

Zomato Dataset Exploratory Data Analysis

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What is EDA ?

Exploratory Data Analysis (EDA) is an approach to analyse the data using visual techniques. It is used to discover trends, patterns, or to check assumptions with the help of statistical summaries and graphical representations.

```
In [4]: 1  ## Importing Python Libraries:-
        2
        3  import pandas as pd
        4  import numpy as np
        5  import matplotlib.pyplot as plt
        6  import seaborn as sns
        7  %matplotlib inline
        8  #to display images and visualization
```

```
In [5]: 1  # To read the dataset.
        2  df=pd.read_csv('zomato.csv',encoding='latin-1')
        3  # Encoding is used based on the dataset, search for pandas documentation for
```

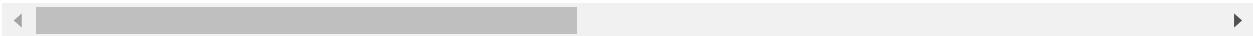
In [6]:

```
1 # Reading the dataset
2 df.head()
```

Out[6]:

	Restaurant ID	Restaurant Name	Country Code	City	Address	Locality	Locality Verbose	Longitude
0	6317637	Le Petit Souffle	162	Makati City	Third Floor, Century City Mall, Kalayaan Avenu...	Century City Mall, Poblacion, Makati City	Century City Mall, Poblacion, Makati City, Mak...	121.027535
1	6304287	Izakaya Kikufuji	162	Makati City	Little Tokyo, 2277 Chino Roces Avenue, Legaspi...	Little Tokyo, Legaspi Village, Makati City	Little Tokyo, Legaspi Village, Makati City, Ma...	121.014101
2	6300002	Heat - Edsa Shangri-La	162	Mandaluyong City	Edsa Shangri-La, 1 Garden Way, Ortigas, Mandal...	Edsa Shangri-La, Ortigas, Mandaluyong City	Edsa Shangri-La, Ortigas, Mandaluyong City, Ma...	121.056831
3	6318506	Ooma	162	Mandaluyong City	Third Floor, Mega Fashion Hall, SM Megamall, O...	SM Megamall, Ortigas, Mandaluyong City	SM Megamall, Ortigas, Mandaluyong City, Mandal...	121.056475
4	6314302	Sambo Kojin	162	Mandaluyong City	Third Floor, Mega Atrium, SM Megamall, Ortigas...	SM Megamall, Ortigas, Mandaluyong City	SM Megamall, Ortigas, Mandaluyong City, Mandal...	121.057508

5 rows × 21 columns



```
In [8]: 1 #Look for what are the columns present in our dataset
        2 df.columns
```

```
Out[8]: 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', 'Is delivering now', 'Switch to order menu',
              'Price range', 'Aggregate rating', 'Rating color', 'Rating text',
              'Votes'],
              dtype='object')
```

```
In [9]: 1 #Undersatand about the dataset, and its types.
        2 df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9551 entries, 0 to 9550
Data columns (total 21 columns):
#   Column                                Non-Null Count  Dtype
---  -
0   Restaurant ID                        9551 non-null   int64
1   Restaurant Name                      9551 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  Is delivering now                    9551 non-null   object
15  Switch to order menu                 9551 non-null   object
16  Price range                          9551 non-null   int64
17  Aggregate rating                     9551 non-null   float64
18  Rating color                         9551 non-null   object
19  Rating text                          9551 non-null   object
20  Votes                               9551 non-null   int64
dtypes: float64(3), int64(5), object(13)
memory usage: 1.5+ MB
```

```
In [10]: 1 #Describes() is used to ckeck all Details of Statistics Method Related with
2 df.describe()
```

```
Out[10]:
```

	Restaurant ID	Country Code	Longitude	Latitude	Average Cost for two	Price range	Aggregat
count	9.551000e+03	9551.000000	9551.000000	9551.000000	9551.000000	9551.000000	9551.000
mean	9.051128e+06	18.365616	64.126574	25.854381	1199.210763	1.804837	2.666
std	8.791521e+06	56.750546	41.467058	11.007935	16121.183073	0.905609	1.516
min	5.300000e+01	1.000000	-157.948486	-41.330428	0.000000	1.000000	0.000
25%	3.019625e+05	1.000000	77.081343	28.478713	250.000000	1.000000	2.500
50%	6.004089e+06	1.000000	77.191964	28.570469	400.000000	2.000000	3.200
75%	1.835229e+07	1.000000	77.282006	28.642758	700.000000	2.000000	3.700
max	1.850065e+07	216.000000	174.832089	55.976980	800000.000000	4.000000	4.900



In Data Analysis What All Things We Do

1. Missing Values
2. Explore About the Numerical Variables
3. Explore About categorical Variables
4. Finding Relationship between features

```
In [11]: 1 # To check all Rows And Columns available in Dataset
2 df.shape
```

```
Out[11]: (9551, 21)
```

```
In [12]: 1 # Show the sum of null values with respect to columns.  
        2 df.isnull().sum()
```

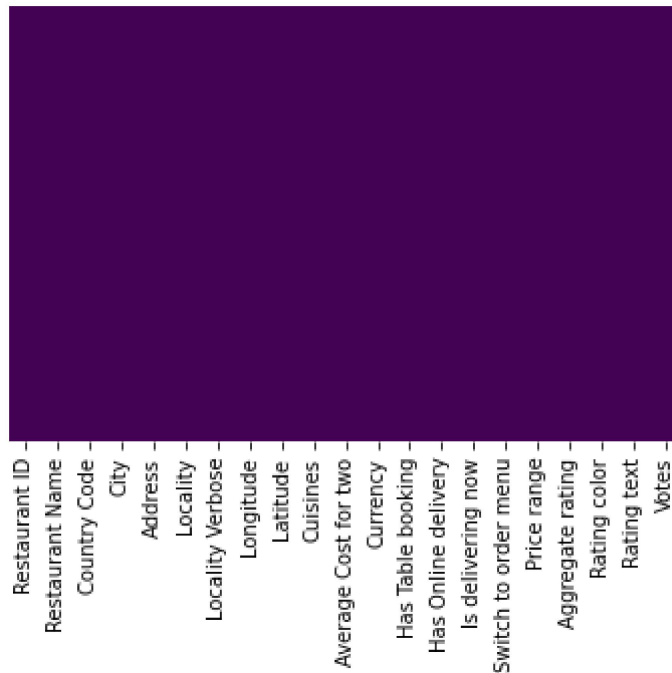
```
Out[12]: Restaurant ID          0  
         Restaurant Name       0  
         Country Code         0  
         City                 0  
         Address              0  
         Locality             0  
         Locality Verbose     0  
         Longitude            0  
         Latitude            0  
         Cuisines             9  
         Average Cost for two 0  
         Currency            0  
         Has Table booking    0  
         Has Online delivery  0  
         Is delivering now    0  
         Switch to order menu 0  
         Price range         0  
         Aggregate rating     0  
         Rating color        0  
         Rating text         0  
         Votes               0  
         dtype: int64
```

```
In [13]: 1 # Find the Missing values in columns by using List Comprehension.  
        2 [features for features in df.columns if df[features].isnull().sum() > 0]
```

```
Out[13]: ['Cuisines']
```

```
In [16]: 1 ## Finding Missing value in column by using Heatmap
          2 sns.heatmap(df.isnull(),yticklabels=False,cbar=False,cmap='viridis')
```

Out[16]: <AxesSubplot:>



```
In [17]: 1 # Loading Another dataset in a dataframe:-
          2 df_contry= pd.read_excel('Country-Code.xlsx')
```

```
In [18]: 1 # For checking top Row from a dataset
          2 df_contry.head()
```

Out[18]:

	Country Code	Country
0	1	India
1	14	Australia
2	30	Brazil
3	37	Canada
4	94	Indonesia

```
In [22]: 1 # For checking all columns Names Available in a dataset.
          2 df_contry.columns
```

Out[22]: Index(['Country Code', 'Country'], dtype='object')

```
In [23]: 1 # For checking all columns Names Available in a dataset.
        2 df.columns
```

```
Out[23]: 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', 'Is delivering now', 'Switch to order menu',
               'Price range', 'Aggregate rating', 'Rating color', 'Rating text',
               'Votes'],
              dtype='object')
```

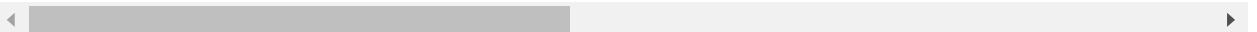
```
In [24]: 1 # pd.merge() is used to Merge Two Dataframe in one
        2 final_df = pd.merge(df,df_contry, on = 'Country Code', how = 'left')
```

```
In [26]: 1 # for Checking top 3 rows from a dataset
        2 final_df.head()
```

Out[26]:

	Restaurant ID	Restaurant Name	Country Code	City	Address	Locality	Locality Verbose	Longitude
0	6317637	Le Petit Souffle	162	Makati City	Third Floor, Century City Mall, Kalayaan Avenu...	Century City Mall, Poblacion, Makati City	Century City Mall, Poblacion, Makati City, Mak...	121.027535
1	6304287	Izakaya Kikufuji	162	Makati City	Little Tokyo, 2277 Chino Roces Avenue, Legaspi...	Little Tokyo, Legaspi Village, Makati City	Little Tokyo, Legaspi Village, Makati City, Ma...	121.014101
2	6300002	Heat - Edsa Shangri-La	162	Mandaluyong City	Edsa Shangri-La, 1 Garden Way, Ortigas, Mandal...	Edsa Shangri-La, Ortigas, Mandaluyong City	Edsa Shangri-La, Ortigas, Mandaluyong City, Ma...	121.056831
3	6318506	Ooma	162	Mandaluyong City	Third Floor, Mega Fashion Hall, SM Megamall, O...	SM Megamall, Ortigas, Mandaluyong City	SM Megamall, Ortigas, Mandaluyong City, Mandal...	121.056475
4	6314302	Sambo Kojin	162	Mandaluyong City	Third Floor, Mega Atrium, SM Megamall, Ortigas...	SM Megamall, Ortigas, Mandaluyong City	SM Megamall, Ortigas, Mandaluyong City, Mandal...	121.057508

5 rows × 22 columns



```
In [27]: 1 # To check Data Types
          2 final_df.dtypes
```

```
Out[27]: 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
          Is delivering now     object
          Switch to order menu  object
          Price range           int64
          Aggregate rating      float64
          Rating color          object
          Rating text           object
          Votes                 int64
          Country               object
          dtype: object
```

```
In [28]: 1 # For Checking All Column Name Available in Dataset.
          2 final_df.columns
```

```
Out[28]: 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', 'Is delivering now', 'Switch to order menu',
                'Price range', 'Aggregate rating', 'Rating color', 'Rating text',
                'Votes', 'Country'],
                dtype='object')
```



```
In [29]: 1 # With Respect to Country columns ,it is used to find total value counts.
        2 final_df.Country.value_counts()
```

```
Out[29]: India            8652
United States          434
United Kingdom         80
Brazil                 60
UAE                   60
South Africa           60
New Zealand            40
Turkey                 34
Australia              24
Phillipines            22
Indonesia              21
Singapore              20
Qatar                  20
Sri Lanka              20
Canada                 4
Name: Country, dtype: int64
```

```
In [31]: 1 # In this Country Value Counted with the help of Indexing.
        2 country_names =final_df.Country.value_counts().index
```

```
In [32]: 1 # Displaying the Value Store in Contry_name variables.
        2 country_names
```

```
Out[32]: Index(['India', 'United States', 'United Kingdom', 'Brazil', 'UAE',
                'South Africa', 'New Zealand', 'Turkey', 'Australia', 'Phillipines',
                'Indonesia', 'Singapore', 'Qatar', 'Sri Lanka', 'Canada'],
                dtype='object')
```

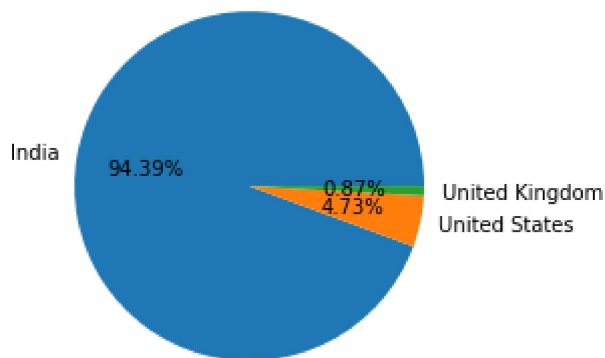
```
In [34]: 1 # In this Country Value Counted with the help of Value function.
        2 country_val = final_df.Country.value_counts().values
```

```
In [35]: 1 country_val
```

```
Out[35]: array([8652, 434, 80, 60, 60, 60, 40, 34, 24, 22, 21,
                20, 20, 20, 4], dtype=int64)
```

```
In [36]: 1 # Plotting Pie chart for Top 3 countries that use zomato. autopct is used to
2 plt.pie(country_val[:3], labels = country_names[:3], autopct = '%1.2f%%')
```

```
Out[36]: ([<matplotlib.patches.Wedge at 0x15ab4947b50>,
<matplotlib.patches.Wedge at 0x15ab4957280>,
<matplotlib.patches.Wedge at 0x15ab49579a0>],
[Text(-1.0829742700952103, 0.19278674827836725, 'India'),
Text(1.077281715838356, -0.22240527134123297, 'United States'),
Text(1.0995865153823035, -0.03015783794312073, 'United Kingdom')],
[Text(-0.590713238233751, 0.10515640815183668, '94.39%'),
Text(0.5876082086391032, -0.12131196618612707, '4.73%'),
Text(0.5997744629358018, -0.01644972978715676, '0.87%')])
```



Observation: Zomato maximum records or transaction are from India After that USA and then United Kingdoms

```
In [37]: 1 # Checking the column name Available in a Dataset.
2 final_df.columns
```

```
Out[37]: 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', 'Is delivering now', 'Switch to order menu',
'Price range', 'Aggregate rating', 'Rating color', 'Rating text',
'Votes', 'Country'],
dtype='object')
```

```
In [38]: 1 # We are Grouping the columns 'Aggregate rating', 'Rating color', 'Rating text'
        2 final_df.groupby(['Aggregate rating', 'Rating color', 'Rating text']).size()
```

```
Out[38]: Aggregate rating  Rating color  Rating text
0.0                      White      Not rated      2148
1.8                      Red         Poor           1
1.9                      Red         Poor           2
2.0                      Red         Poor           7
2.1                      Red         Poor          15
2.2                      Red         Poor          27
2.3                      Red         Poor          47
2.4                      Red         Poor          87
2.5                      Orange      Average         110
2.6                      Orange      Average         191
2.7                      Orange      Average         250
2.8                      Orange      Average         315
2.9                      Orange      Average         381
3.0                      Orange      Average         468
3.1                      Orange      Average         519
3.2                      Orange      Average         522
3.3                      Orange      Average         483
3.4                      Orange      Average         498
3.5                      Yellow      Good           480
3.6                      Yellow      Good           458
3.7                      Yellow      Good           427
3.8                      Yellow      Good           400
3.9                      Yellow      Good           335
4.0                      Green       Very Good        266
4.1                      Green       Very Good        274
4.2                      Green       Very Good        221
4.3                      Green       Very Good        174
4.4                      Green       Very Good        144
4.5                      Dark Green  Excellent         95
4.6                      Dark Green  Excellent         78
4.7                      Dark Green  Excellent         42
4.8                      Dark Green  Excellent         25
4.9                      Dark Green  Excellent         61
dtype: int64
```

```
In [39]: 1 # Adding New column at Last as 'Rating count' by Renaming header 0 = 'Rating
        2 ratings = final_df.groupby(['Aggregate rating', 'Rating color', 'Rating text'
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```

In [40]: 1 ratings

Out[40]:

	Aggregate rating	Rating color	Rating text	Rating count
0	0.0	White	Not rated	2148
1	1.8	Red	Poor	1
2	1.9	Red	Poor	2
3	2.0	Red	Poor	7
4	2.1	Red	Poor	15
5	2.2	Red	Poor	27
6	2.3	Red	Poor	47
7	2.4	Red	Poor	87
8	2.5	Orange	Average	110
9	2.6	Orange	Average	191
10	2.7	Orange	Average	250
11	2.8	Orange	Average	315
12	2.9	Orange	Average	381
13	3.0	Orange	Average	468
14	3.1	Orange	Average	519
15	3.2	Orange	Average	522
16	3.3	Orange	Average	483
17	3.4	Orange	Average	498
18	3.5	Yellow	Good	480
19	3.6	Yellow	Good	458
20	3.7	Yellow	Good	427
21	3.8	Yellow	Good	400
22	3.9	Yellow	Good	335
23	4.0	Green	Very Good	266
24	4.1	Green	Very Good	274
25	4.2	Green	Very Good	221
26	4.3	Green	Very Good	174
27	4.4	Green	Very Good	144
28	4.5	Dark Green	Excellent	95
29	4.6	Dark Green	Excellent	78
30	4.7	Dark Green	Excellent	42
31	4.8	Dark Green	Excellent	25
32	4.9	Dark Green	Excellent	61

Observation

1. When Rating is between 4.5 to 4.9---> Excellent
2. When Rating are between 4.0 to 3.4--->very good
3. when Rating is between 3.5 to 3.9----> good
4. when Rating is between 3.0 to 3.4----> average
5. when Rating is between 2.5 to 2.9----> average
6. when Rating is between 2.0 to 2.4----> Poor

In [41]: 1 ratings.head()

Out[41]:

	Aggregate rating	Rating color	Rating text	Rating count
0	0.0	White	Not rated	2148
1	1.8	Red	Poor	1
2	1.9	Red	Poor	2
3	2.0	Red	Poor	7
4	2.1	Red	Poor	15

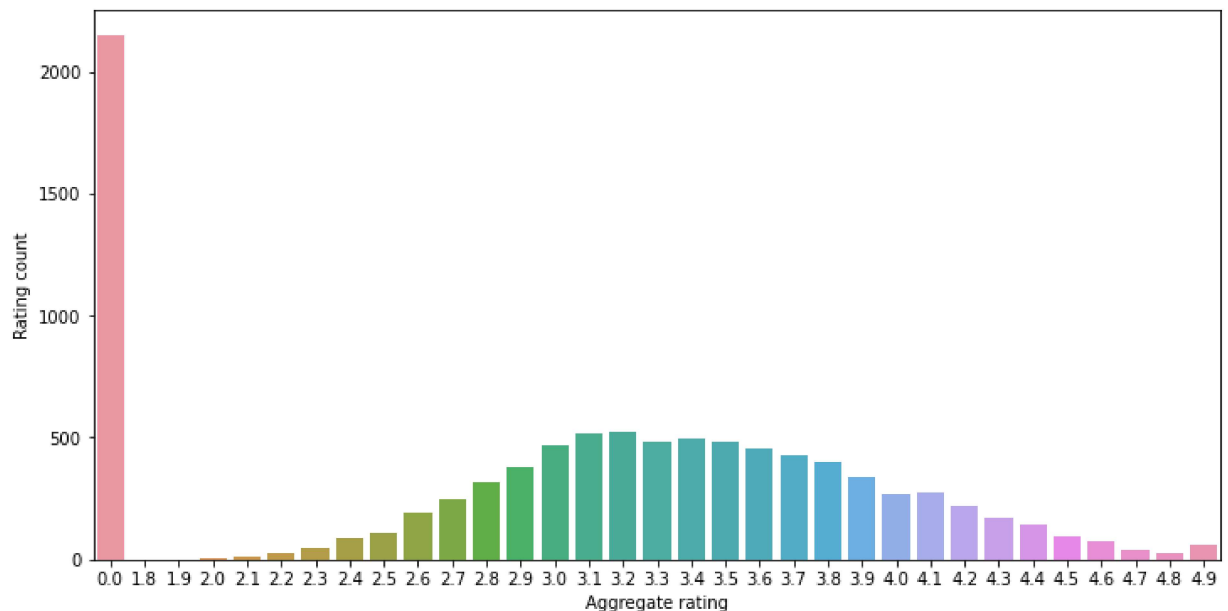
In [43]:

```

1 # Plotting Bar Plot Chart for x = 'Aggregate rating', y = 'Rating count' Val
2
3 import matplotlib
4 matplotlib.rcParams['figure.figsize'] = (12,6)
5 sns.barplot(x = 'Aggregate rating', y = 'Rating count',data= ratings)

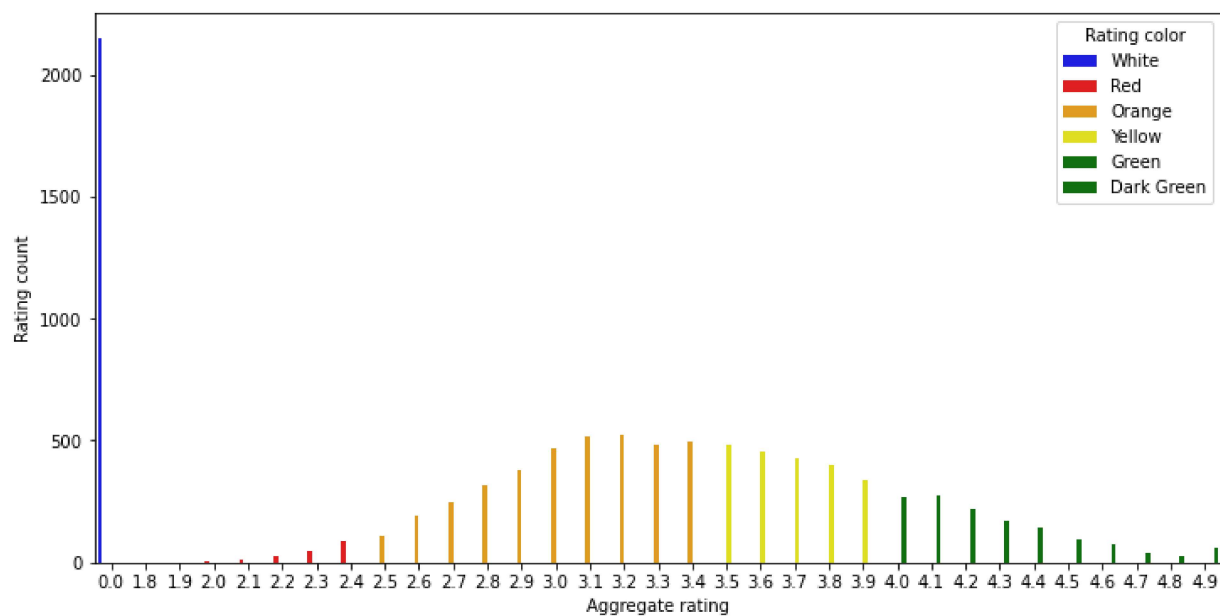
```

Out[43]: <AxesSubplot:xlabel='Aggregate rating', ylabel='Rating count'>



```
In [44]: 1 # Adjusting Bar Plot Layout with the help hue() & palette() properties.  
2 sns.barplot(x = 'Aggregate rating', y = 'Rating count', hue = 'Rating color',
```

```
Out[44]: <AxesSubplot:xlabel='Aggregate rating', ylabel='Rating count'>
```

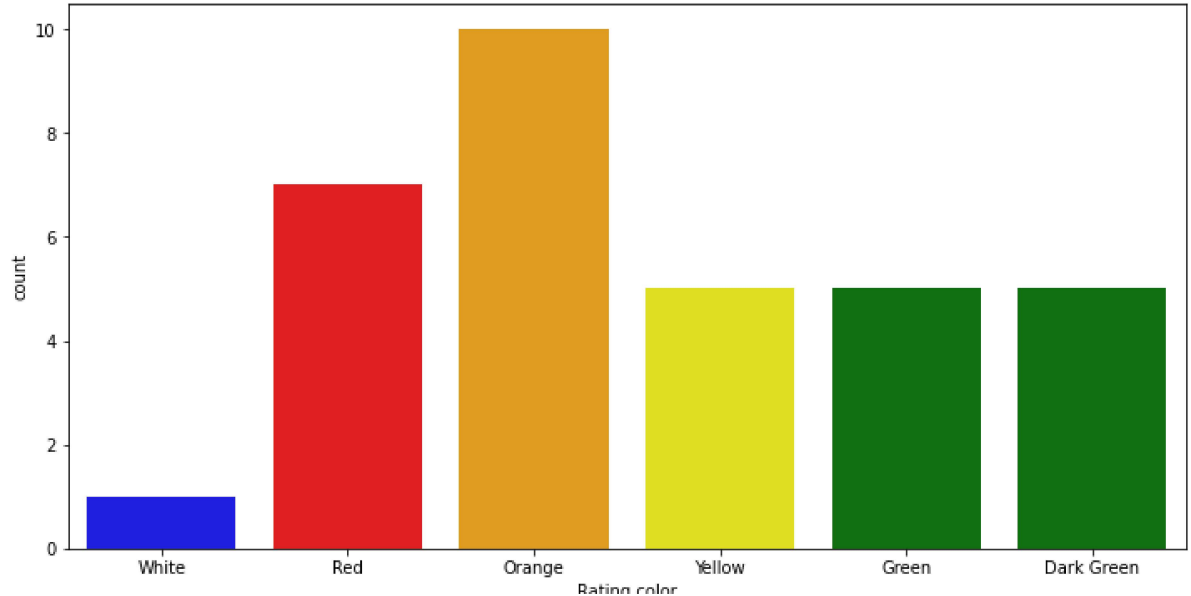


Observation:-

- Not Rated count is very High.
- Maximum Number of rating are between 2.5 to 3.4

```
In [45]: 1 # Plotting Count Plot Bar
          2 sns.countplot(x='Rating color', data = ratings, palette =['blue', 'red','ora
```

```
Out[45]: <AxesSubplot:xlabel='Rating color', ylabel='count'>
```



Find the Countries name that has given 0 rating ?

```
In [46]: 1 # Showing ALL the columns name Available in the dataset.
          2 final_df.columns
```

```
Out[46]: 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', 'Is delivering now', 'Switch to order menu',
                'Price range', 'Aggregate rating', 'Rating color', 'Rating text',
                'Votes', 'Country'],
               dtype='object')
```

```
In [47]: 1 # Solution for Above Questions :-
          2 final_df.groupby(['Aggregate rating', 'Country']).size().reset_index().head(5)
```

```
Out[47]:
```

	Aggregate rating	Country	0
0	0.0	Brazil	5
1	0.0	India	2139
2	0.0	United Kingdom	1
3	0.0	United States	3
4	1.8	India	1

Observations:-

- Maximum Number of 0 Ratings are from Indian customers

Find Out which currency is used by which country ?

```
In [48]: 1 # Showing ALL the columns name Available in the dataset.
        2 final_df.columns
```

```
Out[48]: 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', 'Is delivering now', 'Switch to order menu',
               'Price range', 'Aggregate rating', 'Rating color', 'Rating text',
               'Votes', 'Country'],
              dtype='object')
```

```
In [49]: 1 # Finding Currency for Country by using Groupby()
        2 final_df[['Country', 'Currency']].groupby(['Country', 'Currency']).size().reset_index()
```

```
Out[49]:
```

	Country	Currency	0
0	Australia	Dollar(\$)	24
1	Brazil	Brazilian Real(R\$)	60
2	Canada	Dollar(\$)	4
3	India	Indian Rupees(Rs.)	8652
4	Indonesia	Indonesian Rupiah(IDR)	21
5	New Zealand	NewZealand(\$)	40
6	Phillipines	Botswana Pula(P)	22
7	Qatar	Qatari Rial(QR)	20
8	Singapore	Dollar(\$)	20
9	South Africa	Rand(R)	60
10	Sri Lanka	Sri Lankan Rupee(LKR)	20
11	Turkey	Turkish Lira(TL)	34
12	UAE	Emirati Diram(AED)	60
13	United Kingdom	Pounds(£)	80
14	United States	Dollar(\$)	434

Which Countries do have online deliveries option

```
In [51]: 1 # Country which has online delivery Available are Listed below:-
        2 final_df[final_df['Has Online delivery'] == "Yes"].Country.value_counts()
```

```
Out[51]: India      2423
         UAE         28
         Name: Country, dtype: int64
```



```
In [52]: 1 # Country which has online delivery Available or Which has Not Availables bo
2 final_df[['Has Online delivery', 'Country']].groupby(['Has Online delivery', 'Country']).count()
```

```
Out[52]:
```

	Has Online delivery	Country	0
0	No	Australia	24
1	No	Brazil	60
2	No	Canada	4
3	No	India	6229
4	No	Indonesia	21
5	No	New Zealand	40
6	No	Phillipines	22
7	No	Qatar	20
8	No	Singapore	20
9	No	South Africa	60
10	No	Sri Lanka	20
11	No	Turkey	34
12	No	UAE	32
13	No	United Kingdom	80
14	No	United States	434
15	Yes	India	2423
16	Yes	UAE	28

Observation:-

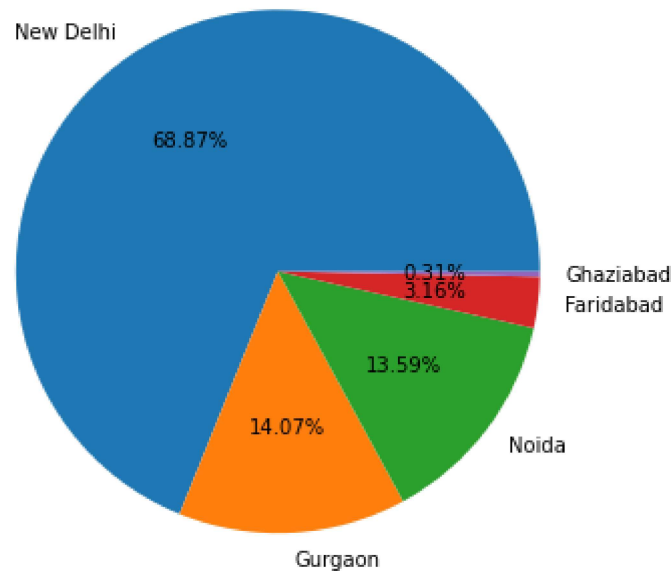
- Online Deliveries are available in India and UAE

Create a Pie chart for Cities Distribution

```
In [53]: 1 # Finding out all city Value Count and Value Label index.
2 city_values = final_df.City.value_counts().values
3 city_labels = final_df.City.value_counts().index
```

```
In [54]: 1 # Plotting the Pie Chart
          2 plt.pie(city_values[:5], labels = city_labels[:5], autopct = '%1.2f%%')
```

```
Out[54]: ([<matplotlib.patches.Wedge at 0x15ab60c01f0>,
<matplotlib.patches.Wedge at 0x15ab60c0970>,
<matplotlib.patches.Wedge at 0x15ab60ce0d0>,
<matplotlib.patches.Wedge at 0x15ab60ce7f0>,
<matplotlib.patches.Wedge at 0x15ab60cef10>],
[Text(-0.6145352824185932, 0.9123301960708633, 'New Delhi'),
Text(0.0623675251198054, -1.0982305276263407, 'Gurgaon'),
Text(0.8789045225625368, -0.6614581167535246, 'Noida'),
Text(1.0922218418223437, -0.13058119407559224, 'Faridabad'),
Text(1.099946280005612, -0.010871113182029924, 'Ghaziabad')],
[Text(-0.3352010631374145, 0.497634652402289, '68.87%'),
Text(0.0340186500653484, -0.5990348332507311, '14.07%'),
Text(0.47940246685229276, -0.36079533641101336, '13.59%'),
Text(0.5957573682667329, -0.07122610585941394, '3.16%'),
Text(0.5999706981848791, -0.005929698099289049, '0.31%')])
```



Observations:-

- So, Number of transaction is mainly done by city 'New Delhi'.

In []:

1