

# CAPSTONE PROJECT

## The Battle of Neighborhoods

### Introduction

**Chennai**, is the capital of the state of Tamil Nadu, located in the south-east coast of India. Along with having the third-largest expatriate population in India, it has also been named as one of the top 10 cities to visit in the world by a number of tourism magazines and websites.

However, with the increase in visitors from all over the world, it is imperative that the city be able to cater to a varied palette. Also, since the Indian cuisine, with its strong flavor, is not a very sustainable eating source for most westerners, the need for restaurants catering continental cuisine arises.

Therefore, my idea for the IBM Data Science Capstone Project is to explore the varied cuisines of restaurants in Chennai, India and determine which would be optimal location to start one.

### Data

For this project, I will be using the following data:

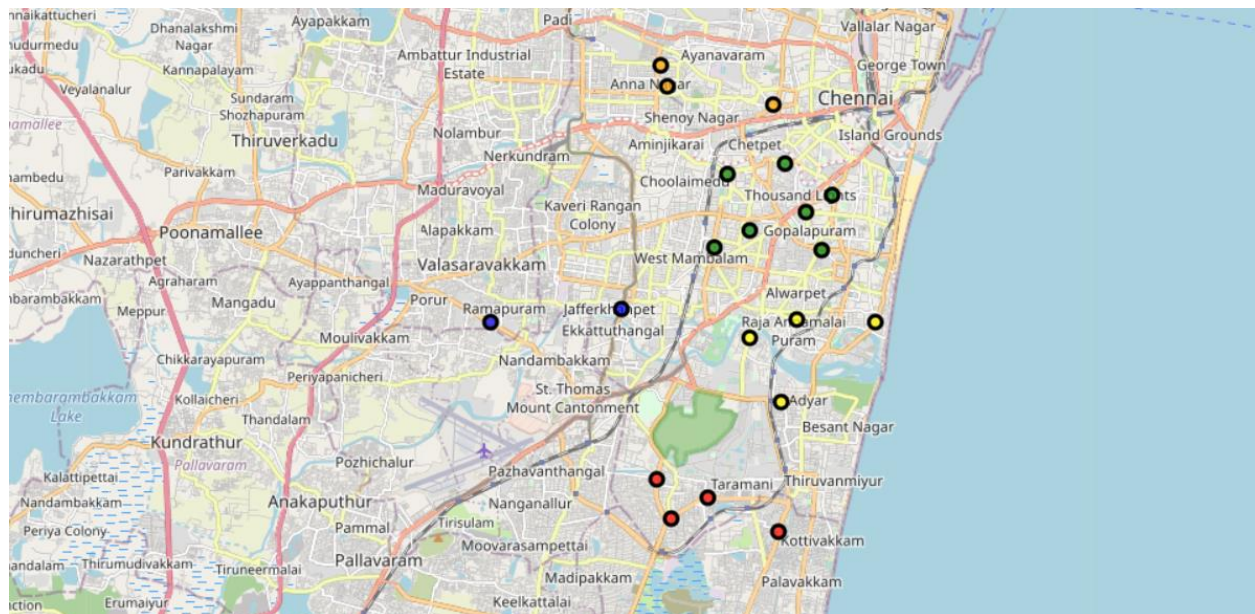
- Chennai Restaurants data.
  - Data source: [Zomato kaggle dataset](#)
  - Description: This data set contains the required information. And we will use this data set to explore various locality of Chennai city.
- Nearby places in each locality of Chennai city.
  - Data source: [Fousquare API](#)
  - Description: By using this api we will get all the venues in each neighborhood.

# Methodology

## Data acquisition and cleaning

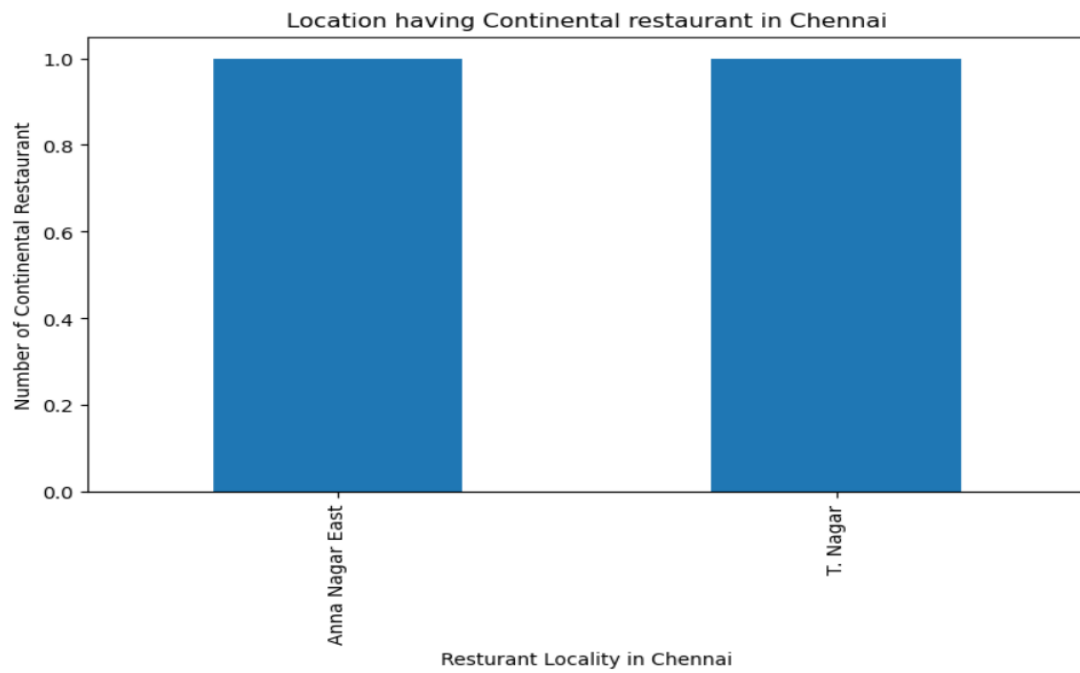
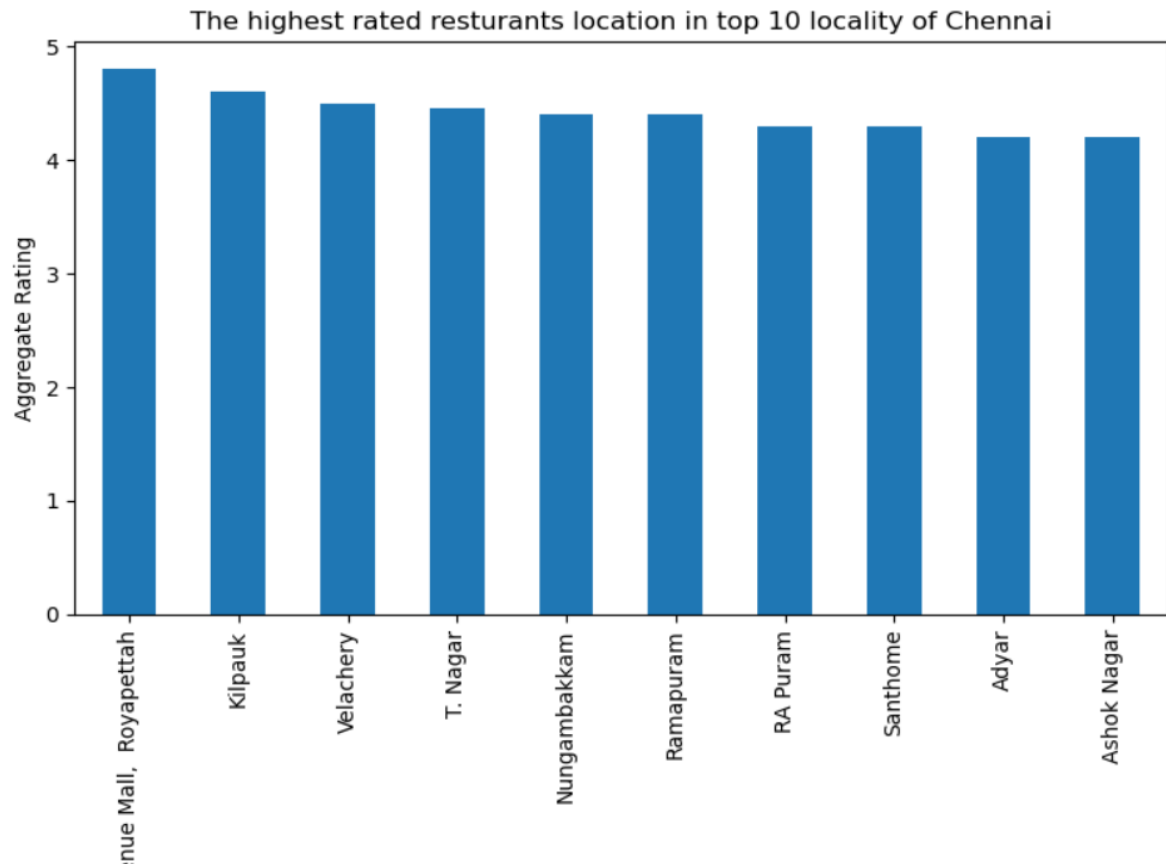
The data for this analysis was acquired from a Zomato Kaggle dataset described above. This data was extracted into a data frame and cleaned by filtering restaurants located in Chennai and also the removal of unwanted columns such as 'Restaurant Id', 'Country code', 'Has delivery', 'has table booking' etc. Doing so reduced the size of the table from 21 columns to 8.

The resultant list was then presented on a folium map as shown below



## Data Analysis

The data was then analysed to figure out the locations containing best rated restaurants in Chennai as well as to note which locations already had a restaurant catering continental cuisine.

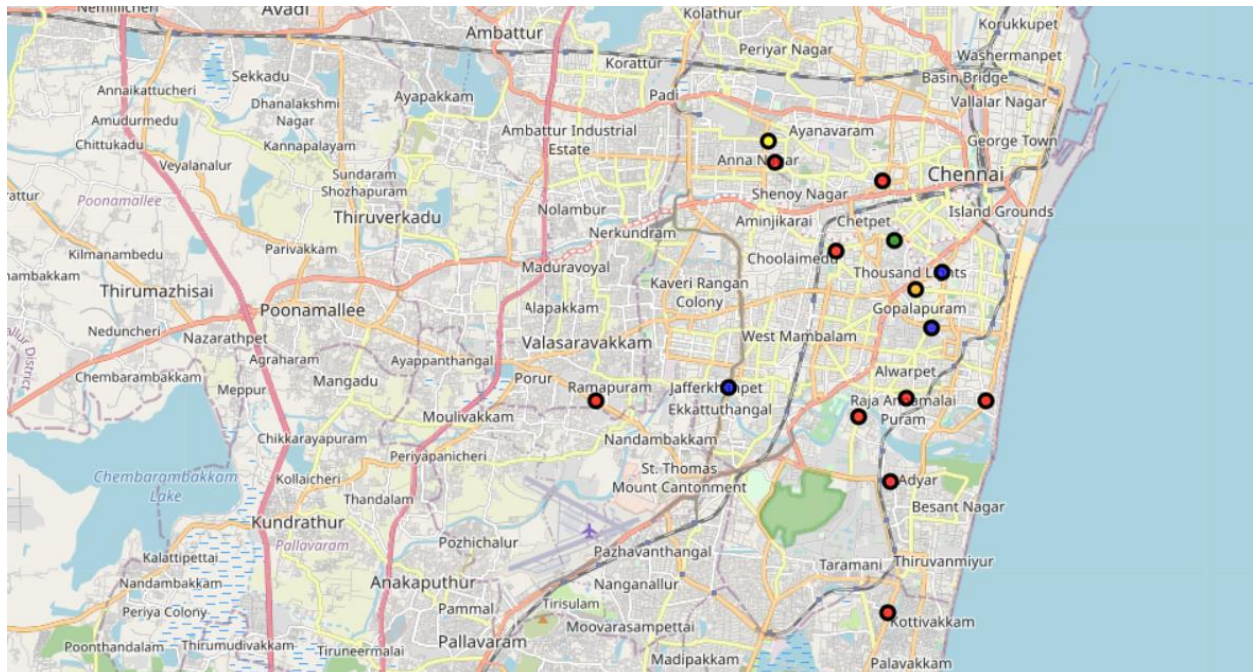


For the next step, Foursquare API was used to find the nearby venues for all the given restaurant locations in Chennai.

Using a function, a new data frame was created containing the 10 most common venues near each restaurant location

	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	Adyar	Indian Restaurant	Café	Dessert Shop	Department Store	Vegetarian / Vegan Restaurant	Pizza Place	North Indian Restaurant	Movie Theater	Italian Restaurant	Ice Cream Shop
1	Anna Nagar East	Indian Restaurant	Café	Fast Food Restaurant	Middle Eastern Restaurant	Restaurant	Bakery	Chinese Restaurant	Ice Cream Shop	Department Store	Pizza Place
2	Ashok Nagar	Indian Restaurant	Fast Food Restaurant	Movie Theater	Vegetarian / Vegan Restaurant	Multicuisine Indian Restaurant	Bakery	Middle Eastern Restaurant	Office	North Indian Restaurant	Nightclub
3	Express Avenue Mall, Royapettah	Clothing Store	Juice Bar	Fast Food Restaurant	Indian Restaurant	Multiplex	Hotel	Shopping Mall	Bookstore	Pizza Place	Movie Theater
4	Gopalapuram	Multiplex	Indian Restaurant	Café	Middle Eastern Restaurant	Movie Theater	Bakery	Juice Bar	Gaming Cafe	Clothing Store	Pub
5	Kilpauk	Indian Restaurant	South Indian Restaurant	Italian Restaurant	Hotel	Pizza Place	Multiplex	Fast Food Restaurant	Shoe Store	Middle Eastern Restaurant	Nightclub
6	Kotturpuram	Indian Restaurant	Bakery	Park	Flower Shop	Café	Department Store	South Indian Restaurant	Grocery Store	Convenience Store	Asian Restaurant
7	Mylapore	Indian Restaurant	Hotel	Ice Cream Shop	Concert Hall	Chinese Restaurant	Mexican Restaurant	Gym	Grocery Store	Fruit & Vegetable Store	Electronics Store
8	Nungambakkam	Indian Restaurant	South Indian Restaurant	Kebab Restaurant	Hotel	Gourmet Shop	Middle Eastern Restaurant	Clothing Store	Café	Seafood Restaurant	Shopping Mall
9	Perungudi	Boutique	Indian Restaurant	Donut Shop	Sports Club	South Indian Restaurant	Snack Place	Sandwich Place	Middle Eastern Restaurant	Nightclub	Multiplex
10	RA Puram	Restaurant	Indian Restaurant	Dessert Shop	Chinese Restaurant	Camera Store	Italian Restaurant	Ice Cream Shop	Hotel	Nightclub	Department Store
11	Ramapuram	Italian Restaurant	Indian Restaurant	Café	Vegetarian / Vegan Restaurant	Andhra Restaurant	Office	Asian Restaurant	Bakery	Restaurant	Sandwich Place
12	Santhome	Indian Restaurant	BBQ Joint	Restaurant	Café	Fast Food Restaurant	Middle Eastern Restaurant	Vegetarian / Vegan Restaurant	Lounge	Kebab Restaurant	Office
13	T. Nagar	Indian Restaurant	Jewelry Store	BBQ Joint	Café	Ice Cream Shop	Hotel	Vegetarian / Vegan Restaurant	South Indian Restaurant	Coffee Shop	Clothing Store

A final map was rendered using Folium to show clustering of restaurants



# Results

In the end, the data was separated into 5 clusters shown below

## Cluster 1

	Locality	Aggregate rating	Rating text	Votes	Cluster	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	Adyar	4.2	Very Good	1810	3	0	Indian Restaurant	Café	Dessert Shop	Department Store	Vegetarian / Vegan Restaurant	Pizza Place	North Indian Restaurant	Movie Theater	Italian Restaurant	Ice Cream Shop
1	Anna Nagar East	3.8	Good	519	4	0	Indian Restaurant	Café	Fast Food Restaurant	Middle Eastern Restaurant	Restaurant	Bakery	Chinese Restaurant	Ice Cream Shop	Department Store	Pizza Place
6	Kilpauk	4.6	Excellent	1510	4	0	Indian Restaurant	South Indian Restaurant	Italian Restaurant	Hotel	Pizza Place	Multiplex	Fast Food Restaurant	Shoe Store	Middle Eastern Restaurant	Nightclub
7	Kotturpuram	4.1	Very Good	1004	3	0	Indian Restaurant	Bakery	Park	Flower Shop	Café	Department Store	South Indian Restaurant	Grocery Store	Convenience Store	Asian Restaurant
10	Nungambakkam	4.2	Very Good	1714	1	0	Indian Restaurant	South Indian Restaurant	Kebab Restaurant	Hotel	Gourmet Shop	Middle Eastern Restaurant	Clothing Store	Café	Seafood Restaurant	Shopping Mall
11	Perungudi	3.8	Good	1317	0	0	Boutique	Indian Restaurant	Donut Shop	Sports Club	South Indian Restaurant	Snack Place	Sandwich Place	Middle Eastern Restaurant	Nightclub	Multiplex
12	RA Puram	4.3	Very Good	1607	3	0	Restaurant	Indian Restaurant	Dessert Shop	Chinese Restaurant	Camera Store	Italian Restaurant	Ice Cream Shop	Hotel	Nightclub	Department Store
13	Ramapuram	4.4	Very Good	645	2	0	Italian Restaurant	Indian Restaurant	Café	Vegetarian / Vegan Restaurant	Andhra Restaurant	Office	Asian Restaurant	Bakery	Restaurant	Sandwich Place
14	Santhome	4.3	Very Good	742	3	0	Indian Restaurant	BBQ Joint	Restaurant	Café	Fast Food Restaurant	Middle Eastern Restaurant	Vegetarian / Vegan Restaurant	Lounge	Kebab Restaurant	Office

## Cluster 2

	Locality	Aggregate rating	Rating text	Votes	Cluster	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	Nungambakkam	4.6	Excellent	1753	1	1	Indian Restaurant	South Indian Restaurant	Kebab Restaurant	Hotel	Gourmet Shop	Middle Eastern Restaurant	Clothing Store	Café	Seafood Restaurant	Shopping Mall

## Cluster 3

	Locality	Aggregate rating	Rating text	Votes	Cluster	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
3	Ashok Nagar	4.2	Very Good	841	2	2	Indian Restaurant	Fast Food Restaurant	Movie Theater	Vegetarian / Vegan Restaurant	Multicuisine Indian Restaurant	Bakery	Middle Eastern Restaurant	Office	North Indian Restaurant	Nightclub
4	Express Avenue Mall, Royapettah	4.8	Excellent	1262	1	2	Clothing Store	Juice Bar	Fast Food Restaurant	Indian Restaurant	Multiplex	Hotel	Shopping Mall	Bookstore	Pizza Place	Movie Theater
8	Mylapore	4.0	Very Good	1820	1	2	Indian Restaurant	Hotel	Ice Cream Shop	Concert Hall	Chinese Restaurant	Mexican Restaurant	Gym	Grocery Store	Fruit & Vegetable Store	Electronics Store

## Cluster 4

	Locality	Aggregate rating	Rating text	Votes	Cluster	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
2	Anna Nagar East	4.4	Very Good	1504	4	3	Indian Restaurant	Café	Fast Food Restaurant	Middle Eastern Restaurant	Restaurant	Bakery	Chinese Restaurant	Ice Cream Shop	Department Store	Pizza Place

## Cluster 5

	Locality	Aggregate rating	Rating text	Votes	Cluster	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	Gopalapuram	4.2	Very Good	191	1	4	Multiplex	Indian Restaurant	Café	Middle Eastern Restaurant	Movie Theater	Bakery	Juice Bar	Gaming Cafe	Clothing Store	Pub

## Observation/Conclusion

Using all of the above data, it can be observed that out of the 2 continental restaurants already present in Chennai, only 1 (T Nagar) is among the top 10 rated.

If we then compare the cluster with the most nearby venues to areas with best rated restaurants in the city, **Adyar** seems to be a good choice to start a new Continental restaurant in Chennai.