

# The Battle of Neighborhoods –

## Continental Restaurant



### Table of Contents

1. Introduction
2. Problem
3. Target Audience
4. Data Overview
5. Methodology
6. Discussion
7. Conclusion

### Introduction:

Eating is one of life's pleasure and pride – so is cooking and serving good food to others. A restaurant is a commercial outfit which specializes in the preparation of quality food and to serve

them to satisfy the customer's demands. Their motto is "Customers are our assets and satisfied customers are our source of wealth". Restaurants do have state of the art kitchens in their premises, where food items are prepared, following a fixed menu to serve the customers.

## **Problem:**

Bangalore is the capital and the largest city of the Indian state of Karnataka. It has a population of more than 8 million and a metropolitan population of around 11 million, making it the third most populous city and fifth most populous urban agglomeration in India. Located in southern India on the Deccan Plateau, at a height of over 900 m (3,000 ft) above sea level, Bangalore is known for its pleasant climate throughout the year. Its elevation is the highest among the major cities of India.

Most of the business persons want to open their own continental Restaurant in this city. To find the exact location in order to open new continental restaurant here is bit difficult because there will high competition in this field for establishing a new restaurant here. The location of the restaurant is crucial to its success. Much thought and planning need to go into deciding the location, and many factors need to be considered before selecting the site. Location plays a crucial role in its success or failure. Great establishments have been known to shut down because of poor restaurant location. While it is true that it takes considerable efforts to find the right mix of a triad- Location, Food, and Service for the success of a restaurant, it is essential to realize that location is just one of the crucial factors.

I have listed few questions to be answered to get a proper location for establishing a new Continental restaurant in Bangalore:

- 1) Which one is the best location to establish Continental Restaurant in Bangalore, India?
- 2) Which area have a greater number of Continental Restaurants?
- 3) Which place have lower number of Continental cuisines?
- 4) The neighborhood of the location selected like shopping mall, park, theater, airport, railway station, school, college etc., so that peoples are attracted towards the restaurant?

## **Target Audience:**

The business person who want to open a new continental restaurant in the populated city Bangalore, are target here. By giving some insight to select the location for the establishment of continental restaurant in the Bangalore based on neighborhood competition of same business field.

## **Data Overview:**

I have selected the location Bangalore, Karnataka, India for the business problem regarding establishing the restaurant in the city. The source of the data as listed below.

1)For location: <https://raw.githubusercontent.com/haanjiankur/Capstone-Project---The-Battle-of-Neighborhoods/master/zomato.csv/>

I have explored this data to find some of the places which are best for the establishing a new restaurant in Bangalore. This data contains all information which are, Restaurant id, Restaurant Name, Country code, City, Address, Locality, Locality Verbose, Cuisine, Has Table booking, Locality, latitude, longitude, Currency, Has Online delivery, Is delivering now, Switch to order menu, Price range, Aggregate rating, Rating color, Rating text, votes  
Including the index number, it contains totally 22 columns. So there no need does extra work to find the latitude and longitude of the location. This data will answer the following questions

2) All data related to locations and quality of Italian restaurants will be obtained via the Foursquare API utilized via the Request library in Python. <https://developer.foursquare.com/>  
Describe: The foursquare is used to find the location of nearby venue near the selected location, based on which I will recommend to select the location to establish the restaurant, to find the other restaurant present near by selected location, best rated restaurant near by it, and types of cuisine of restaurants present in the neighborhood of the selected location, and other nearer venues to it

3)To explore more information such as demographics about Bangalore.  
<https://en.wikipedia.org/wiki/Bangalore/>.

Describe: only refer and report the demography of the location.

## Methodology:

I have used following step in order move towards the solution of the problem:

- i) I have imported required libraries such as numpy, pandas, requests matplotlib.pyplot, folium, kmean from sklearn.cluster , json\_normalize etc.,
- ii) Data acquisition:
  - Imported the data from the above given link using pandas.read\_csv and analyzed the data. The data frame contains 22 columns as listed in the data description.
  - The data has selected for the particular city “Bangalore” in India.
- iii) Cleaning Data:
  - Next step I had only selected important columns such as restaurant id, restaurant name, locality, cuisines, latitude, longitude, aggregate rating, rating in text and votes

	Restaurant Name	Locality	Longitude	Latitude	Cuisines	Aggregate rating	Rating text	Votes
0	Sultans of Spice	BluPetal Hotel, Koramangala	77.615428	12.933284	North Indian, Mughlai	4.1	Very Good	2416
1	The Fatty Bao - Asian Gastro Bar	Indiranagar	77.645396	12.970221	Asian	4.7	Excellent	2369
2	Toit	Indiranagar	77.640709	12.979166	Italian, American, Pizza	4.8	Excellent	10934
3	Three Dots & A Dash	Indiranagar	77.640489	12.980410	European, Continental	3.9	Good	1354
4	Bombay Brasserie	Indiranagar	77.645748	12.970324	Modern Indian	4.2	Very Good	231

- Finding the null values present in the Blre\_df. But there is absence of null value (as shown in the following picture)

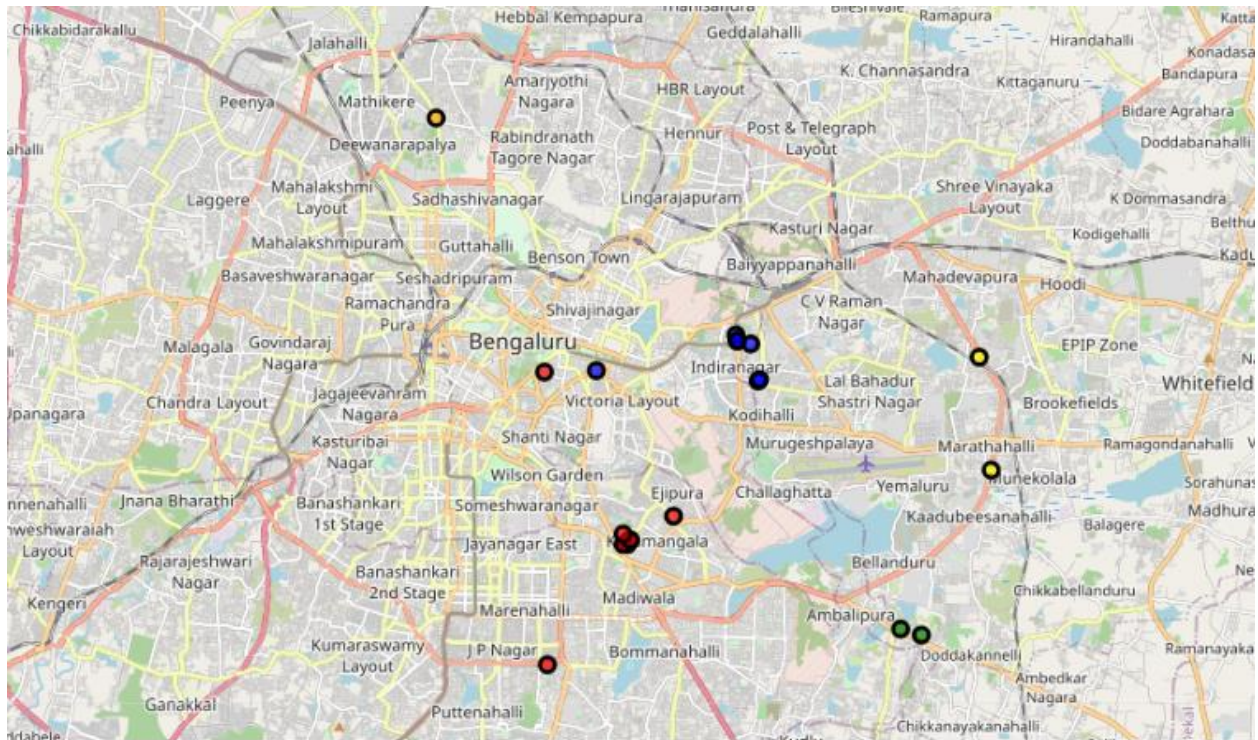
```

Restaurant Name    0
Locality           0
Longitude          0
Latitude           0
Cuisines           0
Aggregate rating    0
Rating text        0
Votes              0
dtype: int64

```

VI) Creating a map using Folium:

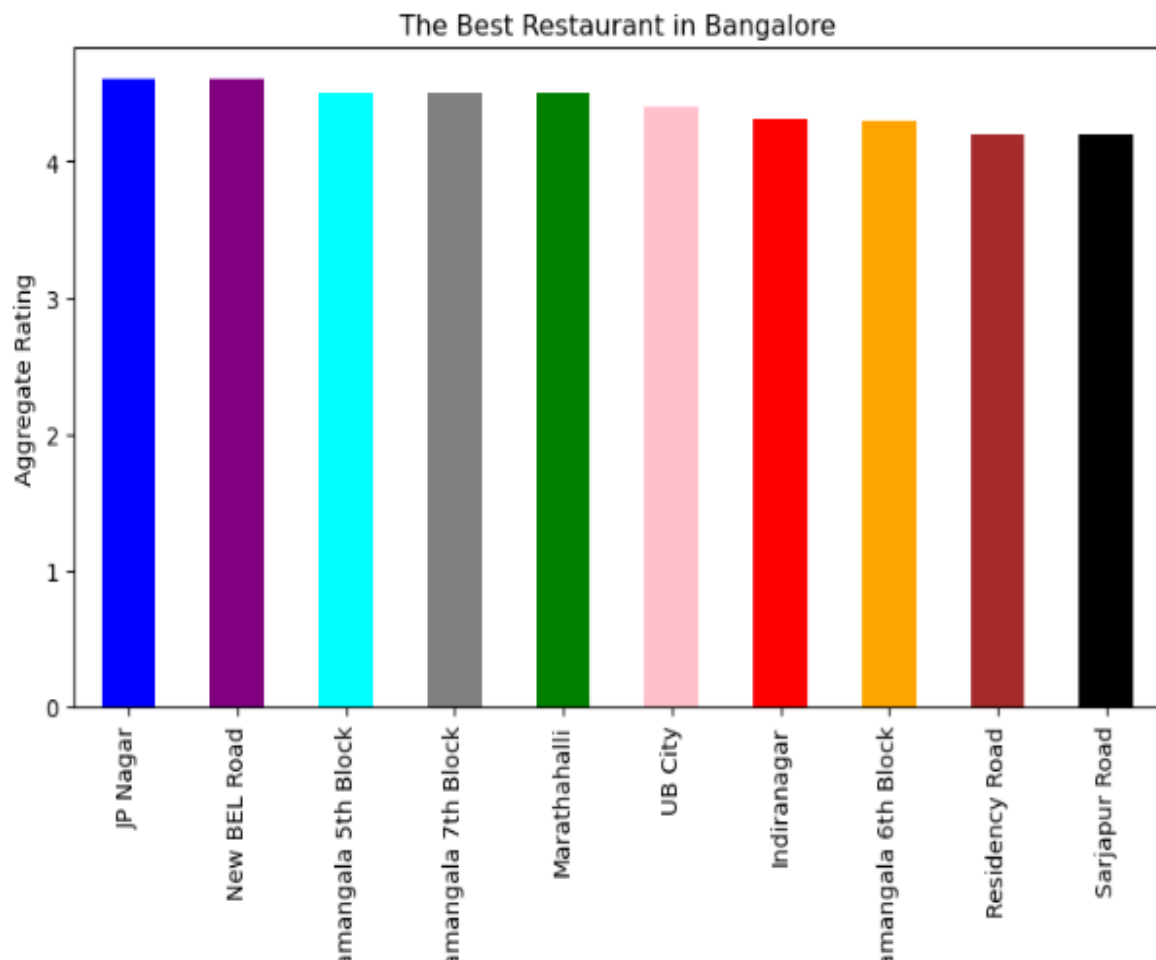
Created map to show the restaurant clusters in few main areas like Indranagar, JP Nagar, Koramangala, Marthahalli, UBcity, Sarjapur etc.,



VII) The data frame of the clusters formed is as follows:

	Restaurant Name	Locality	Longitude	Latitude	Cuisines	Aggregate rating	Rating text	Votes	Cluster
0	Sultans of Spice	BluPetal Hotel, Koramangala	77.615428	12.933284	North Indian, Mughlai	4.1	Very Good	2416	0
1	The Fatty Bao - Asian Gastro Bar	Indiranagar	77.645396	12.970221	Asian	4.7	Excellent	2369	2
2	Toit	Indiranagar	77.640709	12.979166	Italian, American, Pizza	4.8	Excellent	10934	2
3	Three Dots & A Dash	Indiranagar	77.640489	12.980410	European, Continental	3.9	Good	1354	2
4	Bombay Brasserie	Indiranagar	77.645748	12.970324	Modern Indian	4.2	Very Good	231	2

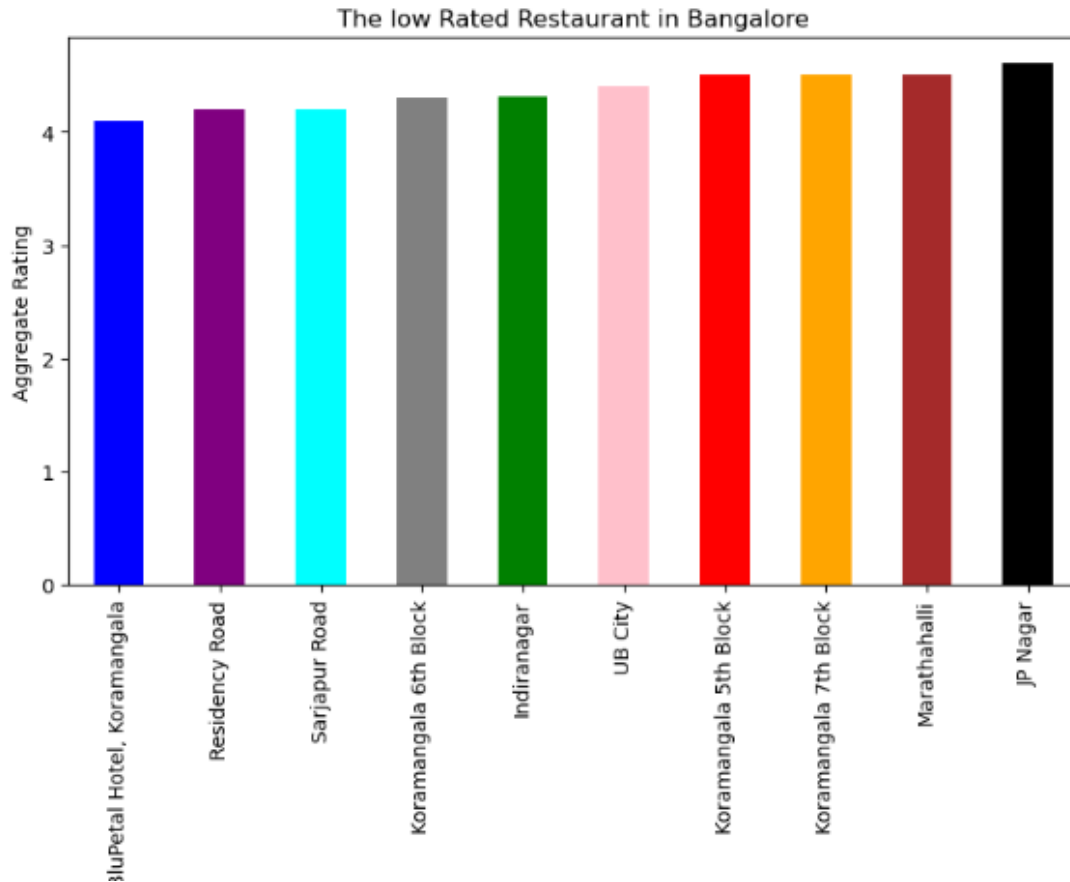
I used visualization to bar graph, to find the places having best Restaurants in Bangalore



This shows the best restaurant occurs in areas like JP nagar, New BEL Road, Koramangal 5th block, Koramangal 5th block and so on we plotted based on aggregate rating provided to the restaurants.

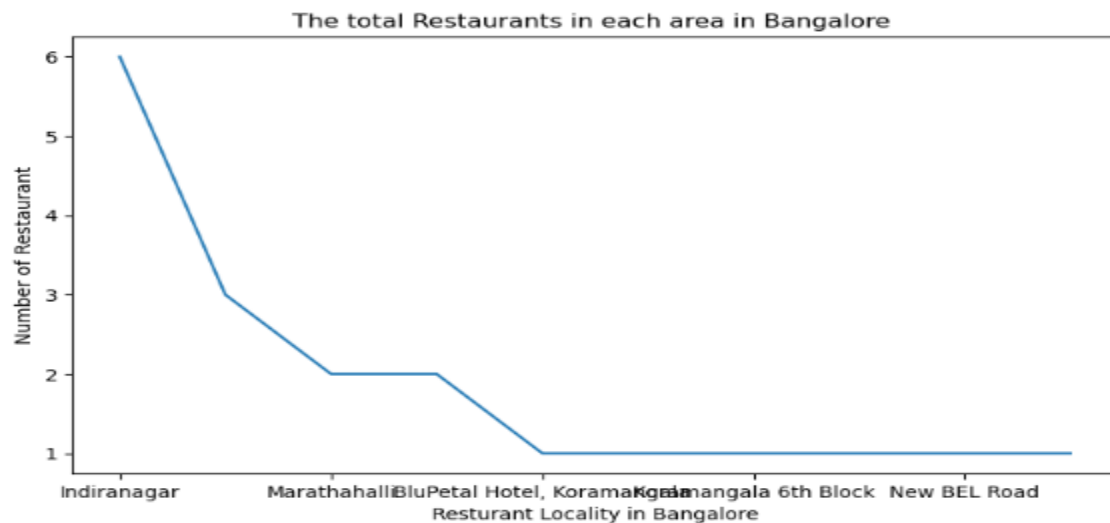


The low rated restaurants are as follows in the picture:



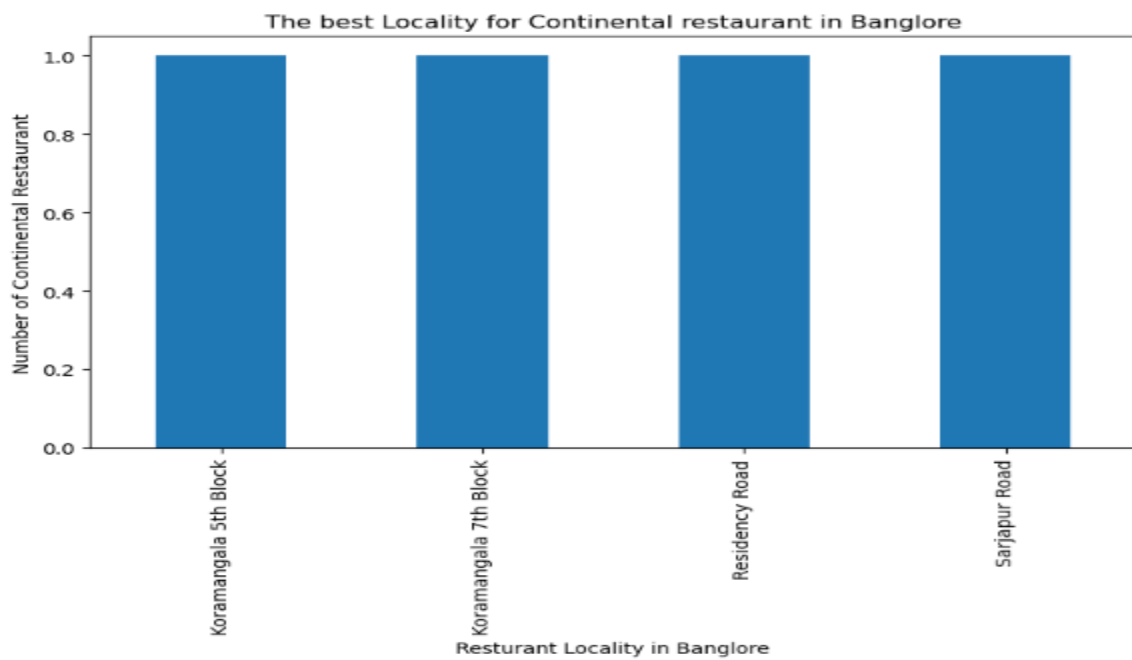
In finding aggregate rate for restaurant we obtained BluPetal Hotel, Koramangal is very low rated restaurant by the customers.

The total number of restaurants in Bangalore as shown in the following bar graph



Larger number of restaurant lies In the Indranagar .

The places where there is availability of continental Restaurant are visualized as follows



### VIII) Preprocessing the Data:

The preprocessed data to use in the Foursquare as follows

	Locality	Lat	Lng	No_of_Restaurant	Cusines	Agg_Rating	Comments	No_of_Votes
0	BluPetal Hotel, Koramangala	12.933284	77.615428	1	North Indian, Mughlai	4.100000	Very Good	2416
1	Indiranagar	12.976278	77.642775	6	Asian, Italian, American, Pizza, European, Con...	4.316667	Excellent, Good, Very Good	19834
2	JP Nagar	12.906229	77.596791	1	Pizza, Cafe, Italian	4.600000	Excellent	781
3	Koramangala 5th Block	12.933947	77.615415	3	Continental, American, Italian, North Indian, ...	4.500000	Excellent, Very Good	15328
4	Koramangala 6th Block	12.939496	77.625999	1	North Indian, Chinese, Italian, Street Food, D...	4.300000	Very Good	753

### IX)Using Foursquare API finding neighborhood:

I had set the radius of search to 500 meters around the restaurant and limit to 100 venues. I used Foursquare API to explore areas around restaurants of each locality and find 10 most common venues in each locality. This is an example of the search result merged with neighborhood data:

1	Indiranagar	12.976278	77.642775	6	Asian, Italian, American, Pizza, European, Con...	4.316667	Excellent, Good, Very Good	19834	0	Café	Indian Restaurant	Dessert Shop	Chinese Restaurant	Pizza Place	Bar	Bakery
2	JP Nagar	12.906229	77.596791	1	Pizza, Cafe, Italian	4.600000	Excellent	781	0	Indian Restaurant	Pizza Place	Bakery	Bar	Coffee Shop	Café	Snack Place
3	Koramangala 5th Block	12.933947	77.615415	3	Continental, American, Italian, North Indian, ...	4.500000	Excellent, Very Good	15328	0	Indian Restaurant	Café	Fast Food Restaurant	Chinese Restaurant	Lounge	Electronics Store	Dessert Shop
4	Koramangala 6th Block	12.939496	77.625999	1	North Indian, Chinese, Italian, Street Food, D...	4.300000	Very Good	753	0	Indian Restaurant	Pizza Place	Seafood Restaurant	Café	Beer Garden	Steakhouse	Pub
5	Koramangala 7th Block	12.935662	77.614130	1	Continental, American	4.500000	Excellent	1288	0	Indian Restaurant	Chinese Restaurant	Café	Fast Food Restaurant	Lounge	Dessert Shop	Restaurant
6	Marathahalli	12.962655	77.698025	2	European, Mediterranean, North Indian, Asian, ...	4.500000	Excellent, Very Good	7890	2	Indian Restaurant	Dessert Shop	Clothing Store	Chinese Restaurant	Café	Pizza Place	Electronics Store
7	New BEL Road	13.029198	77.570997	1	Pizza, Cafe, Italian	4.600000	Excellent	627	3	Ice Cream Shop	Fast Food Restaurant	Pizza Place	Bar	Indian Restaurant	Mexican Restaurant	Chinese Restaurant
8	Residency Road	12.972532	77.608179	1	Continental	4.200000	Very Good	334	0	Café	Indian Restaurant	Bar	Lounge	Chinese Restaurant	Pub	Coffee Shop
9	Sarjapur Road	12.913652	77.680818	2	Finger Food, North Indian, Italian, Continenta...	4.200000	Excellent, Good	6110	1	Indian Restaurant	Café	Brewery	Afghan Restaurant	Ice Cream Shop	Liquor Store	Lounge
10	UB City	12.972161	77.596014	1	Modern Indian	4.400000	Very Good	754	4	Italian Restaurant	Café	Lounge	Hotel	Coffee Shop	Stadium	Ice Cream Shop

Using foursquare to find the nearby venues and new data frame and display the top 10 venues for each Locality.

**X)By using K-Mean clustering(Machine Learning technics are used here to cluster the nearby venues):**

Using K-mean clustering the nearby venues are Now we will run K-Means algorithm for k = 5. Merging the locality table with the results of K-Means algorithm will result in the following table

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	8th most Common Venue	9th most Common Venue	10th most Common Venue
0 BluPetal Hotel, Koramangala	12.933284	77.615428	1	North Indian, Mughlai	4.100000	Very Good	2416	3	Indian Restaurant	Fast Food Restaurant	Café	Chinese Restaurant	Lounge	Dessert Shop	Asian Restaurant	Electronics Store	Bookstore	Pub
1 Indiranagar	12.976278	77.642775	6	Asian, Italian, American, Pizza, European, Con...	4.316667	Excellent, Good, Very Good	19834	1	Café	Indian Restaurant	Pizza Place	Dessert Shop	Chinese Restaurant	Vegetarian / Vegan Restaurant	Pub	Bar	Bakery	Restaurant
2 JP Nagar	12.906229	77.596791	1	Pizza, Cafe, Italian	4.600000	Excellent	781	1	Pizza Place	Café	Bar	Multiplex	Bakery	Indian Restaurant	Coffee Shop	Fast Food Restaurant	Clothing Store	Chinese Restaurant
3 Koramangala 5th Block	12.933947	77.615415	3	Continental, American, Italian, North Indian, ...	4.500000	Excellent, Very Good	15328	3	Indian Restaurant	Café	Fast Food Restaurant	Chinese Restaurant	Lounge	Electronics Store	Bar	Dessert Shop	Asian Restaurant	Bookstore
4 Koramangala 6th Block	12.939496	77.625999	1	North Indian, Chinese, Italian, Street Food, D...	4.300000	Very Good	753	1	Indian Restaurant	Pizza Place	Seafood Restaurant	Beer Garden	Café	Steakhouse	Food Court	Italian Restaurant	Gym / Fitness Center	General Entertainment



## Mapping the clusters:

The clusters are mapped using the folium and I used tiles='CartoDB dark\_matter' and zoom start at 10



I have shown only one cluster her and its inference of all the cluster is as shown below

## Cluster1:

### Cluster 1

```
 Banglore_merged.loc[Banglore_merged['Cluster Labels'] == 0, Banglore_merged.columns[[1] + list(range(5, Banglore_merged.shape[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
0	12.933284	4.100000	Very Good	2416	0	Indian Restaurant	Fast Food Restaurant	Café	Chinese Restaurant	Lounge	Electronics Store	Dessert Shop	Pub	Restaurant	Bookstore
1	12.976278	4.316667	Excellent, Good, Very Good	19834	0	Café	Indian Restaurant	Dessert Shop	Chinese Restaurant	Pizza Place	Bar	Bakery	Lounge	Restaurant	Department Store
2	12.906229	4.600000	Excellent	781	0	Indian Restaurant	Pizza Place	Bakery	Bar	Coffee Shop	Café	Snack Place	Garden	Fast Food Restaurant	Mediterranean Restaurant
3	12.933947	4.500000	Excellent, Very Good	15328	0	Indian Restaurant	Café	Fast Food Restaurant	Chinese Restaurant	Lounge	Electronics Store	Dessert Shop	Restaurant	Bookstore	Shopping Mall
4	12.939496	4.300000	Very Good	753	0	Indian Restaurant	Pizza Place	Seafood Restaurant	Café	Beer Garden	Steakhouse	Pub	General Entertainment	Fast Food Restaurant	Italian Restaurant
5	12.935662	4.500000	Excellent	1288	0	Indian Restaurant	Chinese Restaurant	Café	Fast Food Restaurant	Lounge	Dessert Shop	Restaurant	Bookstore	Electronics Store	Donut Shop
8	12.972532	4.200000	Very Good	334	0	Café	Indian Restaurant	Bar	Lounge	Chinese Restaurant	Pub	Coffee Shop	Clothing Store	Donut Shop	Bookstore

## Cluster2:

## Cluster 2

```
83]: Bangalore_merged.loc[Bangalore_merged['Cluster_Labels'] == 1, Bangalore_merged.columns[[1] + list(range(5, Bangalore_merged.shape[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
9	12.913652	4.2	Excellent, Good	6110	1	Indian Restaurant	Café	Brewery	Afghan Restaurant	Ice Cream Shop	Liquor Store	Lounge	Electronics Store	Eastern European Restaurant	Coffee Shop

## Cluster3:

### Cluster 3

```
]: Bangalore_merged.loc[Bangalore_merged['Cluster_Labels'] == 2, Bangalore_merged.columns[[1] + list(range(5, Bangalore_merged.shape[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
6	12.962655	4.5	Excellent, Very Good	7890	2	Indian Restaurant	Dessert Shop	Clothing Store	Chinese Restaurant	Café	Pizza Place	Electronics Store	Coffee Shop	Comfort Food Restaurant	Cosmetics Shop

## Cluster4:

### Cluster 4

```
Bangalore_merged.loc[Bangalore_merged['Cluster_Labels'] == 3, Bangalore_merged.columns[[1] + list(range(5, Bangalore_merged.shape[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
7	13.029198	4.6	Excellent	627	3	Ice Cream Shop	Fast Food Restaurant	Pizza Place	Bar	Indian Restaurant	Mexican Restaurant	Chinese Restaurant	Asian Restaurant	Burger Joint	German Restaurant

## Cluster5:

### Cluster 5

```
]: Bangalore_merged.loc[Bangalore_merged['Cluster_Labels'] == 4, Bangalore_merged.columns[[1] + list(range(5, Bangalore_merged.shape[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
10	12.972161	4.4	Very Good	754	4	Italian Restaurant	Café	Lounge	Hotel	Coffee Shop	Stadium	Ice Cream Shop	Mexican Restaurant	Pizza Place	Brewery

## Result and Discussion:

Result: The clusters neighborhood based on inference;

- cluster 1(variety of food places, Stadium, Pub, Lounge, Business Service, Coffee shops Clothing store, book store etc.)
- Cluster 2(variety of food places like Indian, afghan, Ice cream shops etc.)
- (Cluster 3 (variety of food places like Indian Restaurant, clothing store, Chinese restaurant, café, electronic store, etc., are present near to the venue.)
- Cluster 4 (variety of food places have different country cuisine nearby selected venue)
- Cluster 5 (variety of food places like Indian, Italian restaurant, café lounge, stadium etc., are present near the venue)

## **Discussion:**

This cluster 1 is the not much preferable best option to open a continental restaurant because there will presence of variety of food place but don't have continental restaurant but there will be some cuisine like Indian, Chinese, cafe, pizza hut, bakery, seafood and Italian restaurants etc., there is also present some places like stadium, business services, Bar, garden, book store, clothing store etc. so the area like Indranagar, JP Nagar, Residency Road, Koramangal 5<sup>th</sup>,6<sup>th</sup> etc., lies in this cluster.

Cluster2: In this cluster there is presence of variety of cuisine near the venue it is also not preferably advised for new restaurant in the area of Sarjapur.

Cluster3: Variety of food places like Indian Restaurant, clothing store, Chinese restaurant, café, electronic store etc., are present near to the venue is also not preferably advised in the area of Marthahalli.

Cluster4: variety of food places have different country cuisine nearby selected venue like Indian, Mexican, Asian, Chinese, German etc., so there is already presence of number of different country cuisine which may not be good to advice to open a new restaurant New BEL Road.

Cluster 5: variety of food places like Indian, Italian restaurant, café lounge, stadium etc., are present near the venue compared to other place this place contains a smaller number of foreign cuisine and there is presence of stadium, lounge etc., also presence of shopping area etc near UB city.

## **Conclusion:**

Coursera "IBM Data Science Professional certificate" course has provided us a best opportunity to learn data science by the end of this course we had an opportunity on a business problem, and it was tackled in a way that it was similar to how a genuine data scientist would do. We utilized numerous Python libraries to fetch the information, control the content and break down and visualize those datasets. We have utilized Foursquare API to investigate the settings in neighborhoods of restaurants of Bangalore using Zomato data set. I had also visualized utilizing different plots present in Matplotlib libraries. Similarly, we applied AI strategy to anticipate the error given the information and utilized Folium to picture it on a map. At end came to a conclusion based on various visualization tools like bar graph, line graph and one maps from which we can

come to a better understanding of the interests we had earlier to be discovered which are specified as follows.

- There is some foreign cuisine like Indian restaurant, Italian restaurant, café, Chinese restaurant and fast food around the selected area.
- There will be also some places which are used for business purpose, lounge, pub etc.
- UB city is the best place to open a new restaurant in cluster 2, but can select any area in cluster2 to open a new continental restaurant