

IBM DATA SCIENCE CAPSTONE PROJECT

(The Battle of Neighborhoods)

An approach to recommend the best Cuisines &
Restaurants in Kolkata

Submitted by :

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27-May-2020

1. Introduction

1.1 Background

A travel agency is a private retailer or public service that provides travel and tourism-related services to the general public on behalf of accommodation or travel suppliers. Travel agencies can provide outdoor recreation activities, airlines, car rentals, hotels, railways, travel insurance, package tours etc. For a traveler who is travelling to a new place with the help of a travel agency, the place would be new and his food habits might not match with the place. In this case a travel agency can guide or recommend the customers with information like where can the customer get his favorite dish or which places are famous for a particular type of dish.

For this project, I have taken Kolkata (India) as my target city.

Kolkata is the capital of the Indian state of West Bengal. According to the 2011 Indian census, it is the seventh most populous city in India; the city had a population of 4.5 million, while the suburb population brought the total to 14.1 million, making it the third-most populous metropolitan area in India. Located on the east bank of the Hooghly River approximately 80 kilometers west of the border with Bangladesh, it is the principal commercial, cultural, and educational centre of East India, while the Port of Kolkata is India's oldest operating port. The city nicknamed the "City of Joy" is widely regarded as the "cultural capital" of India and as of 2019, six Nobel Laureates have been associated with the city. Recent estimates of Kolkata Metropolitan Area's economy have ranged from 60 to 150 billion dollar (GDP adjusted for purchasing power parity) making it the third most-productive metropolitan area in India, after Mumbai and Delhi.

A city filled with history and romance, Kolkata has long been viewed as the home of some of the best food in India. Much of this is to do with its past. Bengal was once ruled by the Mughals, who gave Bengali food the sweet spices, nuts and dried fruit that are characteristic of Persian rice and meat dishes. Later, Calcutta was the seat of British colonial power in India for almost 200 years. Over time, Calcutta became Kolkata and a melting pot of cultures and cuisines from around the world—Chinese, Portuguese, Armenian. They came and settled here and made the most of local ingredients to build a library of dishes, across street foods, family diners, bakeries, mishti shops and ethnic eateries.

Over last few decades Kolkata is continuously growing 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 Kolkata City, each belonging to different categories like Chinese, Italian, French etc.

As part of this project, I will try to list and visualize all major parts of Kolkata City.

I will try to dig in to the data related to various cuisines, restaurants and find the answers to few questions :-

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

1.2 Problem

For a traveler who is travelling to a new place with the help of a travel agency, the place would be new and his food habits might not match with the place. In this case a travel agency can guide or recommend the customers with information like where can the customer get his favorite dish or which places are famous for a particular type of dish. That would not only be helpful for the customers but also add to the reputation of the travel agency. Besides the travel agency can have collaboration with the good restaurants, that would be advantageous for their business.

1.3 Interest

Obviously, travel agency which wants to give the best service to the passengers would be interested to implement a cuisine or restaurant recommending system to the new passengers who are not well acquainted with a new place. Besides any service provider or travel guide may also be interested to provide the best service to the customers.

2. Data acquisition and cleaning

2.1 Data sources

- Kolkata Restaurants data that contains list Locality, Restaurant name, Rating along with their latitude and longitude.
 - Data source : Zomato kaggle dataset
(<https://www.kaggle.com/shrutiamehta/zomato-restaurants-data>)
 - Description : This data set contains the required information. And I will use this data set to explore various locality of Kolkata city.

- Nearby places in each locality of Kolkata city.
 - Data source : Fousquare API
(<https://developer.foursquare.com/>)
 - Description : By using this API, I will get all the venues in each neighborhood.

2.2 Data cleaning

The data downloaded from the data source is in csv format and contains many unwanted columns, which can be excluded from analysis part.

	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	Aggreg rat
0	18217475	Asia Kitchen by Mainland China	1	Kolkata	4th Floor, Acropolis Mall, 1858/1, Rajdanga Ma...	Acropolis Mall, Kasba	Acropolis Mall, Kasba, Kolkata	88.393294	22.514688	Asian, Chinese	Indian Rupees(Rs.)	No	Yes	No	No	3	
1	18249144	Hoppipola	1	Kolkata	4th Floor, Acropolis Mall, 1858/1, Rajdanga Ma...	Acropolis Mall, Kasba	Acropolis Mall, Kasba, Kolkata	88.393310	22.514585	Italian, Mexican, American, Mediterranean	Indian Rupees(Rs.)	No	Yes	No	No	3	
2	19017612	Spice Kraft	1	Kolkata	54/1/2A, Hazra Road, Ballygunge Phan, Near Ha...	Ballygunge	Ballygunge, Kolkata	88.364453	22.526461	Continental, Middle Eastern, Asian	Indian Rupees(Rs.)	No	No	No	No	3	

Fig: Uncleaned Dataset

This dataset is cleaned by excluding certain columns.

	Restaurant Name	Locality	Longitude	Latitude	Cuisines	Aggregate rating	Rating text	Votes
0	Asia Kitchen by Mainland China	Acropolis Mall, Kasba	88.393294	22.514688	Asian, Chinese	4.6	Excellent	945
1	Hoppipola	Acropolis Mall, Kasba	88.393310	22.514585	Italian, Mexican, American, Mediterranean	4.2	Very Good	1103
2	Spice Kraft	Ballygunge	88.364453	22.526461	Continental, Middle Eastern, Asian	4.8	Excellent	1424
3	Nawwarah	Ballygunge	88.364878	22.538731	Chinese, Cafe, North Indian, Desserts	3.9	Good	326
4	6 Ballygunge Place	Ballygunge	88.368628	22.527893	Bengali	4.4	Very Good	1778

Fig: Clean DataSet

2.3 Feature selection

The important features of the data set was obtained that would help to create the clusters that contains our required data

After data cleaning, there were 8 features in the data.

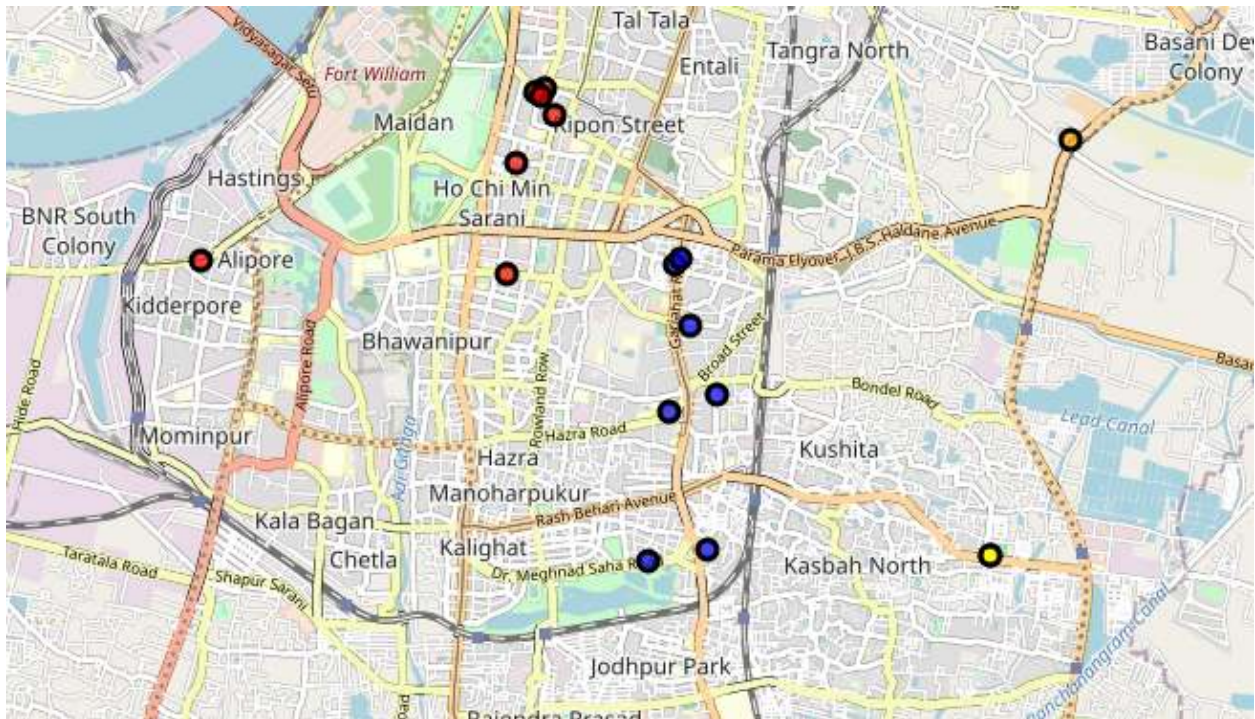
3. Methodology (approach to solve the problem):

- The Kolkata city data from Zomato kaggle dataset will be collected.
- All venues for each neighborhood will be found using FourSquare API .
- All venues that are nearby by locality will be filtered out.
- Aggregative rating will be used for each restaurant to find the best places.
- Visualizing the Ranking of neighborhoods using folium library(python)

[Machine Learning Technique used : K-means Clustering]

3.1 Creating map to show the restaurant clusters

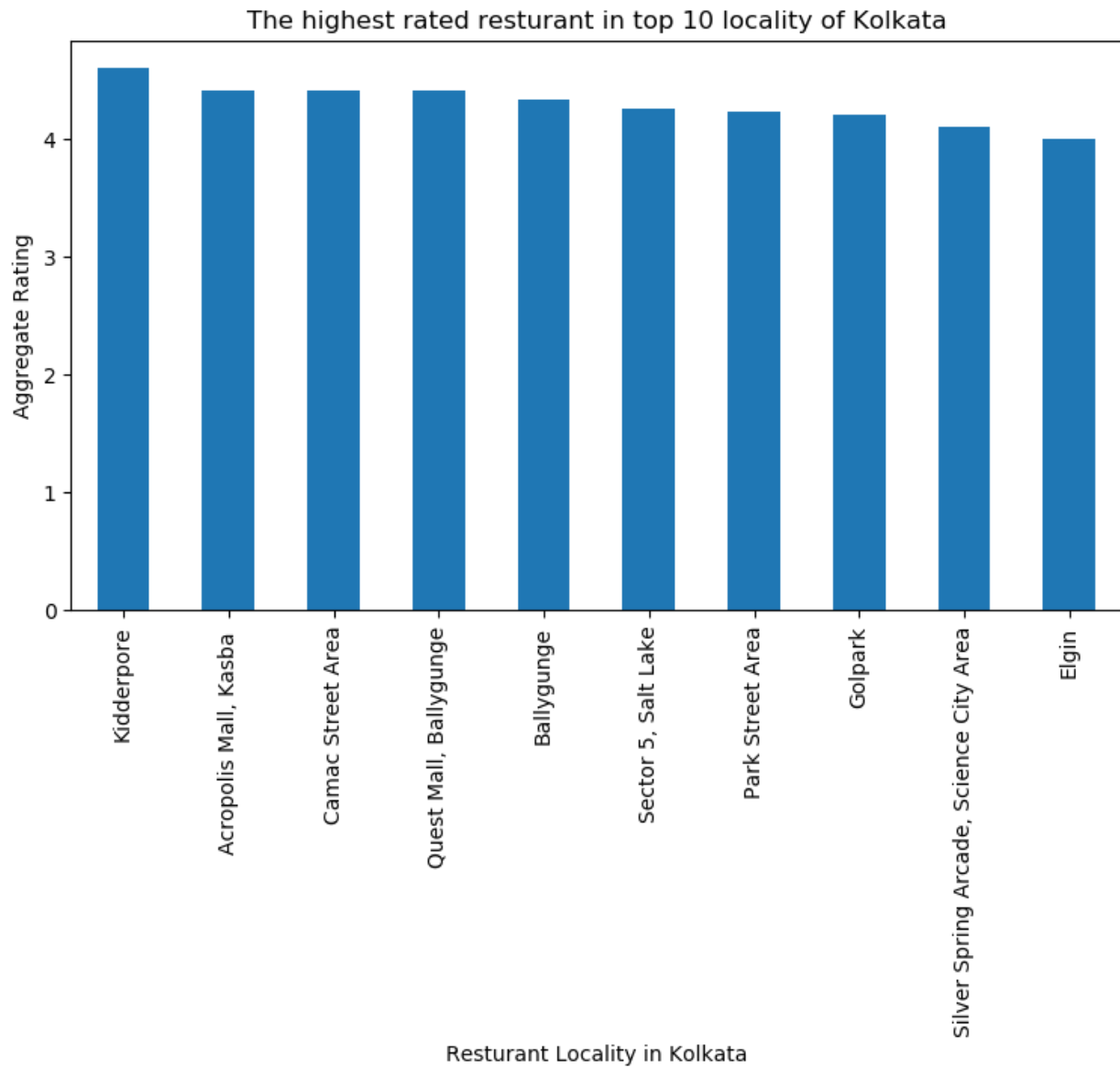
A Map was created to show the 5 clusters of restaurants that are present in Kolkata area.



Each sample (restaurant) was classified in different clusters.

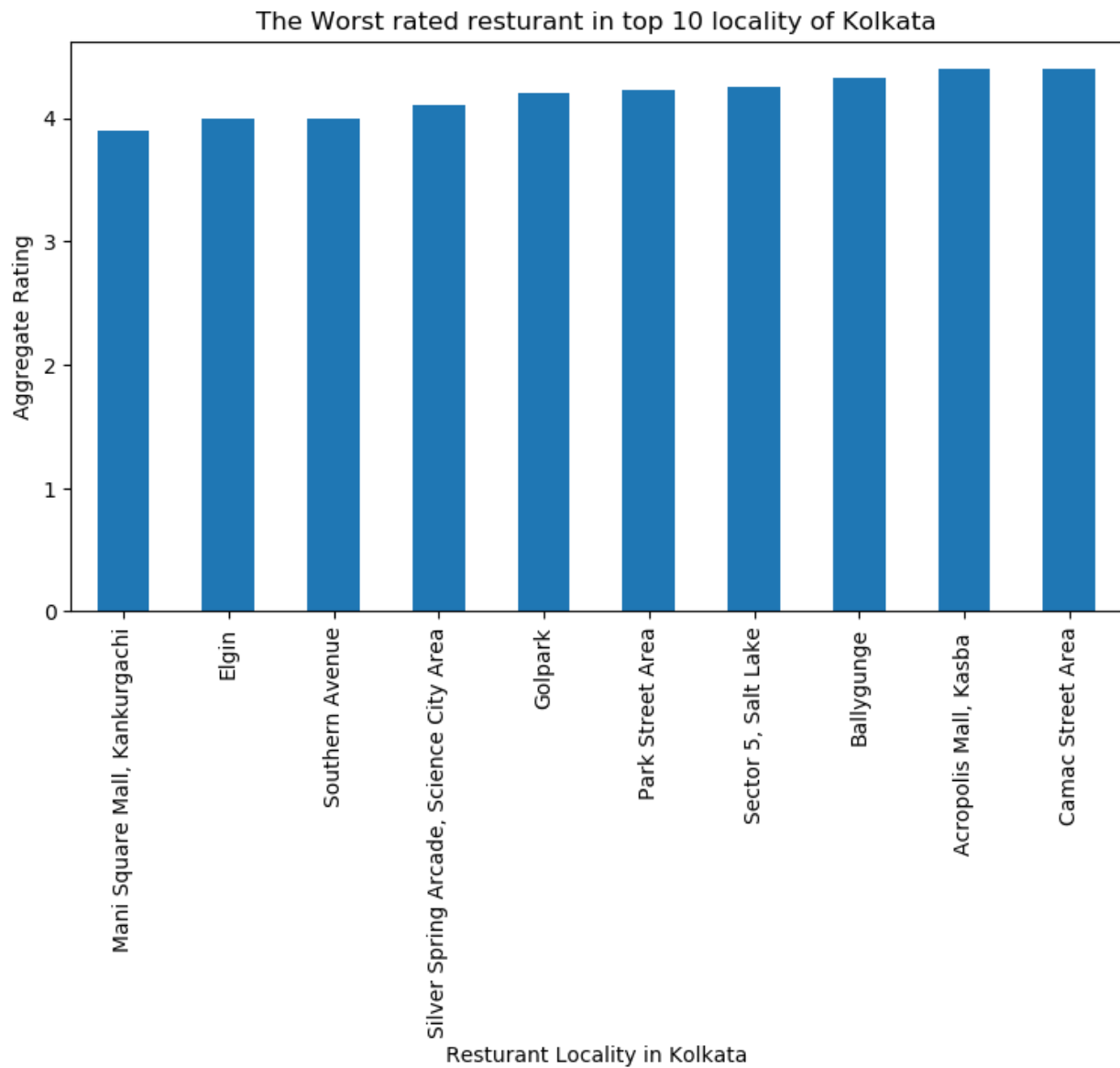
3.2 Exploratory Data Analysis

3.2.1 Q : Which places have the best restaurant in Kolkata?



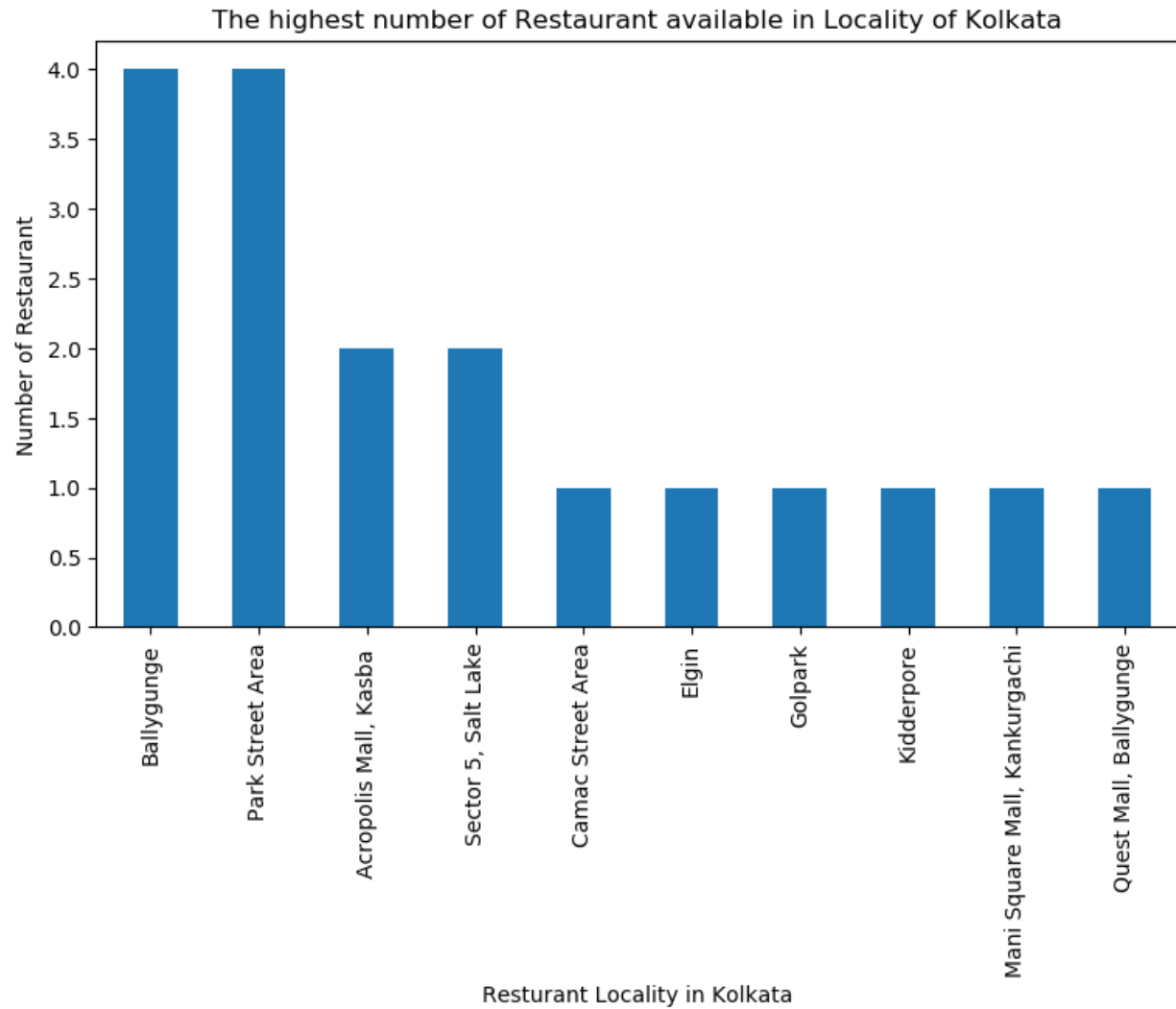
Ans : The best restaurants are available in Kidderpore

3.2.2 Q: Which places have the worst restaurants in Kolkata?



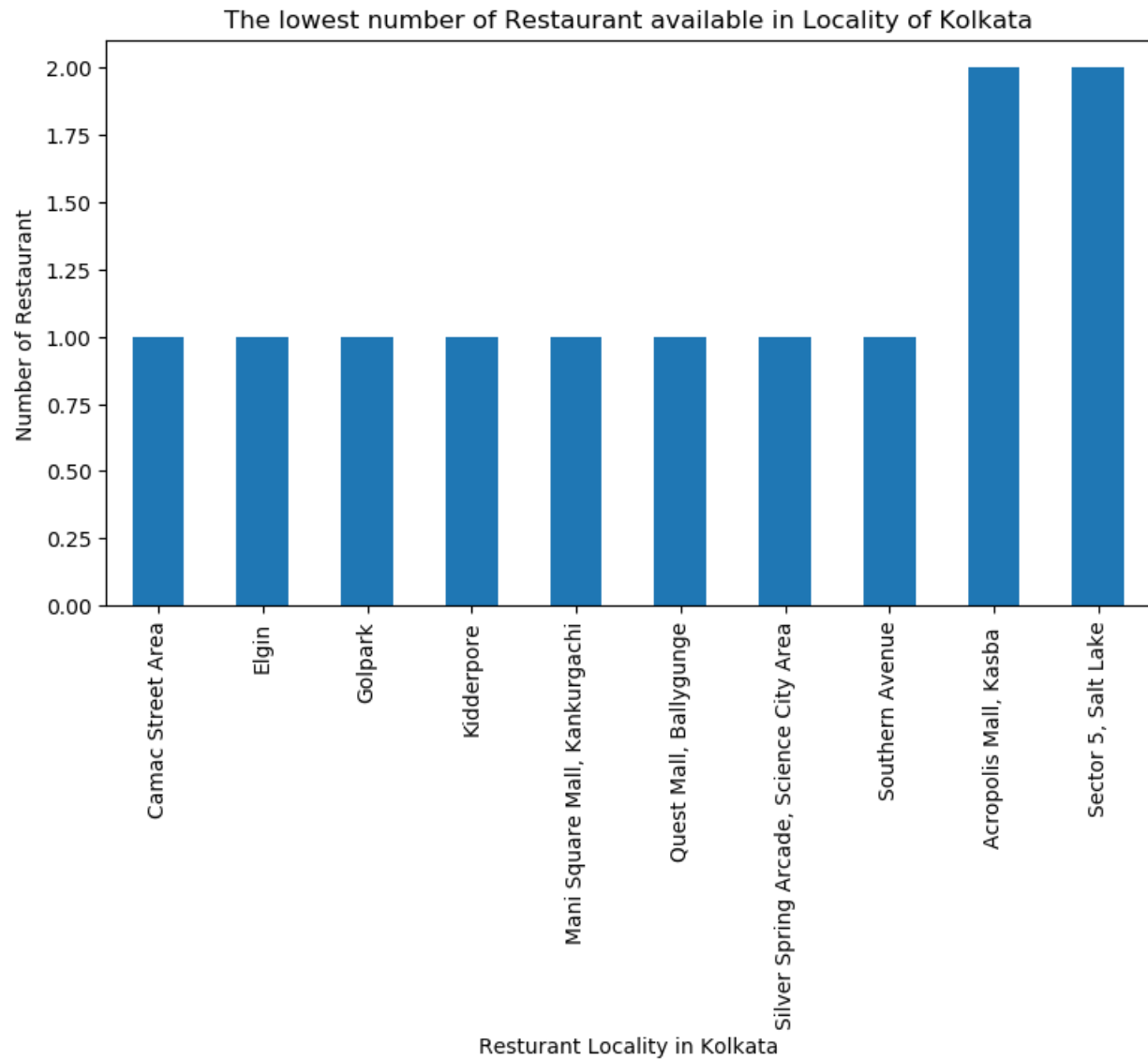
Ans: The worst restaurants are available in Mani Square Mall, KanKurgachi

3.2.3 Q: Which places are suitable for a foodie in kolkata?



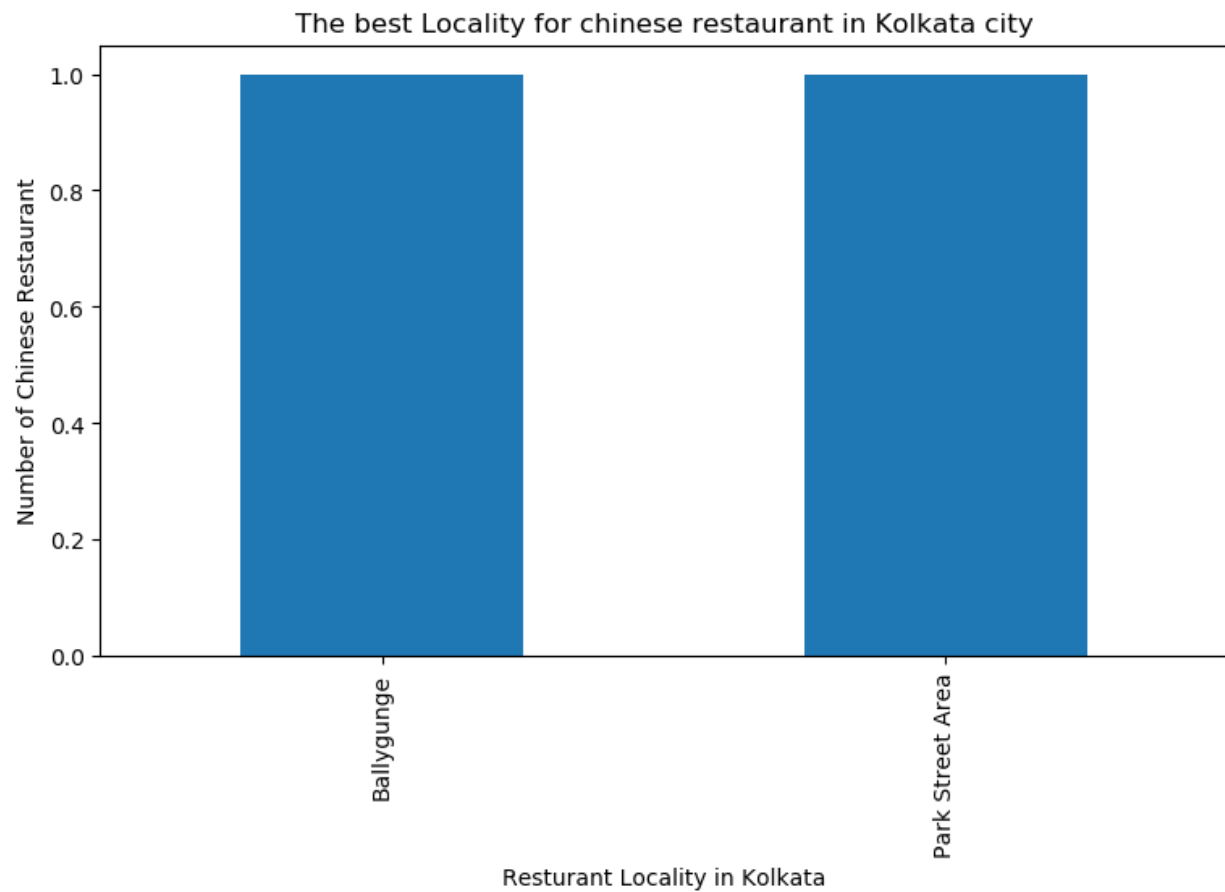
Ans: Ballygunge is the best place for a foodie to stay

3.2.4 Q: Which place is not suitable for a foodie in Kolkata?



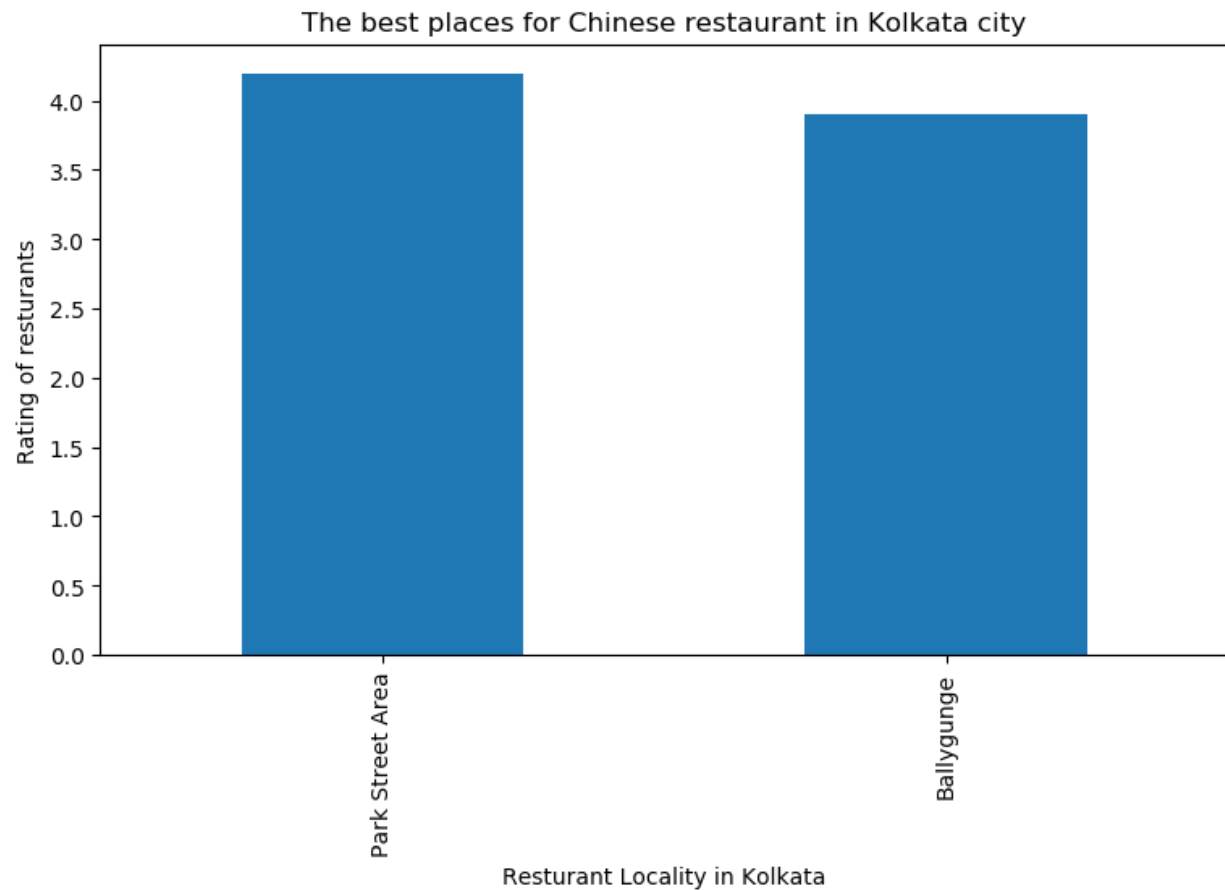
Ans: Camac Street Area is not suitable for a foodie in Kolkata

3.2.5 Q: What are the best places for chinese restaurant in Kolkata?



Ans : Ballygunge and Park Street Area are equally the best place for Chinese restaurant.

3.2.6 Q: Which places have the best chinese restaurants in Kolkata?



Ans : Parkstreet Area has the best Chinese restaurants.

4. Data transformation

4.1 Grouping the data based on Locality

The data was then grouped into several groups based on the locality

	Locality	Lat	Lng	No_of_Restaurant	Cusines	Agg_Rating	Comments	No_of_Votes
0	Acropolis Mall, Kasba	22.514636	88.393302	2	Asian, Chinese, Italian, Mexican, American, Me...	4.400	Excellent, Very Good	2048
1	Ballygunge	22.531687	88.366044	4	Continental, Middle Eastern, Asian, Chinese, C...	4.325	Excellent, Good, Very Good	4232
2	Camac Street Area	22.547186	88.350680	1	North Indian, Chinese, Mexican, Italian	4.400	Very Good	1484
3	Elgin	22.537960	88.349843	1	Tex-Mex, American	4.000	Very Good	911
4	Golpark	22.515082	88.367830	1	Seafood, Chinese	4.200	Very Good	2584

4.2 Creating a list of all the localities and venues in the locality

4.2.1 Defining Foursquare Credentials and Version

```
## Defining Foursquare Credentials and Version
```

```
CLIENT_ID = 'xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx' # Foursquare ID
```

```
CLIENT_SECRET = 'xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx' # Foursquare Secret
```

```
VERSION = '20180605' # Foursquare API version
```

4.2.2 Finding the venues in all Kolkata Locality

```
Acropolis Mall, Kasba  
Ballygunge  
Camac Street Area  
Elgin  
Golpark  
Kidderpore  
Mani Square Mall, Kankurgachi  
Park Street Area  
Quest Mall, Ballygunge  
Sector 5, Salt Lake  
Silver Spring Arcade, Science City Area  
Southern Avenue
```

	Locality	Locality Latitude	Locality Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Acropolis Mall, Kasba	22.514636	88.393302	Acropolis Mall	22.514823	88.393235	Shopping Mall
1	Acropolis Mall, Kasba	22.514636	88.393302	Cinépolis	22.514824	88.393236	Multiplex
2	Acropolis Mall, Kasba	22.514636	88.393302	Punjabee Rasoi	22.515974	88.392545	Dhaba
3	Acropolis Mall, Kasba	22.514636	88.393302	Naushijaan Restaurant - Lazzat e Lucknow	22.515238	88.389958	Awadhi Restaurant
4	Acropolis Mall, Kasba	22.514636	88.393302	KFC	22.514668	88.392230	Fried Chicken Joint

	Locality Latitude	Locality Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Locality						
Acropolis Mall, Kasba	9	9	9	9	9	9
Ballygunge	10	10	10	10	10	10
Camac Street Area	25	25	25	25	25	25
Elgin	21	21	21	21	21	21
Golpark	5	5	5	5	5	5
Kidderpore	4	4	4	4	4	4
Mani Square Mall, Kankurgachi	16	16	16	16	16	16
Park Street Area	43	43	43	43	43	43
Quest Mall, Ballygunge	18	18	18	18	18	18
Sector 5, Salt Lake	17	17	17	17	17	17
Silver Spring Arcade, Science City Area	7	7	7	7	7	7
Southern Avenue	13	13	13	13	13	13

4.2.3 Analyzing each locality

Each locality was analysed as per the availability of the various services

Locality	ATM	American Restaurant	Arts & Crafts Store	Asian Restaurant	Awadhi Restaurant	BBQ Joint	Bakery	Bar	Bengali Restaurant	Seafood Restaurant	Shopping Mall	Snack Place	South Indian Restaurant	Sports Club	Steakhouse	Tea Room	Tex-Mex Restaurant	Rest
0 Acropolis Mall, Kasba	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
1 Acropolis Mall, Kasba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2 Acropolis Mall, Kasba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 Acropolis Mall, Kasba	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Acropolis Mall, Kasba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

5 rows x 56 columns

Locality	ATM	American Restaurant	Arts & Crafts Store	Asian Restaurant	Awadhi Restaurant	BBQ Joint	Bakery	Bar	Bengali Restaurant	Seafood Restaurant	Shopping Mall	Snack Place	South Indian Restaurant	Sports Club	Steakhouse	Tea Room	Tex-Mex Restaurant	Ri
0 Acropolis Mall, Kasba	0.00	0.000000	0.000000	0.000000	0.111111	0.000000	0.000000	0.000000	0.000000	0.000000	0.111111	0.000000	0.00	0.0	0.000000	0.00	0.000000	0.00
1 Ballygunge	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.200000	0.000000	0.100000	0.000000	0.000000	0.000000	0.00	0.1	0.000000	0.00	0.000000	0.00
2 Camac Street Area	0.00	0.000000	0.000000	0.080000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.120000	0.000000	0.04	0.0	0.000000	0.04	0.000000	0.04
3 Elgin	0.00	0.095238	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.095238	0.000000	0.047619	0.000000	0.00	0.0	0.000000	0.047	0.000000	0.047
4 Golpark	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.200000	0.000000	0.000000	0.000000	0.00	0.0	0.000000	0.00	0.000000	0.00
5 Kidderpore	0.75	0.000000	0.000000	0.000000	0.250000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.00	0.0	0.000000	0.00	0.000000	0.00
6 Mani Square Mall, Kankurgachi	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.062500	0.000000	0.000000	0.000000	0.062500	0.000000	0.00	0.0	0.000000	0.00	0.000000	0.00
7 Park Street Area	0.00	0.000000	0.000000	0.046512	0.000000	0.046512	0.023256	0.023256	0.000000	0.000000	0.023256	0.046512	0.00	0.0	0.023256	0.023	0.000000	0.023
8 Quest Mall, Ballygunge	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.055556	0.000000	0.000000	0.000000	0.055556	0.000000	0.00	0.0	0.000000	0.00	0.000000	0.00

4.2.4 Printing each Locality along with the top 5 most common venues

----Acropolis Mall, Kasba ----

	venue	freq
0	Hotel	0.11
1	Restaurant	0.11
2	Awadhi Restaurant	0.11
3	Indian Sweet Shop	0.11
4	Multiplex	0.11

----Ballygunge----

	venue	freq
0	Bakery	0.2
1	Vegetarian / Vegan Restaurant	0.1
2	Pizza Place	0.1
3	Hookah Bar	0.1
4	Dhaba	0.1

----Camac Street Area----

	venue	freq
0	Shopping Mall	0.12
1	Indian Restaurant	0.08
2	Asian Restaurant	0.08
3	Mexican Restaurant	0.08
4	Italian Restaurant	0.08

----Elgin----

	venue	freq
0	Café	0.14
1	Fast Food Restaurant	0.10
2	American Restaurant	0.10
3	Nightclub	0.10
4	Bengali Restaurant	0.10

----Golpark----

	venue	freq
0	Mughlai Restaurant	0.2
1	Bengali Restaurant	0.2
2	Café	0.2
3	Chinese Restaurant	0.2
4	Plaza	0.2

----Kidderpore----

	venue	freq
0	ATM	0.75
1	Awadhi Restaurant	0.25
2	Plaza	0.00
3	Lounge	0.00
4	Mediterranean Restaurant	0.00

----Mani Square Mall, Kankurgachi----

	venue	freq
0	Fast Food Restaurant	0.12
1	Café	0.12
2	Vegetarian / Vegan Restaurant	0.06
3	Shopping Mall	0.06
4	Multiplex	0.06

----Park Street Area----

	venue	freq
0	Café	0.12
1	Indian Restaurant	0.07
2	Hotel	0.07
3	Restaurant	0.07
4	Nightclub	0.07

----Quest Mall, Ballygunge----

	venue	freq
0	Indian Restaurant	0.11
1	Irish Pub	0.06
2	Chinese Restaurant	0.06
3	Multiplex	0.06
4	Italian Restaurant	0.06

----Sector 5, Salt Lake----

	venue	freq
0	Café	0.24
1	Multiplex	0.12
2	Indian Restaurant	0.06
3	IT Services	0.06
4	Dhaba	0.06

----Silver Spring Arcade, Science City Area----

venue freq
0 Bengali Restaurant 0.14
1 Lounge 0.14
2 Asian Restaurant 0.14
3 Multicuisine Indian Restaurant 0.14
4 Indian Restaurant 0.14

----Southern Avenue----

venue freq
0 Café 0.31
1 Boutique 0.15
2 Vegetarian / Vegan Restaurant 0.08
3 Park 0.08
4 Plaza 0.08

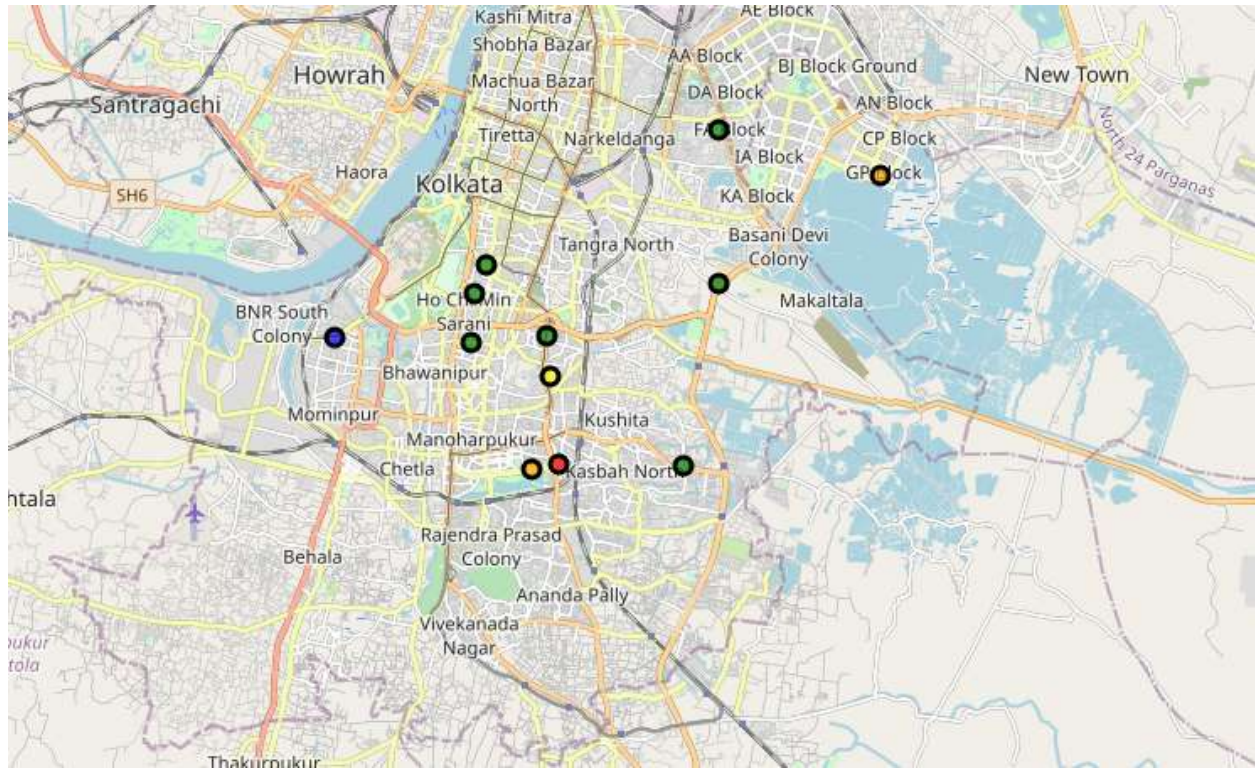
4.2.5 Displaying the top 10 venues for each Locality.

	Locality	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Acropolis Mall, Kasba	Indian Sweet Shop	Chinese Restaurant	Hotel	Awadhi Restaurant	Fried Chicken Joint	Shopping Mall	Dhaba	Restaurant	Multiplex	Hookah Bar
1	Ballygunge	Bakery	Vegetarian / Vegan Restaurant	Hookah Bar	Dhaba	Pizza Place	Plaza	Bengali Restaurant	Indian Sweet Shop	Sports Club	BBQ Joint
2	Camac Street Area	Shopping Mall	Café	Italian Restaurant	Hotel	Nightclub	Mexican Restaurant	Asian Restaurant	Indian Restaurant	Gastropub	Planetarium
3	Elgin	Café	American Restaurant	Nightclub	Bengali Restaurant	Fast Food Restaurant	Restaurant	Multiplex	Department Store	Plaza	Hotel
4	Golpark	Café	Chinese Restaurant	Mughlai Restaurant	Bengali Restaurant	Plaza	Hotel	Hookah Bar	Gastropub	Fried Chicken Joint	Food Court
5	Kidderpore	ATM	Awadhi Restaurant	Chinese Restaurant	IT Services	Hotel	Hookah Bar	Gastropub	Fried Chicken Joint	Food Court	Fast Food Restaurant
6	Mani Square Mall, Kankurgachi	Café	Fast Food Restaurant	Restaurant	Theme Restaurant	Fried Chicken Joint	Mediterranean Restaurant	Department Store	Multiplex	Chinese Restaurant	Bowling Alley
7	Park Street Area	Café	Hotel	Indian Restaurant	Nightclub	Restaurant	Fast Food Restaurant	Pizza Place	Asian Restaurant	Snack Place	Chinese Restaurant

4.3 Clustering the Locality into 5 clusters

	Locality	Lat	Lng	No_of_Restaurant	Cusines	Agg_Rating	Comments	No_of_Votes	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue
0	Acropolis Mall, Kasba	22.514636	88.393302	2	Asian, Chinese, Italian, Mexican, American, Me...	4.400	Excellent, Very Good	2046	1	Indian Sweet Shop	Chinese Restaurant	Hotel	Awadhi Restaurant	Fried Chicken Joint	Shopping Mall	
1	Ballygunge	22.531687	88.366044	4	Continental, Middle Eastern, Asian, Chinese, C...	4.325	Excellent, Good, Very Good	4232	3	Bakery	Vegetarian / Vegan Restaurant	Hookah Bar	Dhaba	Pizza Place	Plaza	E Rest
2	Camac Street Area	22.547186	88.350680	1	North Indian, Chinese, Mexican, Italian	4.400	Very Good	1484	1	Shopping Mall	Café	Italian Restaurant	Hotel	Nightclub	Mexican Restaurant	Rest

4.4 Creating the final map



4.5 Examining the clusters

4.5.1 Cluster 1

	Lat	Agg_Rating	Comments	No_of_Votes	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
4	22.515082	4.2	Very Good	2584	0	Café	Chinese Restaurant	Mughlai Restaurant	Bengali Restaurant	Plaza	Hotel	Hookah Bar	Gastropub	Fried Chicken Joint	Food Court

4.5.2 Cluster 2

	Lat	Agg_Rating	Comments	No_of_Votes	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	22.514636	4.400	Excellent, Very Good	2048	1	Indian Sweet Shop	Chinese Restaurant	Hotel	Awadhi Restaurant	Fried Chicken Joint	Shopping Mall	Dhaba	Restaurant	Multiplex	Hookah Bar
2	22.547186	4.400	Very Good	1484	1	Shopping Mall	Cafe	Italian Restaurant	Hotel	Nightclub	Mexican Restaurant	Asian Restaurant	Indian Restaurant	Gastropub	Planetarium
3	22.537960	4.000	Very Good	911	1	Cafe	American Restaurant	Nightclub	Bengali Restaurant	Fast Food Restaurant	Restaurant	Multiplex	Department Store	Plaza	Hotel
6	22.577821	3.900	Good	1064	1	Cafe	Fast Food Restaurant	Restaurant	Theme Restaurant	Fried Chicken Joint	Mediterranean Restaurant	Department Store	Multiplex	Chinese Restaurant	Bowling Alley
7	22.552495	4.225	Excellent, Good, Very Good	19079	1	Cafe	Hotel	Indian Restaurant	Nightclub	Restaurant	Fast Food Restaurant	Pizza Place	Asian Restaurant	Snack Place	Chinese Restaurant
8	22.539129	4.400	Very Good	2224	1	Indian Restaurant	Irish Pub	Plaza	Indian Sweet Shop	Italian Restaurant	Department Store	Mughai Restaurant	Coffee Shop	Multiplex	Clothing Store
10	22.549100	4.100	Very Good	1616	1	Chinese Restaurant	Hotel	Asian Restaurant	Lounge	Bengali Restaurant	Multicuisine Indian Restaurant	Indian Restaurant	Coffee Shop	Hookah Bar	Gastropub

4.5.3 Cluster 3

	Lat	Agg_Rating	Comments	No_of_Votes	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
5	22.538999	4.6	Excellent	1219	2	ATM	Awadhi Restaurant	Chinese Restaurant	IT Services	Hotel	Hookah Bar	Gastropub	Fried Chicken Joint	Food Court	Fast Food Restaurant

4.5.4 Cluster 4

	Lat	Agg_Rating	Comments	No_of_Votes	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
1	22.531687	4.325	Excellent, Good, Very Good	4232	3	Bakery	Vegetarian / Vegan Restaurant	Hookah Bar	Dhaba	Pizza Place	Plaza	Bengali Restaurant	Indian Sweet Shop	Sports Club	BBQ Joint

4.5.5 Cluster 5

	Lat	Agg_Rating	Comments	No_of_Votes	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
9	22.569363	4.25	Excellent, Good	7006	4	Cafe	Multiplex	Pizza Place	Sandwich Place	Hookah Bar	Fried Chicken Joint	Fast Food Restaurant	Dhaba	IT Services	Bengali Restaurant
11	22.514119	4.00	Very Good	1126	4	Cafe	Boutique	Bakery	Coffee Shop	Park	Chinese Restaurant	Plaza	Vegetarian / Vegan Restaurant	Arts & Crafts Store	Bar

4.6 Results

- Ballygunge, Park Street Area are some of the best neighborhoods for Chinese cuisine.
- Park Street, Ballygunge have the best Chinese Restaurant.
- Ballygunge, Park street Area, Acropolis Mall Kasba are the best places for a foodie.
- Kidderpore, Acropolis Mall Kasba have best restaurants in Kolkata.
- **Cluster 1, Cluster 2, Cluster 5:** It is most recommended for cafe.
- **Cluster 3 :** It is most recommended for Awadhi restaurant, Chinese Restaurant.
- **Cluster 4:** It is most recommended for Bakery & Veg restaurant.

4.2. Discussion

After looking at the result, we can see that Ballygunge, Park Street Area are some of the best neighborhoods for Chinese cuisine, Park Street, Ballygunge have the best Chinese Restaurant. Ballygunge, Park street Area, Acropolis Mall Kasba are the best places for a foodie. Kidderpore, Acropolis Mall Kasba have best restaurants in Kolkata. Moreover if a travel agency has to recommend a traveler about the area that the passenger should choose for staying, then the cluster analysis can be utilized. Here the data analysis and clustering of Kolkata shows that Cluster 1, Cluster 2, Cluster 5: It is most recommended for cafe, Cluster 3 : It is most recommended for Awadhi restaurant, Chinese Restaurant, Cluster 4: It is most recommended for Bakery & Veg restaurant.

4.7 Conclusion

The technique can be implemented in various apps which can recommend the travellers about the best cuisines and restaurants in a place. It can be made more accurate using more data. I have used the data set from Zomato. Like wise data set other food delivery services can be used to create a better experience for the customers. The travel agency would be able to make a better relation with the customers and passengers that would be helpful for the business.
