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]:
```
## Importing Python Libraries:-

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
#to display images and visualization
```

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

In [6]:
```
# Reading the dataset
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]:
```
#Look for what are the columns present in our dataset
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]:
```
#Undersatand about the dataset, and its types.
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]:
```
#Describes() is used to ckeck all Details of Statistics Method Related with
df.describe()
```

Out[10]:

	Restaurant ID	Country Code	Longitude	Latitude	Average Cost for two	Price range	Aggreg rat
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]:
```
# To check all Rows And Columns available in Dataset
df.shape
```

Out[11]: (9551, 21)

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

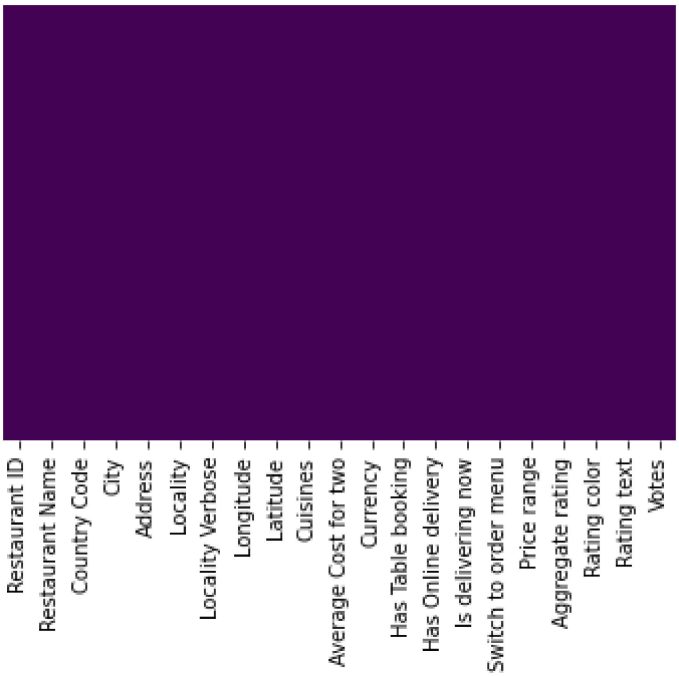
Out[12]:
```
Restaurant ID         0
Restaurant Name       0
Country Code          0
City                  0
Address               0
Locality              0
Locality Verbose      0
Longitude             0
Latitude              0
Cuisines              9
Average Cost for two  0
Currency              0
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]:
```
# Find the Missing values in columns by using list Comprihension.
[features for features in df.columns if df[features].isnull().sum() >0]
```

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

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

Out[16]: <AxesSubplot:>



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

In [18]:
```
# For checking top Row from a dataset
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]:
```
# For checking all columns Names Available in a dataset.
df_contry.columns
```

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

In [23]:
```
# For checking all columns Names Available in a dataset.
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]:
```
# pd.merge() is used to Merge Two Dataframe in one
final_df = pd.merge(df,df_contry, on = 'Country Code', how ='left')
```

In [26]:
```
# for Checking top 3 rows from a dataset
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]:
```
# To check Data Types
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]:
```
# For Checking All Column Name Available in Dataset.
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]:
```
# With Respect to Country columns ,it is used to find total value counts.
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]:
```
# In this Country Value Counted with the help of Indexing.
country_names =final_df.Country.value_counts().index
```

In [32]:
```
# Displaying the Value Store in Contry_name variables.
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')
```

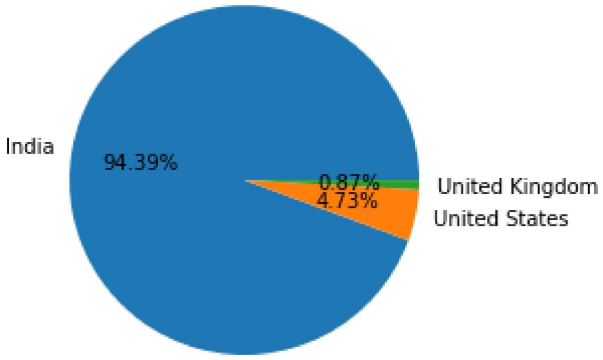
In [34]:
```
# In this Country Value Counted with the help of Value function.
country_val = final_df.Country.value_counts().values
```

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

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

In [36]:
```
# Plotting Pie chart for Top 3 countries that use zomato. autopct is used to
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]:
```
# Checking the column name Available in a Dataset.
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]:
```
# We are Grouping the columns 'Aggregate rating', 'Rating color', 'Rating te
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]:
```
# Adding New column at last as 'Rating count' by Renaming header 0 = 'Rating
ratings = final_df.groupby(['Aggregate rating', 'Rating color', 'Rating text
```

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

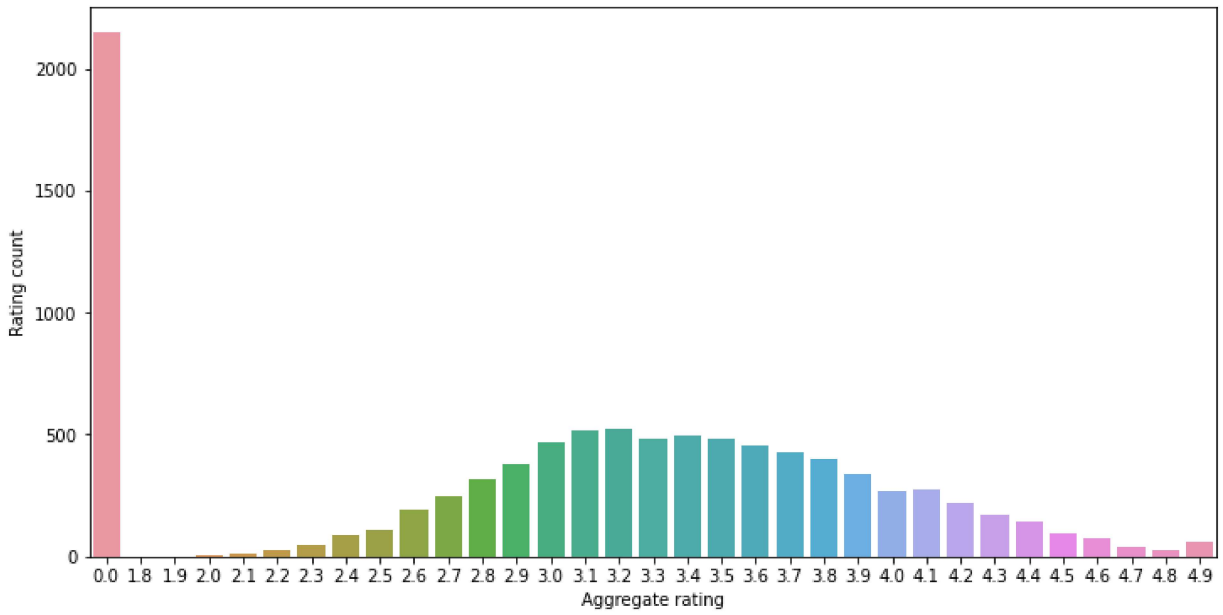
In [41]:
```
1 ratings.head()
```

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

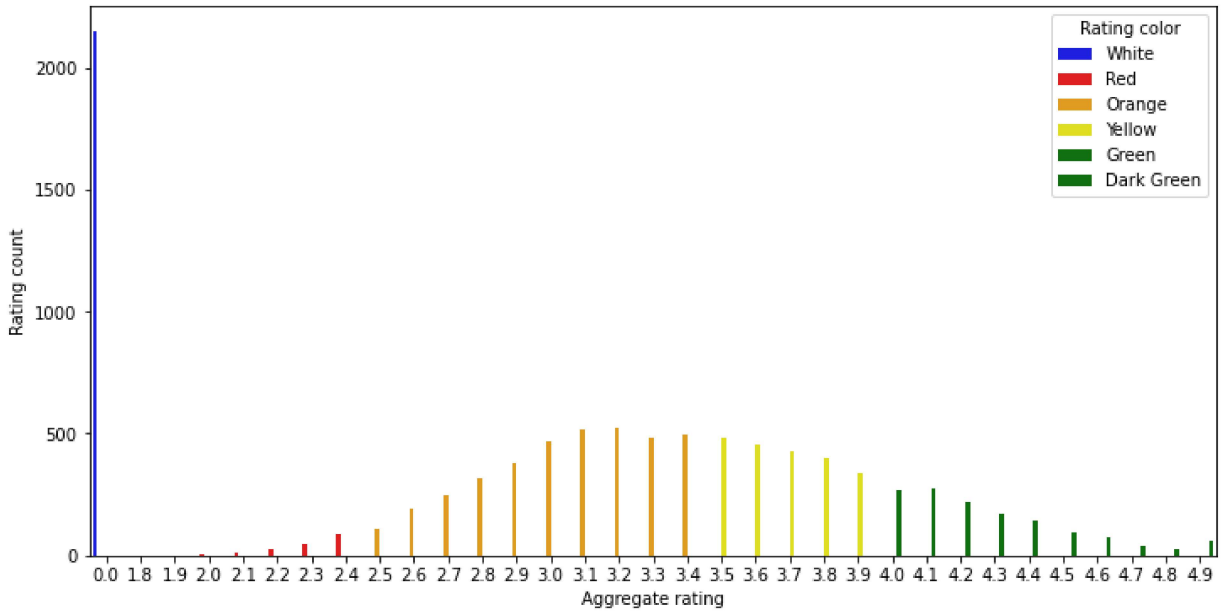
In [43]:
```
1 # Plotting Bar Plot Chart for x = 'Aggregate rating', y = 'Rating count' Val
2
3 import matplotlib
4 matplotlib.rcParams['figure.figsize'] = (12,6)
5 sns.barplot(x = 'Aggregate rating', y = 'Rating count',data= ratings)
```

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



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

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

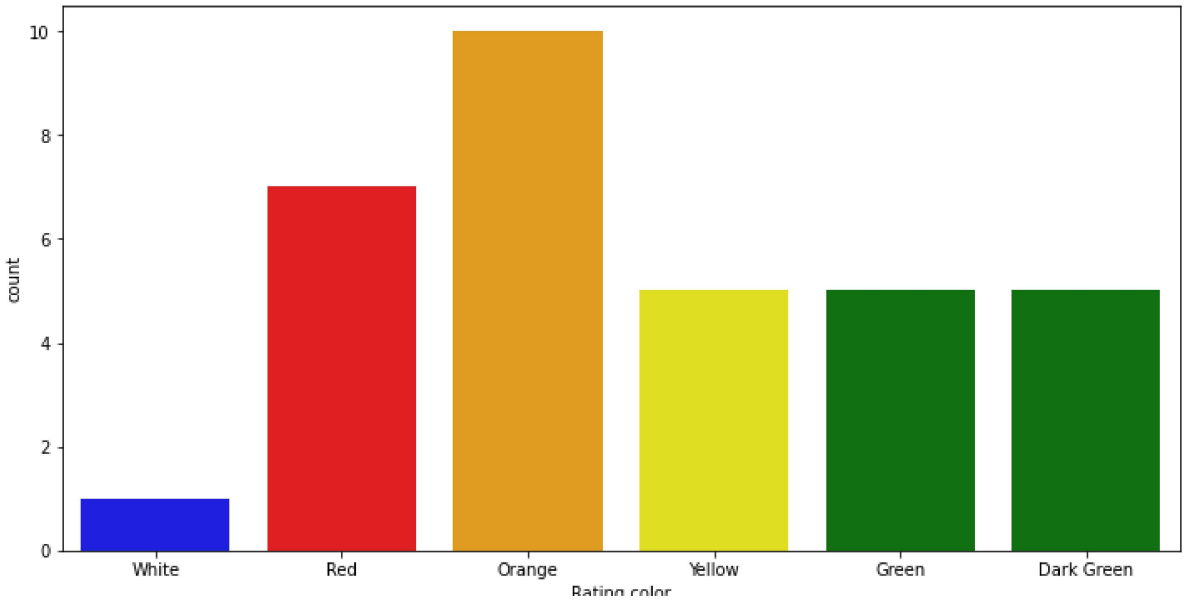


Observation:-

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

In [45]:
```
# Plotting Count Plot Bar
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]:
```
# Showing All the columns name Available in the dataset.
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]:
```
# Solution for Above Questions :-
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]:
```
# Showing All the columns name Available in the dataset.
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]:
```
# Finding Currency for Country by using Groupby()
final_df[['Country','Currency']].groupby(['Country','Currency']).size().rese
```

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

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

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

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:-

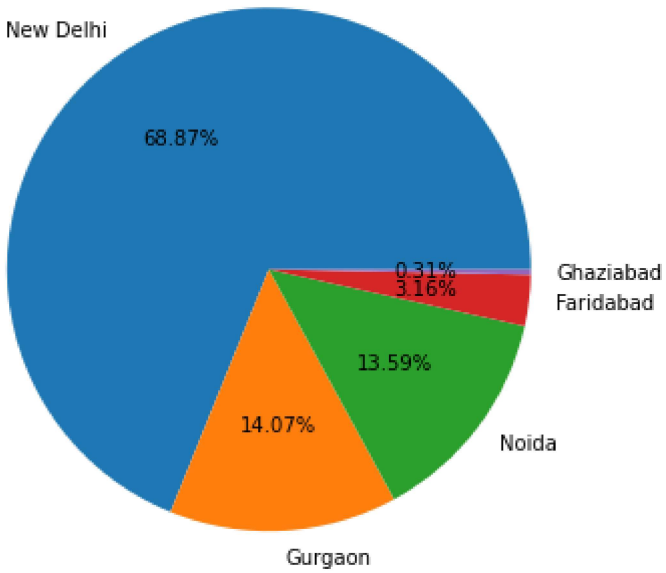
- Online Deliveries are available in India and UAE

Create a Pie chart for Cities Distribution

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

In [54]:
```
# Plotting the Pie Chart
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 [ ]:
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1
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