Coursera Capstone Project - The Battle of Neighbourhoods

Introduction :-

New Delhi is the capital city of India. It is a part of the city of Delhi's 11 districts. The city itself has a large population. However, the much larger metro area has a population that exceeds 30 million.
With Delhi's diverse culture , comes diverse food items. There are many restaurants in New Delhi City, each belonging to different categories like Chinese , Italian , French etc. So as part of this project , we will list and visualise all major parts of New Delhi City.

Questions that can be asked as part of our problem statement

- What is the best location in New Delhi City for Chinese Cuisine?
- Which areas have a large number of Chinese Restaurants?
- Which all areas have less number of restaurants?
- Which is the best place to stay if someone prefers Chinese Cuisine?

Intended Audience :-

1. People or Customers who want to know where they can enjoy the food they want.
2. Business persons who want to start their restaurant and analyze the right locality for the restaurant according to the food they serve.
3. Government or Any organization who wants to analyze the New Delhi Restaurants data and localities where particular type of food is being liked by the people.

Data :-

- New Delhi Restaurants data that contains list Locality, Restaurant name,Rating along with their latitude and longitude
    - **Data Source** : Zomato kaggel dataset
    - **Description of Data**: This dataset contains the locality of different restaurants, along with their ratings given by customers. The Latitude and Longitude are also provided.

    - **Example**: if i want to know best locality of chinese restaurant in New Delhi city then from dataset, we will group the restaurants in the same locality
- Nearby places in each locality of new delhi city
    - **Data source** : Foursquare API
    - **Description**: The foursquare api will be used to get all the nearby venues in each neighborhood.
    - **Example**: Using this we will find the venues in all or selected neighborhoods. And then by filtering out nearby locality and then aggregating the rating of each restaurant, we get the best places.

Methodology :-

Approach :

- Collect the new delhi city data from Zomato kaggle dataset.
- Using FourSquare API we will find all venues for each neighborhood.
- Filter out all venues that are nearby by locality.
- Using aggregate rating for each resturant to find the best places.
- Visualize the Ranking of neighborhoods using folium library(python).

Exploratory Data Analysis :

- Reading the data from zomato kaggle dataset
- **Data Cleaning :**
    - Removed unnecessary data attributes/columns from dataframe
    - Removed all other records/rows from dataframe except for New Delhi rows

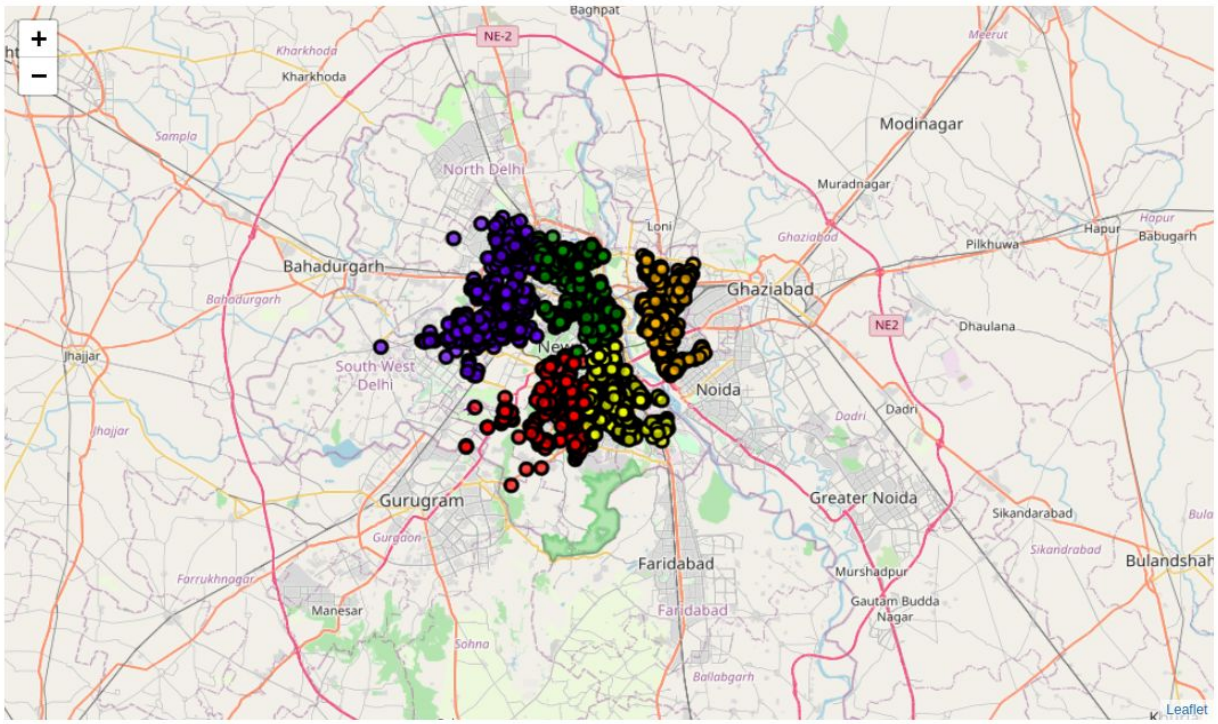
```
In [6]: df_Res.head()
```

Out[6]:

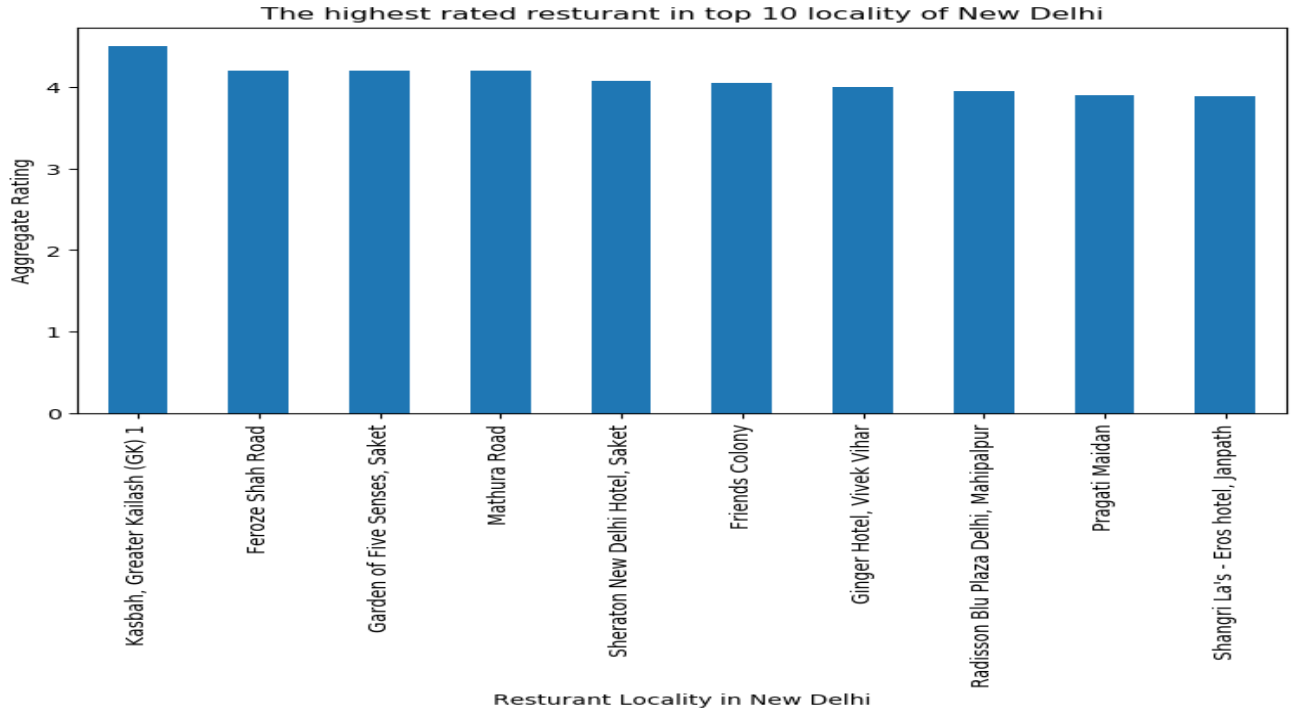
	Restaurant Name	Locality	Longitude	Latitude	Cuisines	Aggregate rating	Rating text	Votes
1	Burger.in	Adchini	77.196923	28.535382	Fast Food	3.2	Average	46
2	Days of the Raj	Adchini	77.197475	28.535493	North Indian, Seafood, Continental	3.4	Average	45
3	Dilli Ka Dhaba	Adchini	77.198033	28.537547	South Indian, North Indian	2.6	Average	11
4	Govardhan	Adchini	77.196924	28.535523	South Indian, North Indian, Chinese	3.4	Average	238
5	Mezbaan Grills	Adchini	77.198122	28.538134	Mughlai	3.1	Average	8

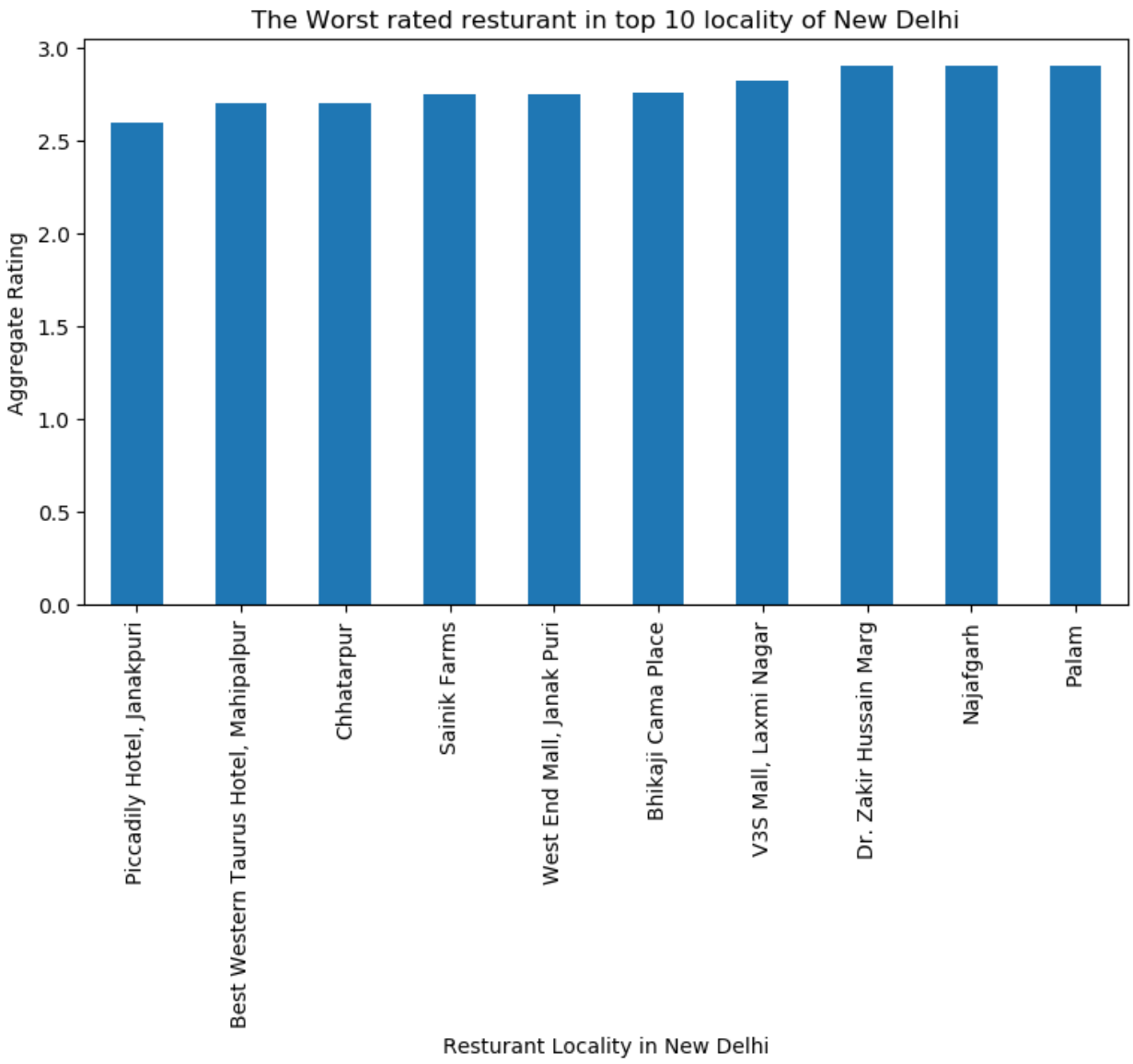
- **Created Map to show restaurants clusters using folium library :**

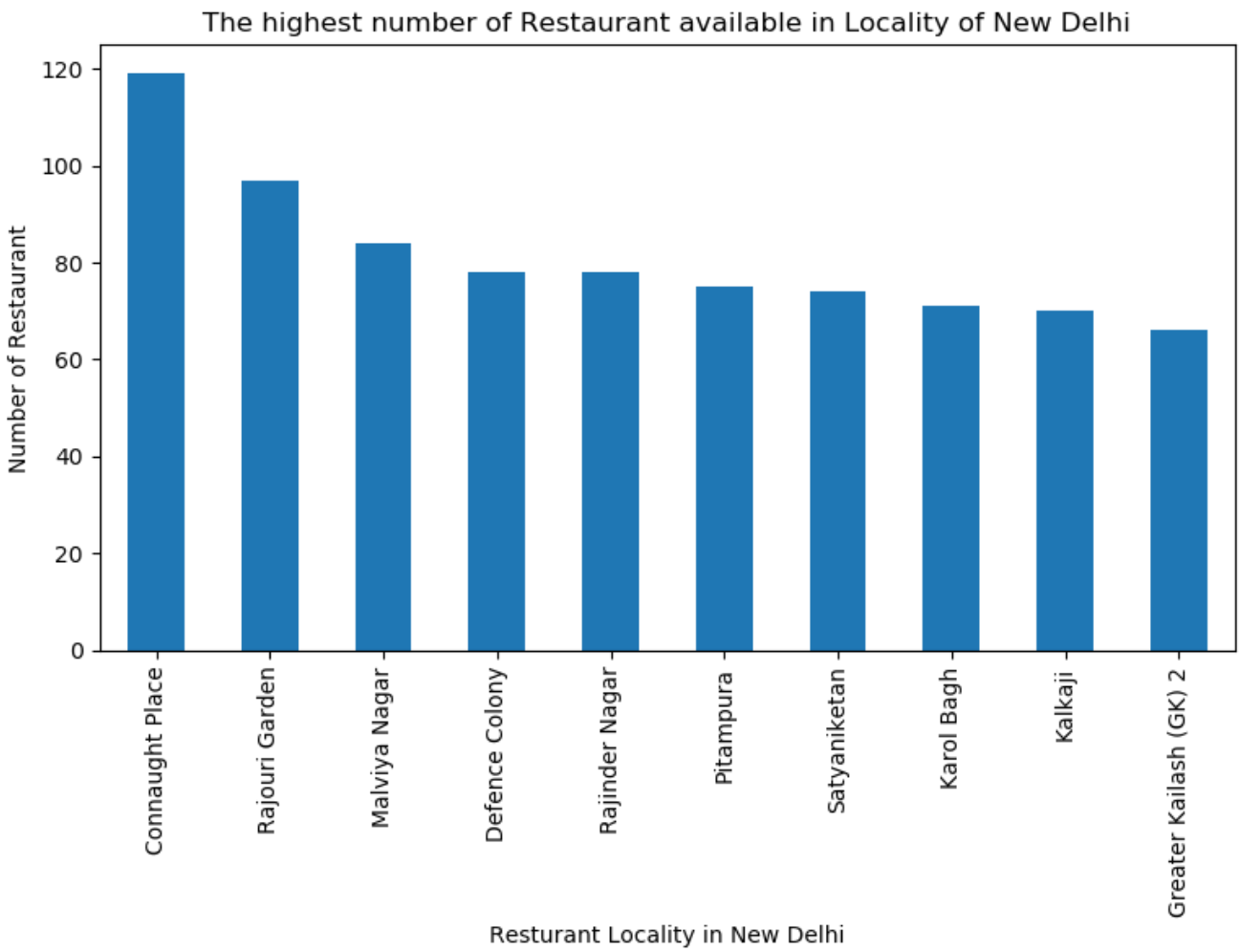
Out[7]:

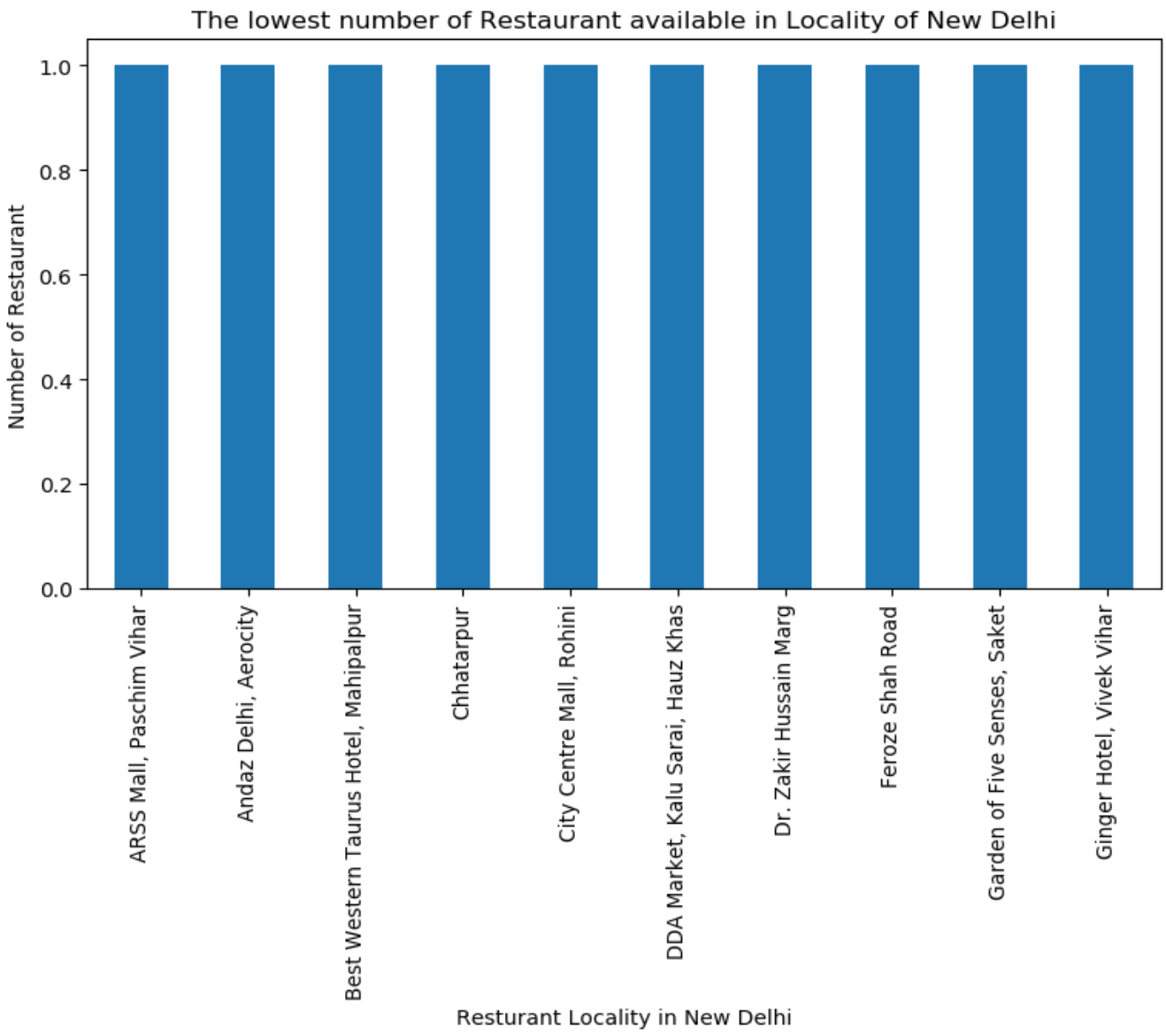


- **Plotted no. of bar plots :**

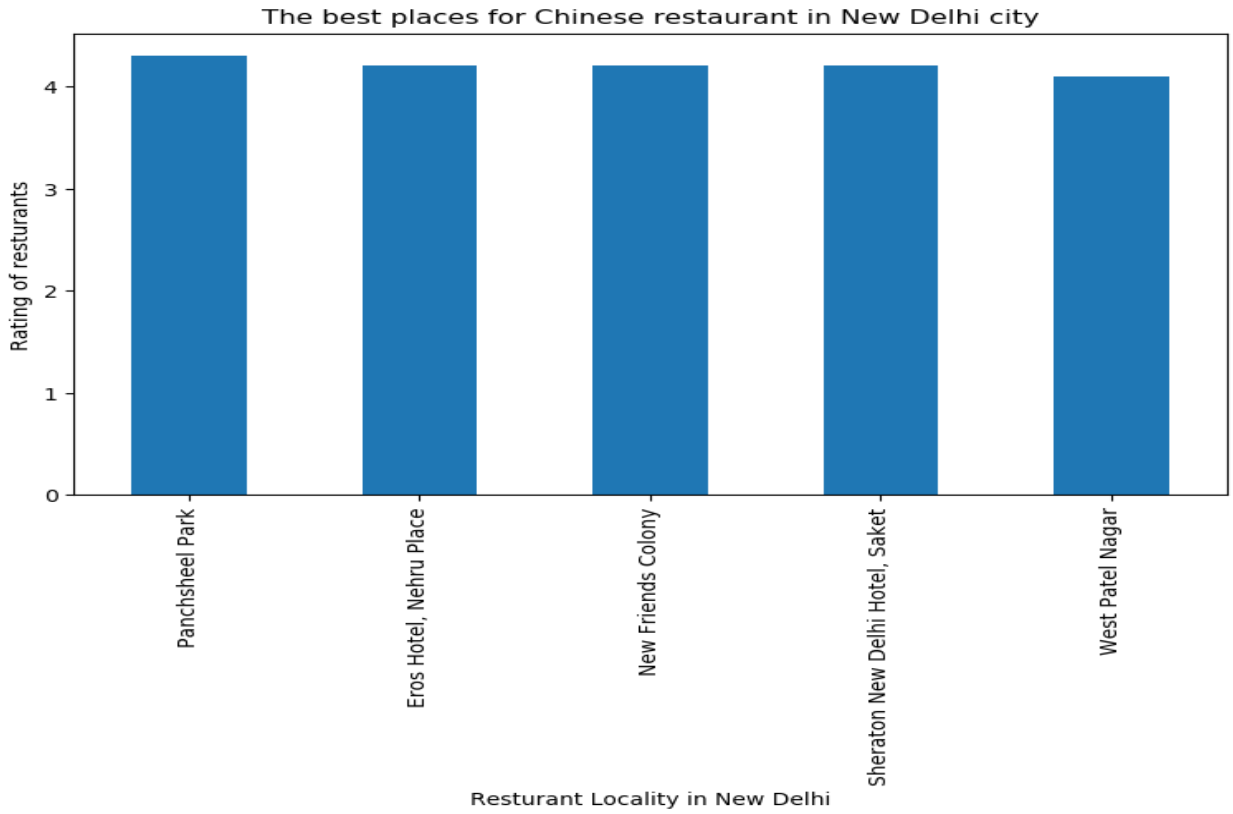



The Worst rated resturant in top 10 locality of New Delhi
Aggregate Rating
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Piccadily Hotel, Janakpuri
Best Western Taurus Hotel, Mahipalpur
Chhatarpur
Sainik Farms
West End Mall, Janak Puri
Bhikaji Cama Place
V3S Mall, Laxmi Nagar
Dr. Zakir Hussain Marg
Najafgarh
Palam
Resturant Locality in New Delhi


The highest number of Restaurant available in Locality of New Delhi
Number of Restaurant
0
20
40
60
80
100
120
Connaught Place
Rajouri Garden
Malviya Nagar
Defence Colony
Rajinder Nagar
Pitampura
Satyaniketan
Karol Bagh
Kalkaji
Greater Kailash (GK) 2
Resturant Locality in New Delhi


The lowest number of Restaurant available in Locality of New Delhi
Number of Restaurant
1.0
0.8
0.6
0.4
0.2
0.0
ARSS Mall, Paschim Vihar
Andaz Delhi, Aerocity
Best Western Taurus Hotel, Mahipalpur
Chhatarpur
City Centre Mall, Rohini
DDA Market, Kalu Sarai, Hauz Khas
Dr. Zakir Hussain Marg
Feroze Shah Road
Garden of Five Senses, Saket
Ginger Hotel, Vivek Vihar
Resturant Locality in New Delhi

The best Locality for chinese restaurant in New Delhi city
Number of Chinese Restaurant
0
2
4
6
8
10
12
Chanakyapuri
Pitampura
Safdarjung
Vikaspuri
Malviya Nagar
Resturant Locality in New Delhi


The best places for Chinese restaurant in New Delhi city
Rating of resturants
0
1
2
3
4
Panchsheel Park
Eros Hotel, Nehru Place
New Friends Colony
Sheraton New Delhi Hotel, Saket
West Patel Nagar
Resturant Locality in New Delhi

- **Data Transformation :** Grouped the data based on locality

Data transformation

Based on Locality grouping the data

In [16]:
```
df_Res_Loc =  df_Res.groupby('Locality').count()['Restaurant Name'].to_frame()
df_Res_rating= df_Res.groupby('Locality')['Aggregate rating'].mean().to_frame()
d_Cuisines = df_Res.groupby(['Locality'])['Cuisines'].agg(', '.join).reset_index()
d_R = df_Res.groupby(['Locality'])['Rating text'].unique().agg(', '.join).reset_index()
d_V = df_Res.groupby(['Locality'])['Votes'].sum().to_frame()
d_Lat = df_Res.groupby('Locality').mean()['Latitude'].to_frame()
d_Lng = df_Res.groupby('Locality').mean()['Longitude'].to_frame()
df_final = pd.merge(d_Lat,d_Lng,on='Locality').merge(df_Res_Loc, on='Locality').merge(d_Cuisines, on='Locality').me
```

In [17]:
```
df_final = df_final[df_final['Aggregate rating'] != 0.000000]
df_final.columns =['Locality','Lat','Lng', 'No_of_Restaurant','Cusines', 'Agg_Rating','Comments' ,'No_of_Votes']
df_final.head()
```

Out[17]:

	Locality	Lat	Lng	No_of_Restaurant	Cusines	Agg_Rating	Comments	No_of_Votes
0	ARSS Mall, Paschim Vihar	28.668945	77.101544	1	North Indian, South Indian, Chinese, Mithai, F...	3.100000	Average	117
1	Adchini	28.537063	77.197808	13	Fast Food, North Indian, Seafood, Continental,...	3.292308	Average, Good, Poor, Very Good	1560
2	Aditya Mega Mall, Karkardooma	28.656131	77.301266	4	Finger Food, North Indian, Mughlai, Pizza, Fas...	3.275000	Average, Good	434
3	Aerocity	28.553077	77.104270	2	Fast Food, Italian, Pizza, North Indian, Conti...	3.200000	Average	59
4	Aggarwal City Mall, Pitampura	28.690020	77.134650	3	North Indian, Chinese, Street Food, Mithai, No...	3.033333	Average	126

In [18]:
```
df_final.shape
```

Out[18]:
```
(240, 8)
```

- **Found the venues in New Delhi Localities using foursquare Places API**
- **Clustering of Localities using K-Means algorithm**

Results :-

After cluster analysis, It is found that

Cluster 1: It is most recommended for Indian Restaurants.

Cluster 2: It is most recommended for Hotels and night clubs.

Cluster 3 and Cluster 4: It is most recommended for Fast food.

Cluster 5: It is most recommended for the cafe and pizza.

Observation :-

- From the complete analysis, It is found that New Delhi has numerous places to have food.
- All the 5 clusters that we made have almost all type of Restaurants or Hotels
- But, from the results we got we can choose the locality according to the food we want.

Conclusion :-

- Chanakyapuri, Pitampura, Safdarjung are some of the best neighborhoods for Chinese cuisine.
- Panchsheel park, Nehru place have the best Chinese Restaurant.
- Connaught place, Rajouri garden, Malviya nagar are the best places for edible food.
- Greater kailash, Feroze shah road, Saket have the best restaurants in New Delhi.