Zomato dataset exploratory data analysis

In [32]:
```
pip install openpyxl
```

```
Collecting openpyxl
  Downloading openpyxl-3.1.4-py2.py3-none-any.whl.metadata (2.5 kB)
Collecting et-xmlfile (from openpyxl)
  Downloading et_xmlfile-1.1.0-py3-none-any.whl.metadata (1.8 kB)
Downloading openpyxl-3.1.4-py2.py3-none-any.whl (251 kB)
   ---------------------------------------- 0.0/251.4 kB ? eta -:--:--
   ---------------------------------------- 0.0/251.4 kB ? eta -:--:--
   - -------------------------------------- 10.2/251.4 kB ? eta -:--:--
   ---- ----------------------------------- 30.7/251.4 kB 435.7 kB/s eta 0:00:01
   ----------- ---------------------------- 71.7/251.4 kB 491.5 kB/s eta 0:00:01
   ----------------- ------------------ 122.9/251.4 kB 654.9 kB/s eta 0:00:01
   ----------------------------------- -- 235.5/251.4 kB 962.7 kB/s eta 0:00:01
   -------------------------------------- 251.4/251.4 kB 909.9 kB/s eta 0:00:00
Downloading et_xmlfile-1.1.0-py3-none-any.whl (4.7 kB)
Installing collected packages: et-xmlfile, openpyxl
Successfully installed et-xmlfile-1.1.0 openpyxl-3.1.4
Note: you may need to restart the kernel to use updated packages.
```

In [68]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
```

zomato exploratory data analysis

In [3]:
```
df=pd.read_csv(r'C:\Users\Shree\Documents\Learning DA\Python_Amazon_Sales_Analysis-main\Zomatodataset\zomato.cs
```

In [4]:
```
df.head()
```

Out[4]:

	Restaurant ID	Restaurant Name	Country Code	City	Address	Locality	Locality Verbose	Longitude	Latitude	Cuisines	...	Curr
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	14.565443	French, Japanese, Desserts	...	Bots Pu
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	14.553708	Japanese	...	Bots Pu
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	14.581404	Seafood, Asian, Filipino, Indian	...	Bots Pu
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	14.585318	Japanese, Sushi	...	Bots Pu
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	14.584450	Japanese, Korean	...	Bots Pu

5 rows × 21 columns

In [5]:
```
df.columns
```

Out[5]:

```
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 [6]:

```
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 [7]:

```
df.describe()
```

Out[7]:

	Restaurant ID	Country Code	Longitude	Latitude	Average Cost for two	Price range	Aggregate rating	Votes
count	9.551000e+03	9551.000000	9551.000000	9551.000000	9551.000000	9551.000000	9551.000000	9551.000000
mean	9.051128e+06	18.365616	64.126574	25.854381	1199.210763	1.804837	2.666370	156.909748
std	8.791521e+06	56.750546	41.467058	11.007935	16121.183073	0.905609	1.516378	430.169145
min	5.300000e+01	1.000000	-157.948486	-41.330428	0.000000	1.000000	0.000000	0.000000
25%	3.019625e+05	1.000000	77.081343	28.478713	250.000000	1.000000	2.500000	5.000000
50%	6.004089e+06	1.000000	77.191964	28.570469	400.000000	2.000000	3.200000	31.000000
75%	1.835229e+07	1.000000	77.282006	28.642758	700.000000	2.000000	3.700000	131.000000
max	1.850065e+07	216.000000	174.832089	55.976980	800000.000000	4.000000	4.900000	10934.000000

In [8]:

```
df.shape
```

Out[8]:

```
(9551, 21)
```

In [9]:

```
df.isnull().sum()
```

Out[9]:

```
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 [24]:

```
df.isnull()
```

Out[24]:

	Restaurant ID	Restaurant Name	Country Code	City	Address	Locality	Locality Verbose	Longitude	Latitude	Cuisines	...	Currency	Has Table booking
0	False	False	False	False	False	False	False	False	False	False	...	False	False
1	False	False	False	False	False	False	False	False	False	False	...	False	False
2	False	False	False	False	False	False	False	False	False	False	...	False	False
3	False	False	False	False	False	False	False	False	False	False	...	False	False
4	False	False	False	False	False	False	False	False	False	False	...	False	False
...	...	...	...	...	...	...	...	...	...	...	...	...	...
9546	False	False	False	False	False	False	False	False	False	False	...	False	False
9547	False	False	False	False	False	False	False	False	False	False	...	False	False
9548	False	False	False	False	False	False	False	False	False	False	...	False	False
9549	False	False	False	False	False	False	False	False	False	False	...	False	False
9550	False	False	False	False	False	False	False	False	False	False	...	False	False

9551 rows × 21 columns

In [10]:

```
[features for features in df.columns if df[features].isnull().sum()>0]
```

Out[10]:

```
['Cuisines']
```

In [11]:

```
df_country=pd.read_excel(r'C:\Users\Shree\Documents\Learning DA\Python_Amazon_Sales_Analysis-main\Zomatodataset'
```

In [12]:

```
df_country.head()
```

Out[12]:

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

In [14]:

```
final_df=pd.merge(df,df_country,on='Country Code', how='left')
```

In [15]:

```
final_df.head()
```

Out[15]:

	Restaurant ID	Restaurant Name	Country Code	City	Address	Locality	Locality Verbose	Longitude	Latitude	Cuisines	...	T bool
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	14.565443	French, Japanese, Desserts	...	
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	14.553708	Japanese	...	
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	14.581404	Seafood, Asian, Filipino, Indian	...	
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	14.585318	Japanese, Sushi	...	
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	14.584450	Japanese, Korean	...	

5 rows × 22 columns

In [21]:

```
## to check data types
final_df.dtypes
```

Out[21]:

```
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 [25]:

```
final_df.Country.value_counts()
```

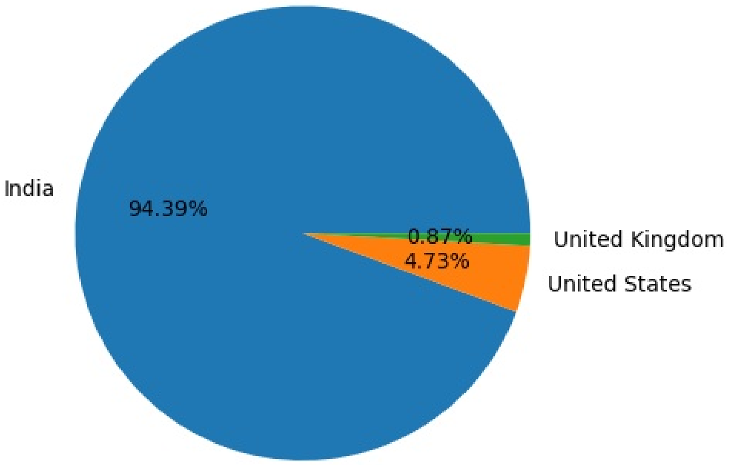
```
Out[25]: Country
         India             8652
         United States      434
         United Kingdom      80
         Brazil              60
         UAE                 60
         South Africa        60
         New Zealand         40
         Turkey              34
         Australia           24
         Phillipines         22
         Indonesia           21
         Singapore           20
         Qatar               20
         Sri Lanka           20
         Canada               4
         Name: count, dtype: int64
```

```
In [49]: country_names=final_df.Country.value_counts().index
```

```
In [38]: country_val=final_df.Country.value_counts().values
```

```
In [55]: ## pie chart of top 3 countries
         plt.pie(country_val[:3],labels=country_names[:3],autopct='%1.2f%%')
```

```
Out[55]: ([<matplotlib.patches.Wedge at 0x1b073349dc0>,
           <matplotlib.patches.Wedge at 0x1b072a89df0>,
           <matplotlib.patches.Wedge at 0x1b07334a9c0>],
          [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%')])
```



```
In [51]: country_names=final_df.Country.value_counts().index
```

```
Out[51]: Index(['India', 'United States', 'United Kingdom', 'Brazil', 'UAE',
                'South Africa', 'New Zealand', 'Turkey', 'Australia', 'Phillipines',
                'Indonesia', 'Singapore', 'Qatar', 'Sri Lanka', 'Canada'],
               dtype='object', name='Country')
```

```
In [52]: final_df.Country.value_counts().values
```

```
Out[52]: array([8652,  434,   80,   60,   60,   60,   40,   34,   24,   22,   21,
                  20,   20,   20,    4], dtype=int64)
```

Obeservation : Zomatos's maximum customer base is in india after that USA and followed by united Kingdom

```
In [57]: final_df.columns
```

```
Out[57]: 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 [60]: final_df.groupby(['Aggregate rating','Rating color', 'Rating text']).size().reset_index()
```

Out[60]:

	Aggregate rating	Rating color	Rating text	0
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

```
In [61]: final_df.groupby(['Aggregate rating','Rating color', 'Rating text']).size().reset_index().rename(columns={0:'Ra
```

Out[61]:

	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

In [62]:

```
rating=final_df.groupby(['Aggregate rating','Rating color', 'Rating text']).size().reset_index().rename(columns=
```

In [63]:

```
rating
```

Out[63]:

	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

Observations

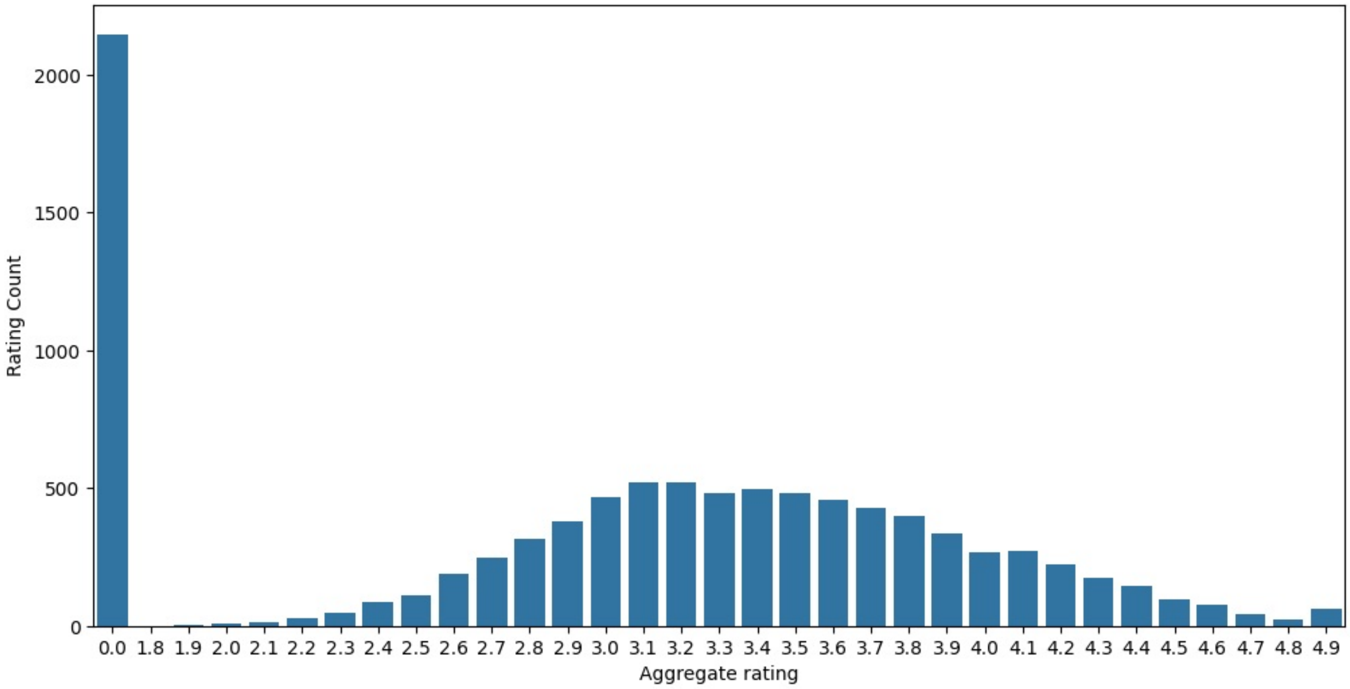
1. When ratings are between 4.5 to 4.9 -----> Excellent
2. When ratings are between 4 to 4.4 -----> Very Good
3. When ratings are between 3.5 to 3.9 -----> Good
4. When ratings are between 2.5 to 3.4 -----> Average

In [76]:

```
import matplotlib
matplotlib.rcParams['figure.figsize']=(12,6)
sns.barplot(x='Aggregate rating',y='Rating Count',data=rating,)
```

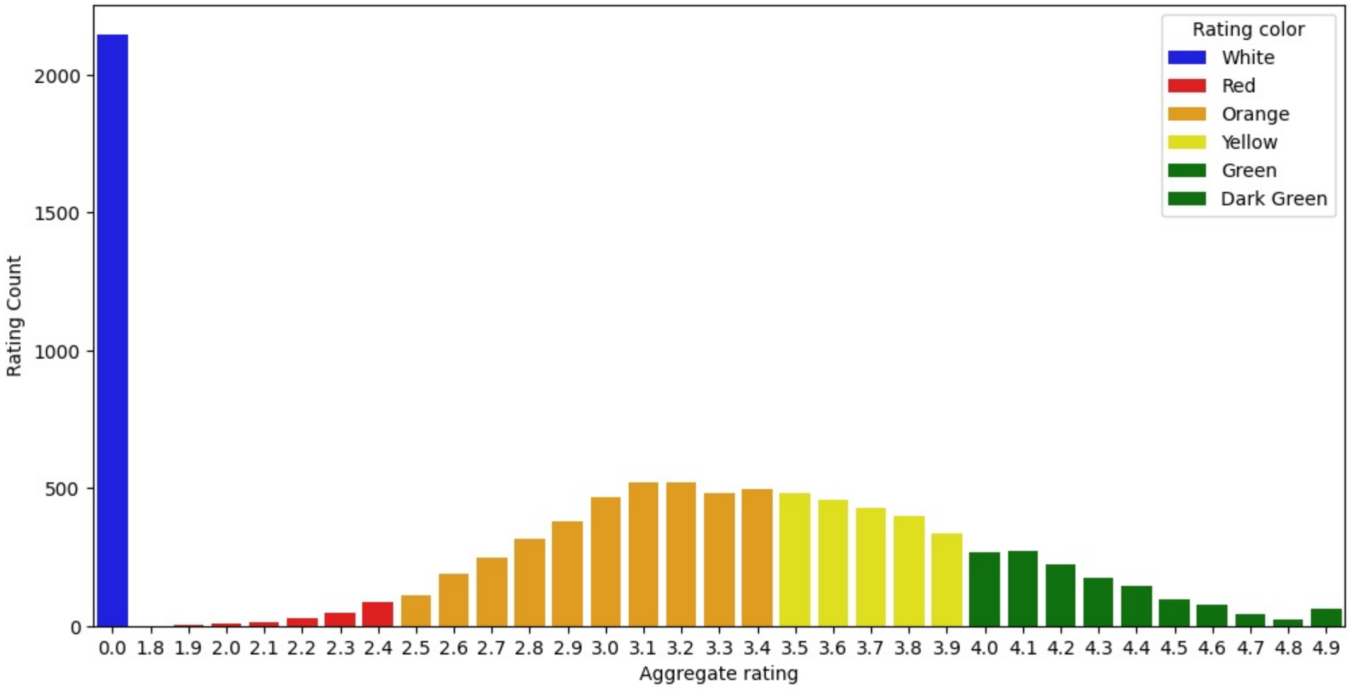
Out[76]:

```
<Axes: xlabel='Aggregate rating', ylabel='Rating Count'>
```



```
In [82]: sns.barplot(x='Aggregate rating',y='Rating Count',data=rating,hue='Rating color',palette=['blue','red','orange'
```

```
Out[82]: <Axes: xlabel='Aggregate rating', ylabel='Rating Count'>
```

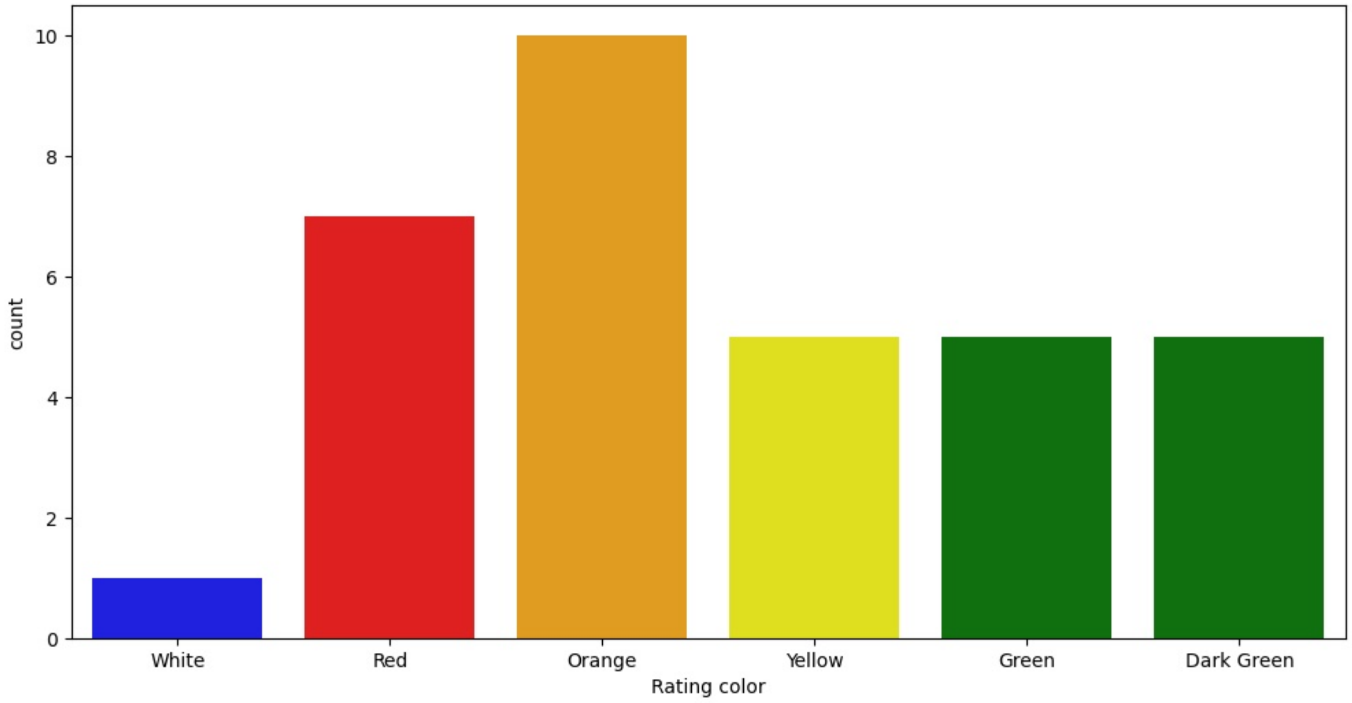


Observation

1. Not rated are in the highest number
2. Maximum rating lie between 2.8 to 3.8

```
In [86]: ## count plot
         sns.countplot(x='Rating color',data=rating,hue='Rating color',palette=['blue','red','orange','yellow','green','
```

```
Out[86]: <Axes: xlabel='Rating color', ylabel='count'>
```



In [118...

```
## countries name that have given zero rating in desending order

final_df[final_df['Aggregate rating']==0].groupby('Country').size().reset_index().rename(columns={0:'Zero_rating
```

Out[118...

	Country	Zero_rating
3	India	8652
14	United States	434
13	United Kingdom	80
1	Brazil	60
9	South Africa	60
12	UAE	60
5	New Zealand	40
11	Turkey	34
0	Australia	24
6	Phillipines	22
4	Indonesia	21
7	Qatar	20
8	Singapore	20
10	Sri Lanka	20
2	Canada	4

Observation

1. The top 3 countries that have given zero ratings are India, USA, UK
2. The maximum zero rating is coming from india

In [119...

```
## Which currency is used by which country
```

In [121...

```
final_df.columns
```

Out[121...

```
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 [126...

```
final_df.groupby(['Country','Currency']).size().reset_index()
```

Out[126…

	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

In [127…

```
## Which countries have online delivery
```

In [134…

```
final_df.head()
```

Out[134…

	Restaurant ID	Restaurant Name	Country Code	City	Address	Locality	Locality Verbose	Longitude	Latitude	Cuisines	...	T bool
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	14.565443	French, Japanese, Desserts	...	
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	14.553708	Japanese	...	
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	14.581404	Seafood, Asian, Filipino, Indian	...	
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	14.585318	Japanese, Sushi	...	
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	14.584450	Japanese, Korean	...	

5 rows × 22 columns

In [143…

```
final_df[final_df['Has Online delivery']=="Yes"].Country.value_counts()
```

Out[143…

```
Country
India    2423
UAE        28
Name: count, dtype: int64
```

In [148…

```
final_df[['Country','Has Online delivery']].groupby(['Country','Has Online delivery']).size().reset_index()
```

Out[148…

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

Observations

1. India and UAE are the only countries which have online delivery

In [ ]:

```
##Create a pie chart for cities didtribution
```

In [149…

```
final_df.columns
```

Out[149…

```
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 [155…

```
cities_names=final_df.City.value_counts().index
```

In [157…

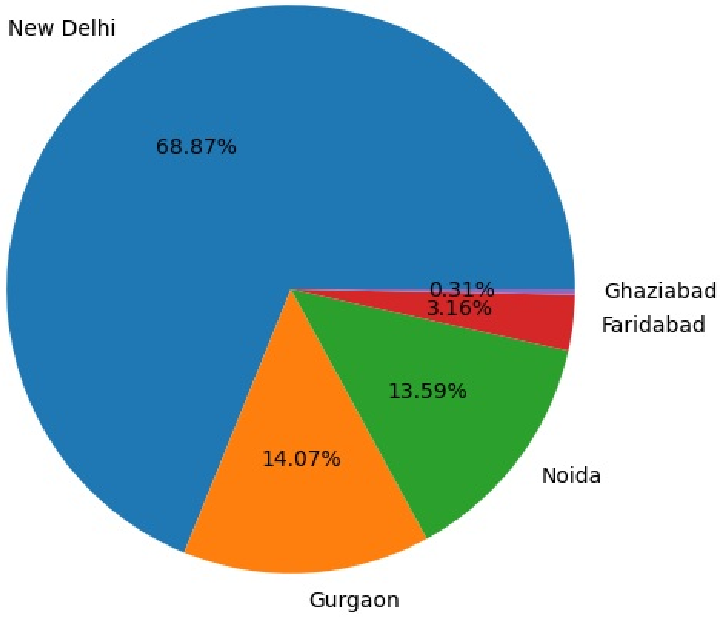
```
cities_val=final_df.City.value_counts().values
```

In [163…

```
plt.pie(cities_val[:5],labels=cities_names[:5],autopct='%1.2f%%')
```

Out[163…

```
([<matplotlib.patches.Wedge at 0x1b07c47c8c0>,
  <matplotlib.patches.Wedge at 0x1b078a03470>,
  <matplotlib.patches.Wedge at 0x1b07c47cec0>,
  <matplotlib.patches.Wedge at 0x1b07c47d520>,
  <matplotlib.patches.Wedge at 0x1b07c47db20>],
 [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%')])
```



```
In [ ]:
```

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