ANALYSIS OF RESTAURANTS IN JAIPUR

Author: Rohit Kumar Bindal

Dated: 14 April 2020

Applied Data Science Capstone Project Report

IBM Data Science Specialization

CONTENTS

1. INTRODUCTION

The Food culture of Jaipur is quite fascinating. One can find almost all the major players in the restaurant business in Jaipur apart from a few exceptions like Starbucks. Currently the approximate count of restaurants in Jaipur stands at around 4500, with an industry that hasn't saturated yet, this number increases day by day. The aim of this project is to analyze the demography and food culture of a locality in Jaipur. It might help new restaurants decide their theme, menus, cuisines, cost and other features to serve better in its locality. We will focus on answering the questions that one might ask while opening a new restaurant, like:

- What kind of food is more popular in a locality?
- What is the avg cost of food in that locality?
- Are there any other localities with similar food culture?

2. DATA DESCRIPTION

The data used for this project has been extracted from two sources:

- The Restaurants in a locality were scraped from Zomato Website.
- Exploring trending venues in a locality, particularly restaurants, art or entertainment venues like a Cinema or Museum, using the Foursquare API.

Other supporting data:

- Geographical Coordinates of Restaurants were extracted using the Google Map's Geocoding API.

2.1 Data Acquisition:

The data collection was completed in 3 Phases, **Phase-1** included the extraction of all the localities of Jaipur and the URLs for their respective webpages.

Phase-2 marked the extraction of details about a restaurant from a locality, i.e., the restaurant details of each locality were scraped individually using the URLs extracted in Phase I.

In **Phase-3**, Geographical Coordinates (latitude, longitude) for each Restaurant were extracted using Google Map's Geocoding API.

We extracted 10 variables describing a restaurant.

- **Locality**: The locality of Jaipur where the restaurant is established.
- **RestaurantName**: Name of the Restaurant.
- **Address**: Street address of the Restaurant.
- **Category**: Restaurant type.
- **CostForTwo**: Cost for a two-person meal.
- **Cuisines**: List of Cuisines offered by the restaurant.

- **Ratings**: Aggregated rating of the restaurant.
- **Votes**: Number of votes.
- **Latitude**: Geographical Latitude of the Restaurant.
- **Longitude**: Geographical Longitude of the Restaurant.

	Locality	RestaurantName	Address	Category	CostForTwo	Cuisines	Ratings	votes	Latitude	Longitude
0	C Scheme	Kanha	E 62, Bhagat Singh Marg, C Scheme, Jaipur	['Sweet Shop', 'Quick Bites']	₹500	['North Indian', 'South Indian', 'Fast Food', ...	4.2	995	26.912258	75.800590
1	C Scheme	Stepout Cafe	P 14, Sehdev Marg, Ashok Nagar, C Scheme, Jaipur	['Café', 'Casual Dining']	₹800	['Cafe', 'Italian', 'Lebanese', 'Mexican', 'Co...	4.5	1385	26.905899	75.802078
2	C Scheme	Burger Farm	3 & 4, Trimurty, V-Jai City Point Building, Ah...	['Quick Bites']	₹400	['Burger', 'Fast Food', 'Beverages']	4.1	1427	26.914246	75.804930
3	C Scheme	Domino's Pizza	C 18, Silver Square Mall, Bhagwandas Marg, C S...	['Quick Bites']	₹700	['Pizza', 'Fast Food']	3.3	1258	26.915043	75.809926
4	C Scheme	Thali and More	C-46 B, Sarojini Marg, Above Punjab National B...	['Casual Dining']	₹1,100	['North Indian', 'South Indian', 'Chinese', 'F...	4.4	2339	26.910926	75.805679

Fig-1: Extracted Data

It can be observed that Category and Cuisines are not very meaningful, we fill fix that in the Data Cleaning stage.

2.2 How will this data help in solving the problem at hand?

The motive behind analyzing Zomato dataset is to get a fair idea about the factors affecting the establishment of different types of Restaurants in different localities in Jaipur. The data that we have extracted helps in achieving exactly what we want. With the help of this data we can answer:

- What kind of food is more popular in a locality?
- How much one must spend to enjoy a good meal in a locality in Jaipur?
- What are some of the best restaurants in a locality?
- Are ratings affected by how cheap/expensive a restaurant is?
- Are restaurants with more than one cuisine are rated higher?

2.3 Data Cleaning:

Once all the Data was collected, it was time to prepare it for further analysis. Fortunately, the data that we collected was in relatively good state except for Ratings and Votes.

The data type for Ratings and votes was set to object while importing into the pandas data frame, it was casted to float and integer respectively. About 1/4th of the values for Ratings and votes were missing, particularly for the restaurants that were new or recently opened. One thing that was observed while extracting the data was that if a restaurant had no ratings, there was also no vote count.

It was decided that the ratings and votes will be left as it is because, about 1/4th of the total restaurants had no ratings, but they would still contribute to the overall demography of a locality and while analyzing the factors that needed ratings and votes, we would simply omit the records with no data.

The features Cuisine and Category were fixed to be in a more readable format. There were also a few restaurants with name preceded by a '#' symbol, it was fixed.
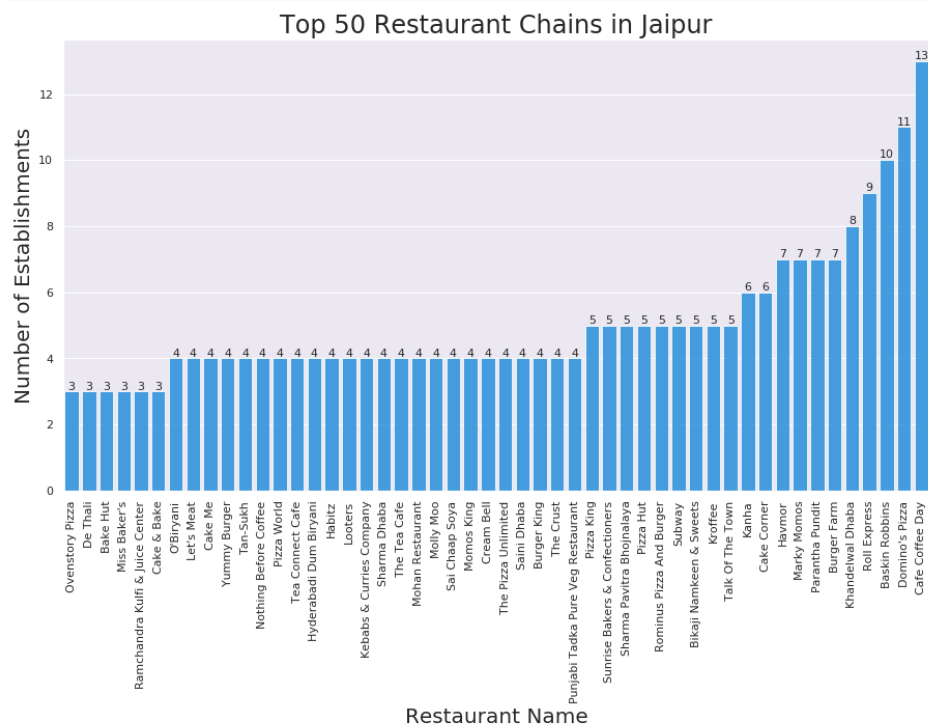
	Locality	RestaurantName	Address	Category	CostForTwo	Cuisines	Ratings	votes	Latitude	Longitude
0	C Scheme	Kanha	E 62, Bhagat Singh Marg, C Scheme, Jaipur	Sweet Shop, Quick Bites	500	North Indian, South Indian, Fast Food, Chinese...	4.2	995.0	26.912258	75.800590
1	C Scheme	Stepout Cafe	P 14, Sehdev Marg, Ashok Nagar, C Scheme, Jaipur	Café, Casual Dining	800	Cafe, Italian, Lebanese, Mexican, Continental,...	4.5	1385.0	26.905899	75.802078
2	C Scheme	Burger Farm	3 & 4, Trimurty, V-Jai City Point Building, Ah...	Quick Bites	400	Burger, Fast Food, Beverages	4.1	1427.0	26.914246	75.804930
3	C Scheme	Domino's Pizza	C 18, Silver Square Mall, Bhagwandas Marg, C S...	Quick Bites	700	Pizza, Fast Food	3.3	1258.0	26.915043	75.809926
4	C Scheme	Thali and More	C-46 B, Sarojini Marg, Above Punjab National B...	Casual Dining	1100	North Indian, South Indian, Chinese, Fast Food	4.4	2339.0	26.910926	75.805679

Fig-2: Cleaned Data

3. METHODOLOGY:

3.1 Number of different Restaurants in Jaipur
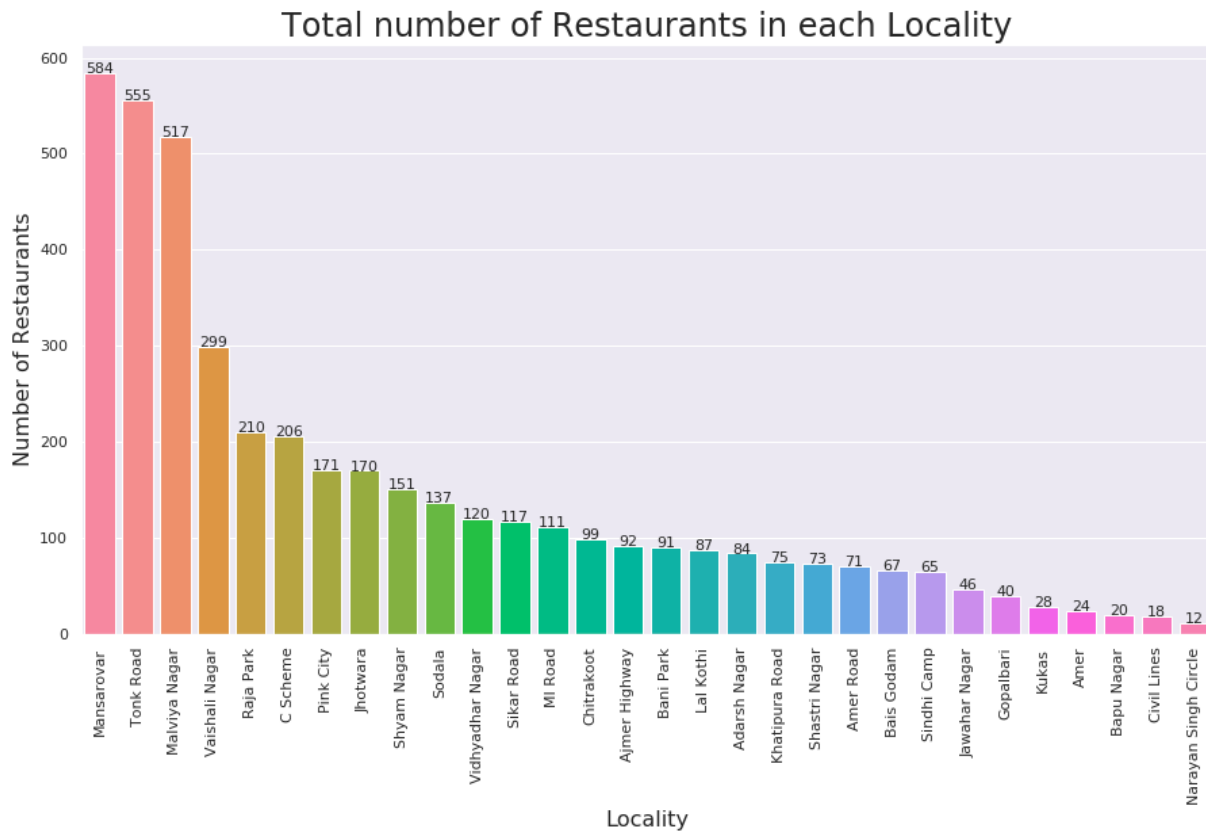How many different Restaurants chains are there in Jaipur?

Fig-3: Top 50 Restaurant chains in Jaipur

Fig-4: Top Restaurant chains in Jaipur
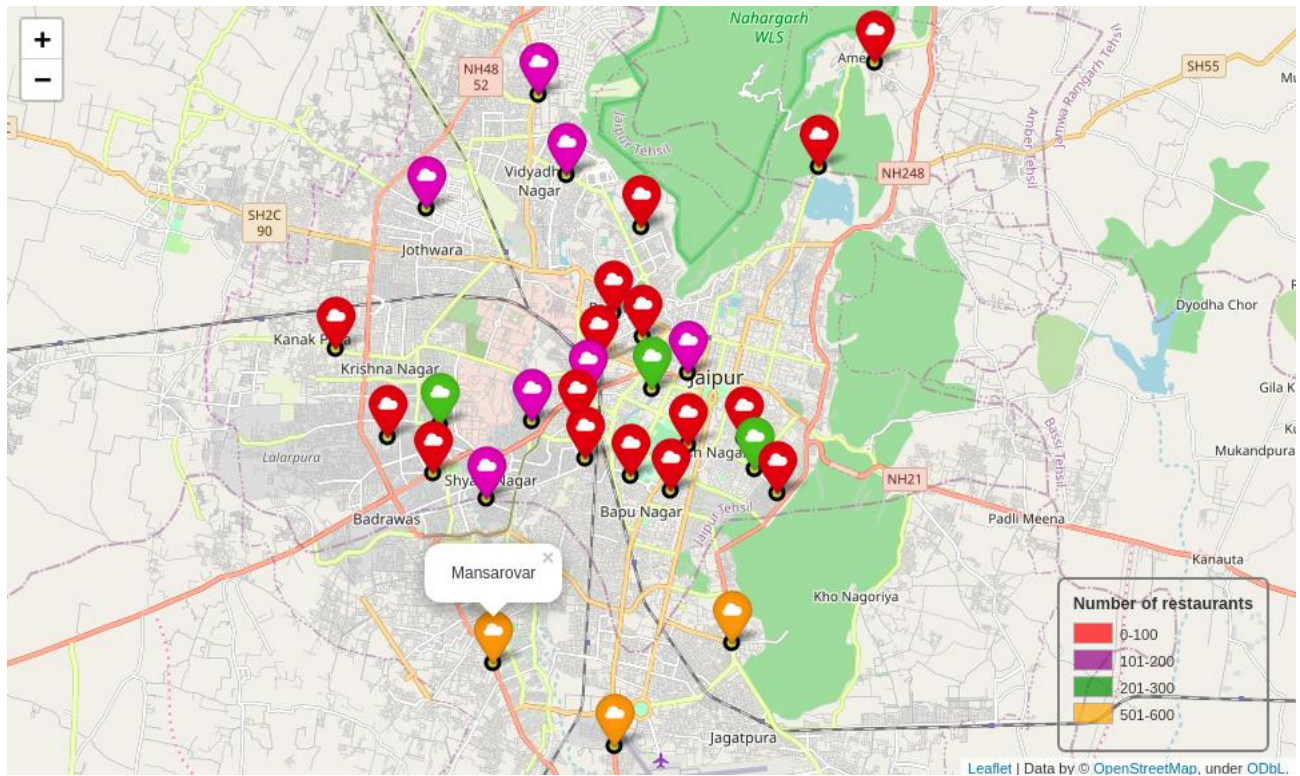
3.2 Number of Restaurants in each in each Locality

Mansarovar has the highest number of restaurants, followed closely by Tonk Road.

Total number of Restaurants in each Locality

Fig-5: Total number of Restaurant in each Locality

3.3 Density of Restaurants in each locality

It was seen that the outer regions of Jaipur have the greatest number of restaurants. But it can be observed that the central region of Jaipur is densely populated in comparison to the outer region.

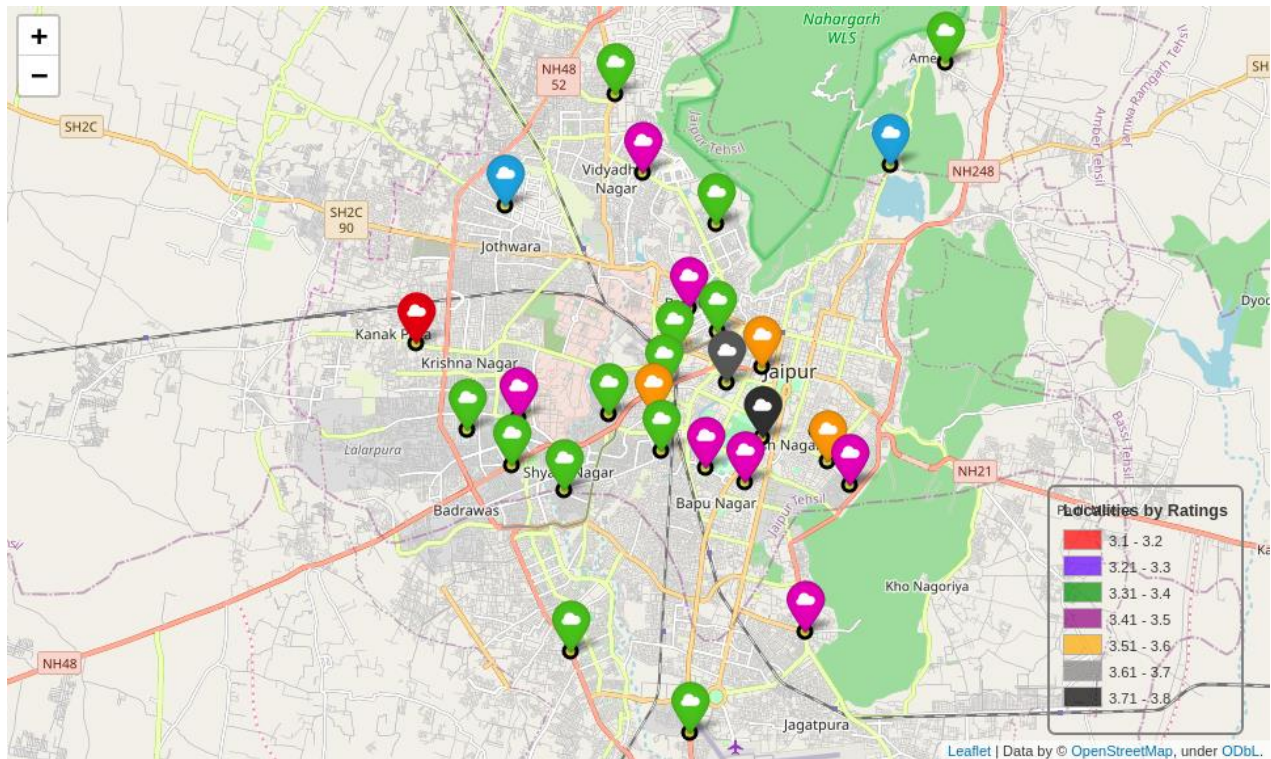
Fig-6: Density of Restaurant in each locality

3.4 Localities by Rating

Most of the top-rated restaurants are clustered around central Jaipur. However, majority of the restaurants are rated between 3.31-3.4/5 and are spread throughout the city.
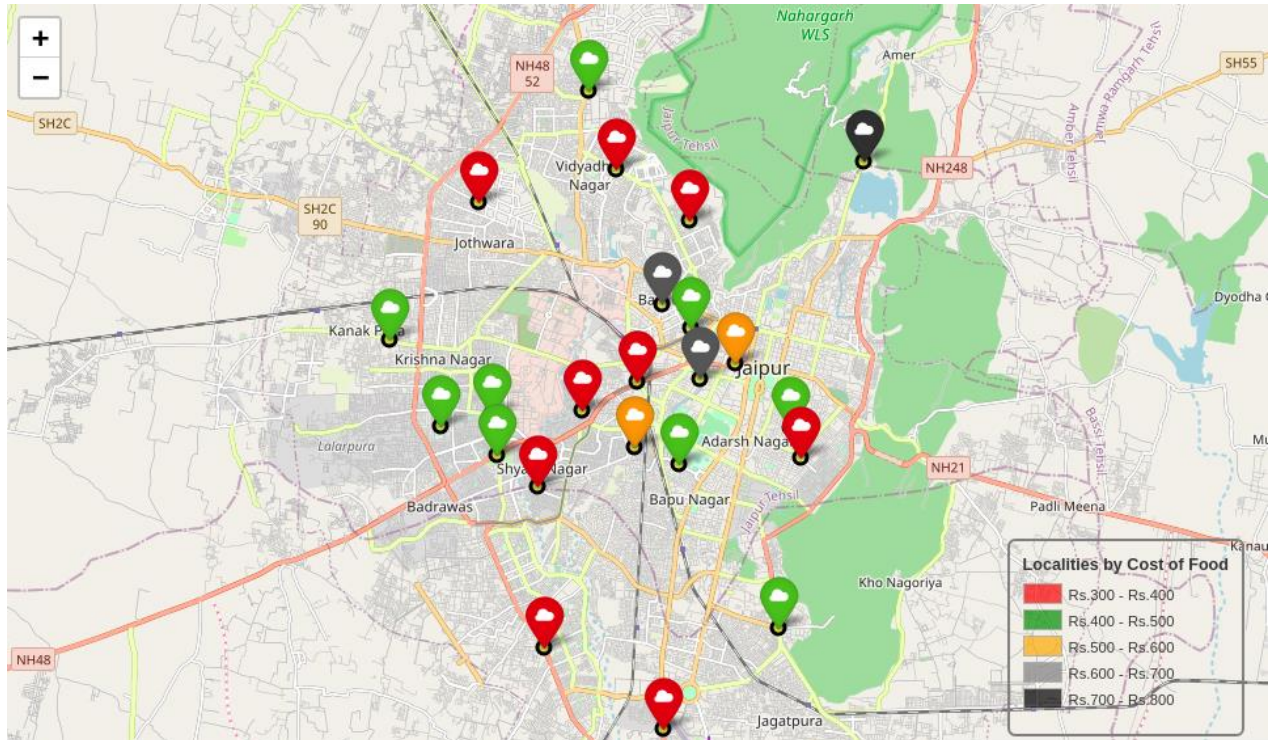

Fig-7: Localities based on the average ratings

3.5 Localities by cost of food

Is there a relation between locality and cost of food? Like, cost on Amer Road or C-Scheme is quite higher than most of the localities in Jaipur as these areas are considered the Posh residential areas of Jaipur and Amer Fort being a popular tourist attraction of Jaipur.

```
Locality
Amer Road             960.563380
Bani Park             669.230769
C Scheme              638.106796
MI Road               576.576577
Bais Godam            564.925373
Khatipura Road        499.333333
Malviya Nagar         463.442940
Sindhi Camp           449.230769
Sikar Road            447.863248
Vaishali Nagar        432.943144
Ajmer Highway         417.391304
Lal Kothi             412.068966
Chitrakoot            410.101010
Adarsh Nagar          401.785714
Shastri Nagar         395.205479
Tonk Road             392.522523
Raja Park             391.904762
Shyam Nagar           390.397351
Sodala                387.591241
Vidhyadhar Nagar      371.666667
Mansarovar            361.729452
Jhotwara              353.823529
Pink City             323.976608
```

Fig-8: Localities by avg. cost of food

Fig-9: Localities by avg. cost of food

We can see that most of the costly restaurants are in the central Jaipur, Bani Park, C-Scheme, MI-Road.

3.6 Grouping the localities by type of Restaurants
To find out what type of restaurants are more popular in Jaipur. It can be seen in the real life too, one area being popular for its fast food, the other for clubs, bars, dining.

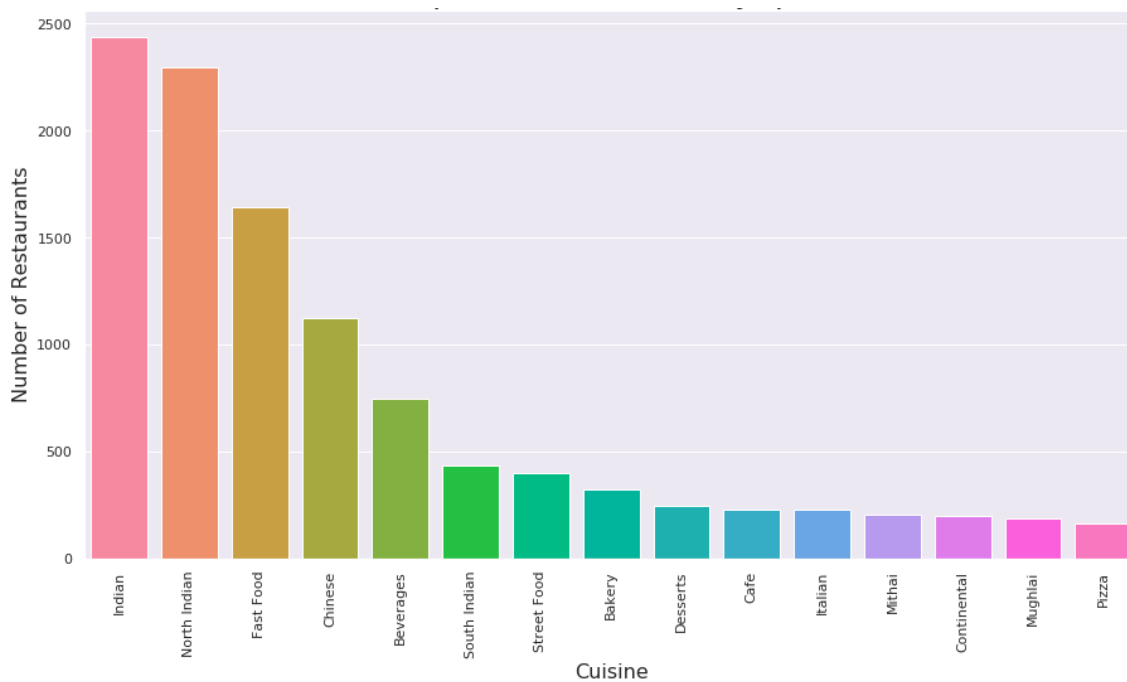| Locality	ClusterLabels	Fine Dining	Sweet Shop	Paan Shop	Casual Dining	Lounge	Food Court	Quick Bites	Bar	Club	...	Confectionery	Food Truck	Mess	Dhaba	Café	Dessert Parlor	Bhojana
Adarsh Nagar	1	0	4	0	9	1	25	27	4	0	...	0	0	0	3	3	3	
Ajmer Highway	1	0	3	0	20	0	0	45	5	0	...	0	0	0	0	0	2	
Amer	1	2	1	0	9	1	0	8	3	0	...	0	0	0	1	2	0	
Amer Road	1	7	3	1	25	1	0	19	3	0	...	0	0	0	1	3	0	
Bais Godam	1	4	1	1	6	0	6	24	2	0	...	1	0	0	2	4	3	
Bani Park	1	2	5	0	41	3	0	18	6	0	...	1	0	0	1	3	1	
Bapu Nagar	1	0	2	0	4	0	0	8	0	0	...	0	0	0	0	2	1	
C Scheme	0	5	2	1	39	4	0	71	4	1	...	0	2	0	2	29	10	
Chitrakoot	1	0	3	0	12	0	0	44	1	0	...	0	1	0	0	5	2	
Civil Lines	1	0	0	0	5	0	0	6	2	0	...	0	0	0	0	1	0	

Fig-10: Localities by types of Restaurants
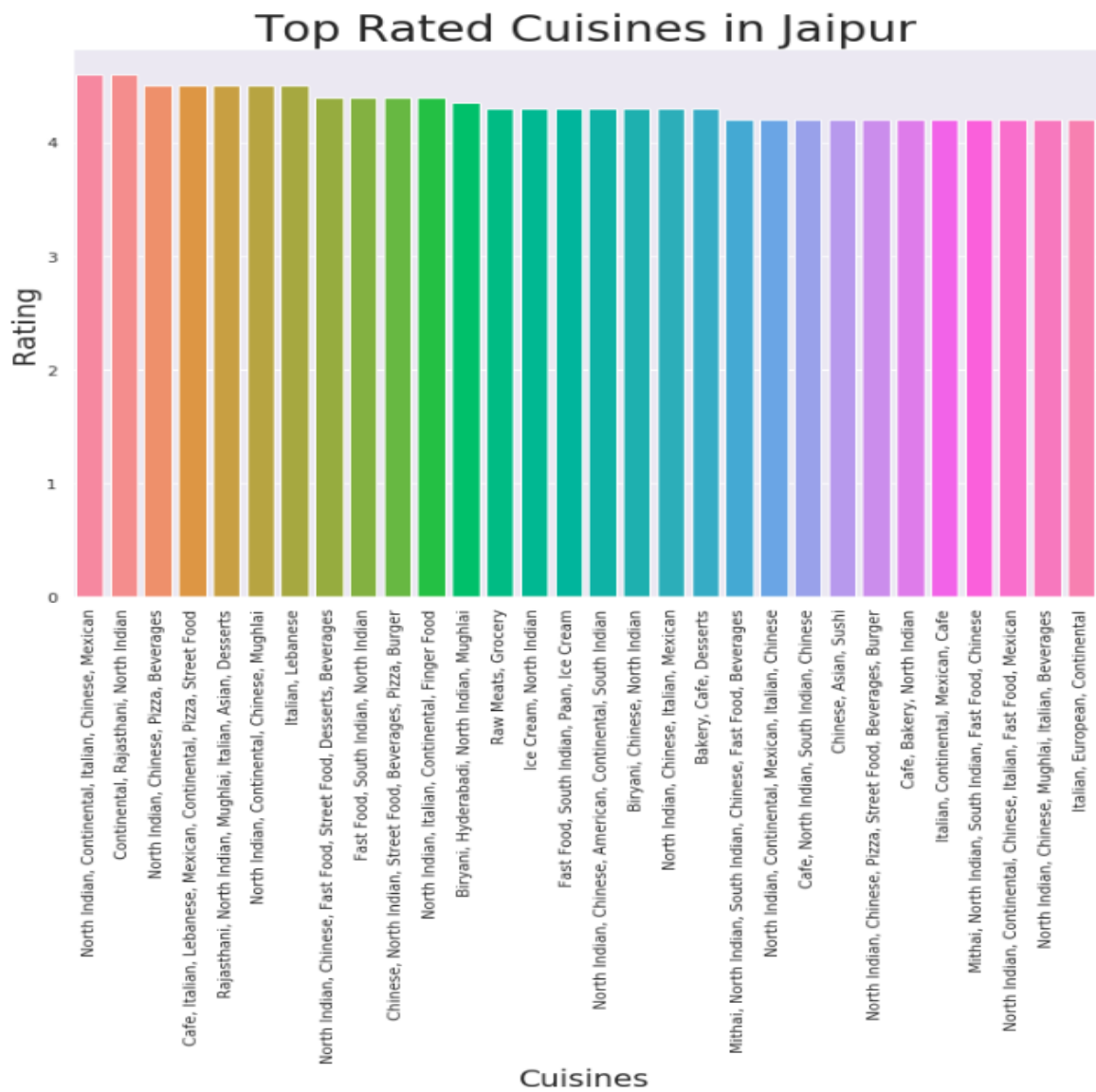
3.7 Grouping the localities by Cuisines

If we see in real life too, there are places famous for a food or cuisine and with this, the number of restaurants offering that cuisine in that locality also increase. So is there any locality famous for a cuisine.

Locality	Italian	Seafood	Burger	Maharashtrian	North Indian	Street Food	Mediterranean	Coffee	Beverages	Arabian	...	Sandwich	Japanese	Hot dogs	Juices	Eu
Adarsh Nagar	3	0	1	0	35	18	0	0	12	0	...	1	0	0	0	
Ajmer Highway	3	0	2	0	62	6	0	0	10	0	...	2	0	0	2	
Amer	0	0	0	0	18	2	0	0	1	0	...	1	0	0	0	
Amer Road	2	0	0	0	52	4	0	0	6	1	...	1	0	0	0	
Bais Godam	2	0	0	0	31	5	0	0	8	0	...	2	0	1	0	
Bani Park	9	1	0	1	55	5	1	0	14	0	...	3	0	0	0	
Bapu Nagar	3	0	0	0	6	3	0	0	6	0	...	0	0	0	0	
C Scheme	26	1	6	1	86	25	1	1	57	1	...	4	0	0	2	
Chitrakoot	2	0	2	0	57	8	0	0	21	0	...	2	0	0	0	
Civil Lines	2	0	0	0	11	1	0	0	2	0	...	0	0	0	0	

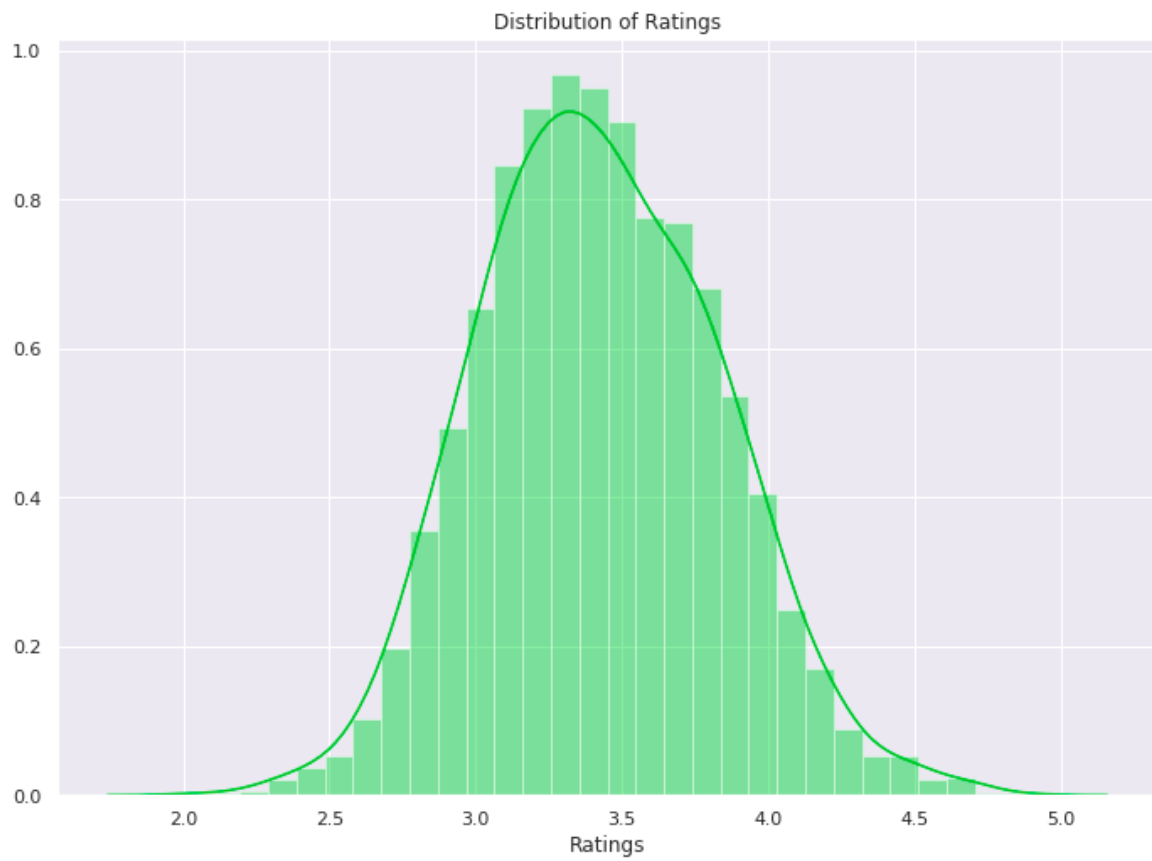**Fig-11**: Localities by number of restaurants offering a cuisine

Fig-12: Number of different type of restaurants

Fig-13: Top rated cuisines in Jaipur
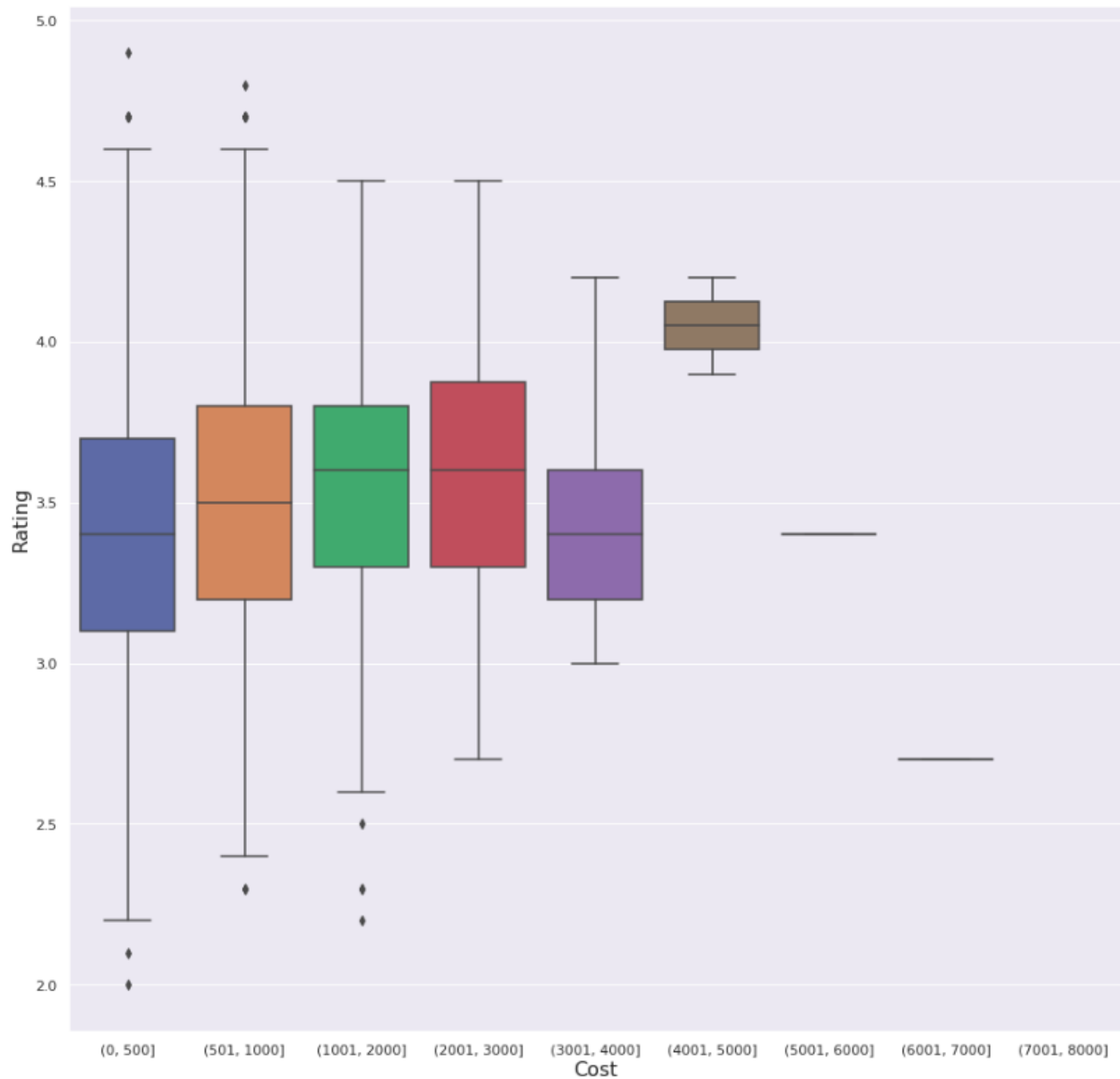
3.8 Restaurant rating Distribution

In general, the rating distribution is normal, and the highest score 3.3 has a peak.

Fig-14: Distribution of Ratings

3.8 Price range and rating

We can see that almost all the price categories have their 75% of the restaurants rated between 3.0 to 4.0, but the rating still improves with expensive restaurants.

Fig-15: Price range and Avg. ratings

3.9 Cuisine and rating of restaurants

Does having more cuisines means the restaurant could be rated higher?

Number of Cuisines	Average Ratings
1	3.363603
2	3.406291
3	3.461219
4	3.502907
5	3.534091
6	3.605405
7	3.590000
8	3.400000

Fig-16: Avg. ratings based on the number of cuisines offered by restaurants.

Yes, restaurants having a greater number of cuisines are rated higher. So is there a cuisine in a restaurant that makes the restaurant rated higher. Through further analysis, it was found that **Asian, Mexican, Italian, Lebanese, Hyderabadi, European, Continental, South Indian, American, Desserts, Finger Food** were the highest rated cuisines. Though **North Indian, Chinese, Mughlai, Rajasthani** were the top rated, but that was obvious since Jaipur lies in the Northern Region of India.

3.10 Popular cuisines in Jaipur

Fig-17: Popular cuisines across Jaipur

3.11 Are ratings affected by how cheap or expensive a restaurant is?

We will use the Pearson Correlation to carry out our statistical analysis.

Null Hypothesis: There is no relation between the rating and price of a restaurant.

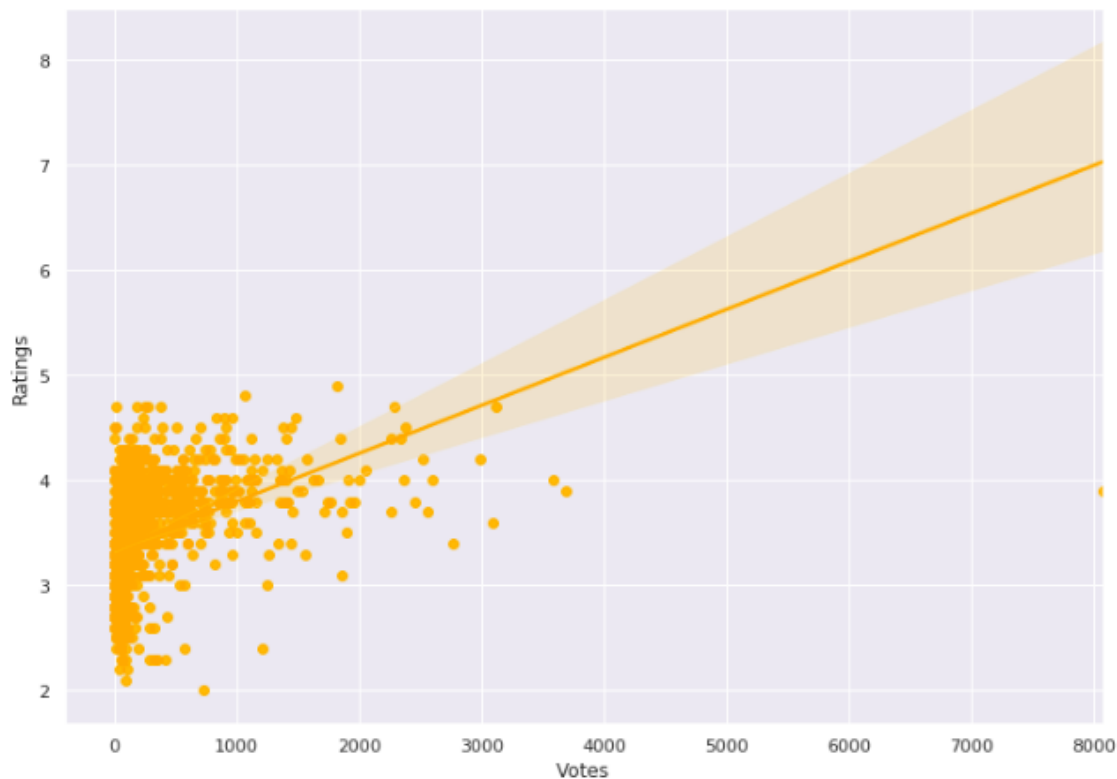Alternate Hypothesis: Cost of a restaurant affect how it is Rated.

```
Pearson Correlation Coefficient: 0.10470684414637545, P-Value: 9.358168343806198e-10
```

The p-values comes out to be much lower than our significance 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.

3.12 Do more votes == higher ratings?

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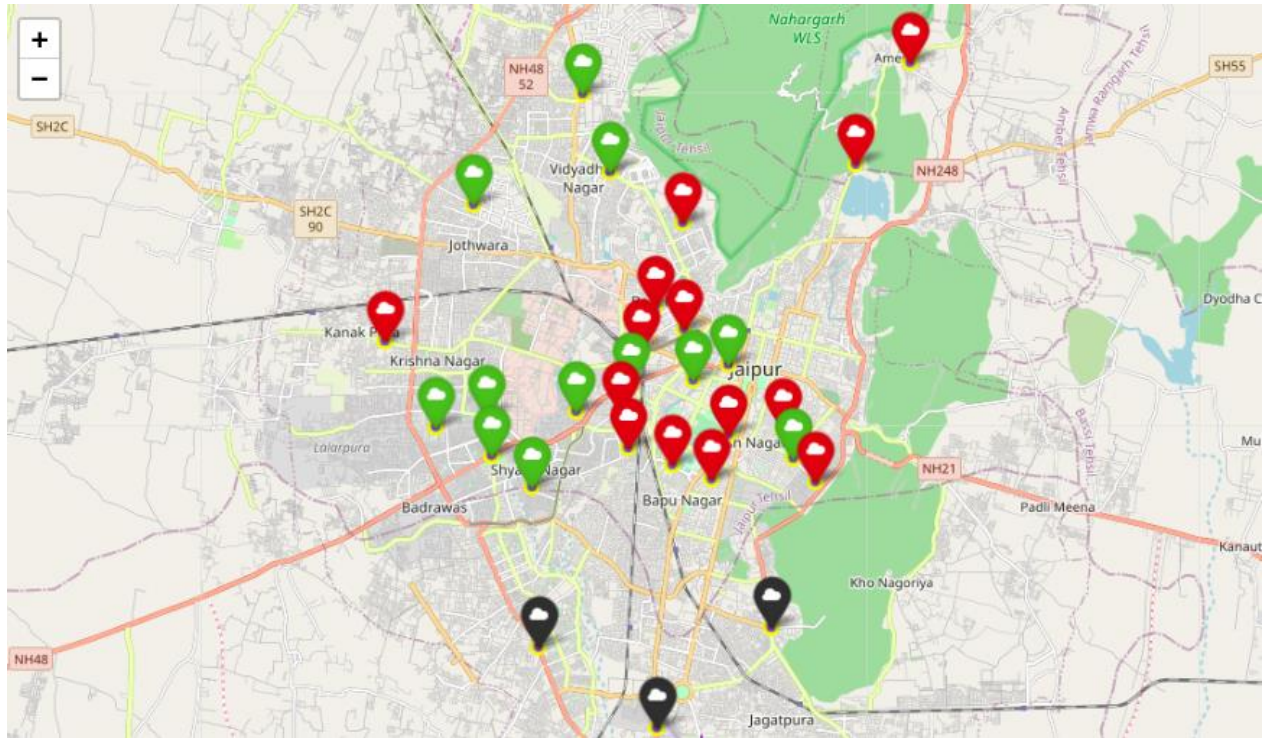

Fig-18: Relation between Ratings and votes

3.13 K-Means Clustering

3.13.1 CLUSTERING BASED ON CUISINES

There are about 30 different localities(neighborhoods) in Jaipur. Can we say that two localities are similar based on the cuisines offered?

Fig-19: Clusters based on different cuisines offered in a Locality

On analyzing the data, it was found that North Indian, South Indian are available and famous in most (approx. 90%) of the localities of Jaipur. But Italian food is also widely loved by the people of Jaipur and there are bunch of different places spread around the localities that offer Italian food.
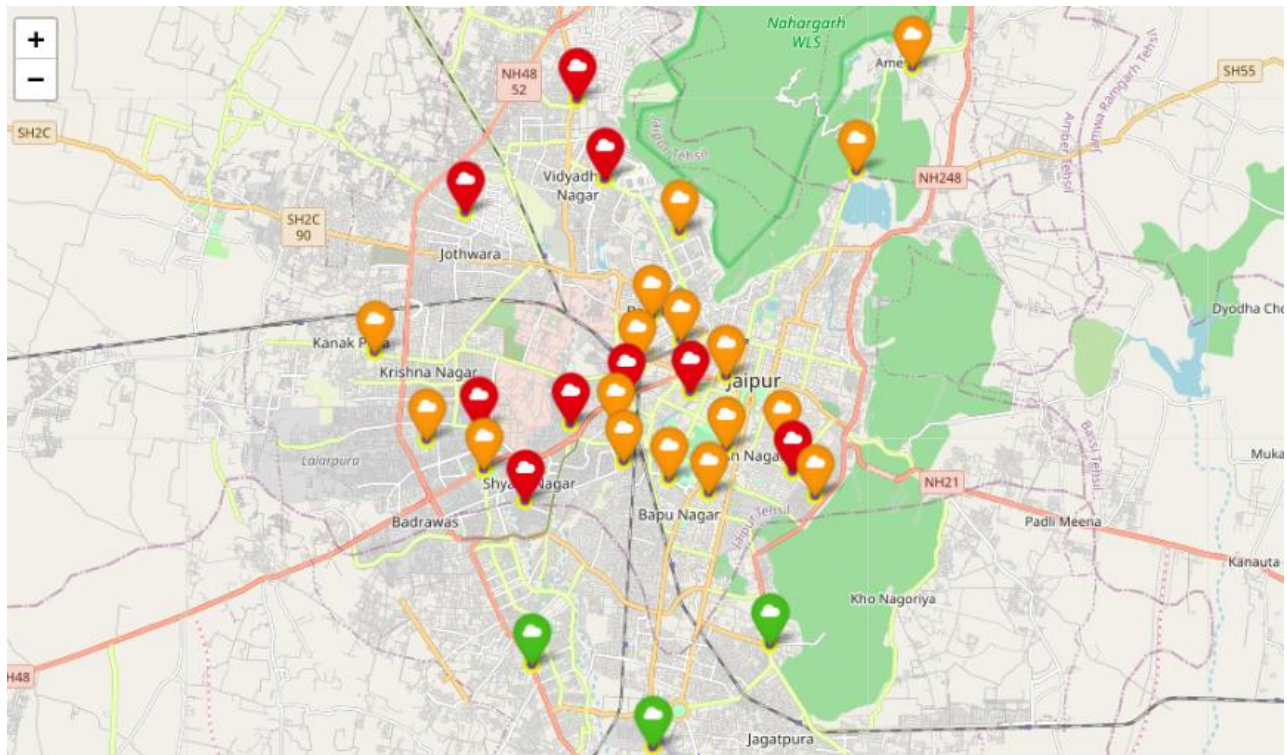
Cluster 1(Red) are the places that are more famous for their North Indian, South Indian and Chinese cuisines.

Cluster 2(Black) are the places that are famous for North Indian cuisine, Italian cuisine and Fast Food.

Cluster 3(Green) are the places known for the Mexican, Mediterranean, Continental, Japanese food.

3.13.2 CLUSTERING BASED ON RESTAURANT TYPES

There are several types of restaurants in Jaipur. Pubs, bars, Quick Bites, Fine Dining, and many more. Can we compare two localities of Jaipur based on the types of restaurants present?

Fig-20: Clusters based on type of Restaurants in a Locality.

Cluster 1(Red) are the places with more traditional eating offerings, bars, Quick Bites.

Cluster 2(Orange) are the places known for the various sophisticated dining offerings, mainly Fine Dining restaurants and cafes.

Cluster 3(Green) are the places known for their fast-paced eating habit, Quick Bites and the Nightlife.

4. RESULTS

It was worth noting that the top 3 restaurants of Jaipur were all foreign restaurant chains. What the Indian restaurants chains are lacking in terms of food, cuisine will be worth studying about in future. Mansarovar has the greatest number of restaurants, as it is one of the places with students and working individuals as most of its populace. Most of the top-rated restaurants are centered around central Jaipur with Amer Road as an exception, as being one of the main tourist attractions of Jaipur, there are a lot of high rated restaurants on Amer road. There are a greater number of Quick bites restaurants followed by casual dining

restaurants. It was also observed that a locality becomes famous as a restaurant/cuisine increases over there. Also, as the price increases, there is very high chance that the food is better.

The data was clustered twice, first it was clustered in 3 clusters based on the cuisines offered by restaurants. Here, cluster 1 included the places famous for their North Indian, South Indian and Chinese cuisines. The second cluster included the places famous for their North Indian cuisine, Italian cuisine and Fast Food and the third cluster included the places known for their Mexican, Mediterranean, Continental, Japanese food. The second time based on the type of Restaurants in a locality.

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 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 patterns 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 Jaipur. Cafe Coffee day has its outlet in most of the localities of Jaipur. The Indian food service market has come a long way from the early Nineties when it was dominated by unorganized players and few brands.

The revolution began in 1996 with McDonalds, Pizza Hut, Domino's 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 visit Jaipur and only indulge in Kadi-Kachori or at best Chinese food. Jaipur is an inspiring mishmash 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.