IBM Coursera

Data Science Specialization

Bangalore Restaurants Analysis

Report for the Project

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Contents

1 Introduction

I was always fascinated by the food culture of Bengaluru. Restaurants from all over the world can be found here in Bengaluru. From United States to Japan, Russia to Antarctica, you get all type of cuisines here. Delivery, Dine-out, Pubs, Bars, Drinks,Buffet, Desserts you name it and Bengaluru has it. Bengaluru is best place for foodies. The number of restaurant are increasing day by day. Currently which stands at approximately 12,000 restaurants. With such a high number of restaurants. This industry hasn't been saturated yet. And new restaurants are opening every

day. However it has become difficult for them to compete with already established restaurants. The key issues that continue to pose a challenge to them include high real estate costs, rising food costs, shortage of quality manpower, fragmented supply chain and over-licensing. This project aims at analysing demography, its food culture of the location. Most importantly it will help new restaurants in deciding their theme, menus, cuisine, cost etc for a particular location. It also aims at finding similarity between neighborhoods of Bengaluru on the basis of food. With the analysis the project also will help people in choosing the restaurant based on several other factors. The project will mainly try to answer the quetion based on restaurants and foodies interest. And what factors should be kept in mind if someone wants to open new restaurant.

- Does the demography of an area matters?
- Does location of a particular type of restaurant also depends on the people living in that area?
- Does the theme of the restaurant matters?
- Is a food chain category restaurant likely to have more customers than its counter part?
- Are any neighborhoods similar based on the type of food?
- Is a particular neighborhood famous for its own kind of food?
- If two neighborhoods are similar does that mean these are related or particular group of people live in the neighborhood or these are the places to it?
- What kind of a food is more popular in a locality?
- Do the entire locality loves vegetarian food. If yes then is that locality populated by a particular sect of people for eg. Jain, Marwaris, Gujaratis who are mostly vegetarian.

With these questions in mind we will try to find out the factors that would affect opening of a new restaurant in a locality. The dataset also contains reviews for each of the restaurant which will help in finding overall rating for the place.

2 Data Description

The main data used for this project were from two sources:

- The restaurants in each neighborhood scraped from the Zomato website.
- Explore trending venues in a neighborhood particularly restaurant (FourSquare API).

Other supporting data:

- Coordinates (Geocoder Python)
- GeoJson (https://github.com/openbangalore)

2.1 Data Collection Process

The data was scraped from Zomato in two phase. After going through the structure of the website I found that for each neighborhood there are 6-7 category of restaurants viz. Buffet, Cafes, Delivery, Desserts, Dine-out, Drinks & nightlife, Pubs and bars.

2.1.1 Phase I

In Phase I of extraction only the URL, name and address of the restaurant were extracted which were visible on the front page. The URl's for each of the restaurants on the zomato were recorded in the csv file so that later the data can be extracted individually for each restaurant. This made the extraction process easier and reduced the extra load on my machine. The data for each neighborhood and each category can be found here

2.1.2 Phase II

In Phase II the recorded data for each restaurant and each category was read and data for each restaurant was scraped individually. 15 variables were scraped in this phase. For each of the neighborhood and for each category their online order, book table, rate, votes, phone, location, rest type, dish liked, cuisines, approx cost(for two people), reviews list, menu item was extracted. See data documentation for more details about the variables.

2.1.3 Foursquare API

For each neighborhood, geopy module to convert an address into latitude and longitude values. For each neighborhood's coordinate, call FourSquare API to get the trending venues in that location.

2.2 Using data to solve the problem

The basic idea of analyzing the Zomato dataset is to get a fair idea about the factors affecting the establishment of different types of restaurant at different places in Bengaluru, aggregate rating of each restaurant, Bengaluru being one such city has more than 12,000 restaurants with restaurants serving dishes from all over the world. With each day new restaurants opening the industry has'nt been saturated yet and the demand is increasing day by day. Inspite of increasing demand it however has become difficult for new restaurants to compete with established restaurants. Most of them serving the same food. Bengaluru being an IT capital of India. Most of the people here are dependent mainly on the restaurant food as they don't have time to cook for themselves. With such an overwhelming demand of restaurants it has therefore become important to study the demography of a location. What kind of a food is more popular in a locality. Do the entire locality loves vegetarian food. If yes then is that locality populated by a particular sect of people for eg. Jain, Marwaris, Gujaratis who are mostly vegetarian. These kind of analysis can be done using the data, by studying the factors such as

- Approx Price of food
- Location of the restaurant
- Theme based restaurant or not
- Which locality of that city serves that cuisines with maximum number of restaurants
- The needs of people who are striving to get the best cuisine of the neighborhood
- Is a particular neighborhood famous for its own kind of food.

Just so that you have a good meal the next time you step out

2.3 Data Cleaning

Data scraped from multiple sources were combined into one table. There were a lot of missing values in data in most of the columns. First of all the NULL values which were encoded in various form while scraping the data from the Zomato website where assigned a common representation which was blank in our case. Then one by one each of the seventeen column were analysed and noise were removed(if any). ne of the column Phone number had junk values in it. A phone number column should not contain any character other than digits or plus(+) in it. All the anamolies in the column were removed using regex. The columns containing redundant information in its rows for eg one of our column "approx cost" had "two people" repeating for every row beside the cost in the column. Such type of redundancy were also removed in the cleaning phase. The columns were converted to appropriate data type string, number, categorical etc to carry out the analysis perfectly. For eg one of the column Reviews contained the list of tuples but while reading it from the csv file it was read as string datatype. The column was therefore analysed for it to contain the list of tuples in it. Some of the column that contained greek letter in the cell were encoded differently by pandas and therefore they had to be converted to its English equivalent for processing. Some values that were scraped from the website were also not much comprehensive so they had to be mapped to a form which was much easier to understand. There were much more cleaning carried out in the data. Please refer to the cleaning notebook to know more about the cleaning phase. After fixing these problems, I checked for outliers in the data but there weren't much outliers in our data.

Figure 1: Data Frame

	url	address	name	online_order	book_table	rate	votes	phone	location	rest_type	dish_
0	https://www.zomato.com/bangalore/jalsa-banasha...	942, 21st Main Road, 2nd Stage, Banashankari, ...	Jalsa	Yes	Yes	4.1/5	775	080 42297555\r\n+91 9743772233	Banashankari	Casual Dining	P L B M: P: P: L
1	https://www.zomato.com/bangalore/spice-elephan...	2nd Floor, 80 Feet Road, Near Big Bazaar, 6th ...	Spice Elephant	Yes	No	4.1/5	787	080 41714161	Banashankari	Casual Dining	Mo L B Choc Nirv Tha
2	https://www.zomato.com/SanchurroBangalore?cont...	1112, Next to KIMS Medical College, 17th Cross...	San Churro Cafe	Yes	No	3.8/5	918	+91 9663487993	Banashankari	Cafe, Casual Dining	Chu Canne Mines Soup Ch
3	https://www.zomato.com/bangalore/addhuri-udupi...	1st Floor, Annakuteera, 3rd Stage, Banashankar...	Addhuri Udupi Bhojana	No	No	3.7/5	88	+91 9620009302	Banashankari	Quick Bites	M: I
4	https://www.zomato.com/bangalore/grand-village...	10, 3rd Floor, Lakshmi Associates, Gandhi Baza...	Grand Village	No	No	3.8/5	166	+91 8026612447\r\n+91 9901210005	Basavanagudi	Casual Dining	Pan Gol G

3 Methodology

3.1 Finding popular/most liked dish in a locality

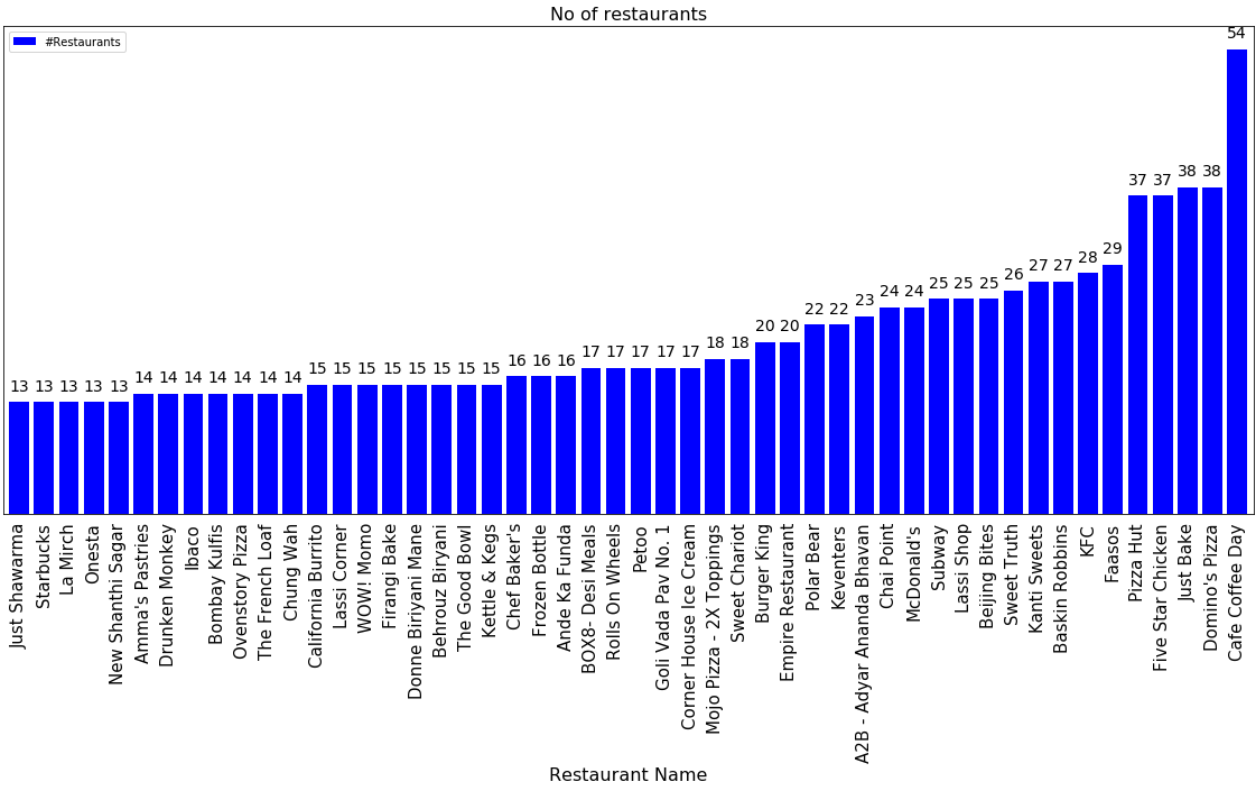
On analysing the data it was found that the name and adress can be the primary key for our data. So based on these two column all the values which were duplicate in our data were dropped. Our main aim is to find out what type of food is more popular or is ordered more in a particular locality of Bangalore. But the problem is we don't have any column in our data that can exactly speak about a place. But we had the reviews column for each of the restaurant for neighborhoods of Bengaluru. So for each restaurant those reviews that were greater than equal to 3 we extracted the most liked food of that restaurant. In our dataframe we had menu column for each of the restaurants. So a food corpus or menu corpus was created for the entire data. Now for each of the restaurant review all those review(greater than 3) that contained food items from the corpus in it were only extracted. Since the data was not structured and the food menu contained a lot of noise in it. A careful analysis of the corpus was done to remove those menu that were not a food item. After extracting the liked food for each of the restaurant it was stored in a list of menu items which will later then be used for our analysis.

3.2 Exploratory Data Analysis

3.2.1 Number of different restaurant in Bengaluru

Silicon Valley and the hub of IT in India, Bangalore is a city of people, colors, and culture. It is also the city of sumptuous and mouth-watering delicacies that you just cant say no to! The society welcomes international food chains. All international fast food chains open their first Indian outlets in Bangalore. How many different restaurants are there in Bengaluru. Lets check it out.

Figure 2: Top 50 restaurants



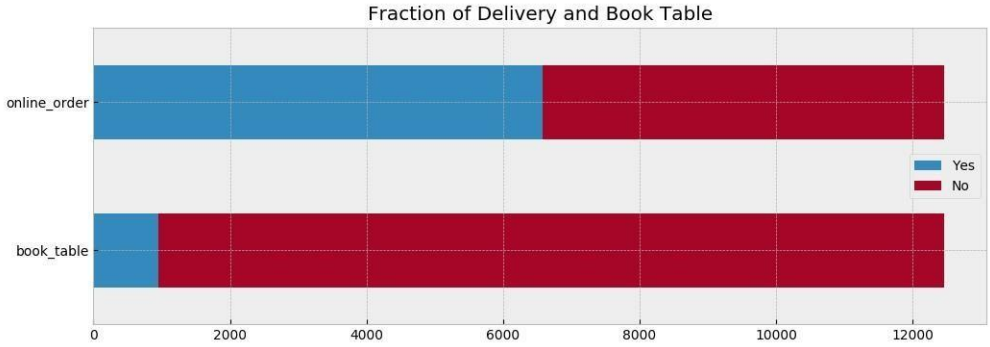
Though this figure is known as a word cloud but it may not be wrong to call it as restaurant cloud here.

Figure 3: Restaurant Cloud

3.2.2 Delivery and Dine-Out restaurant

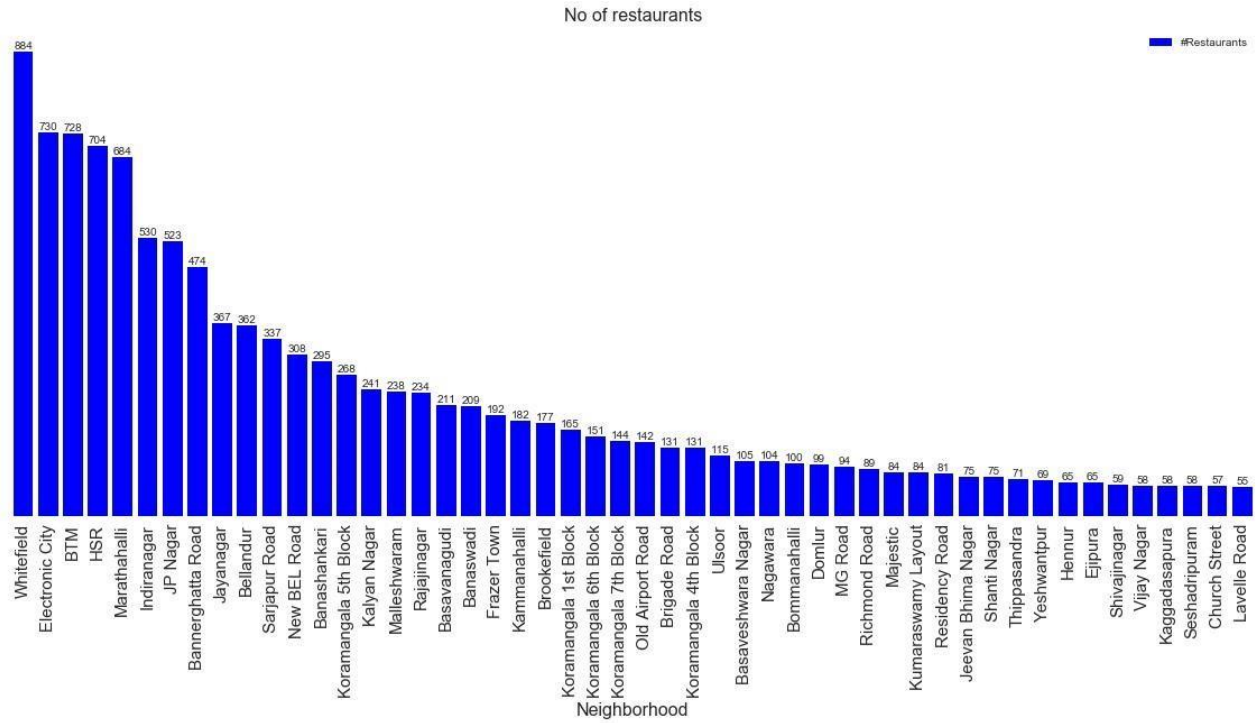
There are much more delivery restaurants in Bangalore than Dine-out. Being an IT capital of India here people(particularly bachelors) don't have much time to prepare food for them. The best option for them seems to be mess or restaurants. Most of the working personal do not want to waste their time in preparing food so restaurants does plays a major role here. Which can also be verified with the ground reality.

Figure 4: Delivery and Dine-out



3.2.3 Number of restaurants in each Neighborhood

Whitefield has the highest number of restaurants followed by Electronic city. But wait is that true. Verifying it with the ground truth we found that Koramangala has the highest number of restaurant but what we are forgetting is that in our dataset Koramangala is divided into 8 blocks starting from first to eighth. Figure 5: Number of restaurants in each Neighborhood



3.2.4 Plotting the areas on Map

The Zomato dataset did not contain latitude and longitude for the location. We got the latitude and longitude for each of the neighborhood using the from geopy module in Python. The availability of Zomato in Bangalore can also be inferred from this map.

Figure 6: Zomato's Presence across Bangalore

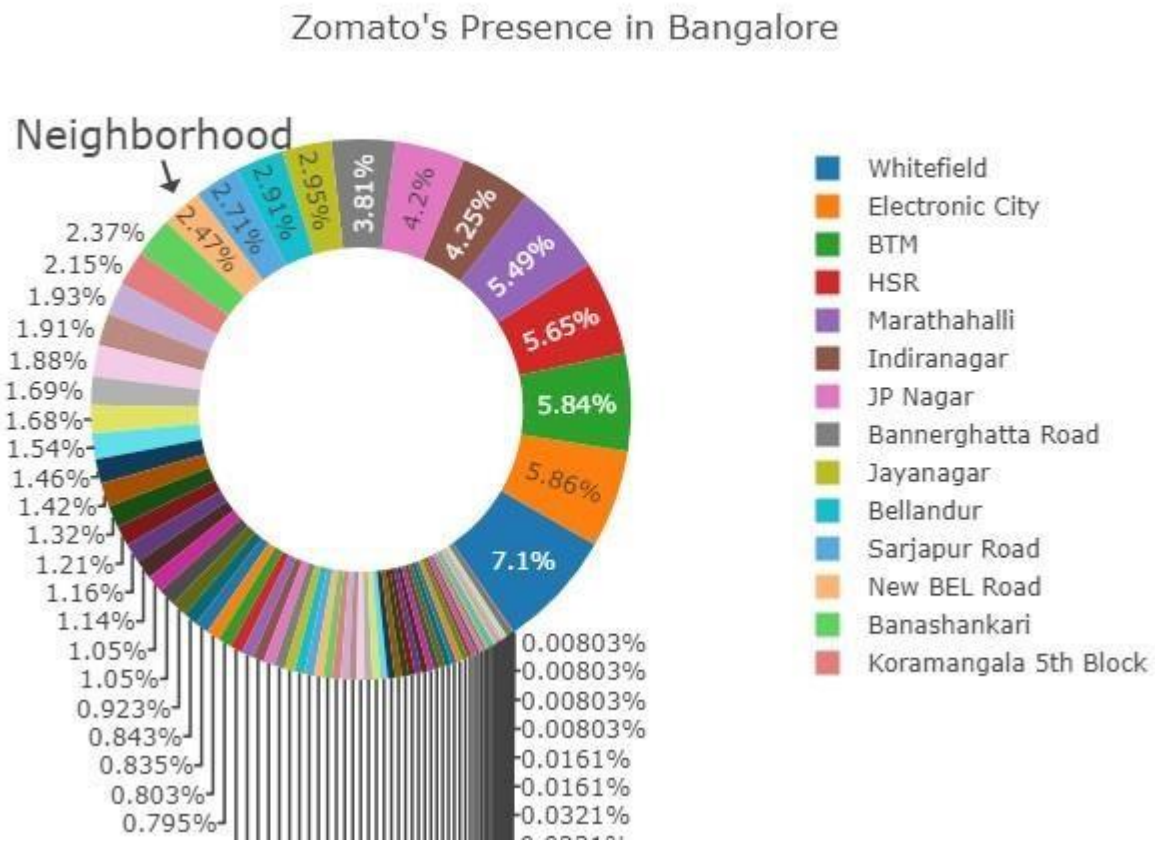
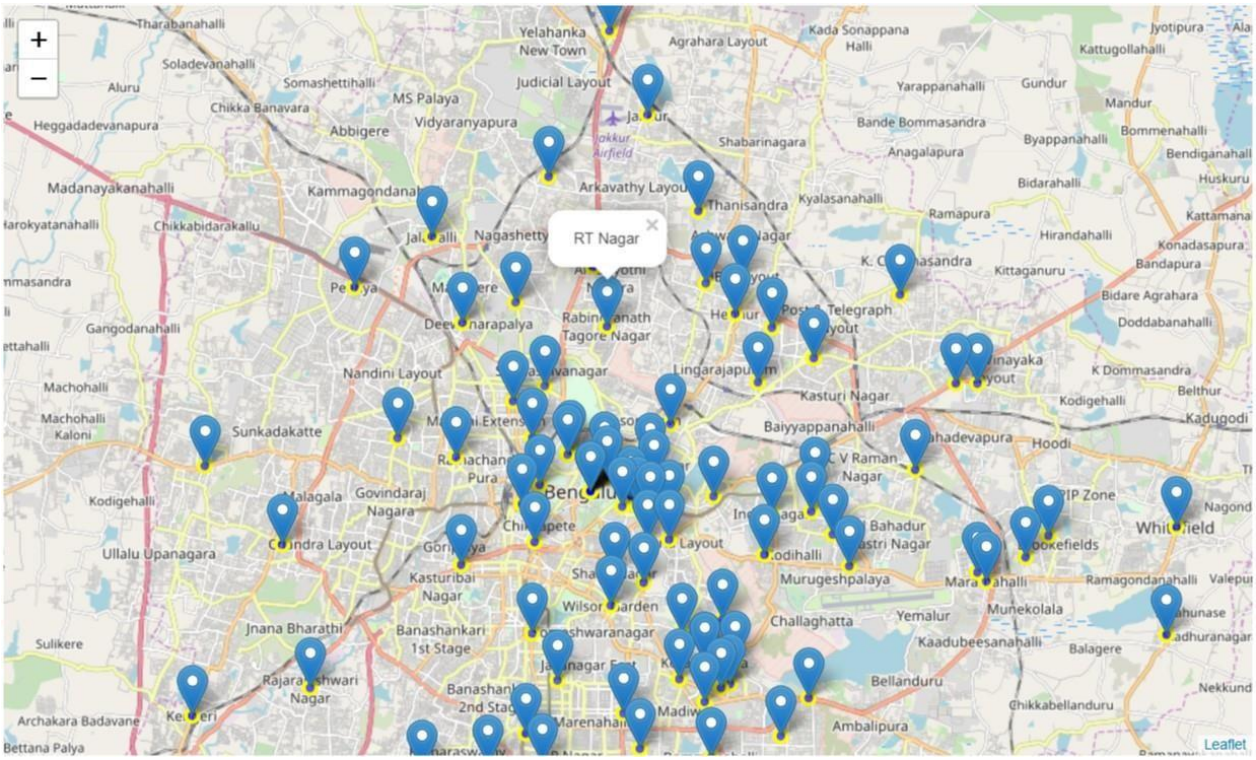


Figure 7: Zomato's Presence across Bangalore



3.2.5 Density of restaurants in each neighborhood

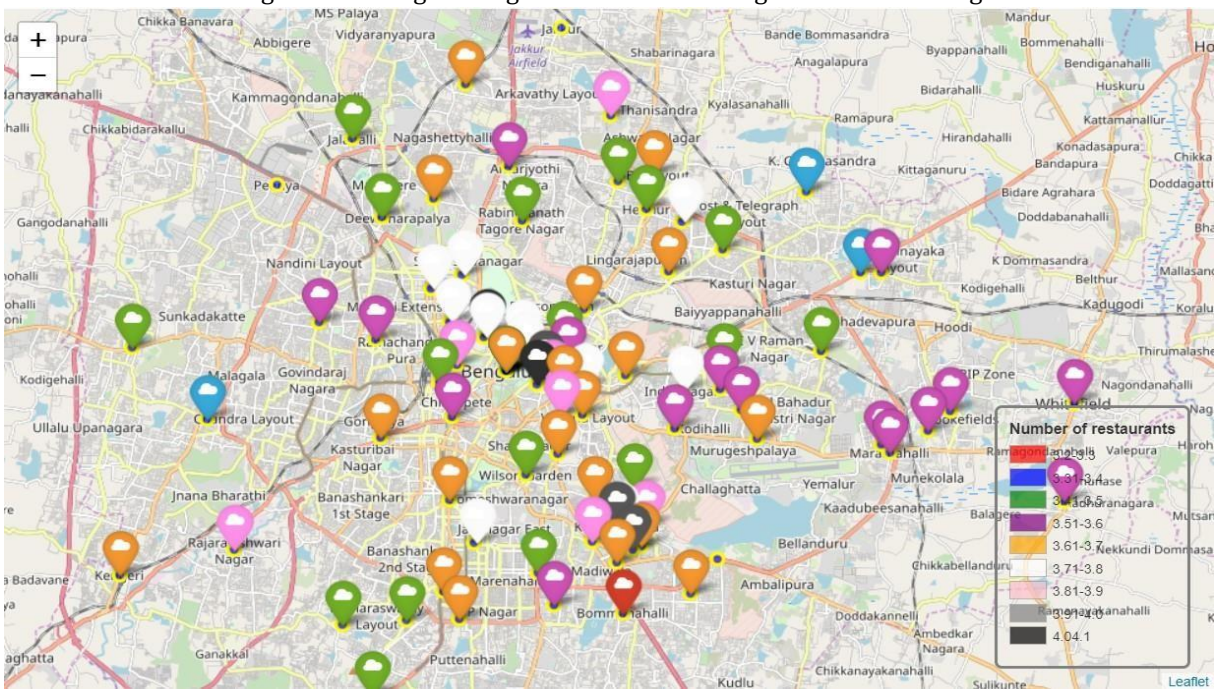
It was seen that outer cities of Bengaluru has most number of restaurants. But wait is that true ? Analysing the data we found that central bengaluru is densely populated while there aren't much markers at the outer part of the city.

Figure 8: Density of restaurants in neighborhoods of Bangalore

3.2.6 Neighborhood by rating

Most of the top rated restaurants are clustered around Central Bengaluru which was also quite obvious since the hub of foreign restaurant is located in central Bangalore.

Figure 9: Average Rating of restaurants in neighborhoods of Bangalore



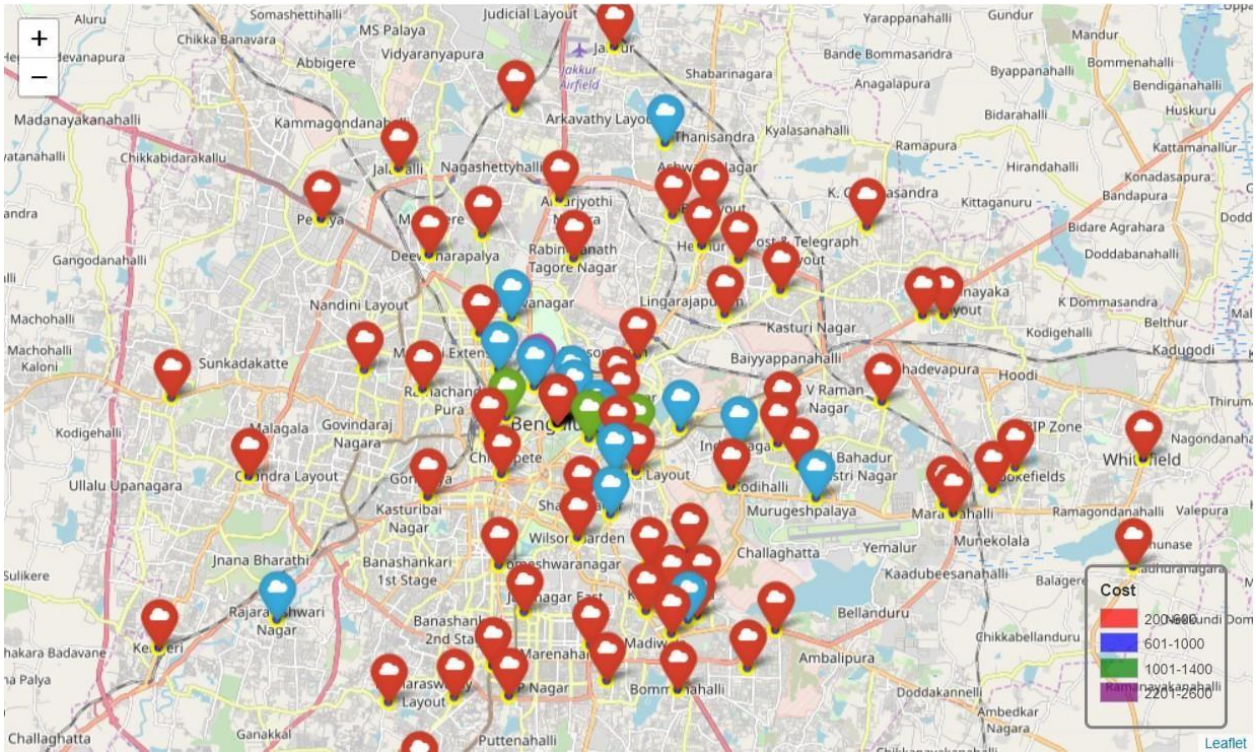
3.2.7 Neighborhood by cost of food

The data for each of the neighborhood was however not uniform. So to segragate the neighborhoods by cost of food we decided to choose those neighborhood that has more than 50 restaurant. But before going further I had a question in my mind Does higher cost of food means its a posche area. The top 10 neighborhoods by cost of food are :

Neighborhood	Cost
Lavelle Road	1292.727273
MG Road	1052.127660
Residency Road	949.382716
Church Street	762.280702
Richmond Road	736.516854
Seshadripuram	733.620690
Vasanth Nagar	719.444444
Ulsoor	687.280702
Old Airport Road	637.304965
Indiranagar	601.064639
Koramangala 4th Block	595.038168

Cost of living in Lavelle Road is also quite high, even I can't afford the restaurants in lavelle road. Lets see it on the map :

Figure 10: Neighborhood by cost of food



It can be seen that all the costly restaurants are located in Central Bangalore, Lavelle Road, MG Road, Race Course Road. Yes it can therefore be said from higher cost of food means posche area comparing it to the ground truth of Bangalore.

3.2.8 Grouping the neighborhood by the type of restaurant

To find out what type of restaurant is more popular in which neighborhood. It can be seen in th e real life too one of the area being more popular for its pubs bars, drinks, nighlife, biryani, dine out etc. It was seen that there are more number of Quick Bites restaurants followed by Delivery restaurant which was Quite obvious to us. Figure 11: Neighborhood by type of restaurant

neighborhood	Pop Up	Bhojanalya	Pub	Lounge	Microbrewery	Bar	Quick Bites	Takeaway	Fine Dining	Delivery	...	Meat Shop	Cafe	Food Truck	Casual Dining	Kiosk	Confectionery	Club	Bakery
BTM	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0
Banashankari	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0
Banaswadi	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0
Bannerghatta Road	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0
Basavanagudi	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0
Basaveshwara Nagar	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0
Bellandur	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0
Bommanahalli	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0
Brigade Road	0	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0

3.2.9 Neighborhood by the cuisines

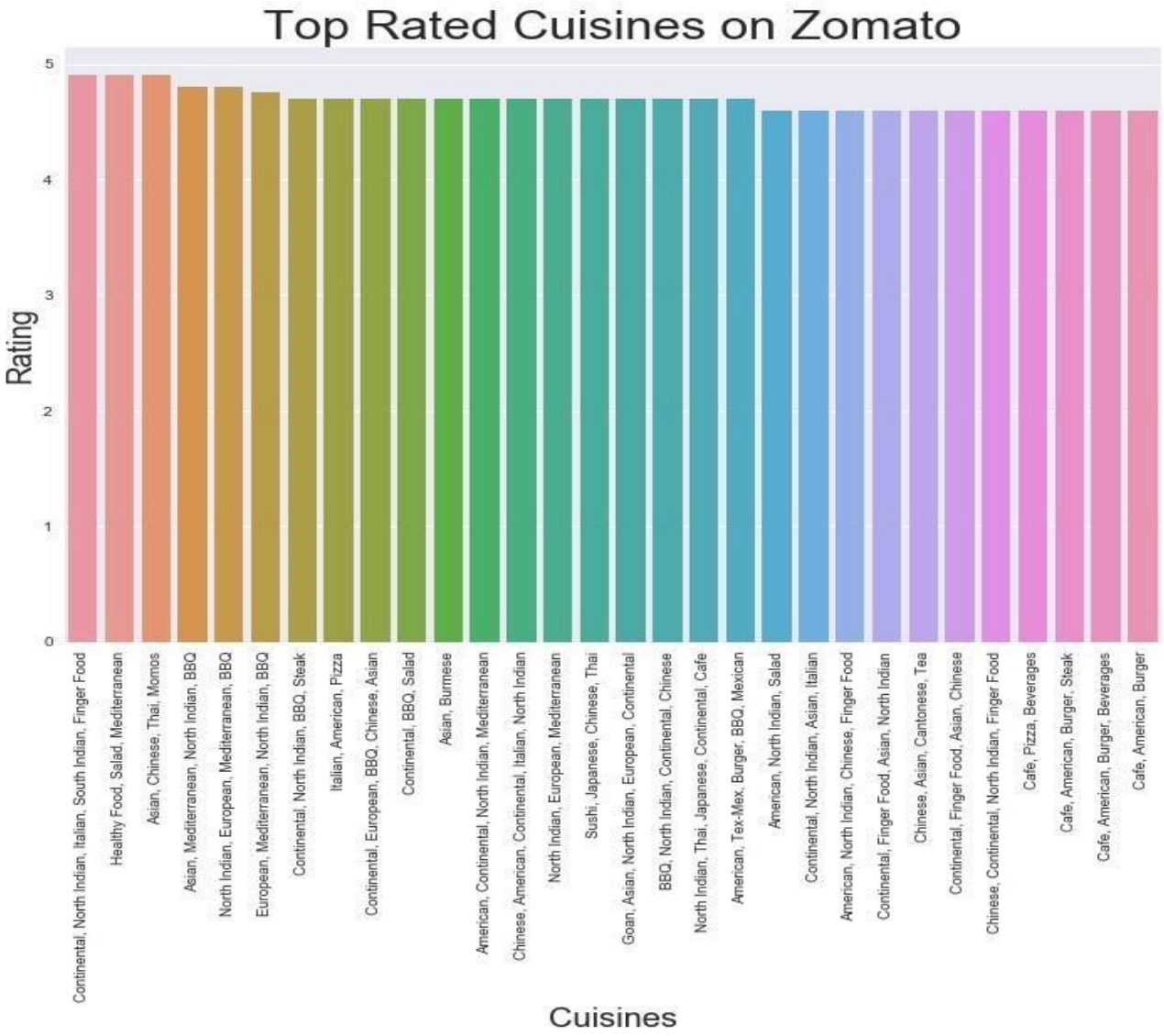
If we seen in real life, there happens to be some place i.e more famous for its own kind of cuisine and as it becomes famous, the number of restaurants also keeps increasing for that cuisines in that locality. So is there any neighborhood that is more famous for its cuisines?

Figure 12: Neighborhood by cuisine

neighborhood	Goan	Seafood	Korean	North Indian	African	Bakery	Chinese	Continental	Australian	Thai	...	Burger	Tamil	Tibetan	Middle Eastern	Nepalese	Assamese	Indian
BTM	0	16	0	335	0	27	236	25	0	5	...	15	0	6	2	1	0	385
Banashankari	0	6	1	93	0	15	71	18	0	5	...	9	0	1	0	0	0	144
Banaswadi	0	4	0	74	0	11	77	12	0	4	...	4	0	2	0	1	0	101
Bannerghatta Road	0	18	0	200	1	33	143	18	0	7	...	13	0	5	1	0	0	239
Basavanagudi	0	3	0	50	0	18	42	5	0	1	...	6	0	0	0	0	0	101
Basaveshwara Nagar	0	3	0	32	0	6	27	6	0	0	...	2	0	0	0	0	0	45
Bellandur	0	4	0	172	0	26	98	20	1	4	...	9	1	0	0	0	0	194
Bommanahalli	0	1	0	50	0	7	39	1	0	0	...	1	0	0	0	0	0	61
Brigade Road	0	6	1	32	0	10	36	21	0	2	...	9	0	5	0	0	0	43

Figure 13: Top 15 cuisine

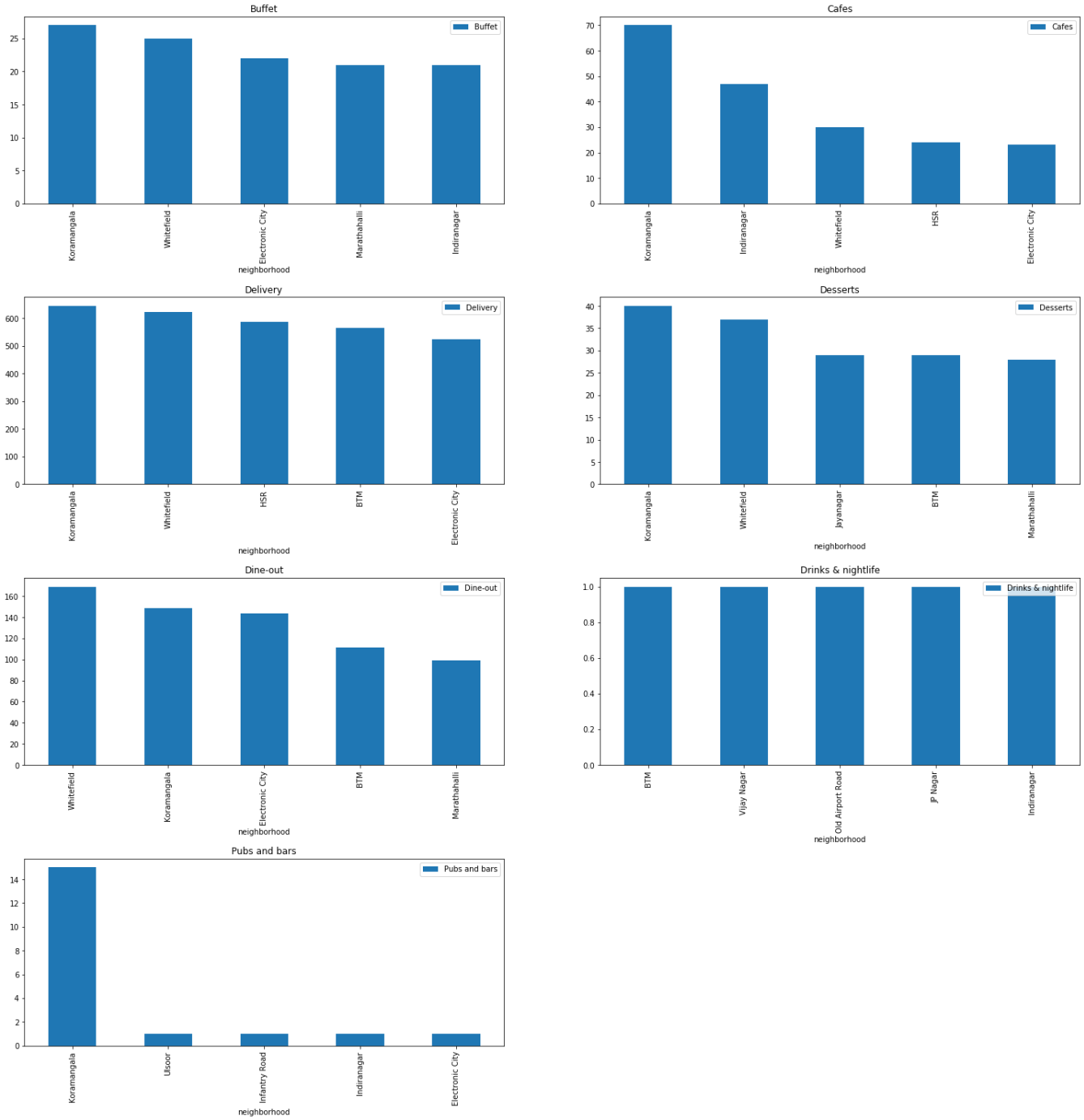
Figure 14: Top Rated Cuisines



3.2.10 Grouping Neighborhoods by Types Of Restaurant

Koramangala has most number of Pubs and bars, With whitefield having the most number of Dine out restaurant, Koramangala with high number of Desserts restaurant, again koramangala and whitefield with large number of delivery restaurant, Koramangala and Indira nagar with large number of Cafes and Koramangala and Whitefield with higher buffet restaurants than others. It may not be wrong to conclude Koramangala as the hub of restaurants in Bengaluru.

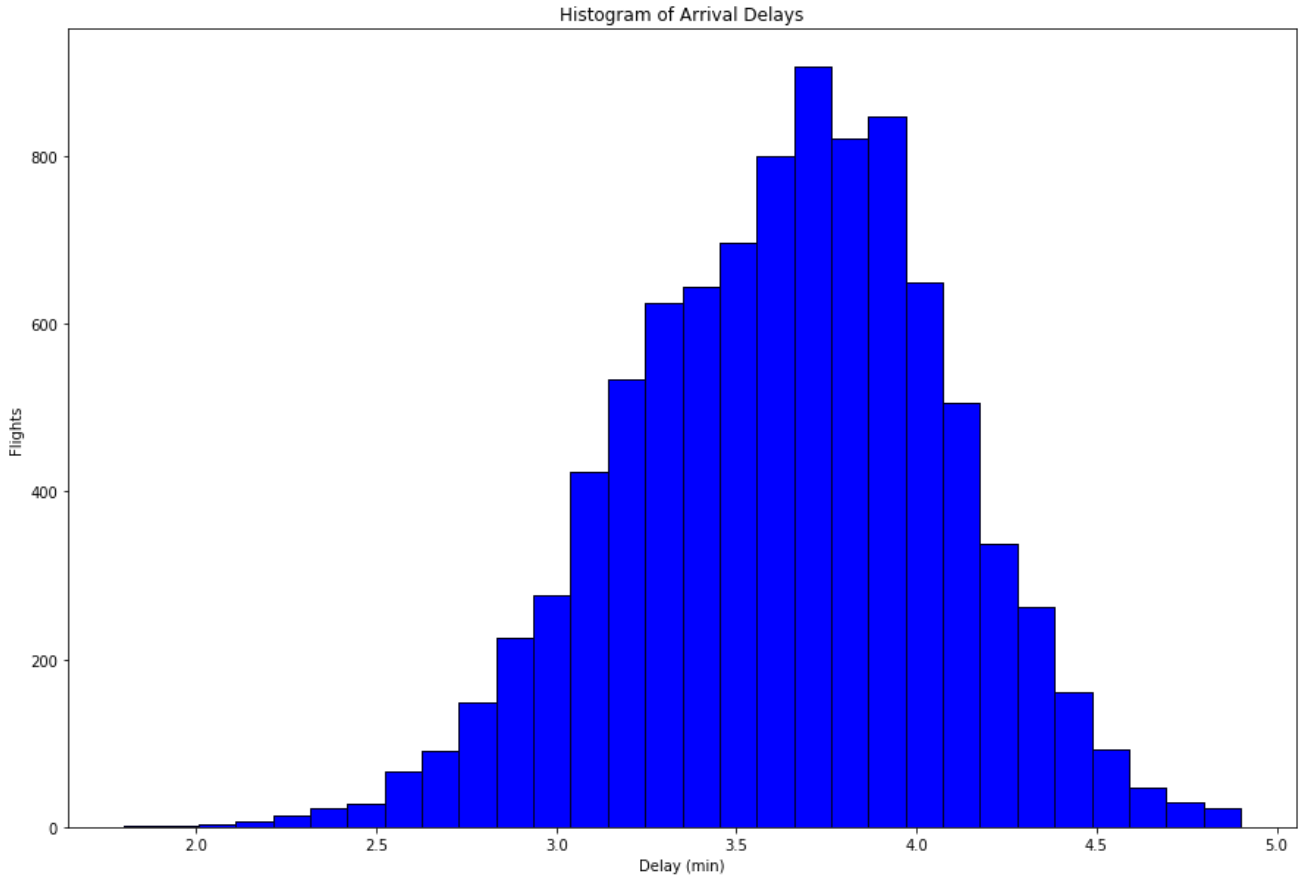
Figure 15: Top 5 neighborhoods by type of restaurant



3.2.11 Restaurant rating Distribution

In general, the rating distribution is normal and in the highest score 3.7 has peak!

Figure 16: Rating distribution



We have to carefully see the condition of the highest rated restaurant.
Most of the High rated restaurants had North Indian Cuisine in their menu, moreover we can see that all the Figure

17: Data Frame

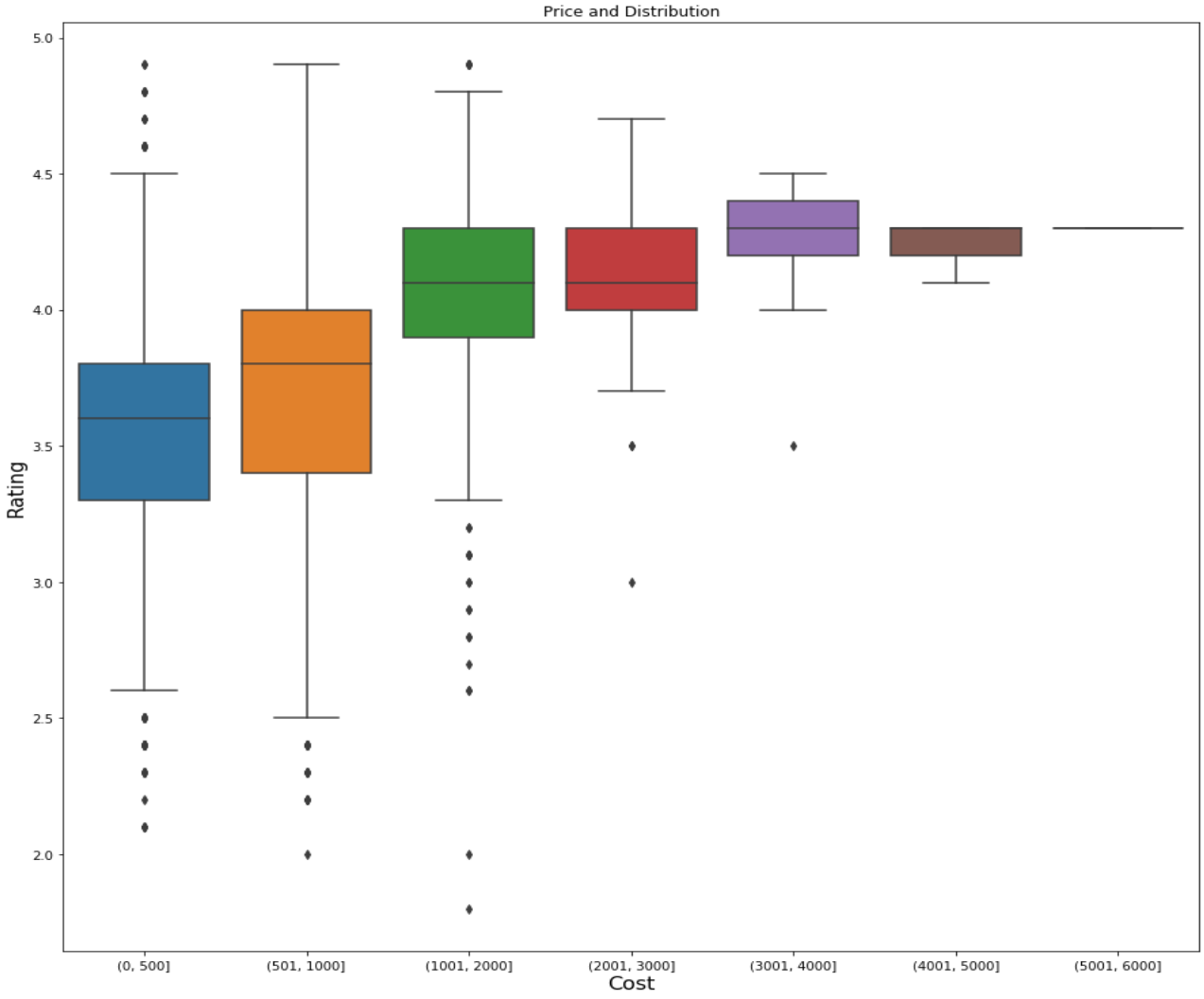
name	online_order	book_table	rate	votes	phone	location	rest_type	...	cuisines	approx_cost(for two people)	reviews_list	me
Brahmin's Coffee Bar	No	No	4.8	2679.0	+91 9845030234	Basavanagudi	Quick Bites	...	South Indian	100	[('Rated 5.0', "RATED\n Very soft idly, soft ...	
The Black Pearl	No	Yes	4.8	7023.0	080 49653069	Marathahalli	Casual Dining, Bar	...	North Indian, European, Mediterranean, BBQ	1,500	[('Rated 5.0', 'RATED\n One of the best place...	
Byg Brewski Brewing Company	Yes	Yes	4.9	16345.0	+91 8039514766	Sarjapur Road	Microbrewery	...	Continental, North Indian, Italian, South Indi...	1,600	[('Rated 5.0', 'RATED\n I have been to this p...	
Belgian Waffle Factory	Yes	No	4.9	1746.0	+91 9481511911	Brigade Road	Dessert Parlor	...	Desserts	400	[('Rated 3.0', "RATED\n Waffles are totally w...	
AB's - Absolute Barbecues	No	Yes	4.8	2882.0	040 45659913	Whitefield	Casual Dining	...	European, Mediterranean, North Indian, BBQ	1,600	[('Rated 4.0', 'RATED\n Went today for Lunch ...	
Flechazo	No	Yes	4.9	2745.0	+91 8884333312	Whitefield	Casual Dining	...	Asian, Mediterranean, North Indian, BBQ	1,400	[('Rated 5.0', 'RATED\n Food quality is amazi...	
Punjab Grill	Yes	No	4.9	518.0	+91 8448581880\r\n+91 8448581881	Whitefield	Casual Dining	...	North Indian	2,000	[('Rated 5.0', 'RATED\n The food is great...t...	Ti Pur
AB's - Absolute Barbecues	No	Yes	4.9	6375.0	040 45659912	BTM	Casual Dining	...	European, Mediterranean, North Indian, BBQ	1,600	[('Rated 5.0', 'RATED\n We liked the place a ...	

higher rated restaurant has higher cost of food too. However location does not play much important role here.

3.2.12 Price range and rating

From the analysis it was pretty much evident that as the price increases the average rating of restaurants also increase. So can we say Price does affect rating of a restaurant.? Not now, there may be some other factors too. We will see later in the report.

Figure 18: Box Plot between Price and Rating



3.2.13 Cuisine and rating of a resaurant

Does having more number of cuisine mean higher rating of the restaurant.Where 0 means no cuisine was listed in the website.

no of cuisine	rating
0	3.400000
1	3.584998
2	3.589250
3	3.620158
4	3.736189
5	3.790373
6	3.917822
7	3.905357

8	3.768571

Yes it can be seen that retaurants having more number of cuisines are rated higher.

So is there a particular cuisine in a restaurant that makes the restaurant rated higher. After analysing the data it was found that these type of cuisines were very highly rated Goa, Seafood, Korean, African,Fast Food, Figure 19: Data Frame

rate	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9
Goan	1	2	2	0	1	0	0	1	0	0
Seafood	19	29	19	8	12	5	2	0	0	0
Korean	2	5	4	1	5	1	1	0	0	0
North Indian	225	178	110	78	63	31	13	14	5	5
African	0	0	0	1	0	0	2	0	0	0
Bakery	41	24	16	15	2	0	1	0	1	0
Chinese	162	117	65	41	34	17	10	5	0	1
Continental	79	91	76	58	39	26	8	11	3	1
Australian	0	0	0	0	0	0	0	0	0	0
Thai	24	15	11	11	11	7	2	2	0	1
Sushi	1	1	0	0	0	1	0	1	0	0
South Indian	88	64	33	35	13	9	3	2	1	1

Biryani, Chinese, Continental, Thai, Sushi, Sindhi, Portuguese, Turkish, Naga, Jewish, Rajasthani, BBQ, Sandwich, Momos, Andhra, Steak, Tex-Mex, Arabian, Rolls, Healthy Food, Desserts, Finger Food, Pizza, Vietnamese Italian, Mediterranean, Kebab, American, Japanese, Mexican, Indonesian, Burmese, European, French, Malaysian, Asian, Mughlai, Burger, Iranian but among these **American, Italian, Pizza, Biryani, Continental, Chinese, Seafood, Korean** were much highly rated. Though North Indian, South Indian, Ice Cream, Mangalorean Beverages, Street Food, Cafe, Indian were the top rated but it is quite obvious for such type of restaurant to be at the top.

3.2.14 Cuisine popular in Bengaluru

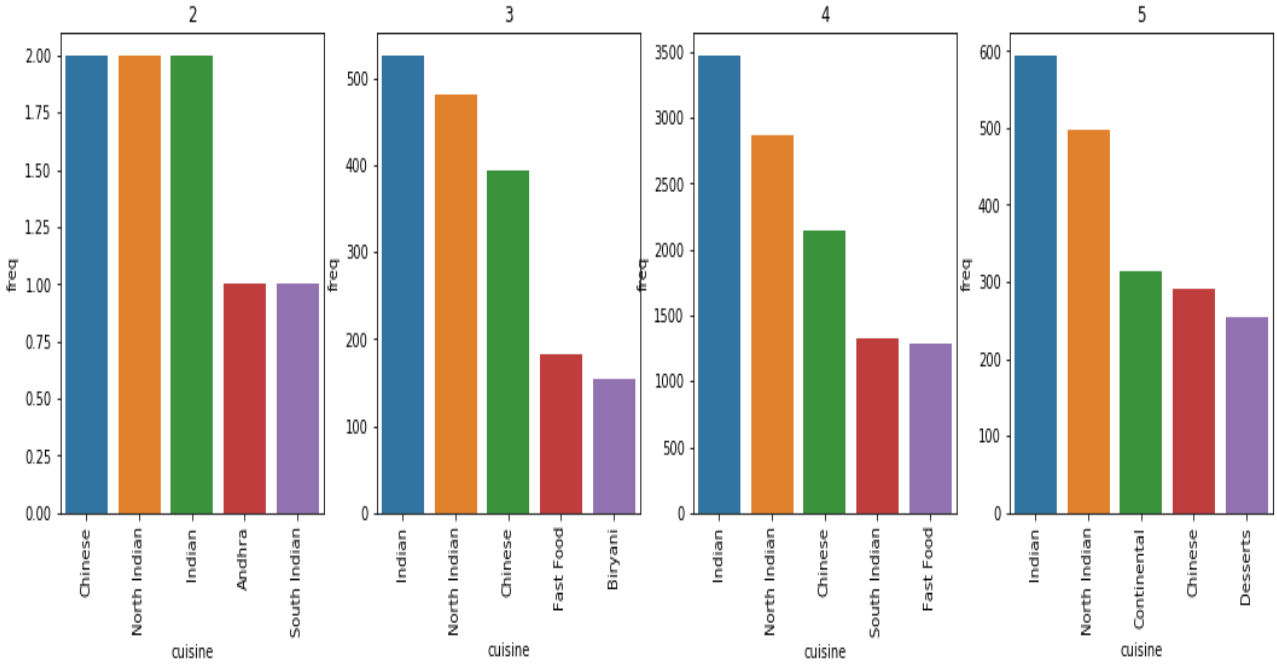
Though we already stated that you can get all types of Cuisines in Bengaluru but apart from the Indian Cuisine what type of cuisine is more popular in Bengaluru. Seems like Italian, American, Japanese, Chinese and many more.

Figure 20: Cuisine Cloud

3.2.15 Rating and Cuisine

There are some cuisine which are rare and are much liked by people. So is there any cuisine which is always rated high.

Figure 21: Cuisine and Rating



Indian, North Indian, Chinese tough were common among the ratings but Most of the continental Cuisine restaurant were rated high which was also evident from the data, and not to forget there are large number of desserts restaurant

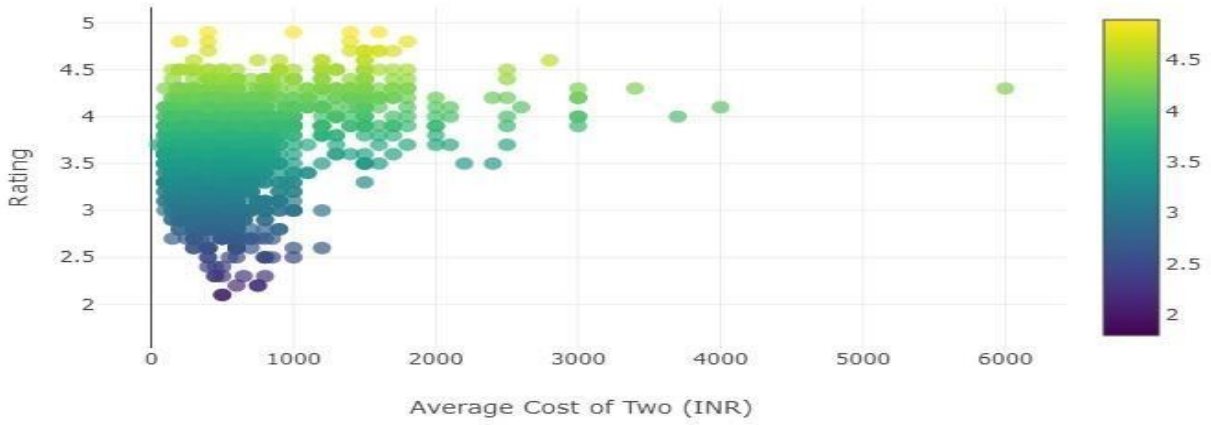
3.3 Statistical Analysis

There are several question that needs to be asked to the data that EDA alone cannot answer.

3.3.1 Are ratings affected by how cheap/expensive a restaurant is ?

As it seems, from a quick glance, there is no obseravable linear relationship. At almost every price point, there appears to be both Good and Bad restaurants.

Figure 22: Rating vs Cost



If we see statistical analysis pearson correlation on it where our :
Null Hypothesis : There is no relationship between the rating and price of the restaurant
Alternate Hypothesis : There is some relationship between the two

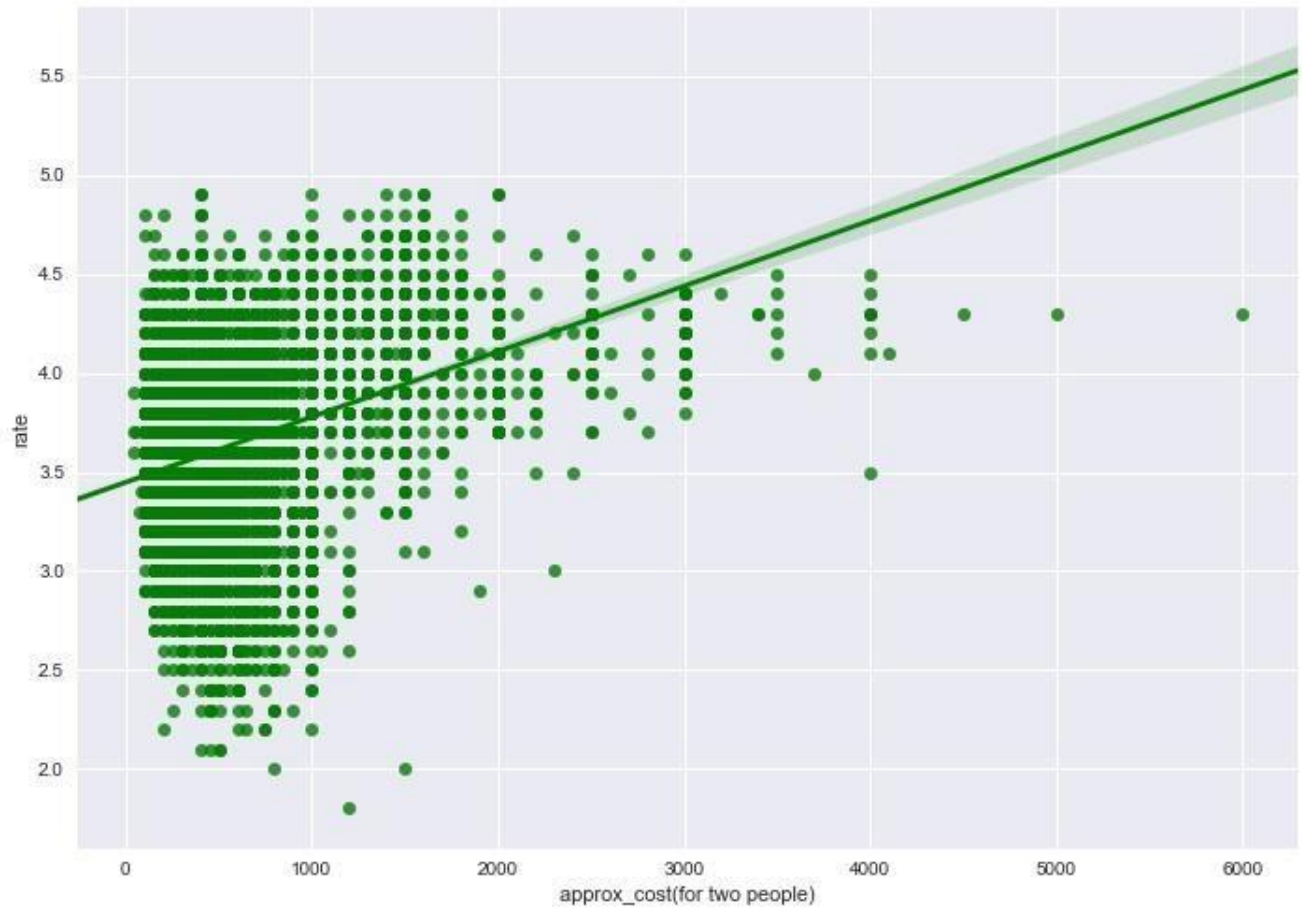
Pearson Correlation Coefficient: 0.32609607011051456 and a P-value of: 3.595009214519809e-228

The p-values comes out to be much much lower than our signifiance level. Hence we reject our NULL hypothesis and accept the alternate hypothesis. And our finding can be said to be statistically significant. Therefore we can say that there is some relationship between the two.

3.3.2 Do more votes == Higher Ratings?

As it seems, from a the graph, there is no obseravable linear relationship. At almost every price point, there appears to be both low and high cost restaurants.

Figure 23: Rating vs Votes



Lets see the statistical analysis

Null Hypothesis : There is no relationship between the rating and votes of the restaurant

Alternate Hypothesis : There is some relationship between the two

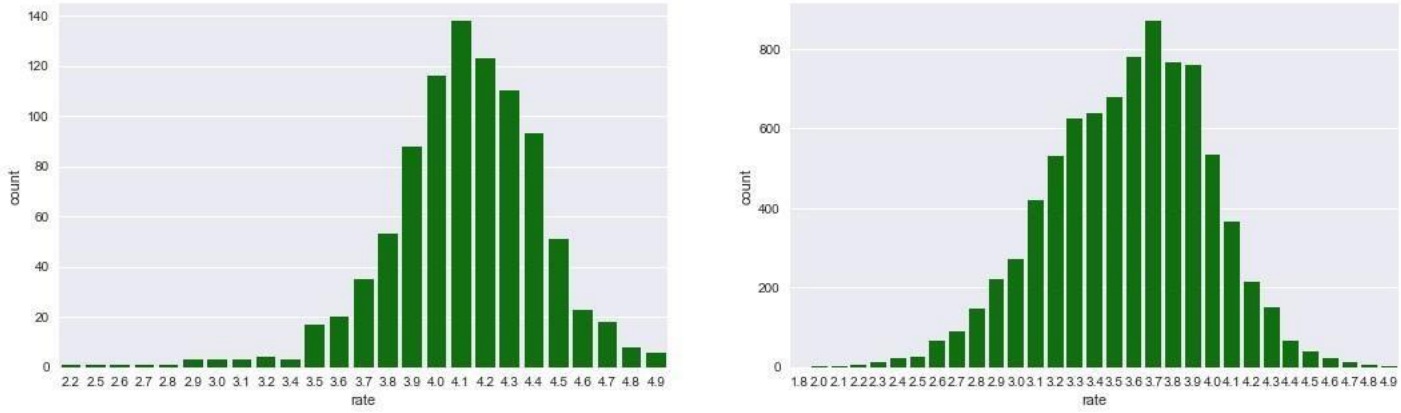
Pearson Correlation Coefficient: 0.39935415986250994 and a P-value of: 0.0

The p-value shows result is significant. And hence we reject our NULL hypothesis and accept the Alternate Hypothesis i.e both the variables are related and our finding was statistically significant.

3.3.3 Are restaurants that offer Table booking option rated higher?

So those restaurants that provide the option of table book are they rated higher. Lets check this out from the graph.

Figure 24: Rating vs Votes



Seems like can't say anything from the graph. lets check out the statistics for the same.

Figure 25: Statistics

OLS Regression Results

Dep. Variable:	rate	R-squared:	0.141
Model:	OLS	Adj. R-squared:	0.141
Method:	Least Squares	F-statistic:	1526.
Date:	Mon, 22 Apr 2019	Prob (F-statistic):	3.39e-309
Time:	20:59:06	Log-Likelihood:	-4663.8
No. Observations:	9285	AIC:	9332.
Df Residuals:	9283	BIC:	9346.
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	3.5712	0.004	816.754	0.000	3.563	3.580
C(book_table)[T.Yes]	0.5426	0.014	39.066	0.000	0.515	0.570

Omnibus:	152.465	Durbin-Watson:	1.634
Prob(Omnibus):	0.000	Jarque-Bera (JB):	162.245
Skew:	-0.301	Prob(JB):	5.87e-36
Kurtosis:	3.241	Cond. No.	3.38

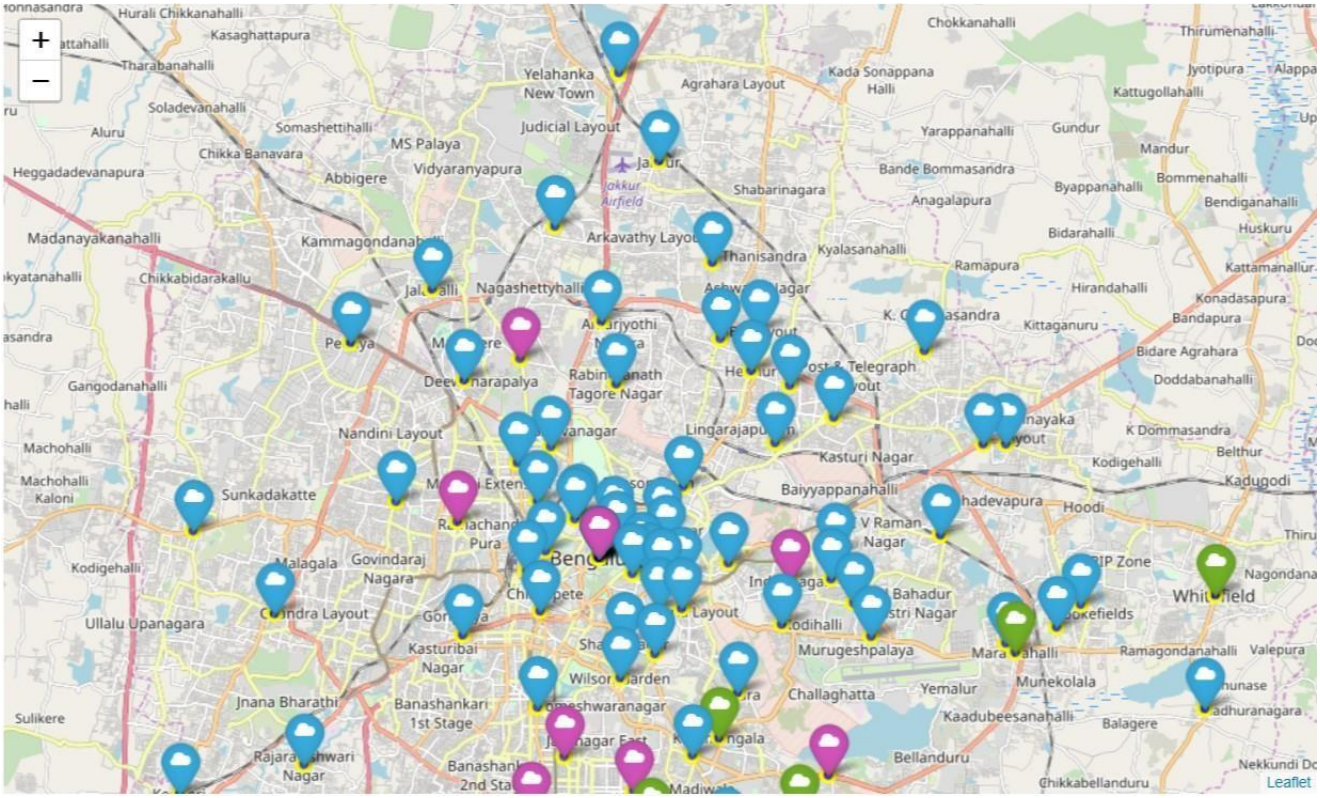
Yes, The relation is statistically significant. Hence we can say that those restaurant which provides the table booking options are relatively rated higher.

3.4 K-Means Clustering

3.4.1 Clustering on the basis of cuisine

There are approx 93 neighborhoods in Bengaluru. Can we say that two neighborhoods are same on the basis of cuisine they offer.

Figure 26: Clustering on the basis of cuisine



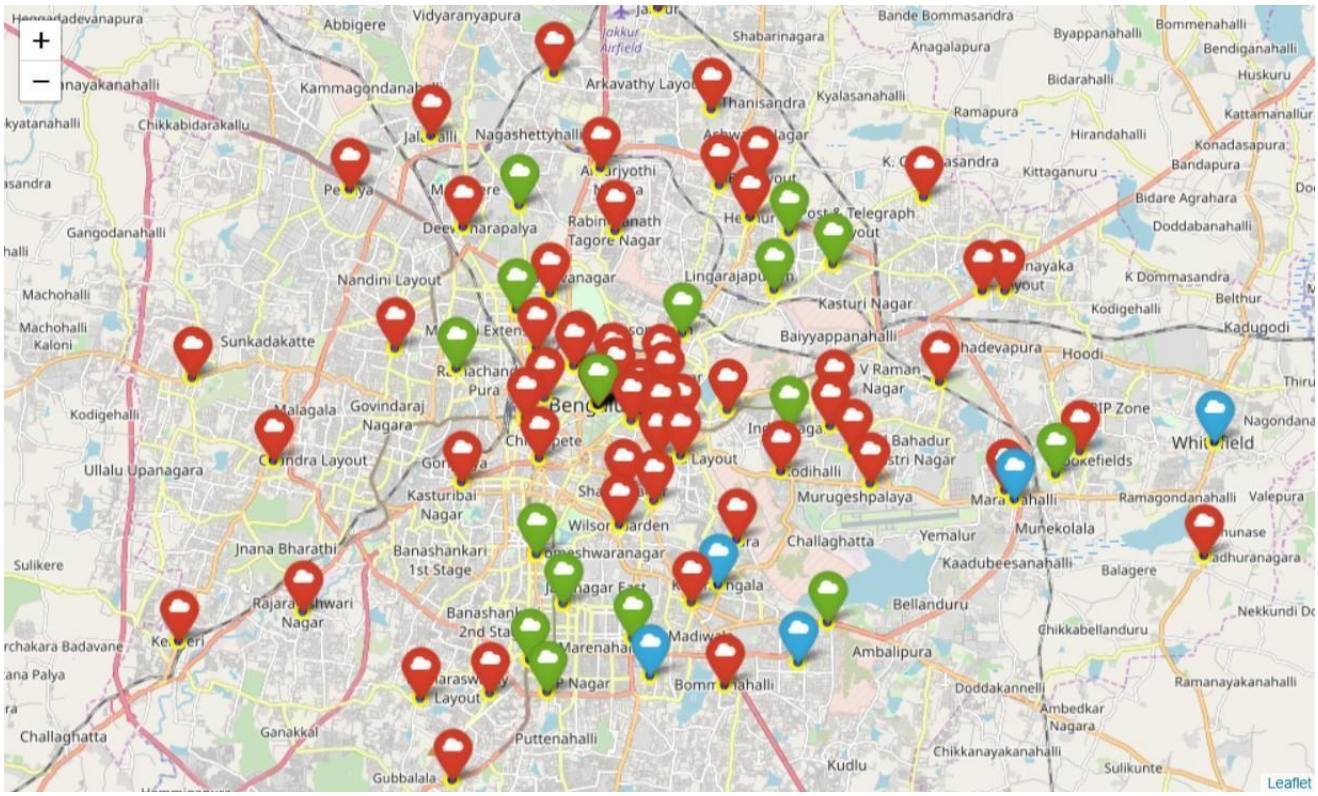
On analysing the data it was found that North Indian, Indian, South Indian are available and famous in most(approx 90Cluster 0 or those marked in Red are the places that are more famous for its foreign cuisines can be goan, assamese, bihari, american, thai etc.

Cluster 1 or those marked in Blue are the places that are more famous for its Biryani, Chinese, Fast food and North Indian food.
Cluster 2 or those marked in Green are those places that are more famous for its South Indian, Indian, North Indian, Chinese as well as fast food.
Cluster 3 or those marked in Purple were those areas where Street Food, Chinese, Fast food were more popular or we can say more number of restaurants were present.

3.4.2 Clustering neighborhood on the basis of type of restaurants

There are several types of restaurant. Pubs, Bars, Drinks, Dine out, Delivery only. Can we compare two neighborhoods o Bangalore on the basis of type of restaurant. It will also help us in finding out the different type of area of Bangalore.

Figure 27: Clustering on the basis of type of restaurant



Yes! Pretty good results

Cluster 1 that are marked in red are generally residence(only) areas of bangalore. There aren't much nighlife, pubs, bars in those areas

Cluster 2 marked in Blue are the hubs of restaurant in Bangalore, After verifying it with the ground truth it was found that new foreign food chain starts its operation from these places only.

Cluster 3 marked in green contains most of the posche areas of Bengaluru, they contain both residence as well as costly restaurants of Bangalore.

4 Results

It was worth noting that all the top 5 restaurants of Bangalore were foreign restaurant chains. What are Indian restaurants lacking in terms of the food, cuisine which will be worth studying about in future. More than 60% of the restaurants in Bangalore offer online delivery, clearly most of the population are working population here. Whitefield which is also a software industrial area houses more restaurants of Bangalore and can be said heaven for foodies. Most of the top rated restaurants are clustered around Central Bengaluru. Lavelle Road houses the maximum number of costly restaurants of Bangalore. There are more number of Quick Bites restaurants followed by Delivery restaurant which was Quite obvious to us. Also we saw that an area becomes famous as a particular specififc type of cuisine/restaurant increases over there. Bangalore being in south India, but North Indian food is more famous among the people here. Why is that? One of the possible reason can be huge migration of people in search of good job from north India. koramangala and whitefield with large number of delivery restaurant, Koramangala and Indira nagar with large number of Cafes and Koramangala and Whitefield with higher buffet restaurants than others. Koramangala can be considered as the central hub of restaurants. Most of the High rated restaurants had North Indian Cuisine in their menu, moreover we can see that all the higher rated restaurant has higher cost of food too. It was also evident that as the price(approx cost for two) increases the average rating of restaurants also increase. It was also worth noting that retaurants having more number of cuisines are rated highe. After analysing the data it was found that these type of cuisines were very highly rated Goa, Seafood, Korean, African,Fast Food, Biryani, Chinese, Continental, Thai, Sushi, Sindhi, Portuguese, Turkish, Naga, Jewish, Rajasthani, BBQ, Sandwich, Momos, Andhra, Steak, TexMex, Arabian, Rolls, Healthy Food, Desserts, Finger Food, Pizza, Vietnamese Italian, Mediterranean, Kebab, American, Japanese, Mexican, Indonesian, Burmese, European, French, Malaysian, Asian, Mughlai, Burger, Iranian but among these American, Italian, Pizza, Biryani, Continental, Chinese,

Seafood, Korean were much highly rated. Though North Indian, South Indian, Ice Cream, Mangalorean Beverages, Street Food, Cafe, Indian were the top rated but it is quite obvious for such type of restaurant to be at the top. Neighborhoods on the basis of cuisine were divided into three cluster one, that are more famous for its Biryani, Chinese, Fast food and North Indian food. two those places that are more famous for its South Indian, Indian, North Indian, Chinese as well as fast food, third those areas where Street Food, Chinese, Fast food and foreign cuisines were more popular or we can say more number of restaurants were present.Also based on the type of restaurant the neighborhood were clusterd into three : residence areas, Hub of restaurants containing pubs, bars, nighlife and third were posche areas of Bangalore housing costly restaurants.

5 Discussion

The model and the idea can be used in real life if I get the access to the ordering data of Zomato. Telling certainly about entire neighborhood which is really large is not possible. But the taste of a locality can be found out by their ordering pattern and the type of restaurant it houses. If we see the real life example a Muslim locality would house more non veg restaurant than vegetarian restaurants. Moreover the people in the locality would like to order more Arabian dishes, biryani etc. similarly a marwari residency would order more vegetarian food than any other. These pattern can be mined from the data which is seen in the real life too. Thanks to the diversity of India. The data can also be used to find out the popular food, type of people, residency area etc to help new restaurants take better data driven decisions.

6 Conclusion

After all the analysis we did some of the point which were worth noting that there are more number foreign food chains than Indian restaurants in Bengaluru. Cafe Coffee day has its outlet in most of the neighborhood of Bengaluru. The Indian food service market has come a long way from the early Nineties when it was dominated by unorganised players and few brands.

The revolution began in 1996 with McDonalds, Pizza Hut, Dominos Pizza, Subway and Yo!China, among others, setting up shop in the country. Since then, the food services market has been continuously growing. Quick service restaurants are a mainstay of the Indian food service market, and are growing fast. Fine dining is gaining prominence too. Both multi-cuisine and single-cuisine establishments have shown tremendous growth. Gone are the days when you would go to Bangalore and only indulge in dosas or at best Kodava food from the region of Coorg. Bangalore is an inspiring mish-mash of old and new, and has plenty of options on offer, regardless of whether you are visiting only for a few days or live there.

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