In [3]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
```

In [4]:

```
df=pd.read_csv('zomato.csv',encoding= 'latin-1')
df.head()
```

Out[4]:

	Restaurant ID	Restaurant Name	Country Code	City	Address	Locality	Locality Verbose	Longitude	Latitude	Cuisines	...	Currency	Has Table booking	Has Online delivery	Is delivering now	Switch to order menu	Price range	Aggregate rating	Rating color	Rating text	Votes
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	...	Botswana Pula(P)	Yes	No	No	No	3	4.8	Dark Green	Excellent	314
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	...	Botswana Pula(P)	Yes	No	No	No	3	4.5	Dark Green	Excellent	591
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	...	Botswana Pula(P)	Yes	No	No	No	4	4.4	Green	Very Good	270
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	...	Botswana Pula(P)	No	No	No	No	4	4.9	Dark Green	Excellent	365
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	...	Botswana Pula(P)	Yes	No	No	No	4	4.8	Dark Green	Excellent	229

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: 1.1+ 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 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 [8]:

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

Out[8]:

```
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 [12]:

```
df.shape
```

Out[12]:

```
(9551, 21)
```

In [9]:

```
[features for features in df.columns if df[features].isnull.sum()>1]
```

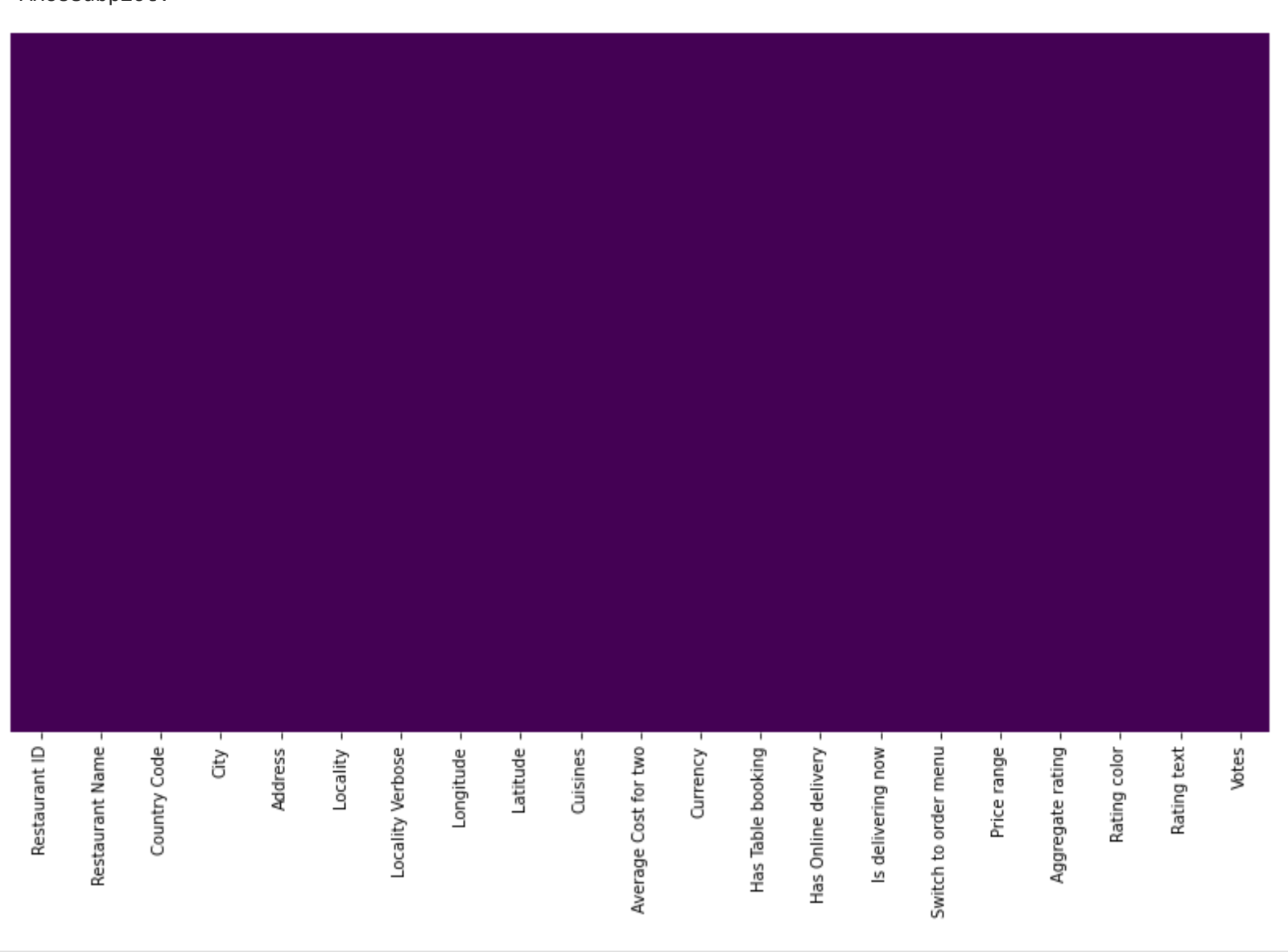
```
---------------------------------------------------------------------------
AttributeError                            Traceback (most recent call last)
<ipython-input-9-b175ff1425e5> in <module>
----> 1 [features for features in df.columns if df[features].isnull.sum()>1]

<ipython-input-9-b175ff1425e5> in <listcomp>(.0)
----> 1 [features for features in df.columns if df[features].isnull.sum()>1]

AttributeError: 'function' object has no attribute 'sum'
```

In [48]:

```
sns.heatmap(df.isnull(),yticklabels=False,cbar=False,cmap='viridis')
```

Out[48]:

```
<AxesSubplot:>
```



In [14]:

```
df_country= pd.read_excel('Copy of Country-Code.xlsx')
```

In [15]:

```
df_country.head()
```

Out[15]:

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

In [18]:

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

In [20]:

```
final_df.head(2)
```

Out[20]:

	Restaurant ID	Restaurant Name	Country Code	City	Address	Locality	Locality Verbose	Longitude	Latitude	Cuisines	...	Has Table booking	Has Online delivery	Is delivering now	Switch to order menu	Price range	Aggregate rating	Rating color	Rating text	Votes	Country
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	...	Yes	No	No	No	3	4.8	Dark Green	Excellent	314	Phillipines
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	...	Yes	No	No	No	3	4.5	Dark Green	Excellent	591	Phillipines

2 rows × 22 columns

In [22]:

```
## To check data type
final_df.dtypes
```

Out[22]:

```
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 [23]:

```
final_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', 'Country'],
      dtype='object')
```

In [24]:

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

Out[24]:

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

In [26]:

```
country_names=final_df.Country.value_counts().index
```

In [28]:

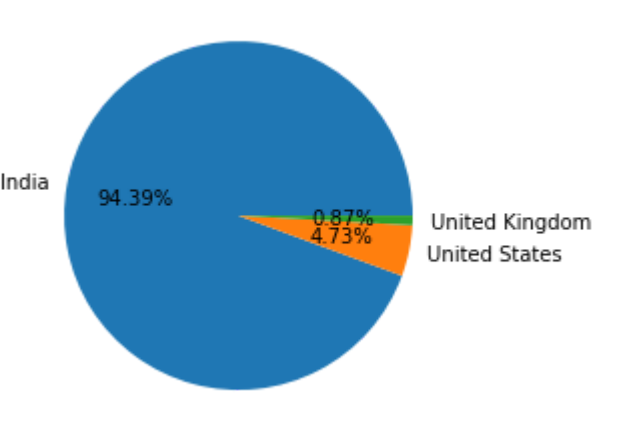
```
country_val=final_df.Country.value_counts().values
```

In [31]:

```
##pie chart -top 3 countries that uses zomato
plt.pie(country_val[:3],labels=country_names[:3],autopct='%1.2f%%')AA
```

Out[31]:

```
([<matplotlib.patches.Wedge at 0xafa9d30>,
  <matplotlib.patches.Wedge at 0x125d628>,
  <matplotlib.patches.Wedge at 0x125d8e0>],
 [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 kingdom

In [32]:

```
final_df.columns
```

Out[32]:

```
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 [39]:

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

In [40]:

```
rating.head()
```

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

Observation

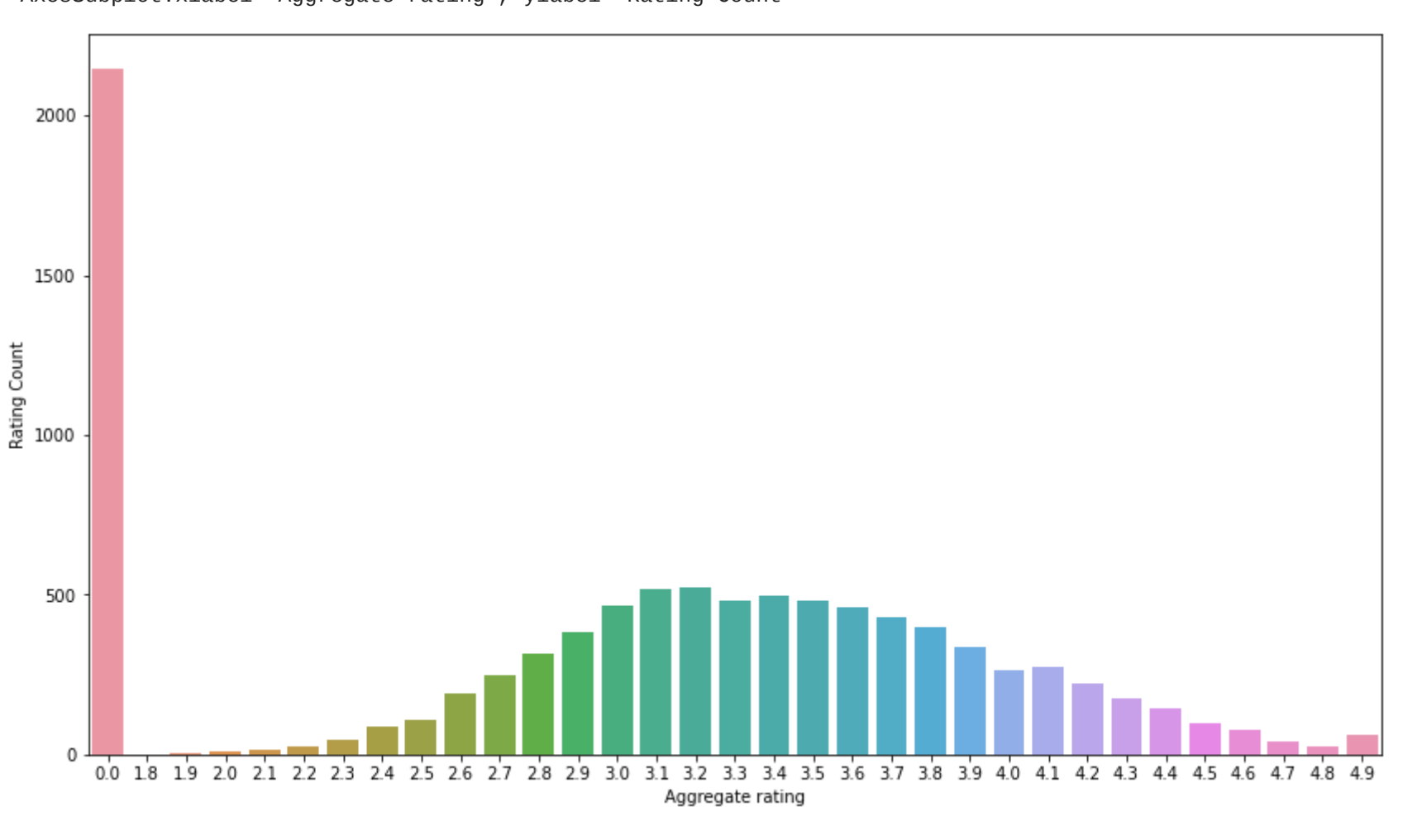
1. When rating is between 4.5 to 4.9 ---> Excellent
2. When rating are between 4.0 to 3.4---> very good
3. When rating are between 3.4 to 3.9---> good
4. When rating are between 3.0to 3.4---> average
5. When rating are between 2.5 to 2.9---> average
6. When rating are between 2.0 to 2.4---> poor

In [47]:

```
import matplotlib
matplotlib.rcParams['figure.figsize']= (14,8)
sns.barplot(x="Aggregate rating", y="Rating Count",data= rating)
```

Out[47]:

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

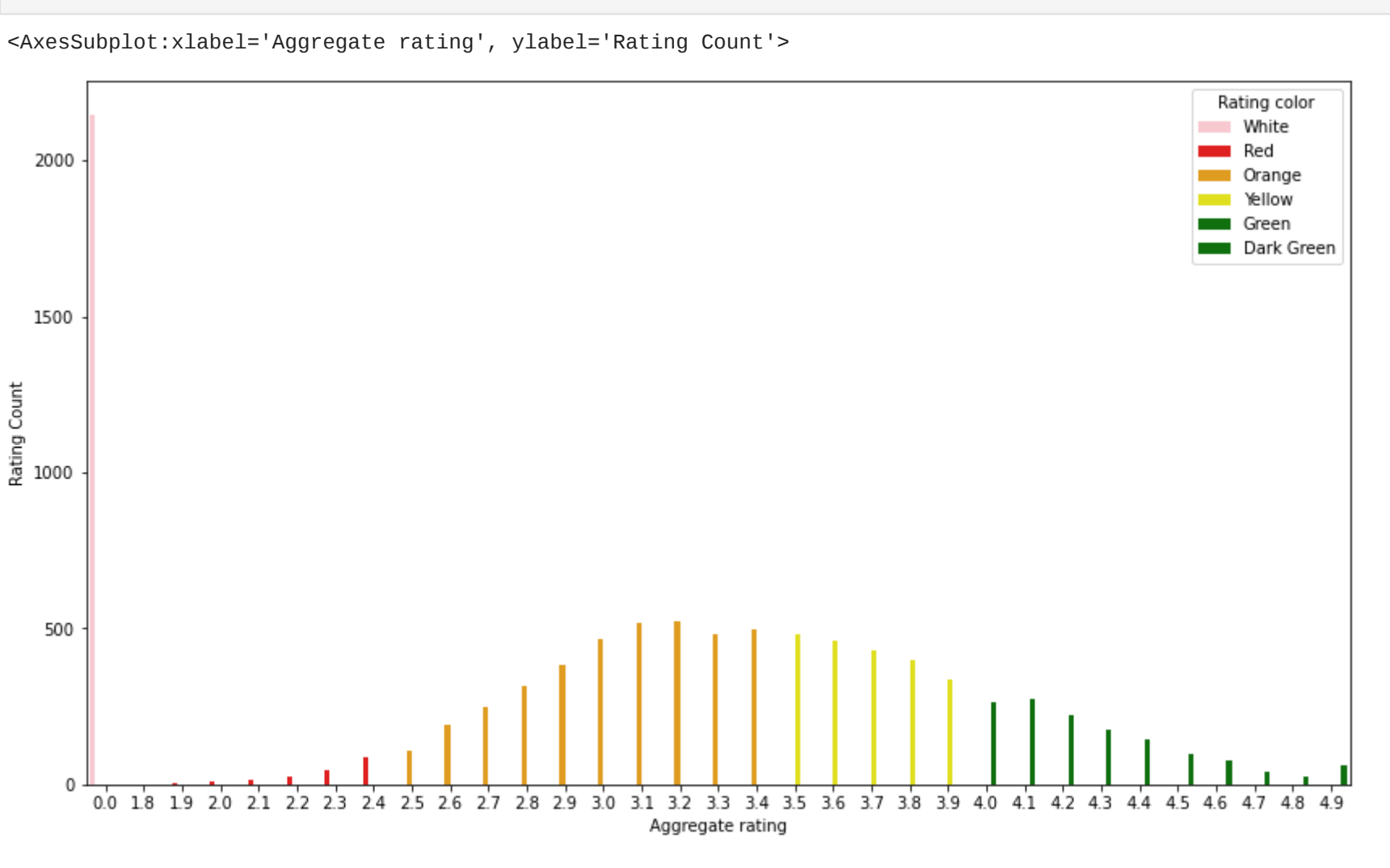


In [57]:

```
sns.barplot(x="Aggregate rating", y="Rating Count",hue='Rating color',data=rating, palette=['pink','red','orange','yellow','green','green'])
```

Out[57]:

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



OBSERVATION

1. Not rated count is very high
2. Maximum number of rating are between 2.5 to 3.4

In [59]:

```
## count plot
sns.countplot(x= "Rating color",data= rating,palette=['pink','red','orange','yellow','green','green'] )
```

Out[59]:

```
<AxesSubplot:xlabel='Rating color', ylabel='count'>
```

In [65]:

```
### find the countries that has given 0 rating
final_df[final_df['Rating color']=='White'].groupby('Country').size().reset_index()
```

Out[65]:

	Country	0
0	Brazil	5
1	India	2139
2	United Kingdom	1
3	United States	3

observations maximum number of 0 rating from indian customer

In [66]:

```
## find out which currency is used by which country?
final_df[['Country','Currency']].groupby(['Country','Currency']).size().reset_index()
```

Out[66]:

	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 [ ]:

```
## which countries  do have online deliveries option
```

In [68]:

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

Out[68]:

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

In [72]:

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

Out[72]:

	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

obesrvation:

1. online deliveries are available in India and UAE

In [73]:

```
final_df.columns
```

Out[73]:

```
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 [74]:

```
## create a pie chart for cities distribution
```

In [76]:

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

Out[76]:

```
Index(['New Delhi', 'Gurgaon', 'Noida', 'Faridabad', 'Ghaziabad', 'Ahmedabad',
       'Bhubaneshwar', 'Guwahati', 'Lucknow', 'Amritsar',
       ...
       'Consort', 'Quezon City', 'Forrest', 'Vernonia', 'Flaxton', 'Inverloch',
       'Lincoln', 'Balingup', 'Miller', 'Mayfield'],
      dtype='object', length=141)
```

In [89]:

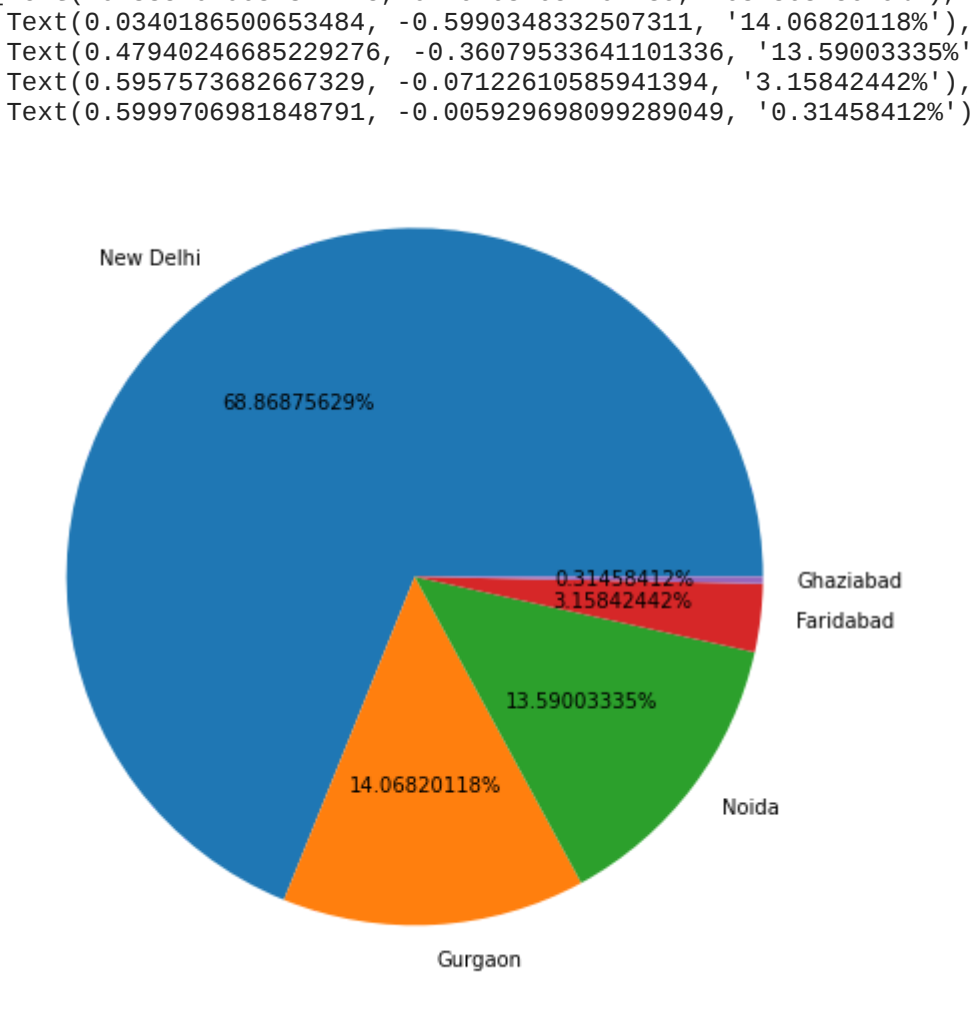
```
city_values=final_df.City.value_counts().values
city_lables=final_df.City.value_counts().index
```

In [99]:

```
plt.pie(city_values[:5],labels=city_lables[:5],autopct='%1.8f%%')
```

Out[99]:

```
([<matplotlib.patches.Wedge at 0xfd5f958>,
  <matplotlib.patches.Wedge at 0xfd5fca0>,
  <matplotlib.patches.Wedge at 0xfd5ffa0>,
  <matplotlib.patches.Wedge at 0xfe512c8>,
  <matplotlib.patches.Wedge at 0xfe515c8>],
 [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, '68.86875629%'),
  Text(0.0340186500653484, -0.5990348332507311, '14.06820118%'),
  Text(0.47940246685229276, -0.36079533641101336, '13.59003335%'),
  Text(0.5957573682667329, -0.07122610585941394, '3.15842442%'),
  Text(0.5999706981848791, -0.005929698099289049, '0.31458412%')])
```



In [ ]:

In [ ]: