Comparative Analysis of Localities in Bangalore and Chennai, India

1. Introduction

1.1 Background

Exploring various venues for a new visitor to a city certainly cannot be hassle-free and especially in multilingual and multicultural society like India, the scenario becomes much tougher. However, using an application to obtain necessary details and customize our choices according to preferences can make exploration of various locations in a much easier manner.

Different cities tend to have various demographics and people in their respective cities tend to have different preferences. Cities have various types of locations to explore with various price ranges and ratings, which influences choices. Clustering and Segmentation of these localities helps in analysis of trends in particular cities, which in turn provides a broad picture of these cities, which can be compared and contrasted. Thus, throwing a light on the lifestyle of people and price ranges.

In this project, the places (especially restaurants and hotels) in Bangalore and Chennai are compared and contrasted to analyze the behavior patterns of cities in terms of price range. These two South Indian cities are separated by a distance of 347 KM, comparing restaurants in both of these urban regions could give us the insights on the cuisine that is preferred and ease of accessibility to that restaurant, the quality of food, service can be assessed through user ratings, the cost per person and number of restaurants that offer the particular cuisine. It provides valuable information which enables the tourists to make informed decisions about the restaurant they prefer and whether it is within the reach of their budget.

The project enables to understand the similarities and differences between these two cities. It can give economic information and behavioral preferences of the population in the respective metropolitans. Hence, this analysis can be used to assert that how two different major urban agglomerations are diverse and their expenditure on restaurants and hotels.

1.2 Interested Audience

This project is catered to address issues for three major categories namely:

1. Tourists, especially International tourists who face communication problems in finding out localities in Bangalore and Chennai, India
2. Any organization which is interested to begin their restaurant in Bangalore or Chennai, India, can compare and contrast the characteristics of the cities
3. Any institution interested to study the way restaurants operate in these cities.

2. Data

2.1 Description of data

This project is intended to analyze venues with special focus on restaurants, cafes and hotels. In order to acquire this data, two Application Program Interfaces are used namely:

2.1.1 Foursquare API

This API is fed the geographical coordinates of Bangalore and Chennai which returns the following variables of location as shown in Table 1. API returns a JSON file consisting of these location and related information, which is converted into a Pandas data frame. The locations were obtained within the radius of 10KM from the geographical coordinates of the city.

1. **Foursquare API**
2. **Zomato API**

Table 1: Variables returned by Foursquare API

VARIABLES	DESCRIPTION
VENUE NAME	Name of the location
CATEGORY	Category of the location as defined by the API (e.g.: restaurant, cafe)

LATITUDE	Latitude of the location
LONGITUDE	Longitude of the location

2.1.2 Zomato API

The name, latitude and longitude values obtained from the Foursquare API is fed to the Zomato API and the following details are retrieved:

Table 2: Variables returned by Zomato API

VARIABLES	DESCRIPTION
VENUE NAME	Name of the location
ADDRESS	Detailed address of the location in the city.
PRICE RANGE	Depending upon the price, the Zomato API ranks them on a scale of 1.0-5.0
PRICE FOR TWO	It provides the mean cost of dining at the restaurant for two people.
RATINGS	The average feedback of the location provided by the user represented by stars ranging from 0.0 to 5.0
LATITUDE	Latitude of the location
LONGITUDE	Longitude of the location

2.2 Utilization of Data to solve the given problem

The data obtained from both the APIs provide the requisite elements to analyze the restaurants in Bangalore and Chennai. However, redundant and non-matching items have to be removed and processed. After merging the results from both the APIs into a data frame, analysis of data can be performed.
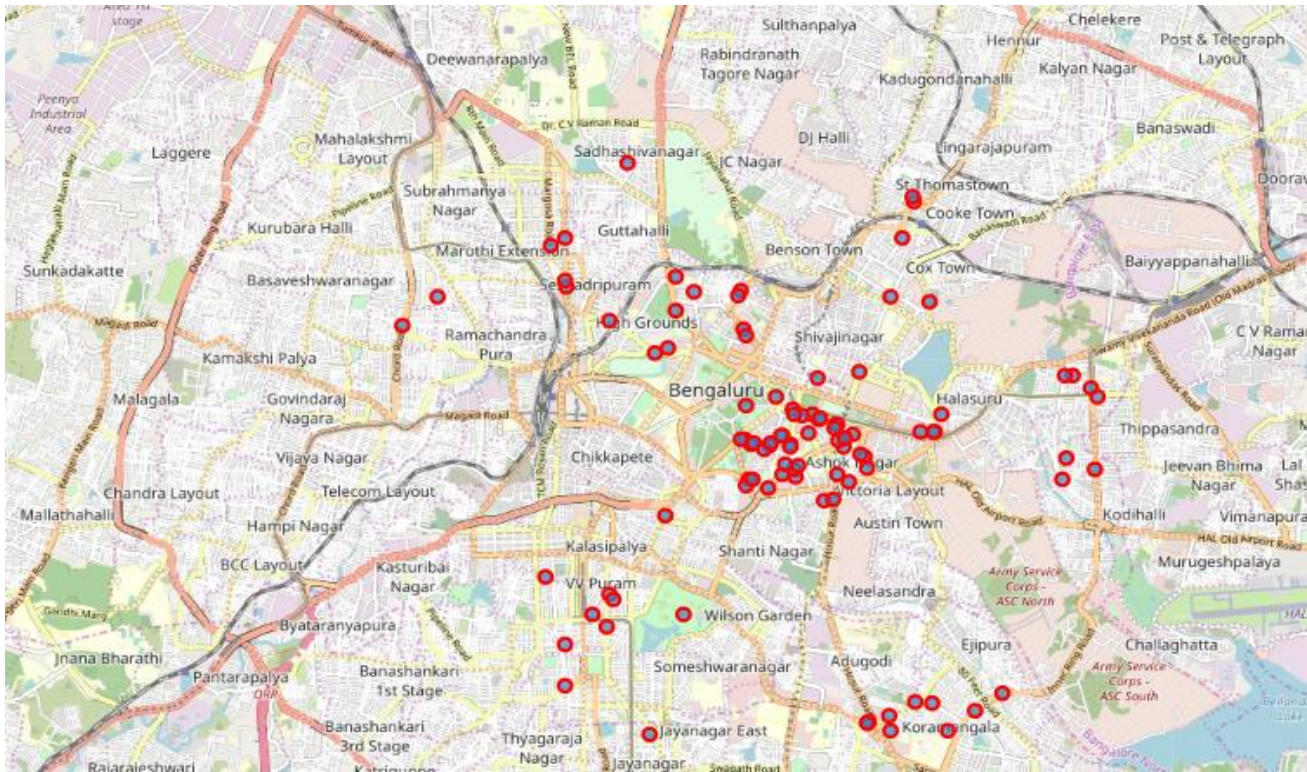
2.3 Cleaning of Data

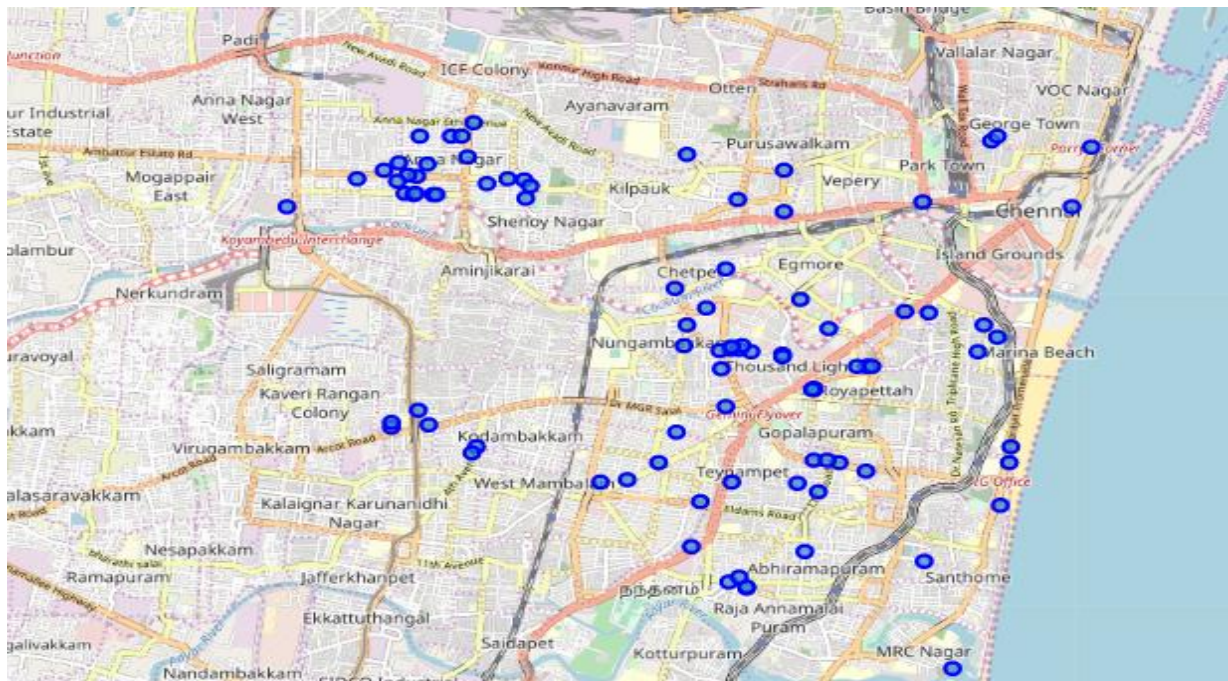*Figure 1: Venues retrieved from Foursquare API for Bangalore*

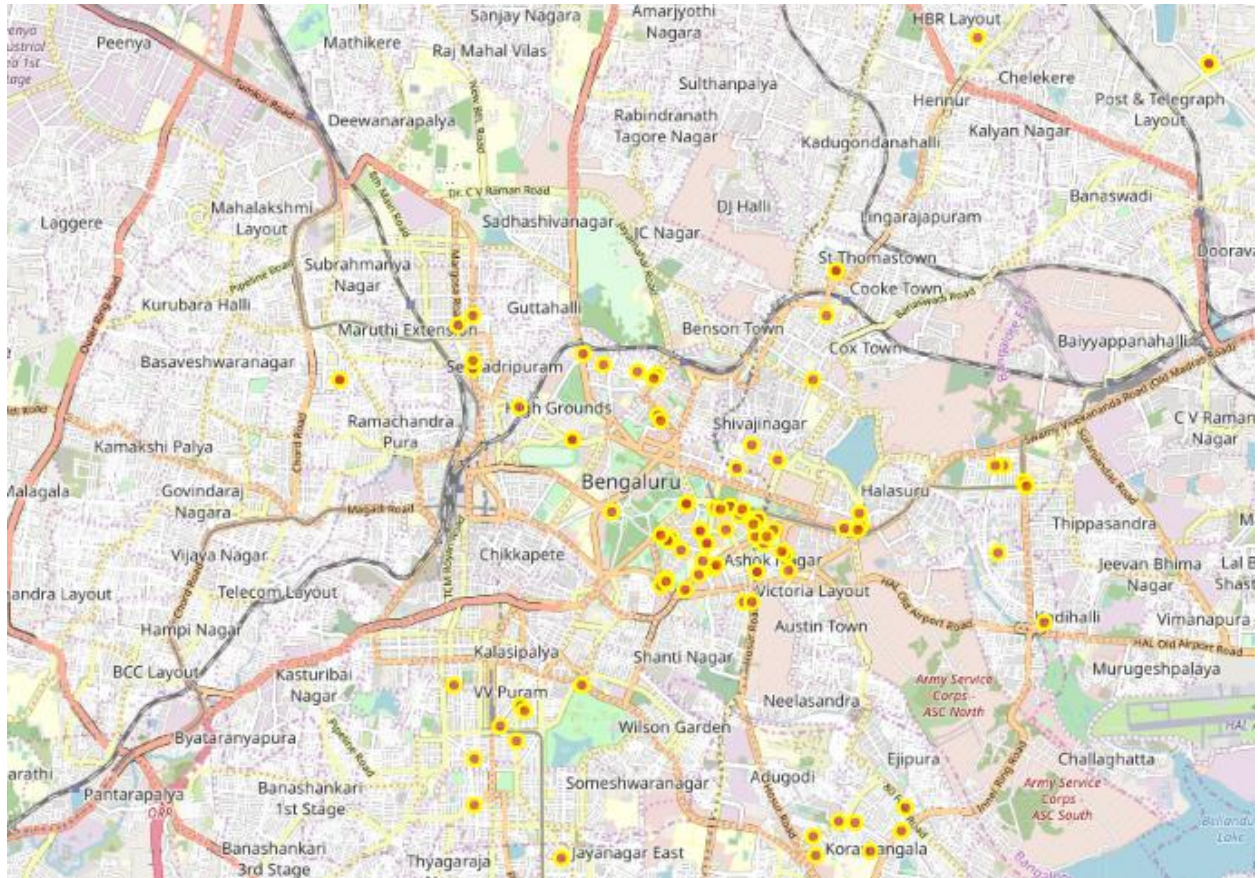*Figure 2: Venues retrieved from Foursquare API for Chennai*

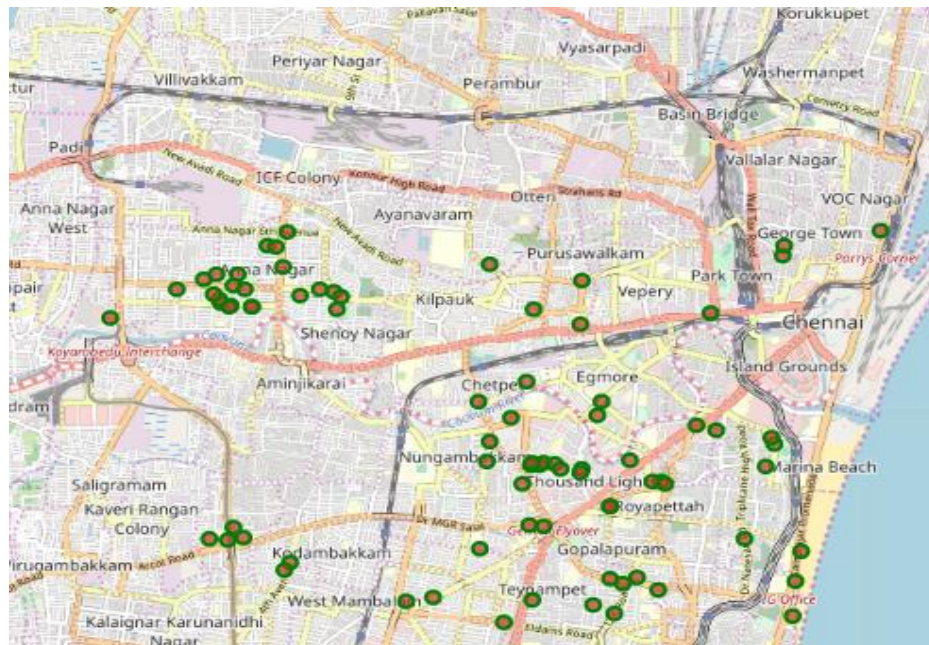*Figure 3: Venues retrieved from Zomato API for Bangalore*

Figure 4: Venues retrieved from Zomato API for Chennai

The data from both the APIs might not always match. Thus, it is important to clean the combined data retrieved from sources properly. To combine both of these datasets, the latitude and longitude values of the respective venue should match. The latitude and longitude values are rounded up to 4 decimal places. The difference between the corresponding latitude and longitude values and check if the difference is less than 0.0005 which implies that the location is same. Sometimes two locations are very close because of that they almost have same latitude and longitude values, some of the locations are redundant and irrelevant for restaurant analysis. Hence, they are removed.

After Cleaning the data look as shown in Figure 5.

	categories	venue	latitude	longitude	price_range	rating	address	cuisine	avg_price
0	Snack Place	Links	13.0799	80.2545	1.0	4.3	22, Raja Annamalai Road, Purasavakkam, Chennai	Fast Food, Street Food	125.0
1	Dessert Shop	Bombay Lassi	13.0656	80.2709	1.0	4.7	8, Bahar Agan Street, Anna Salai, Ellis Road, ...	Street Food	50.0
2	Indian Restaurant	Shree Mithai	13.0722	80.2479	1.0	4.6	18, Dr TV Road, Chetpet, Chennai	Mithai, Street Food, Fast Food	150.0
3	Shopping Mall	Pappa Roti	13.0587	80.2642	2.0	3.2	Shop S 129, 1st Floor, Express Avenue Mall, Mh...	Cafe, Continental, Desserts	400.0
4	Kebab Restaurant	Kabab Corner	13.0599	80.2545	1.0	4.5	12/1, Opposite Royal Enfield Showroom, Egmore,...	Kebab, Rolls, Mughlai	225.0

Figure 5: Cleaned Data

3. Methodology

Initially, venues are retrieved in Bangalore and Chennai from Foursquare and Zomato APIs. I extract the location data from the Foursquare API for all venues up to a distance of 10 kilometers radius from the coordinates of Bangalore and Chennai. Using the data fetched from Foursquare API, the venue information including price and rating data is obtained from Zomato API.

Using data cleaning, the dataset from the two APIs will be combined based on the venue names, latitude, and longitude values. Data should be checked to remove any redundant data or multiple venues at the same location from the two datasets.

The final data frame will include the venue name, category, address, latitude, longitude, rating, price range, average cost per person, and cuisine.

The venues can be analyzed and compared on the basis of ratings and price range of various venues. The venues will be plotted using proper color coding such that a simple glance at the map would provide the location of the venues as well as give information about them.

Venues are clustered using K-means clustering in Bangalore and Chennai and see if we can draw meaningful information out of what kind of venues exist in. As a final step, I will analyze these plots and try to draw conclusions on what places can be recommended to visitors

3.1 Categories

Count of venues in each category in Bangalore

Count of venues in each category in Chennai
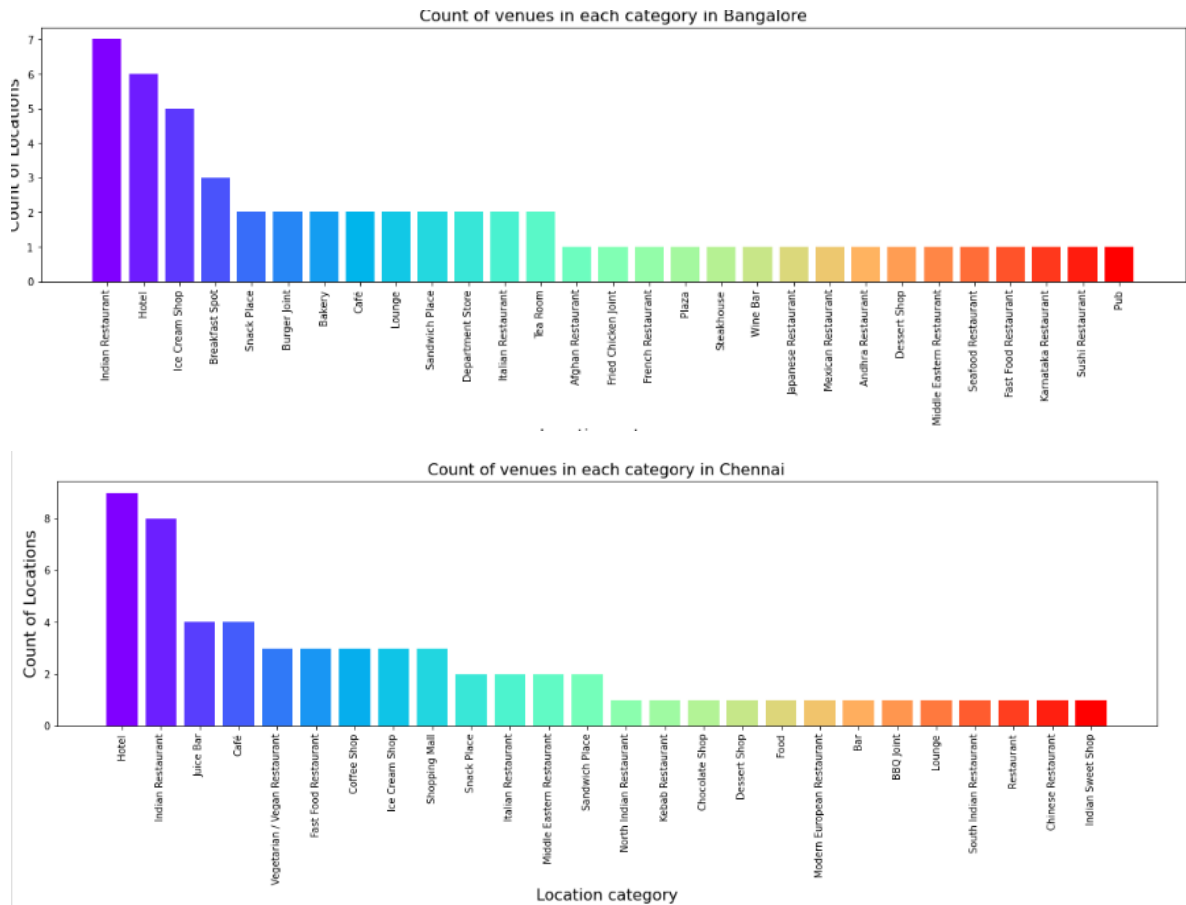
The most popular category in Bangalore is Indian Restaurant whereas in Chennai it is Hotel. The least popular category in Bangalore is Sushi restaurant whereas in Chennai it is Chinese Restaurant.

3.2 Average Price

No of venues in Bangalore with range of average price

No of venues in Chennai with range of average price
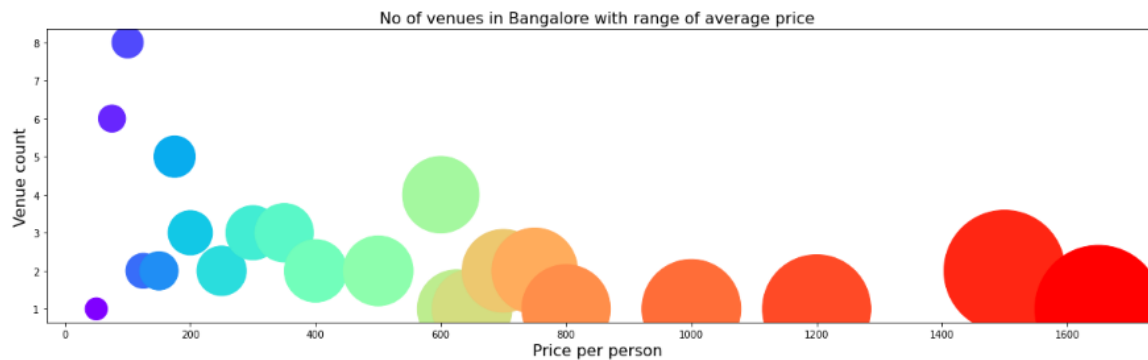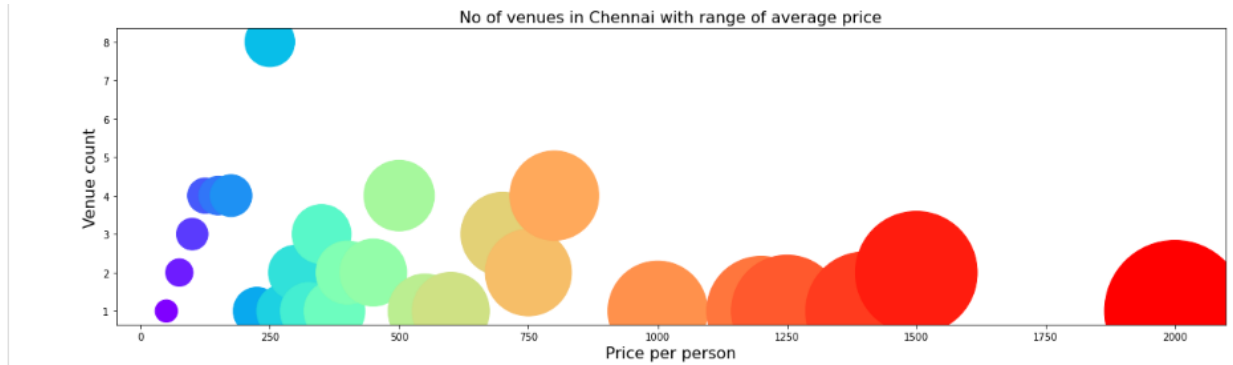
The minimum price in Bangalore and Chennai ranges around Rs. 350 per person. The average price in Bangalore ranges around Rs.800 per person and 1000 per person in Chennai. The maximum price in Bangalore ranges around Rs. 800 per person and Rs. 2000 per person in Chennai.

3.3 Clustering

There are three clusters in each city and their details are shown below:

Bangalore:

- There are 37 venues in cluster 0 having average price of 1.27 and mean rating as 4.14
- There are 4 venues in cluster 1 having average price of 4.00 and mean rating as 4.10
- There are 14 venues in cluster 2 having average price of 3.07 and mean rating as 4.09

Chennai:

- There are 37 venues in cluster 0 having average price of 1.49 and mean rating as 4.05
- There are 6 venues in cluster 1 having average price of 4.00 and mean rating as 4.08

- There are 18 venues in cluster 2 having average price of 2.94 and mean rating as 4.14

4. Results and Discussion

After collecting data from the Foursquare and Zomato APIs, we got a list of 200 different venues. However, all venues from the two APIs were not matching. Hence, we had to inspect their latitude and longitude values as well as their names to combine them and remove all the redundant and unnecessary. This resulted in a total venue count of 61 venues for Chennai and 55 venues for Bangalore.

It was identified that from the venue's category, majority of them were Hotels and Indian Restaurants in both Bangalore and Chennai.

While the ratings range from 1 to 5, majority venues have ratings close to 4.25 in both Bangalore and Chennai. This means that most restaurants provide good quality food, thus indicating the high rating.

These clusters also have very high ratings. When we take a look at the price values of each venue, we explore that many venues have price that ranges start from Rs 250 and goes up till Rs 1800 in Bangalore and Rs 2000 in Chennai.

5. Conclusion

The purpose of this project was to explore the places in Bangalore and Chennai could explore. The venues have been identified using Foursquare and Zomato API and have been plotted on the map. The map reveals that there are locations that are widespread across the cities. In terms of categories, cuisine and clustering both cities exhibited similar behavior. However they differed only in terms of price range, minimally in which Chennai exceeded Bangalore by Rs 200 on the higher end of average price. Based on the vis rating and price preferences, user can choose a wide variety of cuisines spread across both cities.