EXPLORING RESTAURANTS IN THE NEIGHBORHOODS OF HYDERABAD, INDIA

I. Introduction

Problem Background :

As the capital of India's southern Telangana state, Hyderabad is considered an international hub for technology, as well as being known for its regal history. Both the old and new identity that this city is defined by is reflected through its diverse dining scene. The biryani destination of India – Hyderabad, can spoil you with delicious choices when it comes to food. There's actually so much more to Hyderabadi food than the famed biryani. The food culture of Hyderabad offers a beautiful blend of Deccani and Telugu cuisines, with slight influences of Marathwada, Arabic, and Mughlai culinary styles. In this project, best restaurants in Hyderabad for several categories, such as fine dining, north Indian, south Indian, global and regional food, were selected and sorted according to their pricing and its reviews.

Problem Description :

Suppose a person visits Hyderabad for the first time and wants to explore the city, in this situation food can be an important factor for decided how you rate your trips and also recommend it to the people. In such scenarios, we need to find the right place having good reviews and are at a reasonable price to serve

them in the best possible way. This information helps them to decide which restaurant to choose amongst many restaurants in the city. Thus combining the restaurants in a neighborhood with their average prices and rating information would surely help the visitors take better decisions about the restaurants to visit.

To explore this information , this project involves the usage of Foursquare API and Zomato API for fetching the information of the restaurants in different neighborhoods in the city. Further, a map of these venues are plotted highlighting their position and information. This enables the visitors to decide what place to visit.

Target Audience :

Target audience for this project does not limit to one person but everyone. People could simply decide to look for a similar restaurant all the time because they are addicted to a specific category of food. People who rarely use restaurants would prefer to have the most rated restaurants nearby them and all this could be easily handled by the given data. Also a company can use this information to create a website or application to the individuals in the city or even expand same functionality to other places.

II. Data

Data Sources:

- In this project, neighborhoods of Hyderabad were obtained from Wikipedia page(https://en.wikipedia.org/wiki/Category:Neighbourhoods_in_Hyderabad,_India) by web scraping using BeautifulSoup package to explore the restaurants in

the city. To get the locations for these neighborhoods, Geocoder Python package was used. The head of the data is shown below

	Neighborhood	Latitude	Longitude
0	A. S. Rao Nagar	17.479950	78.556834
1	A.C. Guards	17.402804	78.459487
2	Abhyudaya Nagar	18.990477	72.844063
3	Abids	17.389478	78.477182
4	Adikmet	17.409550	78.513094
5	Aghapura	17.389178	78.465273
6	Aliabad, Hyderabad	17.345630	78.472680
7	Alijah Kotla	17.360545	78.480102
8	Allwyn Colony	17.504362	78.414985
9	Alwal	17.502229	78.508858
10	Amberpet	17.777683	78.570507

Table 1 : Neighborhoods obtained from Geocoder

- For obtaining the venues in these neighborhoods, Foursquare API is used. Using the Foursquare explore API(https://developer.foursquare.com/), venues were fetched in a neighborhood for a radius of 1 kilometer and their names, category and location were collected. The head of the data is shown below

	Neighborhood	Venue	Latitude	Longitude	Category
0	A. S. Rao Nagar	Cafe Coffee Day	17.481262	78.555077	Café
1	A. S. Rao Nagar	The Coffee Cup	17.483180	78.552104	Café
2	A. S. Rao Nagar	Domino's Pizza	17.475035	78.553141	Pizza Place
3	A. S. Rao Nagar	KFC	17.475040	78.553137	Fast Food Restaurant
4	A. S. Rao Nagar	Parivaar Restaurant	17.476850	78.563525	Indian Restaurant
5	A. S. Rao Nagar	Swagath Grand	17.482022	78.553261	Indian Restaurant

Table 2 : Venues obtained from Foursquare explore API

- Using the venues, latitude and longitude obtained from Foursquare API, venues from Zomato search API(https://developers.zomato.com/api) were obtained.

	venue	latitude	longitude	price_for_two	price_range	rating	address
0	KFC	17.4815789851	78.5552679375	450.0	1.0	4.1	A 13, G1, PNR SSV Complex, Kapra Muncipality, A S Rao Nagar, Secunderabad
1	Parivaar	17.4770378973	78.5636813566	1000.0	3.0	4.0	Plot 239, ECIL, Secunderabad
2	Kinara Grand	17.4821958608	78.5533769801	700.0	2.0	3.6	Opposite ICICI Bank, A S Rao Nagar, Secunderabad
3	McDonald's	17.4769931255	78.5647924617	500.0	2.0	4.0	456/1p, HPCL Outlet, A S Rao Nagar, Secunderabad
4	Lassi Shop	17.4090049314	78.4605195746	200.0	1.0	3.5	6S 2S, 146/A/4, Opposite Shadan College, Chintal Basti Bus Stop, Khairatabad, Hyderabad
5	Jewel of Nizam - The Golkonda Hotel	17.4043612591	78.4541067481	2200.0	4.0	4.3	The Golkonda Hotel, 10-1-124, Banjara Hills, Masab Tank, Hyderabad

Table 3 : Venues obtained from Zomato search API

Data Cleaning :

Foursquare venues:

- Since we are going to explore only restaurants in this project, the venues obtained from foursquare are filtered by the category which contains only restaurants.
- Some of the neighborhoods are very close to each other obtaining the venues again which are in other neighborhoods. Hence these venues are considered as duplicates and are dropped.

Zomato venues :

- After obtaining the desired output of the foursquare venues, the venues and their locations are passed to obtain the zomato venues.
- Finally, both the tables are joined together creating a final dataset.

Final dataset :

- In the final dataset, comparing the venues of foursquare and zomato there are some venues which doesn't match with their names despite being in the same location. This may be occurred due to change in restaurants name or two of them are very close to each other. Hence these venues are dropped.
- Finally restaurants with zero ratings were removed and obtained a total of 310 restaurants in the neighborhoods of Hyderabad. The head of the data is shown below

	Neighborhood	Category	venue	latitude	longitude	price_range	rating	address	average_price
0	A. S. Rao Nagar	Fast Food Restaurant	KFC	17.481579	78.555268	1.0	4.1	A 13, G1, PNR SSV Complex, Kapra Muncipality, A S Rao Nagar, Secunderabad	225.0
1	A. S. Rao Nagar	Indian Restaurant	Parivaar	17.477038	78.563681	3.0	4.0	Plot 239, ECIL, Secunderabad	500.0
2	A. S. Rao Nagar	Fast Food Restaurant	McDonald's	17.476993	78.564792	2.0	4.0	456/1p, HPCL Outlet, A S Rao Nagar, Secunderabad	250.0
3	A.C. Guards	Middle Eastern Restaurant	Jewel of Nizam - The Golkonda Hotel	17.404361	78.454107	4.0	4.3	The Golkonda Hotel, 10-1-124, Banjara Hills, Masab Tank, Hyderabad	1100.0
4	A.C. Guards	Hyderabadi Restaurant	Shahi Dastarkhwan	17.402515	78.461426	2.0	4.2	Mustafa Apartment, Opposite Jamuna Ganga Hotel, Lakdikapul, Hyderabad	400.0

Table 4 : Final dataset obtained from both API's

III. Methodology and Exploratory Data Analysis

Exploring the dataset gives you initials insights and may help you to get partial idea of the answers that you are looking to find out from the data. Exploring the data through visualization gives us more clarity and better understanding of the data.

In this project, firstly different category of restaurants and their count are identified to get a quick glance of types of restaurants available in Hyderabad. Then ratings of restaurants are observed to decide which is a better one. Then comes the price for which price ranges and the average price are observed. Finally cluster analysis is done to find the similar group thereby choosing the restaurants easily.

Restaurant Category :

From the final dataset, restaurant's category is taken and plotted on a bar plot to know the types of restaurants available and their count.

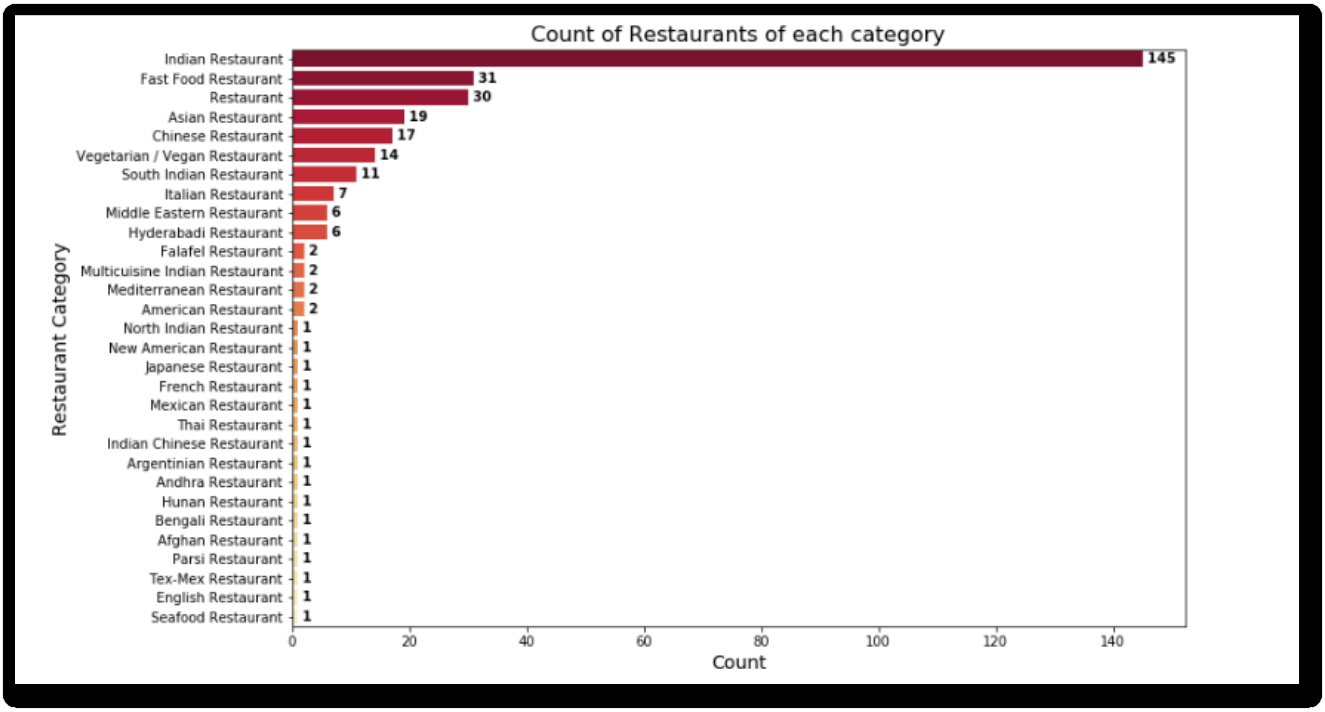

Figure 1 : Count of various types of Restaurants in Hyderabad

We can see that majority of the restaurants in Hyderabad are 'Indian Restaurants' with a count of 145. If some person is looking for a Indian restaurant then the person has ample of choices.

Ratings :

Rating is an important factor for considering a restaurant. The restaurant's ratings are taken and are visualized on the bar plot with their count .

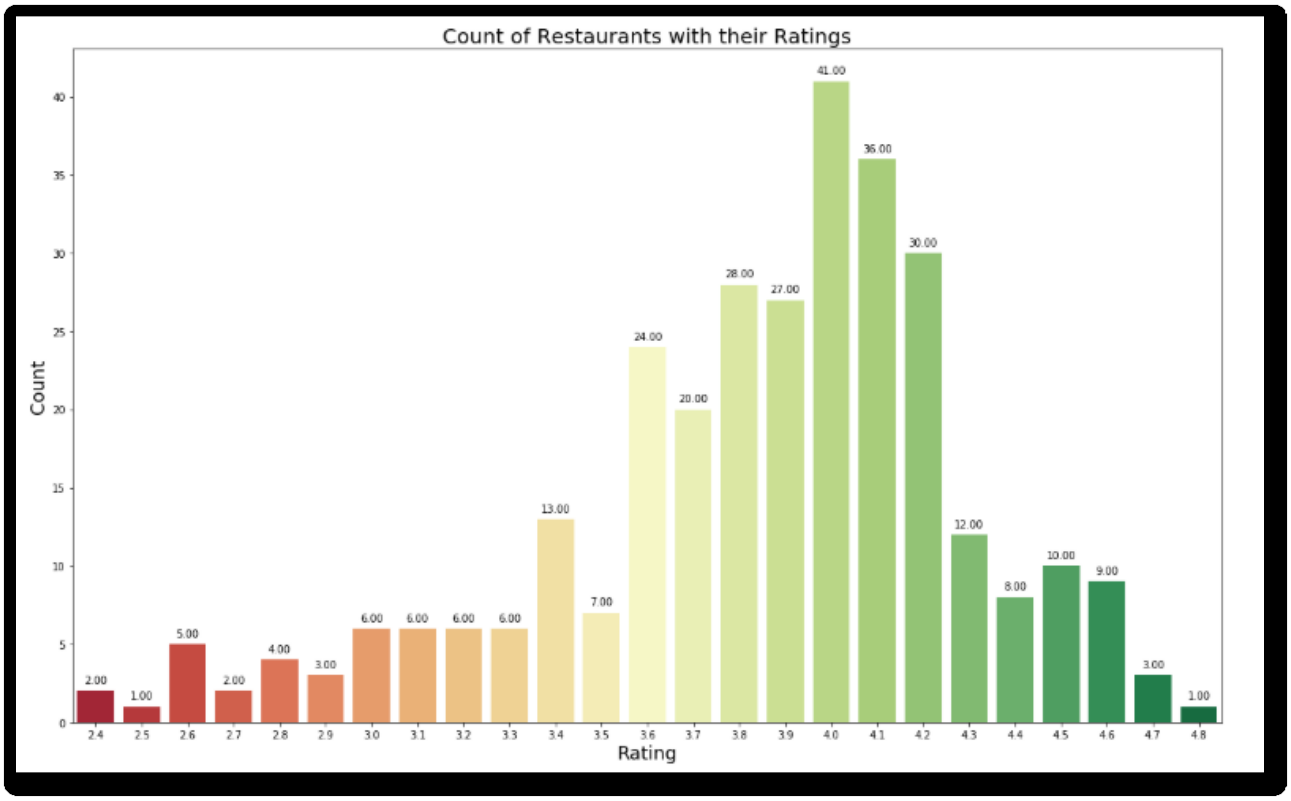

Figure 2 : Ratings and their count for the restaurants.

From the above plot we can see that the most of the restaurant having rating 4.0 with count of 41 and also the average rating close to 4.0. But this does not give the information about the neighborhoods in which they are present. Hence rating bins are created according to their respective ratings and colors are added for better understanding and are plotted on the map in their respective neighborhoods.

[Since there are many restaurants, all the markers are not visible. For reference check into my repository]

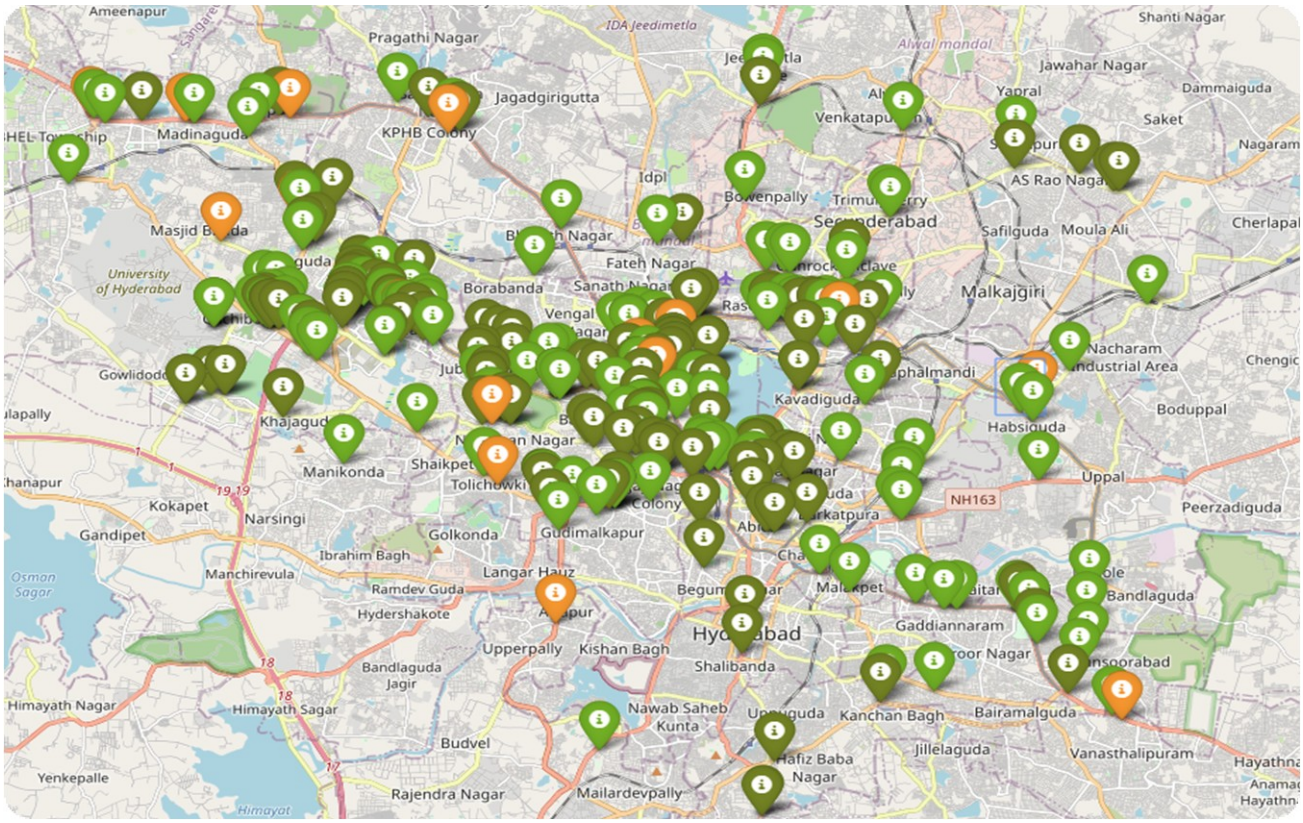

Figure 3 : Plot of restaurants with their rating

In the above plot, the restaurant markers are indicated in three different colors for different ratings. Marker with orange colors have ratings ranging from 2.0 to 2.9, while with green color ranging from 3.0 to 3.9 and dark green color ranging from 4.0 to 5.0.

Price :

Price is the main important factor for selecting a restaurant. In this project there are two categories of prices namely 'average price' and 'price range'. First we will explore the average price for the restaurant and their count using a scatter plot.

From the below scatter plot we can observe that average price ranges from 50 to 2000 INR. Most of the restaurants have an average price between 200 and 500.

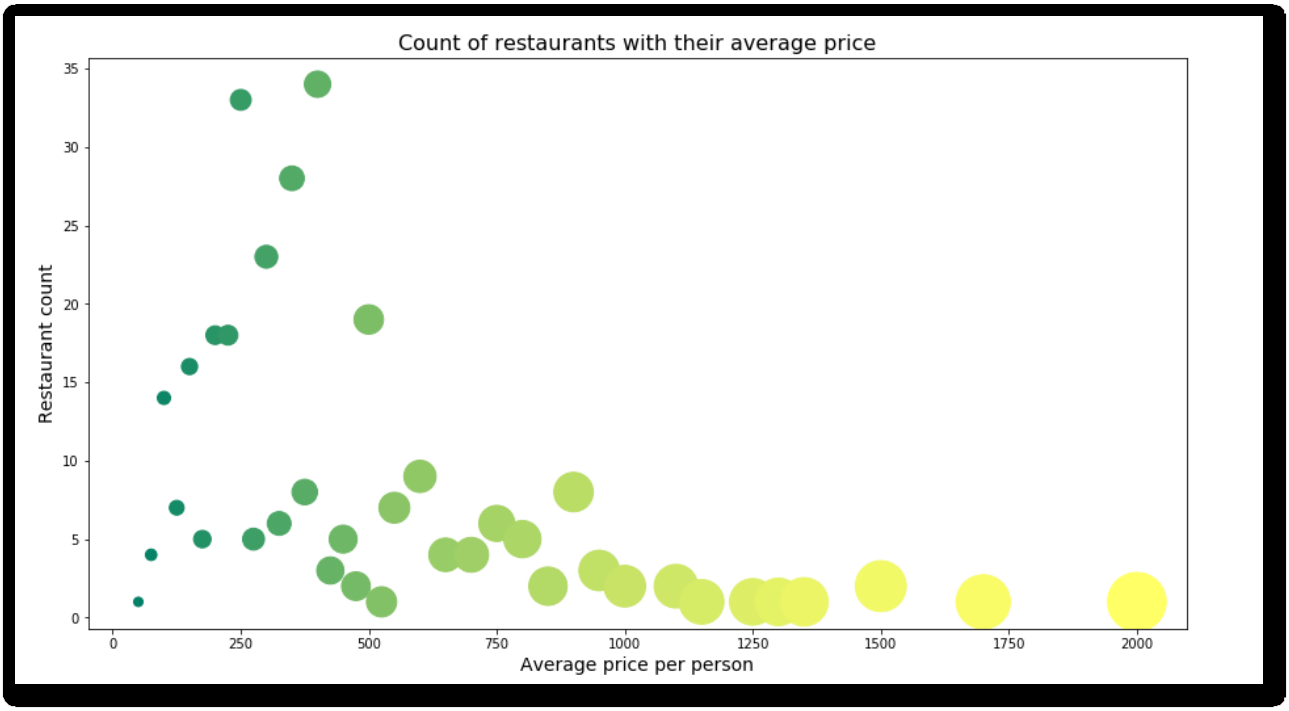

Figure 4 : Average price and their count

The price range is divided into four categories according to their prices from low to high. Hence color map is defined and are plotted on the map in their neighborhoods.

In the below plot we can see the markers with different colors for different price range. The marker with green color indicates 1.0(low), dark green as 2.0, orange as 3.0 and red as 4.0(high).

Hence we can say that the most of the restaurants in the neighborhoods of 'Jubilee Hills', 'Banjara hills' and 'Hitec City' have higher price range while compared to other neighborhoods which have mixed price range.

[Since there are many restaurants, all the markers are not visible. For reference check into my repository]

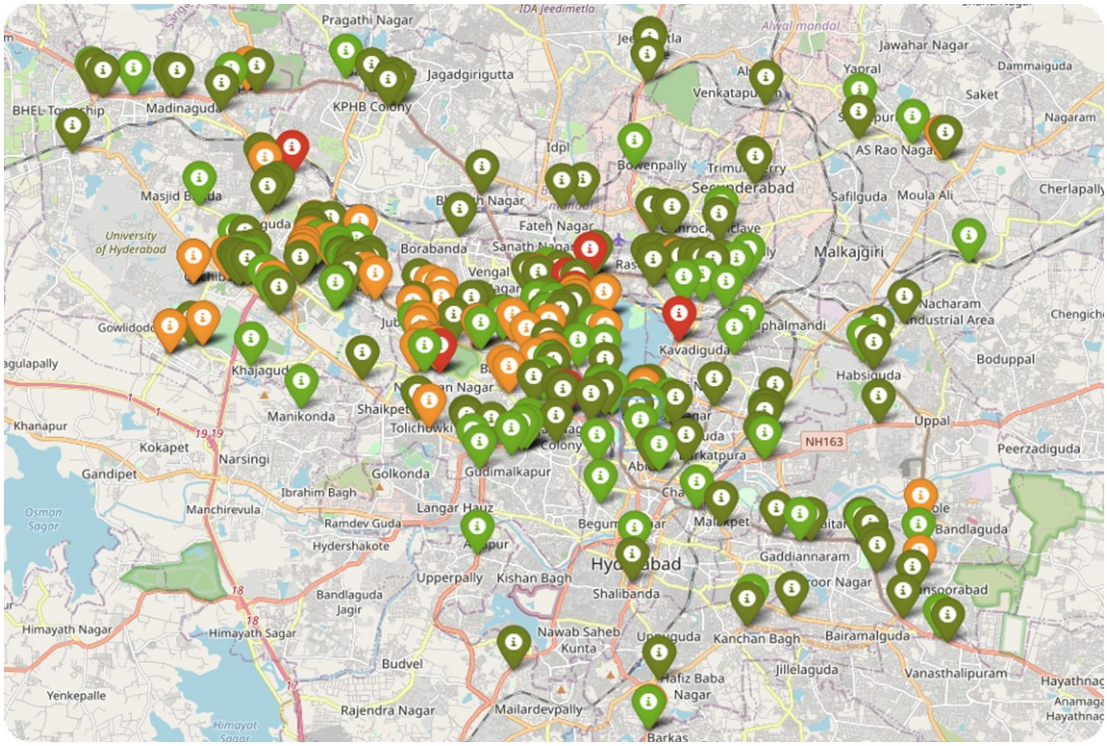

Figure 5 : Plot of restaurants with their price range

Cluster Analysis :

Cluster analysis helps in identifying similar groups which makes better understanding of the data. We will now cluster all the restaurants into two separate groups based on the price range, average price and more using K-Means Clustering.

The first cluster(0) of color green has majority of the restaurants and are spread across the whole city, while the second cluster(1) of color red has very few restaurants and are sparsely spread.

[Since there are many restaurants, all the markers are not visible. For reference check into my repository]

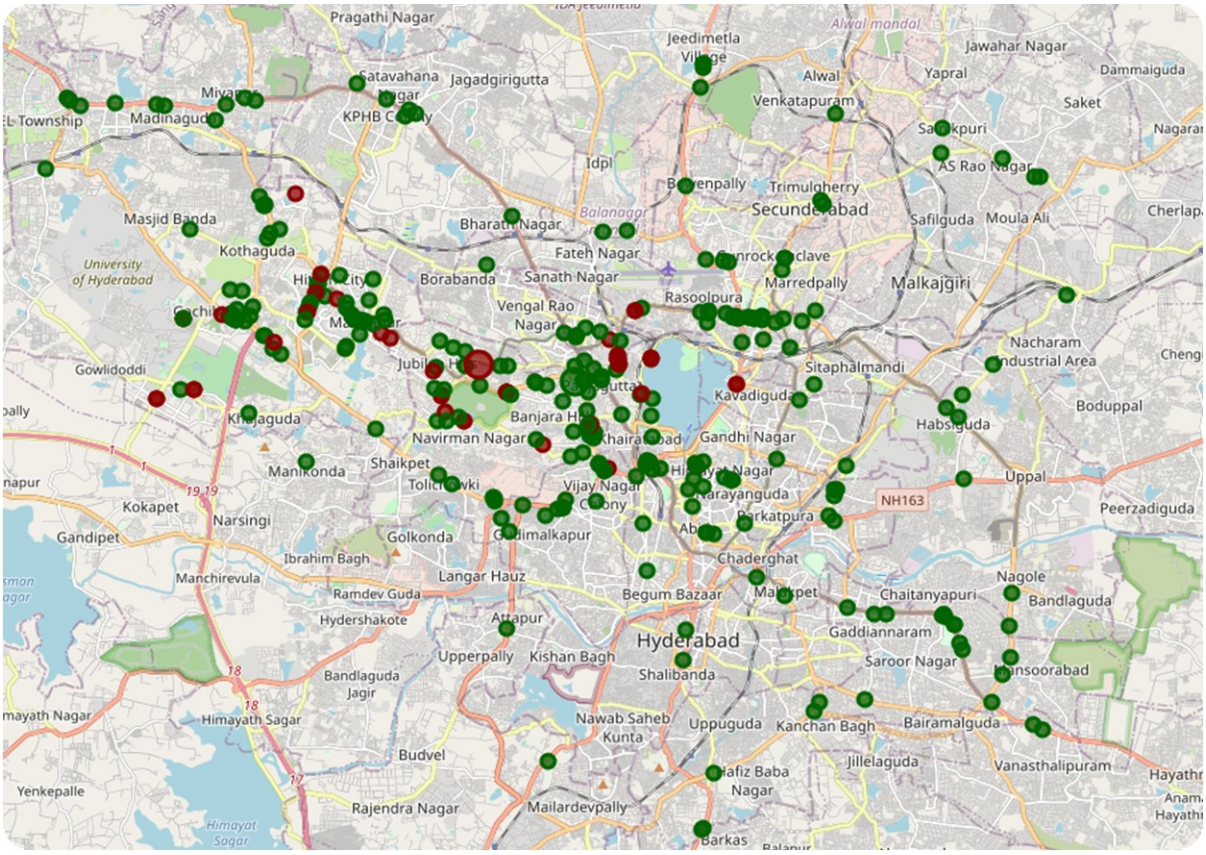

Figure 6 : Clusters of Restaurants

IV. Results and Discussion

- After collecting the data from both the Foursquare and Zomato API's, data cleaning is done and the resulted dataset contains a total of 310 restaurants in the neighborhoods of Hyderabad.
- When these restaurants are filtered according to their category it is found that majority are the Indian Restaurants with a count of 145 followed by the Fast food Restaurants. If some person is looking for a Indian restaurant then the person has ample of choices.

- While the ratings ranging from 1.0 to 5.0, most of restaurants have a rating of 4.0 thus providing good quality food for the people.
- For the category of price, the average price ranges from 50 to 2000 INR. Most of the restaurants have an average price between 200 and 500. The restaurants in the neighborhoods of 'Jubilee Hills', 'Banjara hills' and 'Hitec City' have higher price range while compared to other neighborhoods which have mixed price range.
- Finally from the cluster analysis, the restaurants which are lower priced have mean price range of 1.82 with average price per person ranging from 50 to 600 INR and mean rating spread around 3.78. The restaurants which are higher priced have mean price range of 3.27 with average price per person ranging from 650 to 2000 INR and mean rating spread around 4.24.

V. Conclusion

This exploration of restaurants in the neighborhoods of Hyderabad considers factors such as price, ratings and makes use of Foursquare and Zomato API's to determine the nearby venues. The data obtained in this project will not only help the people who visits Hyderabad for first time but also to the people in Hyderabad who rarely use restaurants would prefer to have the most rated restaurants nearby them. Also a company can use this information to create a website or application to the individuals in the city or even expand same functionality to other places.