Continental                   0
9548  Cafe, Continental, Desserts, Ice Cream, Italia…                    0
9549                                       Street Food                   0
9550                             Chinese, North Indian                   0

                    Currency Has_Table_booking Has_Online_delivery  \
0     Indonesian Rupiah(IDR)                 No                  No
1     Indonesian Rupiah(IDR)                 No                  No
2     Indonesian Rupiah(IDR)                 No                  No
3     Indonesian Rupiah(IDR)                 No                  No
4     Indonesian Rupiah(IDR)                 No                  No
…                        …                 …                   …
9546      Indian Rupees(Rs.)                 No                  No
9547      Indian Rupees(Rs.)                 No                  No
9548      Indian Rupees(Rs.)                 No                  No
9549      Indian Rupees(Rs.)                 No                  No
9550      Indian Rupees(Rs.)                 No                  No

      Price_range  Aggregate_rating Rating_color Rating_text  Votes    Country
0               3               4.1        Green   Very Good   1498  Indonesia
1               3               4.6   Dark Green   Excellent    873  Indonesia
2               3               4.9   Dark Green   Excellent    605  Indonesia
3               3               4.2        Green   Very Good    395  Indonesia
4               3               4.3        Green   Very Good    243  Indonesia
…             …                 …          …         …    …         …
9546            1               4.3        Green   Very Good     63      India
9547            1               3.6       Yellow        Good     34      India
9548            1               3.9       Yellow        Good    127      India
9549            1               3.8       Yellow        Good     78      India
9550            1               3.5       Yellow        Good    109      India

[9551 rows x 20 columns]>
```

[10]:
```
data1.shape
```

[10]:
```
(9551, 20)
```

[11]:
```
data1.dtypes
```

[11]:
```
Restaurant_ID            int64
Restaurant_Name         object
Country_Code             int64
City                    object
Address                 object
Locality                object
```

```
Locality_Verbose         object
Longitude               float64
Latitude                float64
Cuisines                 object
Average_Cost_for_two      int64
Currency                 object
Has_Table_booking        object
Has_Online_delivery      object
Price_range               int64
Aggregate_rating        float64
Rating_color             object
Rating_text              object
Votes                     int64
Country                  object
dtype: object
```

[12]:
```
#Data Cleaning
#Removing null values
data1.isnull().sum()
```

[12]:
```
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
```

[13]:
```
data.isnull()
```

[13]:
```
      Restaurant ID  Restaurant Name  Country Code   City  Address  Locality  \
0             False            False         False  False    False     False
1             False            False         False  False    False     False
```

```
2            False            False         False  False    False     False
3            False            False         False  False    False     False
4            False            False         False  False    False     False
…              …                …             …      …        …         …
9546         False            False         False  False    False     False
9547         False            False         False  False    False     False
9548         False            False         False  False    False     False
9549         False            False         False  False    False     False
9550         False            False         False  False    False     False

      Locality Verbose  Longitude  Latitude  Cuisines  Average Cost for two  \
0                False      False     False     False                 False
1                False      False     False     False                 False
2                False      False     False     False                 False
3                False      False     False     False                 False
4                False      False     False     False                 False
…                  …          …         …         …                     …
9546             False      False     False     False                 False
9547             False      False     False     False                 False
9548             False      False     False     False                 False
9549             False      False     False     False                 False
9550             False      False     False     False                 False

      Currency  Has Table booking  Has Online delivery  Price range  \
0        False              False                False        False
1        False              False                False        False
2        False              False                False        False
3        False              False                False        False
4        False              False                False        False
…          …                  …                    …            …
9546     False              False                False        False
9547     False              False                False        False
9548     False              False                False        False
9549     False              False                False        False
9550     False              False                False        False

      Aggregate rating  Rating color  Rating text  Votes
0                False         False        False  False
1                False         False        False  False
2                False         False        False  False
3                False         False        False  False
4                False         False        False  False
…                  …             …            …      …
9546             False         False        False  False
9547             False         False        False  False
9548             False         False        False  False
9549             False         False        False  False
```

```
9550            False         False        False  False

[9551 rows x 19 columns]
```

[14]:
```
#Restaurant name is missing, drop the name and reset the index
data1.dropna(axis=0, subset=['Restaurant_Name'], inplace=True)
data1.reset_index(drop=True,inplace=True)
```

[15]:
```
data1[data1['Cuisines'].isnull()]
```

[15]:

```
      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
```

[16]:
```
#Only 9 recordds without Cuisines, so replace the null values with Others
data1['Cuisines'].fillna('Others',inplace=True)
```

[17]:
```
data1.isnull().sum()
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9551 entries, 0 to 9550
Data columns (total 19 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
dtypes: float64(3), int64(5), object(11)
memory usage: 1.4+ MB
```

Performing Exploratory Data Analysis

[18]:
```
#Explore the geographical distribution of the restaurants
#Identify the cities with the maximum and minimum number of restaurants
#using groupby we can further proceed
cntry_dist=data1.groupby(['Country_Code','Country']).
 ↪agg(Count=('Restaurant_ID','count'))
cntry_dist.sort_values(by='Count',ascending=False)
```

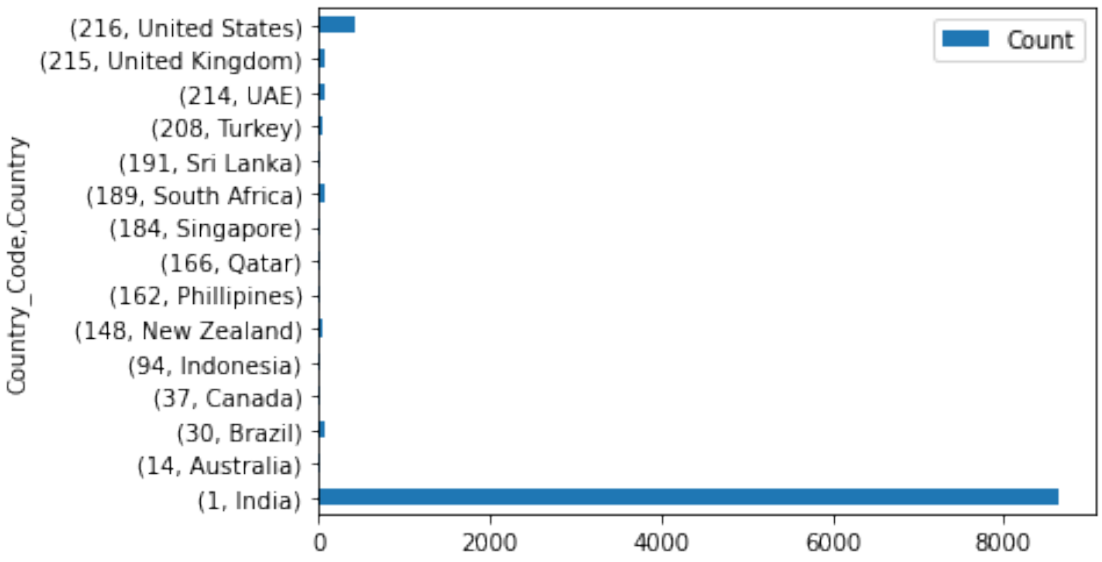
[18]:

| Country_Code | Country | Count |
|---|---|---|
| 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 |

The above result shows that India has maximum number of restaurants whereas Canada has the minimum.

[19]:
```
cntry_dist.plot(kind='barh')
```

[19]:
```
<AxesSubplot:ylabel='Country_Code,Country'>
```




[20]:
```
#City with max and min restaurant count
city_dist=data1.groupby(['Country','City']).agg(Count=('Restaurant_ID','count'))
city_dist.describe()
```

[20]:

| | 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 |

The above analysis show that the max value of restaurant in a city is 5473 Whereas the minimum value is 1

[21]:
```
#Sorting the Cities with most number of restaurants
city_dist.sort_values(by='Count',ascending=False)
```

[21]:

| | | 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]
```

The above analysis shows that New Delhi has maximum number of restaurants

[22]:
```
#Number of countries with minimum restaurants
min_rest=city_dist[city_dist['Count']==1]
min_rest.info()
min_rest
```

```
<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
```

[22]:

| Country | City | Count |
|---|---|---|
| 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
```

The above data shows that there are 46 cities in 7 different countries with only 1 restaurant

[23]:
```
#How ratings distributed overall and highest and lowest rated restaurants
max_rate=data1.sort_values(by='Aggregate_rating',ascending=False).
 ↪groupby(['Country','City'],as_index=False).first()
#highest rating restaurants
min_rate=data1.sort_values(by='Aggregate_rating',ascending=False).
 ↪groupby(['Country','City'],as_index=False).last()
#lowest rating restaurants
```

[24]:
```
df_max=max_rate[['Country','City','Restaurant_Name','Aggregate_rating']]#dataframe␣
 ↪created for highrated restaurants
df_min=min_rate[['Country','City','Restaurant_Name','Aggregate_rating']]#dataframe␣
 ↪created for lowrated restaurants
rest_rating=df_max.
 ↪merge(df_min,left_on='City',right_on='City',how='inner')#Merging of both␣
 ↪dataframes
```

[25]:
```
rest_rating
```

[25]:
```
          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]
```

[26]:
```
rest_rating.drop(columns='Country_y',axis=1,inplace=True)
rest_rating.columns=['Country','City','Highest Rated Restaurant','Rating␣
 ↪Max','Lowest Rated Restaurant','Rating Min']
rest_rating
```

[26]:
```
            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]
```

[27]:
```
data_rest=data1.copy()
data_rest.columns
```

[27]:
```
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')
```

[28]:
```
#The ratio between restaurants that allow table booking vs that do not allow␣
 ↪table booking?
#What is the percentage of restaurants providing online delivery?
#Is there a difference in no. of votes for the restaurants that deliver and the␣
 ↪restaurant that don't?

dummy=['Has_Table_booking','Has_Online_delivery']
```

[29]:
```
data_rest=pd.get_dummies(data_rest,columns=dummy,drop_first=True)
data_rest.head()
```

[29]:

| | Restaurant_ID | Restaurant_Name | Country_Code | City | Address | Locality | Locality_Verbose | Longitude | Latitude | Cuisines | Average_Cost_for_two | Currency | Price_range | Aggregate_rating | Rating_color | Rating_text | Votes | Country | Has_Table_booking_Yes | Has_Online_delivery_Yes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 7402935 | Skye | 94 | Jakarta | Menara BCA, Lantai 56, Jl. MH. Thamrin, Thamri… | Grand Indonesia Mall, Thamrin | Grand Indonesia Mall, Thamrin, Jakarta | 106.821999 | -6.196778 | Italian, Continental | 800000 | Indonesian Rupiah(IDR) | 3 | 4.1 | Green | Very Good | 1498 | Indonesia | 0 | 0 |
| 1 | 7410290 | Satoo - Hotel Shangri-La | 94 | Jakarta | Hotel Shangri-La, Jl. Jend. Sudirman | Hotel Shangri-La, Sudirman | Hotel Shangri-La, Sudirman, Jakarta | 106.818961 | -6.203292 | Asian, Indonesian, Western | 800000 | Indonesian Rupiah(IDR) | 3 | 4.6 | Dark Green | Excellent | 873 | Indonesia | 0 | 0 |
| 2 | 7420899 | Sushi Masa | 94 | Jakarta | Jl. Tuna Raya No. 5, Penjaringan | Penjaringan | Penjaringan, Jakarta | 106.800144 | -6.101298 | Sushi, Japanese | 500000 | Indonesian Rupiah(IDR) | 3 | 4.9 | Dark Green | Excellent | 605 | Indonesia | 0 | 0 |
| 3 | 7421967 | 3 Wise Monkeys | 94 | Jakarta | Jl. Suryo No. 26, Senopati, Jakarta | Senopati | Senopati, Jakarta | 106.813400 | -6.235241 | Japanese | 450000 | Indonesian Rupiah(IDR) | 3 | 4.2 | Green | Very Good | 395 | Indonesia | 0 | 0 |
| 4 | 7422489 | Avec Moi Restaurant and Bar | 94 | Jakarta | Gedung PIC, Jl. Teluk Betung 43, Thamrin, Jakarta | Thamrin | Thamrin, Jakarta | 106.821023 | -6.196270 | French, Western | 350000 | Indonesian Rupiah(IDR) | 3 | 4.3 | Green | Very Good | 243 | Indonesia | 0 | 0 |

| | |
|---|---|
| 1 | 0 |
| 2 | 0 |
| 3 | 0 |
| 4 | 0 |

In the above table 0 indicates No and 1 indicates Yes

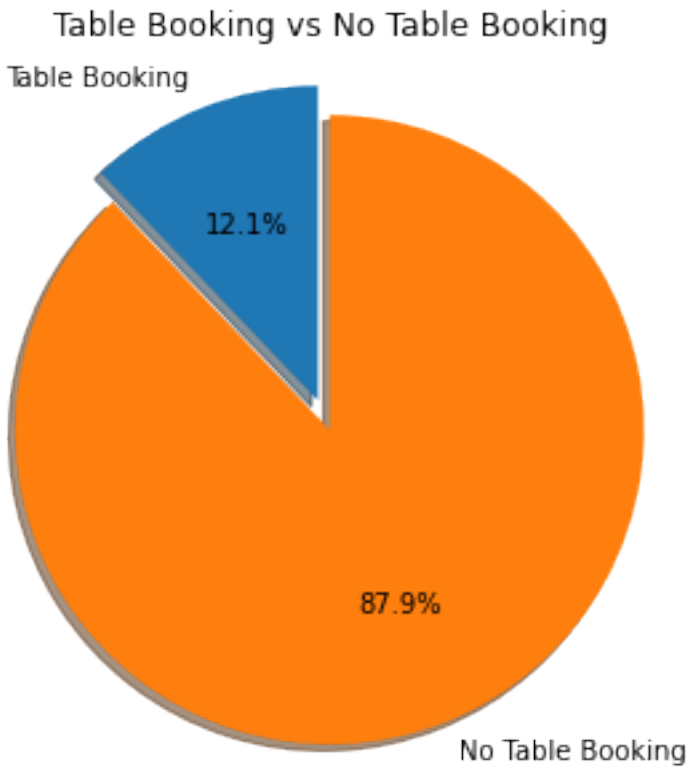
[30]:
```
#Ratio between restaurants that allow table booking vs that do not allow table␣
 ↪booking.
tab_book=data_rest[data_rest['Has_Table_booking_Yes']==1]['Restaurant_ID'].
 ↪count()
notab_book =data_rest[data_rest['Has_Table_booking_Yes']==0]['Restaurant_ID'].
 ↪count()
print('Ratio between restaurants that allow table booking vs. those that do not␣
 ↪allow table booking: ',
      round((tab_book/notab_book),2))
```

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

[31]:
```
print(tab_book,notab_book)
```

```
1158 8392
```

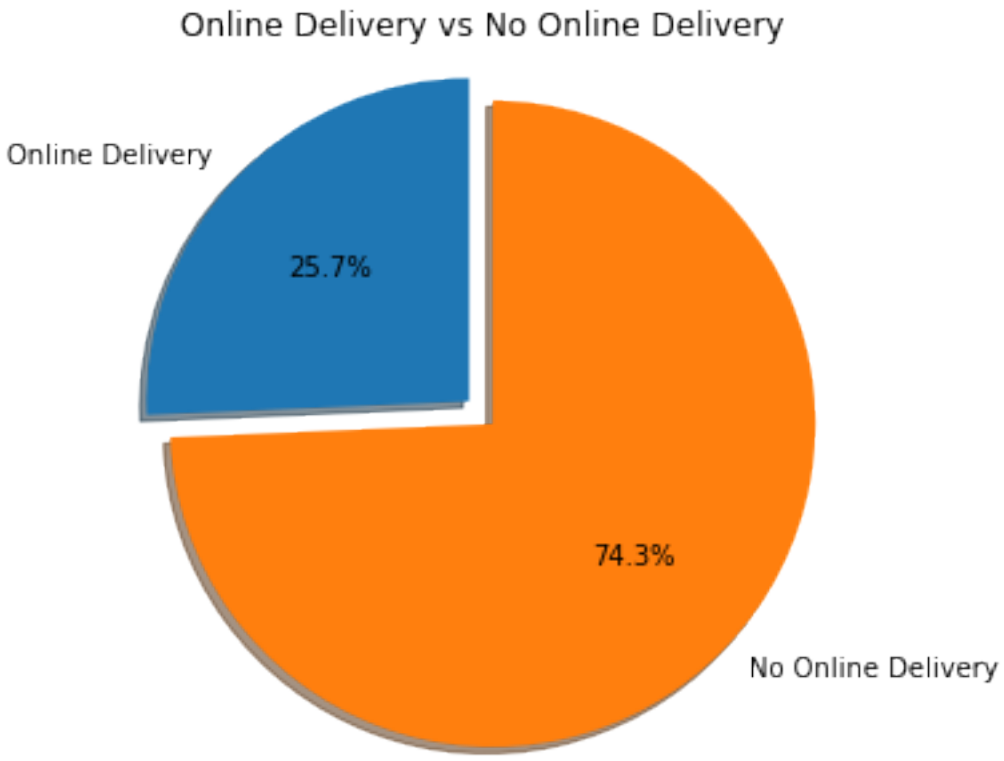
[32]:
```
#Pie chart to show percentage of restaurants which allow table booking and␣
 ↪those which don't
labels = 'Table Booking', 'No Table Booking'
sizes = [tab_book,notab_book]
explode = (0.1, 0)  # only "explode" the 2nd slice (i.e. 'Hogs')

fig1, ax1 = plt.subplots(figsize=(5,5))
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()
```




[33]:
```
#Percentage of restaurant that has online delivery
ol_dlvry = data_rest[data_rest['Has_Online_delivery_Yes'] ==␣
↪1]['Restaurant_ID'].count()
no_ol_dlvry = data_rest[data_rest['Has_Online_delivery_Yes'] ==␣
↪0]['Restaurant_ID'].count()
print('Percentage of restaurants providing online delivery : {} %'.
↪format((round(ol_dlvry/len(data_rest),3)*100)))
```

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

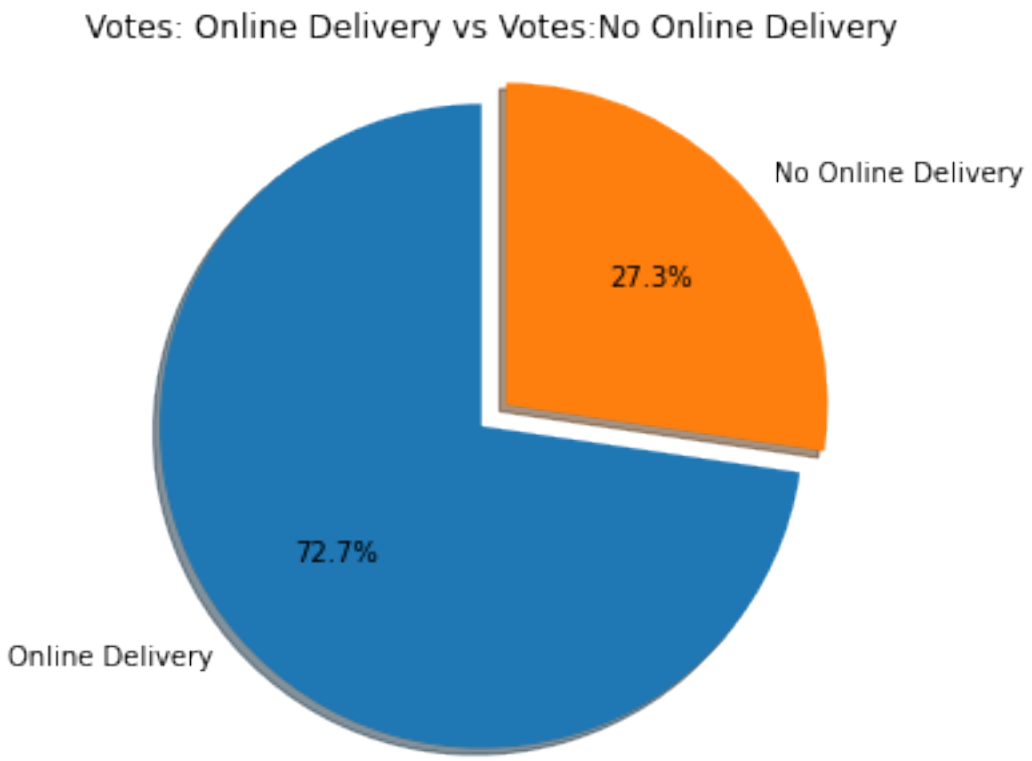
[34]:
```
#pie chart to show percentages of restaurants allowing online delivery vs those␣
↪which do not have online delivery
labels = 'Online Delivery','No Online Delivery'
size = [ol_dlvry,no_ol_dlvry]
explode = (0.1,0)
fig1,ax1 = plt.subplots(figsize=(5,5))
ax1.pie(size,explode=explode,labels=labels,autopct='%1.
↪1f%%',shadow=True,startangle=90)
ax1.set_title("Online Delivery vs No Online Delivery")
ax1.axis('equal')
plt.show()
```




[35]:
```
#Difference in no. of votes for the restaurants that deliver and the restaurant␣
 ↪that don't?
rest_del = data_rest[data_rest['Has_Table_booking_Yes'] == 1]['Votes'].sum()
rest_ndel = data_rest[data_rest['Has_Table_booking_Yes'] == 0]['Votes'].sum()
print('Difference in number of votes for restaurants that deliver and dont␣
 ↪deliver: ',abs((rest_del - rest_ndel)))
```

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

[36]:
```
labels = 'Online Delivery','No Online Delivery'
size = [rest_ndel,rest_del]
explode = (0,0.1)
fig1,ax1 = plt.subplots(figsize=(5,5))
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 dont have online delivery option This clearly shows that restaurants that have online delivery are more likely to get a vote(feedback)

[37]:
```
#What are the top 10 cuisines served across cities?
#What is the maximum and minimum no. of cuisines that a restaurant serves?
```

[38]:
```
data1.columns
cuisines = data1['Cuisines'].apply(lambda x: pd.Series(x.split(',')))
```

[39]:
```
cuisines.columns =␣
 ↪['Cuisine_1','Cuisine_2','Cuisine_3','Cuisine_4','Cuisine_5','Cuisine_6','Cuisine_7','Cuisi
cuisines.tail()
```

[39]:

| | 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
```

[40]:
```
data_cuisines = pd.concat([data1,cuisines],axis=1)
data_cuisines.head()
```

[40]:
```
   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]
```

[41]:
```
cuisine_loc = pd.
↪DataFrame(data_cuisines[['Country','City','Locality_Verbose','Cuisine_1','Cuisine_2','Cuisi
                                                    ␣
↪'Cuisine_4','Cuisine_5','Cuisine_6','Cuisine_7','Cuisine_8']])
```

[42]:
```
cuisine_loc_stack=pd.DataFrame(cuisine_loc.stack()) #stacking the columns
cuisine_loc.head()
```

[42]:
```
     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
```

[43]:
```
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()
```

[43]:
```
                                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
```

[44]:
```
#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()
```

[44]:

| | 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 |

[45]:
```
rating_res=loc.
 ↪merge(data1,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]])
```

[46]:
```
final_con
```

[46]:

| | 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
```

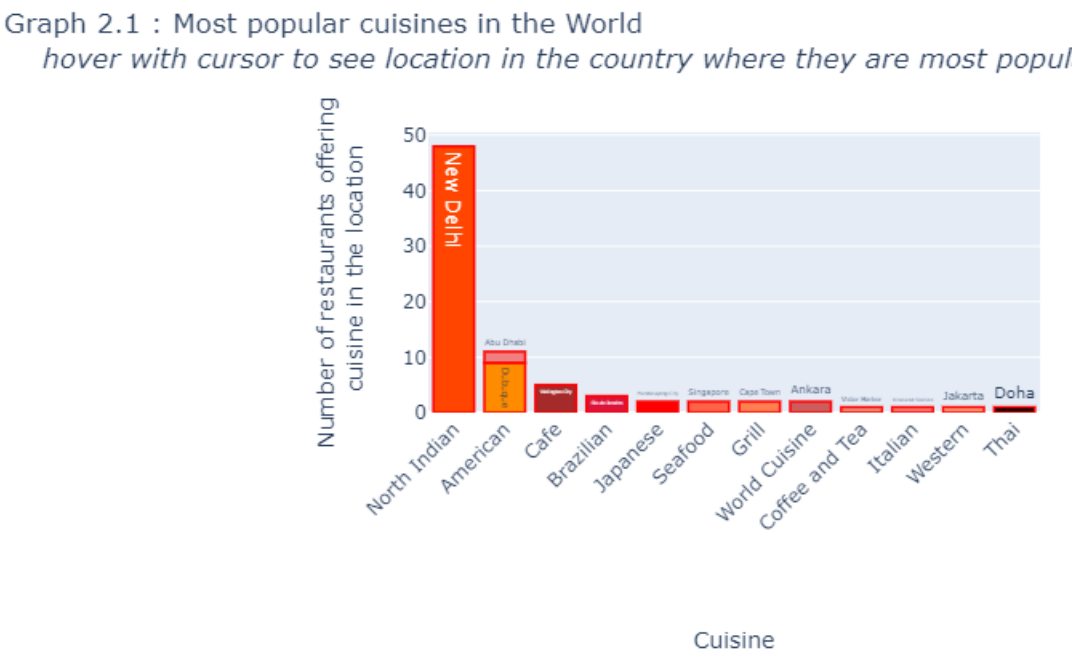
[47]:
```
loc_list=final_con['City'] #converting the series to dataframe
a_list=loc_list.tolist()

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()
```

[48]:
```
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
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)
```

```
/usr/local/lib/python3.7/site-packages/plotly/graph_objs/_deprecations.py:410:
DeprecationWarning:

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




[49]:
```
rest_cuisine = pd.
 ↪DataFrame(data_cuisines[['Restaurant_Name','City','Cuisine_1','Cuisine_2','Cuisine_3','Cuis
                                                                  ␣
 ↪'Cuisine_5','Cuisine_6','Cuisine_7','Cuisine_8']])
rest_cuisine_stack=pd.DataFrame(rest_cuisine.stack()) #stacking the columns
rest_cuisine.head()
```

[49]:

| | 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
```

[50]:
```
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)
```

[50]:
```
            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
```

[51]:
```
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.
```

[51]:

| | 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]

[52]:
```
rating =␣
↪data_rest[['Restaurant_ID','Restaurant_Name','Country','City','Aggregate_rating','Average_C
```

[53]:
```
rating = rating.
↪merge(max_rate1,left_on='Restaurant_Name',right_on='Restaurant_Name',how='left')
rating
```

[53]:

| | 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 | |

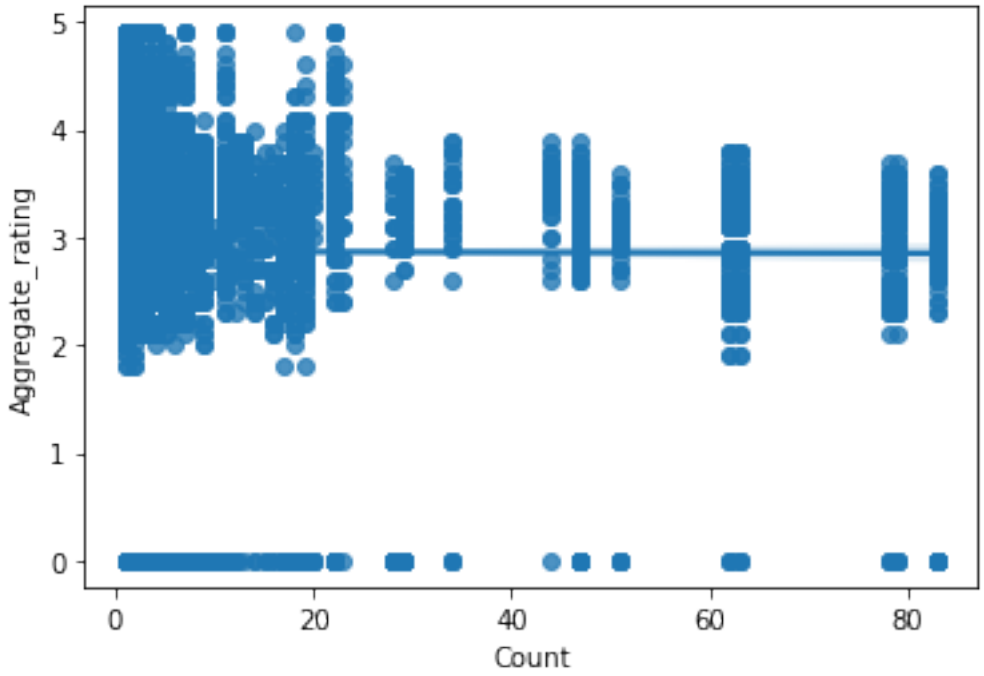
| | Aggregate_rating | Average_Cost_for_two | Votes | Price_range | \ |
|---|---|---|---|---|---|
| 0 | 4.1 | 800000 | 1498 | 3 | |
| 1 | 4.1 | 800000 | 1498 | 3 | |
| 2 | 4.6 | 800000 | 873 | 3 | |
| 3 | 4.6 | 800000 | 873 | 3 | |
| 4 | 4.6 | 800000 | 873 | 3 | |
| … | … | … | … | … | |
| 23810 | 3.9 | 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                          0                       0        Italian      1
1                          0                       0    Continental      1
2                          0                       0          Asian      1
3                          0                       0     Indonesian      1
4                          0                       0        Western      1
…                        …                       …              …    …
23810                      0                       0        Italian      1
23811                      0                       0      Beverages      1
23812                      0                       0    Street Food      1
23813                      0                       0        Chinese      1
23814                      0                       0   North Indian      1

[23815 rows x 12 columns]
```

[54]:
```
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
```

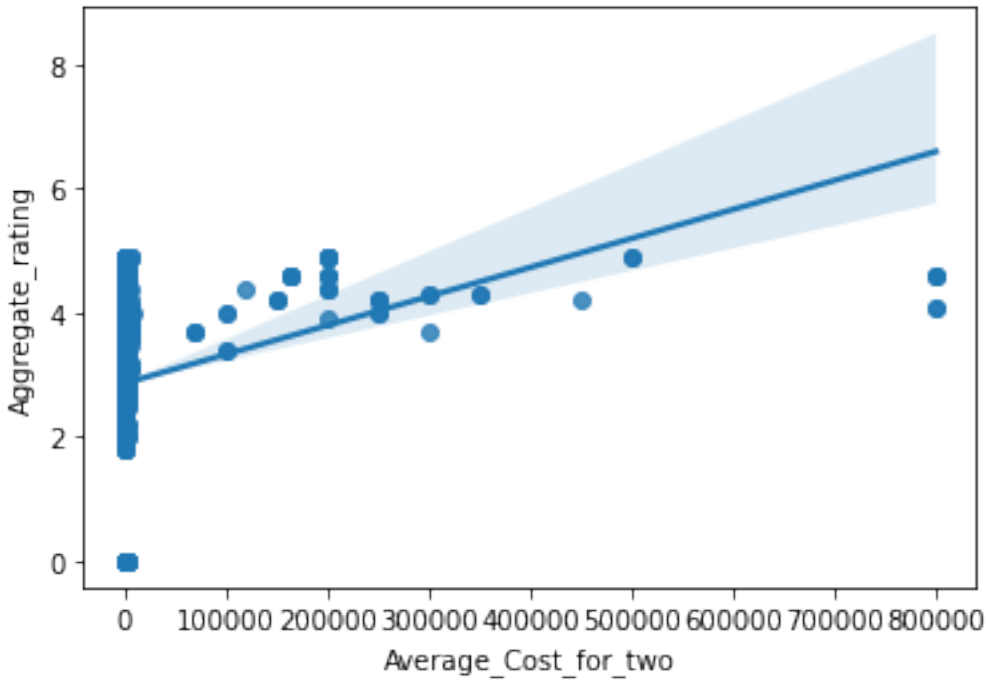
[54]:
```
                     Count  Aggregate_rating
Count             1.000000         -0.001642
Aggregate_rating -0.001642          1.000000
```



[55]:
```
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
```

[55]:

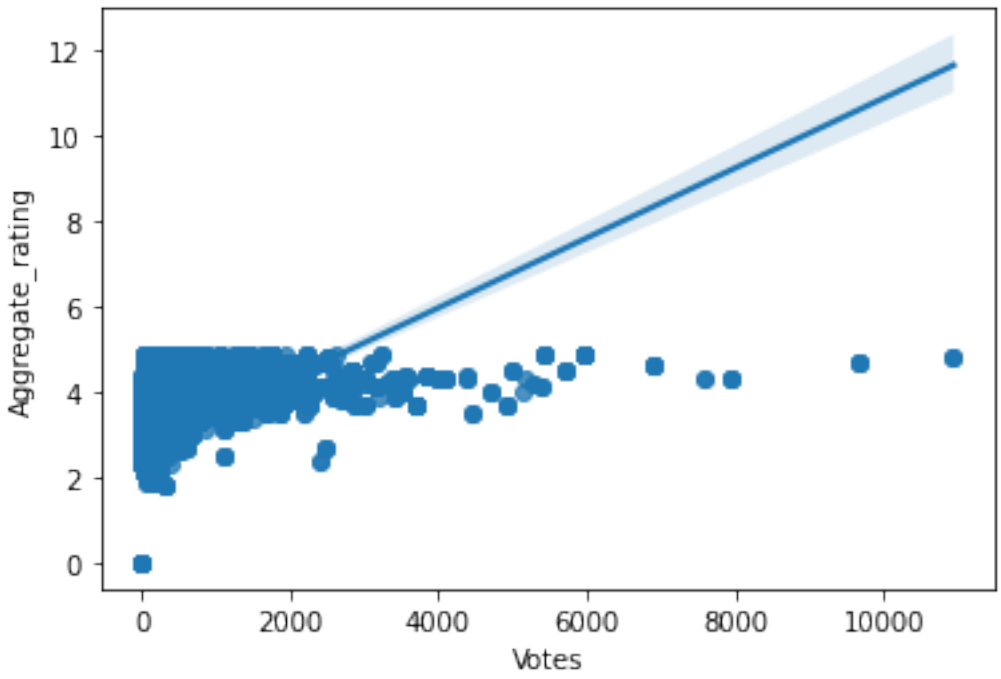
| | Average_Cost_for_two | Aggregate_rating |
|---|---|---|
| Average_Cost_for_two | 1.00000 | 0.05011 |
| Aggregate_rating | 0.05011 | 1.00000 |




[56]:
```
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
```

[56]:

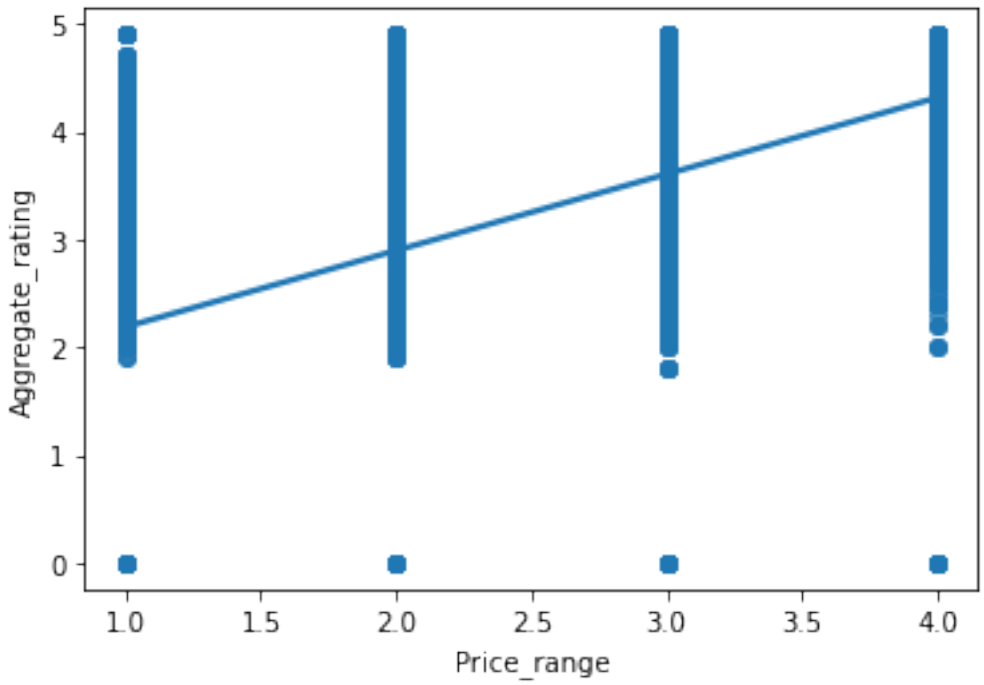
| | Votes | Aggregate_rating |
|---|---|---|
| Votes | 1.000000 | 0.318667 |
| Aggregate_rating | 0.318667 | 1.000000 |




[57]:
```
abc = data_rest[data_rest['Has_Online_delivery_Yes'] == 1]['Aggregate_rating'].
 ↪mean()
xyz = data_rest[data_rest['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
```

[57]:

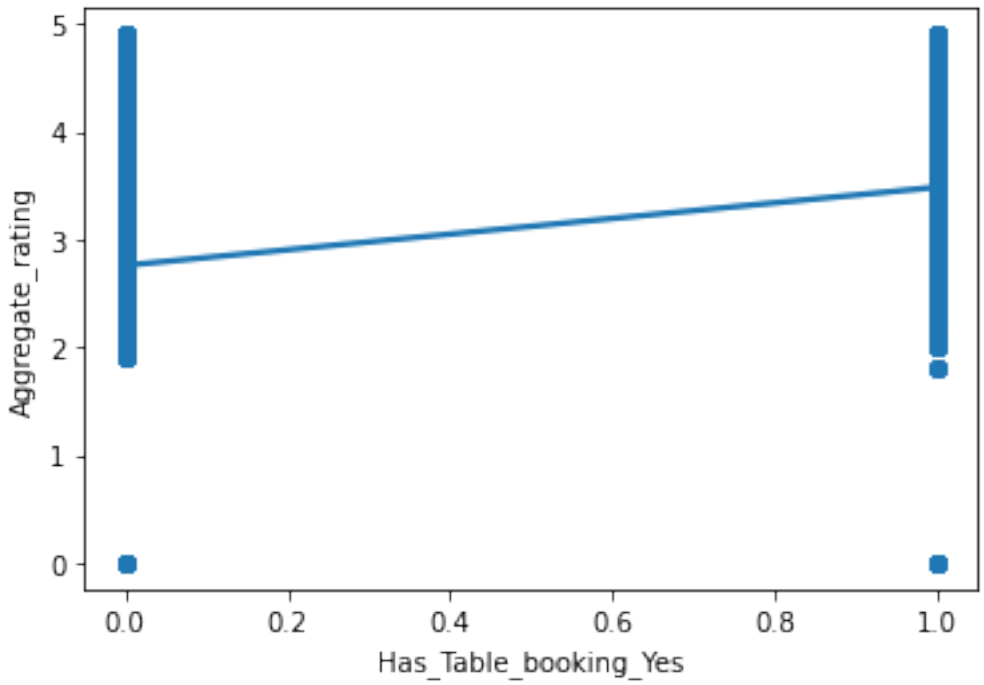
| | Price_range | Aggregate_rating |
|---|---|---|
| Price_range | 1.000000 | 0.462983 |
| Aggregate_rating | 0.462983 | 1.000000 |




[58]:
```
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
```

[58]:

| | Has_Table_booking_Yes | Aggregate_rating |
|---|---|---|
| Has_Table_booking_Yes | 1.000000 | 0.181843 |
| Aggregate_rating | 0.181843 | 1.000000 |




We see that there is no single variable that affects the rating strongly, however table booking,online delivery,avg price for two and price range, number of votes do play a part in affecting the rating of a restaurant.

[62]:
```
data_rest.to_excel("Restaurant_Zomato_Data.xls",index=False)
```

[64]:
```
new=pd.read_excel("Restaurant_Zomato_Data.xls")
```

[65]:
```
new
```

[65]:

| | 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 | |
| … | … | … | … | … | |
| 9545 | 18279289 | BMG - All Day Dining | 1 | Dehradun | |
| 9546 | 2300497 | Atmosphere Grill Cafe Sheesha | 1 | Kanpur | |
| 9547 | 18312106 | UrbanCrave | 1 | Kanpur | |
| 9548 | 3900245 | Deena Chat Bhandar | 1 | Varanasi | |
| 9549 | 18246202 | VNS Live Studio | 1 | Varanasi | |

| | 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
…                                                   …
9545               140 A, Rajpur Road, Jakhan, Dehradun
9546  8th Floor, J.S. Tower, 16/106 - Mall Road, Kan…
9547  14/125, The Mall, Mall Road, Colonelganj, Para…
9548    D-47/184, Luxa Road, Dashaswmedh Road, Varanasi
9549  Hotel Varuna Ground Floor, 22 Gulab Bagh, Sigr…

                           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
…                                  …                                       …
9545                          Jakhan                          Jakhan, Dehradun
9546                       Mall Road                       Mall Road, Kanpur
9547                          Parade                          Parade, Kanpur
9548                Dashaswmedh Road               Dashaswmedh Road, Varanasi
9549                           Sigra                           Sigra, Varanasi

       Longitude   Latitude  \
0     106.821999  -6.196778
1     106.818961  -6.203292
2     106.800144  -6.101298
3     106.813400  -6.235241
4     106.821023  -6.196270
…          …          …
9545   78.068890  30.362686
9546   80.354002  26.472001
9547   80.342796  26.474986
9548    0.000000   0.000000
9549   82.991694  25.318345

                                          Cuisines  Average_Cost_for_two  \
0                                Italian, Continental                800000
1                          Asian, Indonesian, Western                800000
2                                     Sushi, Japanese                500000
3                                            Japanese                450000
4                                     French, Western                350000
…                                                 …                     …
9545                  Chinese, North Indian, Fast Food                     0
9546                      Indian, Chinese, Continental                     0
9547  Cafe, Continental, Desserts, Ice Cream, Italia…                      0
```

```
9548                                    Street Food                    0
9549                          Chinese, North Indian                    0

                   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
…                      …          …                …          …
9545      Indian Rupees(Rs.)            1               4.3        Green
9546      Indian Rupees(Rs.)            1               3.6       Yellow
9547      Indian Rupees(Rs.)            1               3.9       Yellow
9548      Indian Rupees(Rs.)            1               3.8       Yellow
9549      Indian Rupees(Rs.)            1               3.5       Yellow

     Rating_text  Votes    Country  Has_Table_booking_Yes  \
0      Very Good   1498  Indonesia                      0
1      Excellent    873  Indonesia                      0
2      Excellent    605  Indonesia                      0
3      Very Good    395  Indonesia                      0
4      Very Good    243  Indonesia                      0
…          …    …         …                    …
9545   Very Good     63      India                      0
9546        Good     34      India                      0
9547        Good    127      India                      0
9548        Good     78      India                      0
9549        Good    109      India                      0

      Has_Online_delivery_Yes
0                           0
1                           0
2                           0
3                           0
4                           0
…                         …
9545                        0
9546                        0
9547                        0
9548                        0
9549                        0

[9550 rows x 20 columns]
```

[ ]: