Capstone Project - The Battle of Neighborhoods

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 population of 257,803. However, the much larger metro area has a population that exceeds 26 million.

New Delhi are used interchangeably to refer to the National Capital Territory of Delhi (NCT), these are two distinct entities, with New Delhi forming a small part of Delhi. The National Capital Region is a much larger entity comprising the entire NCT along with adjoining districts in neighboring states.

The official language of New Delhi and the one that is most widely spoken is Hindi. However, English is also spoken as a formal language within businesses and government agencies. Over last decades it is continuously grow because of the city's important role in government and commercial business.

With its diverse culture, comes diverse food items. There are many restaurants in New Delhi City, each belonging to different categories like Chinese, Italian, and French etc. So as part of this project, we will list and visualize all major parts of New Delhi City.

Questions that can be asked using the above mentioned datasets

- What is best location in New Delhi City for Chinese Cuisine?
- Which areas have large number of Chinese Restaurant Market?
- Which all areas have less number of restaurant?
- Which is the best place to stay if I prefer Chinese Cuisine?
- What places are have best restaurant in New Delhi?

Most of people who visit New Delhi has this common questions in their minds so, in this project with help of the data I will be able to answer most of the recommended questions and this will appear in details in my notebook submission in week5 of the Capstone Project.

Data Section

For this project we need the following data :

- New Delhi Restaurants data that contains list Locality, Restaurant name, rating along with their latitude and longitude.
    - Data source : Zomato kaggel dataset
    - Description: This data set contains the required information. And we will use this data set to explore various locality of New Delhi city.
- Nearby places in each locality of New Delhi city.
    - Data source : Foursquare API
    - Description: By using this api we will get all the venues in each neighborhood.

Approach

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

Firstly, from Data source : Zomato kaggel dataset, by installing and importing most important libraries

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```
import pandas as pd
import numpy as np
import requests # library to handle requests
from pandas.io.json import json_normalize # tranform JSON file into a pandas dataframe
# Matplotlib and associated plotting modules
import matplotlib.cm as cm
import matplotlib.colors as colors
# import k-means from clustering stage
from sklearn.cluster import KMeans

!conda install -c conda-forge folium=0.5.0 --yes # uncomment this line if you haven't completed the Foursquare API lab
import folium # map rendering library
! pip install geocoder
import geocoder
```

I was able to extract most of the available restaurants in New Delhi as shown in the chart below

	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

Then, through Foursquare API was able to extract the of the data as shown below

[26]:
```
New_Delhi_grouped = df_final.groupby('Locality').mean().reset_index()
New_Delhi_grouped
```

[26]:

	Locality	Lat	Lng	No_of_Restaurant	Agg_Rating	No_of_Votes
0	ARSS Mall, Paschim Vihar	28.668945	77.101544	1	3.100000	117
1	Adchini	28.537063	77.197808	13	3.292308	1560
2	Aditya Mega Mall, Karkardooma	28.656131	77.301266	4	3.275000	434
3	Aerocity	28.553077	77.104270	2	3.200000	59
4	Aggarwal City Mall, Pitampura	28.690020	77.134650	3	3.033333	126
...	...	...	...	...	...	...
235	West Gate Mall, Rajouri Garden	28.652978	77.123116	1	3.500000	178
236	West Patel Nagar	28.648177	77.166667	4	3.675000	876
237	Worldmark 1, Aerocity	28.550257	77.121721	5	3.220000	77
238	Yusuf Sarai	28.559928	77.208290	16	3.075000	923
239	ibis New Delhi, Aerocity	28.551398	77.123127	1	3.100000	9

240 rows × 6 columns

Then Applied data cleaning as shown

	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

Then Data Transformation as shown,

```
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()
```

	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

Then the part of Clustering and creating the map distribution will be shown in the notebook, so please kindly check the notebook for the full and complete illustration

Methodology Section

To compare between the best and the available restaurants available in New Delhi and which are the best according to the service, quality and price then, visualizing the resulted data in the form of figure, tables and charts as shown;

[26]:
```
New_Delhi_grouped = df_final.groupby('Locality').mean().reset_index()
New_Delhi_grouped
```

[26]:

	Locality	Lat	Lng	No_of_Restaurant	Agg_Rating	No_of_Votes
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...	...	...	...	...	...	...
235	West Gate Mall, Rajouri Garden	28.652978	77.123116	1	3.500000	178
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239	ibis New Delhi, Aerocity	28.551398	77.123127	1	3.100000	9

240 rows × 6 columns

Then clustering the data

```
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()
```

	Locality	Lat	Lng	No_of_Restaurant	Cusines	Agg_Rating	Comments	No_of_Votes
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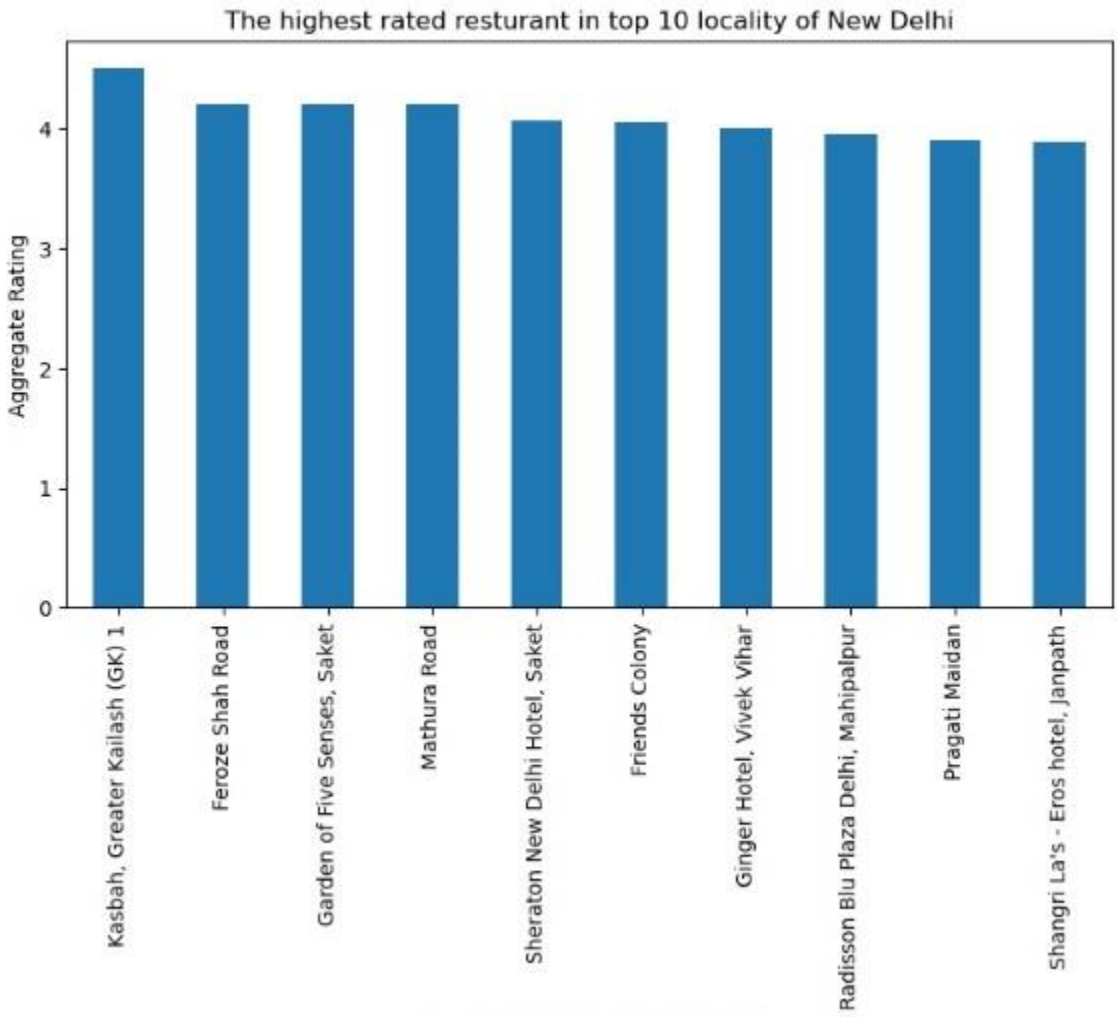
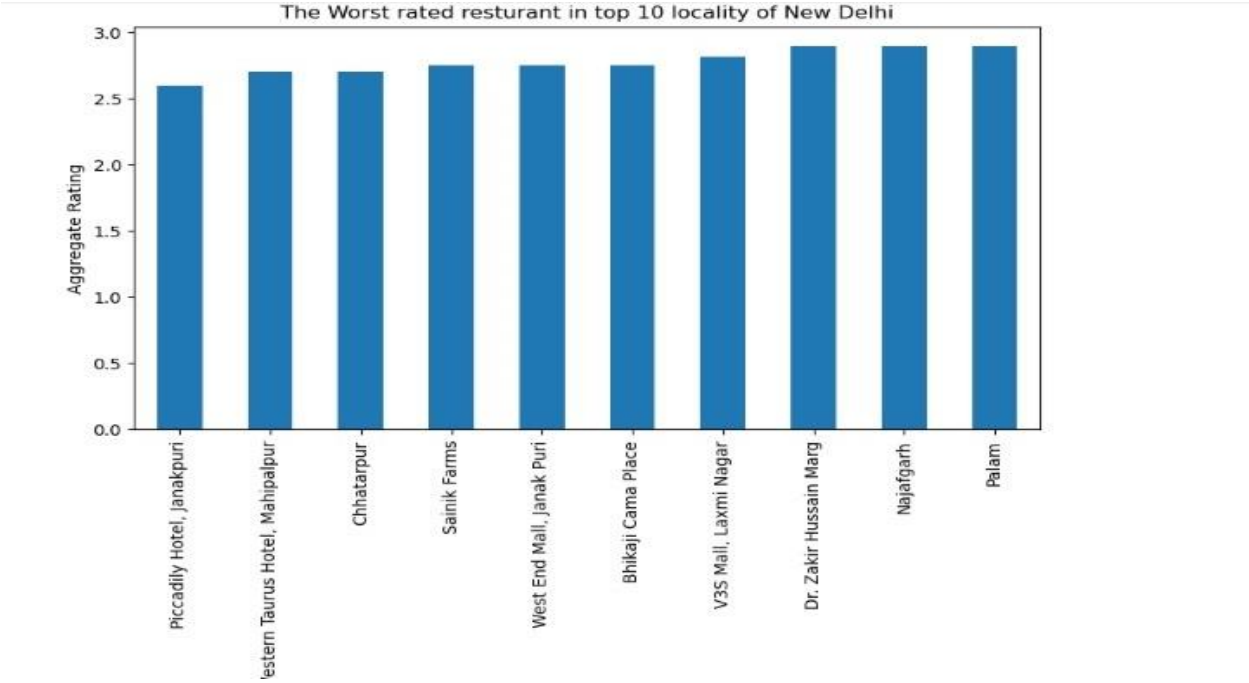
Results Section

By clustering the data, I was able to visualize the data to compare between the restaurants and show them by plotting the data for the interesting view in which,

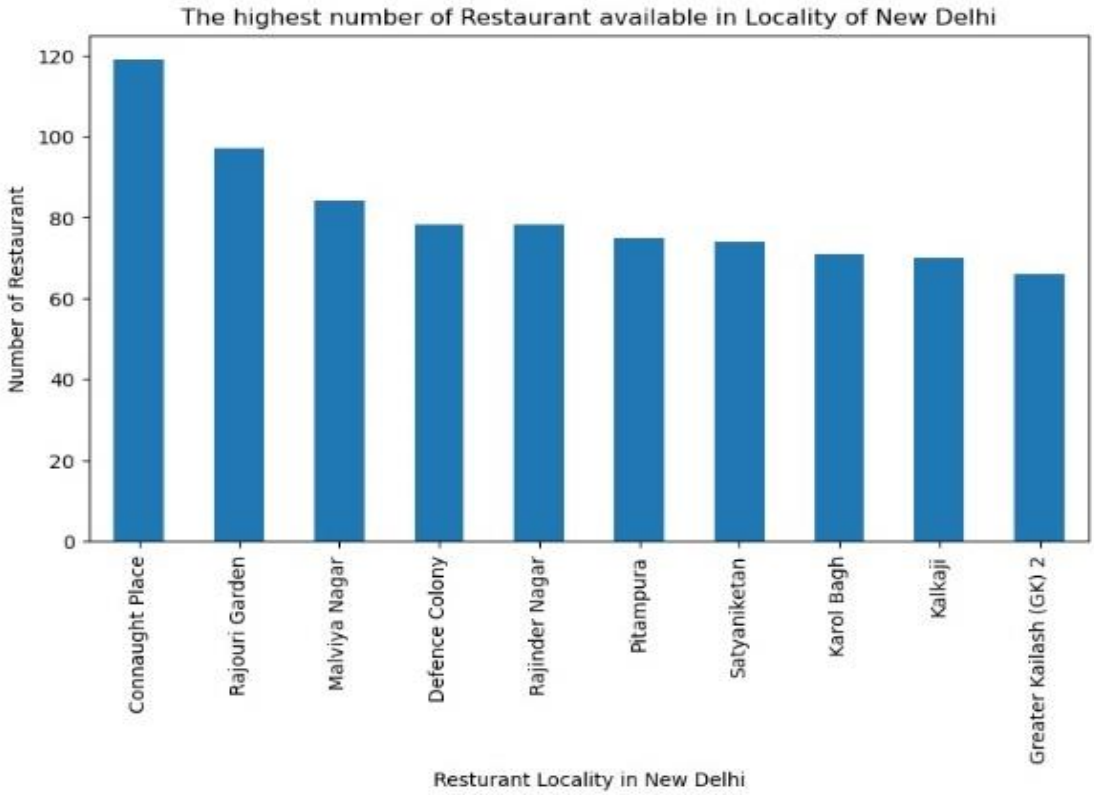
- The first chart shows The highest rated restaurant in top 10 locality of New Delhi



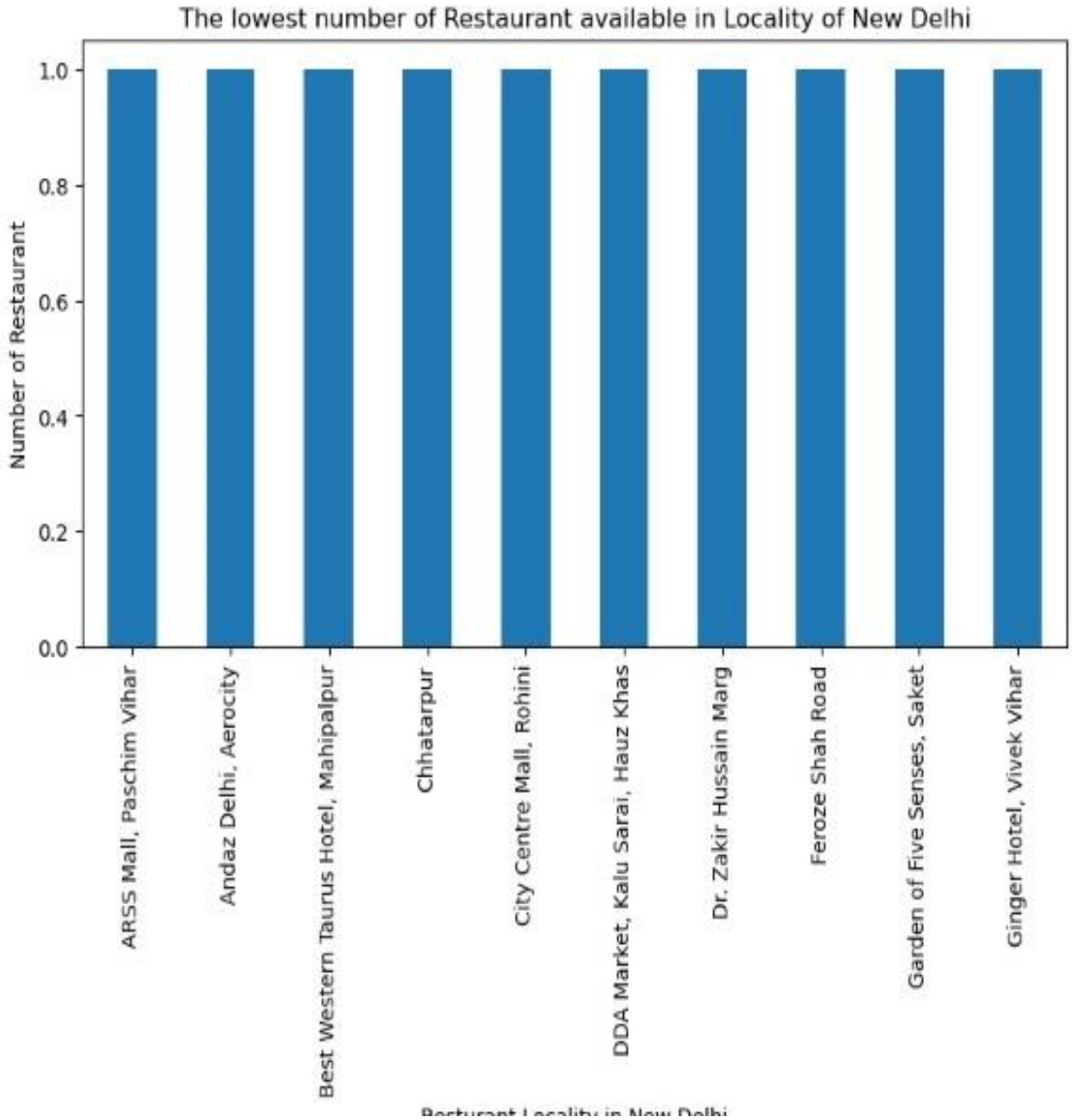
- The second chart shows The Worst rated restaurants in top 10 locality of New Delhi



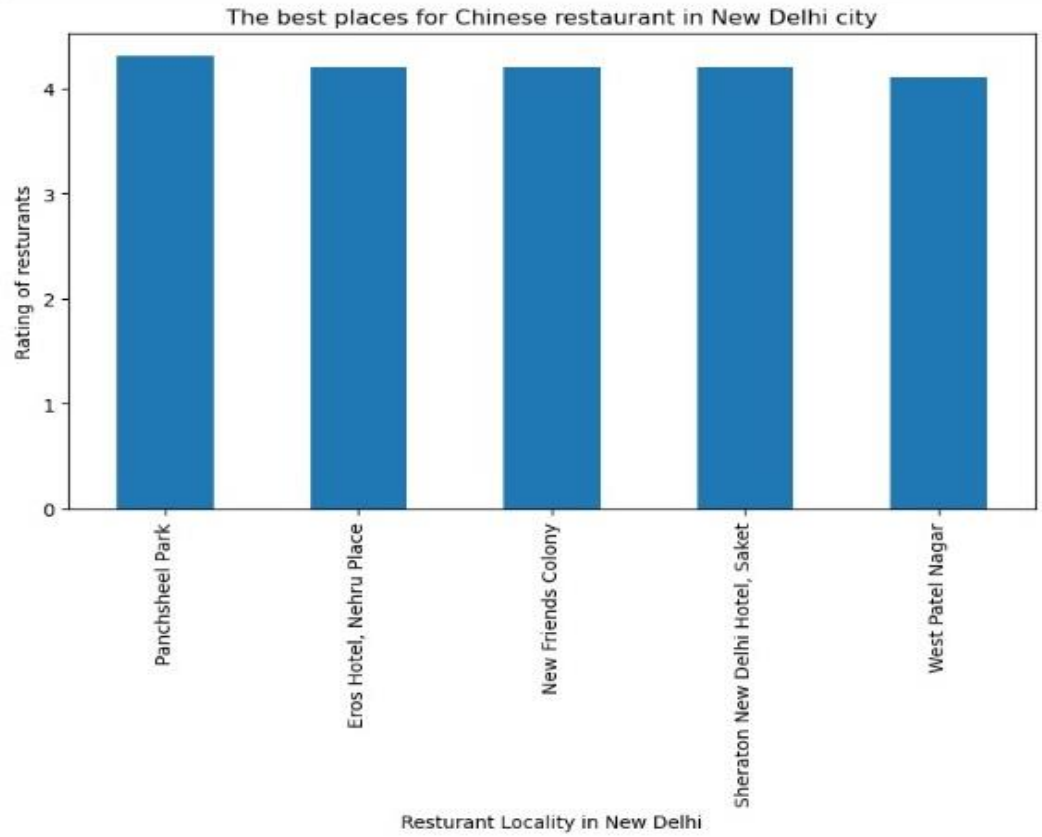
- The next chart shows The highest number of Restaurants available in Locality of New Delhi



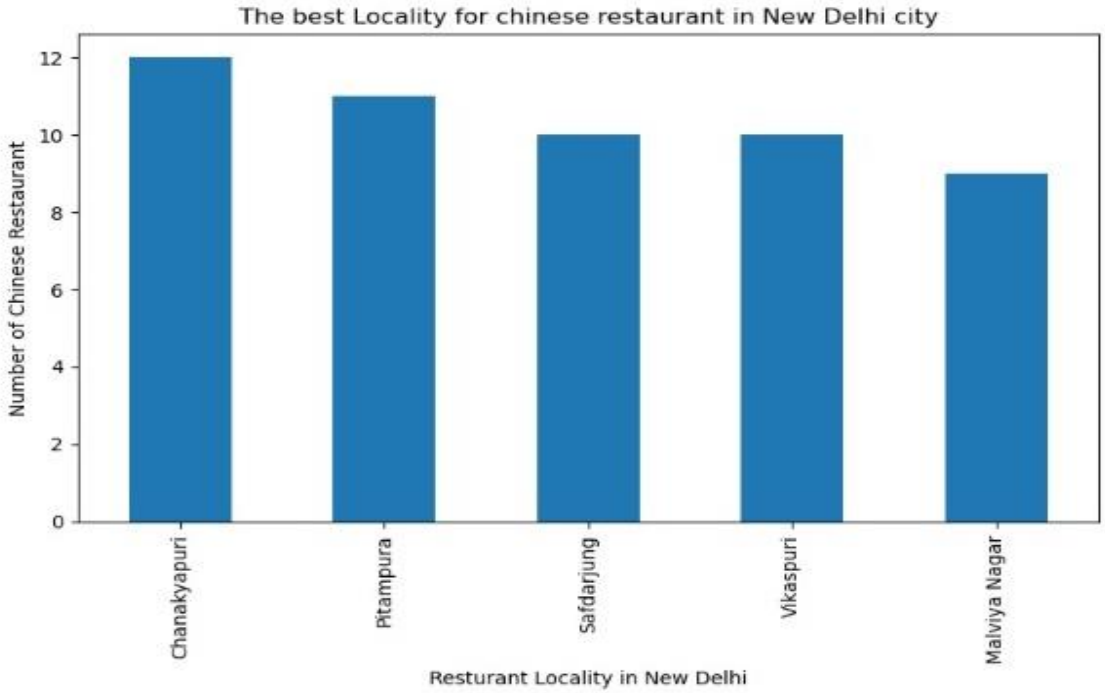
- While this chart shows The lowest number of Restaurant available in Locality of New Delhi



- And this chart also shows The best places for Chinese restaurant in New Delhi city

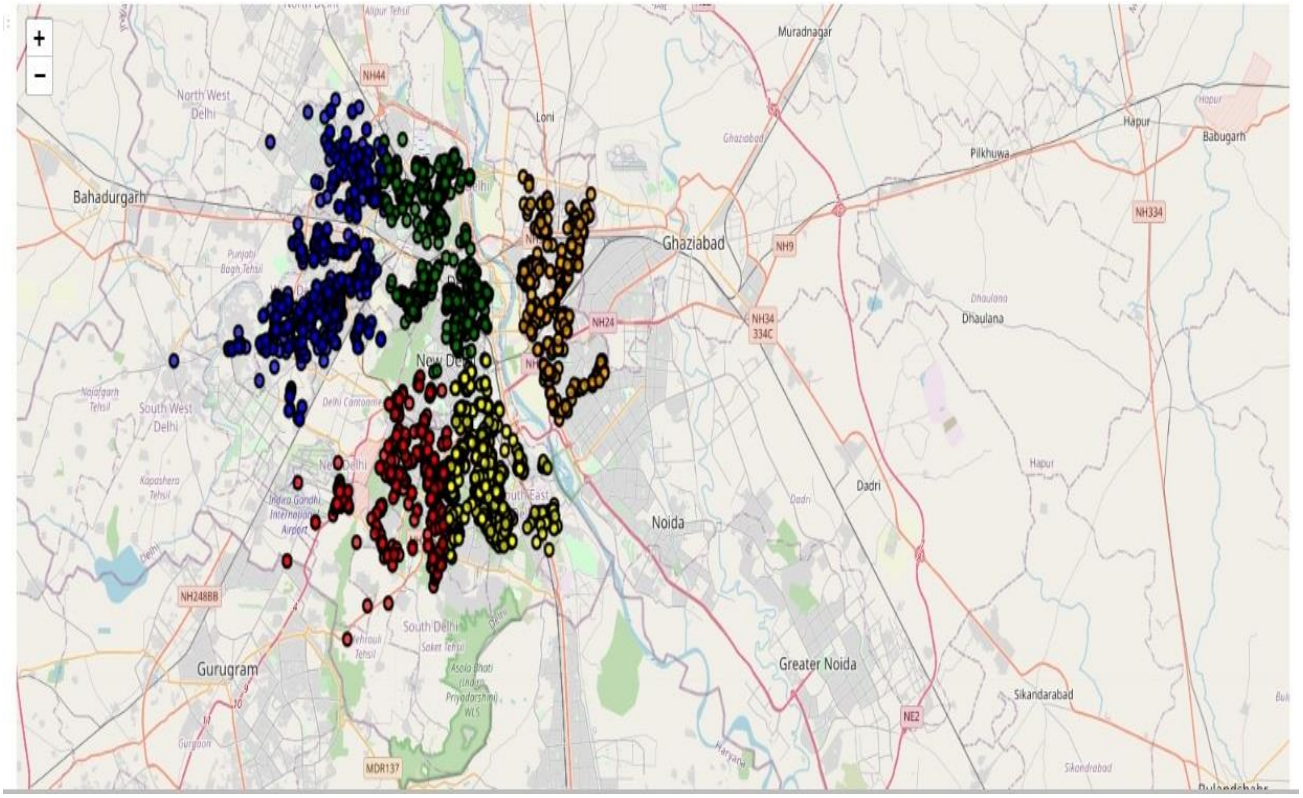


- Finally, the last chart shows the best Locality for Chinese restaurant in New Delhi city

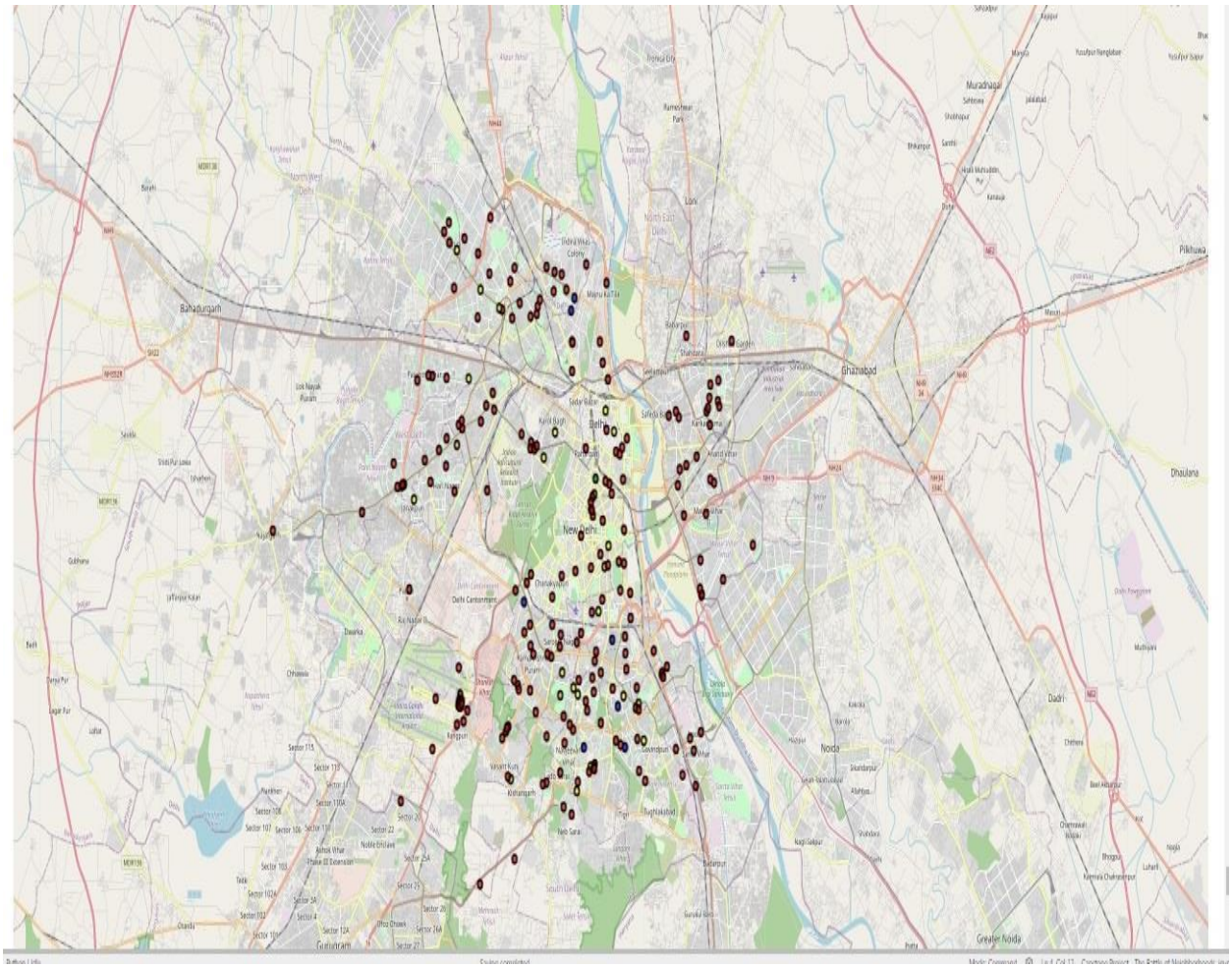


Discussion Section

After clustering the data I was able to create a map which is showed the distribution of the restaurants in New Delhi as shown below;



Also after applying Foursquare API and creating a map as shown;



- It was found that Chanakyapuri, Pitampura, Safdarjung are some of the best neighborhoods for Chinese cuisine.
- Pancsheel Park, Nehru place have the best Chinese Restaurant.
- Cannaught place, Rajouri garden, Malviya nagar are the best places for edible person.
- Greater kailash, Feroze shah road, Saket have best restaurants in New Delhi.

And am totally recommend applying the same clustering if would prefer another type of restaurants as it really ease the idea of searching and thinking about a lot of choices

Conclusion

There are a lot of restaurants and places in New Delhi and any other place around the world which is way difficult to choose which one is convenient to you and which one give the best quality and quantity so through collecting the data and cleaning and transformation some of them it makes the process easier and through clustering the

data and plotting it in the form of colorful charts and maps makes the process of choosing is more fun and easier.