RESTAURANTS ANALYSIS

A Report on the Analysis of Restaurants in Chandigarh

Abstract

Restaurant business has seen a great surge after the booming of online services such as recommendation system, Online Order, Home Delivery etc. Due to increased business it is paramount to know the existing market for Restaurants in a city.

Recommendation to business owners about places perfect for opening a new Restaurant with a particular Cuisine where the owner would get best traffic for the Restaurant.

I build an Analysis system using Zomato Data for the business owners to analyze the market based on Cuisines, Nightlife, Popularity and Restaurants types. The Insights derived from the analysis is helpful in understanding the existing business and how or which area lacks the service.

Amit Maindola

Maindola.amit@gmail.com

Introduction

Data Science is a process of using the data to understand various parameters associated with the Hypothesis/Models of a problem, which we try to validate through the data. It's like to use storytelling to generate insight, insights which can be used to make strategic choices by an Organization or an Institution. In Data Science we perform the data extraction from various source so we can study the data.

Since the Dawn of cloud computing Data Science changed the way people find the products, information, solutions and even other people. Earlier when it was very tedious job to find the information/solution to a problem, now the good news is we have lots and lots of data available mostly in the web. As for the availability of data we can perform various analysis and visualization to the problem statement for which we are working.

As we have lots of data available it is the problem to download, clean and format data from various available sources either from Database, web, csv or Excel files. We need data to be in a meaningful format before making the necessary analysis and visualization. The goal is to generate meaningful insights or a recommendation system or a product solution to the customers for a richer experience based on the Business requirement/Problem. With burgeoning consumerism buoyed by emergence of web, buyers are presented with increasing range of choices while sellers are being faced with the challenge of personalizing their advertising efforts.

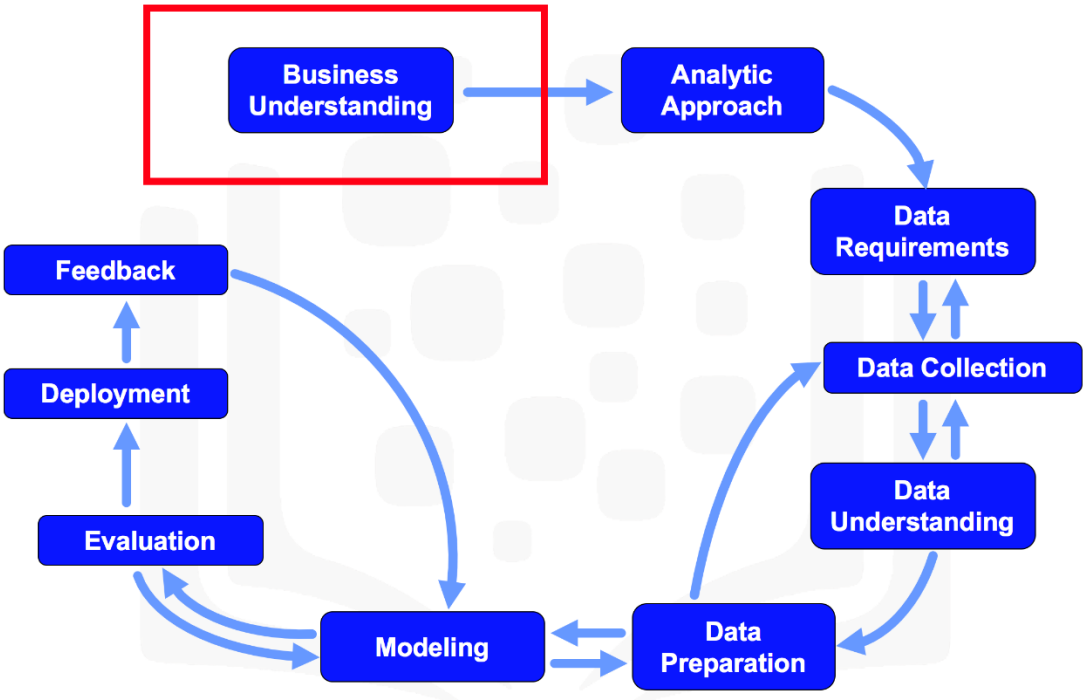
Data science is relevant today because we have tons of data available. We used to worry about lack of data. Now we have a data deluge. In the past, we didn't have algorithms, now we have algorithms. In the past, the software was expensive, now it's open source and free. In the past, we couldn't store large amounts of data, now for a fraction of a cost, we can have gazillions of datasets for a very low cost. So, the tools to work with data, the variability of data, and the ability to store and analyze data, it's all cheap, it's all available, it's all ubiquitous, it's here. There's never been a better time to be a data scientist.

Business Problem

Due to Increased connectivity and availability of Data it is now possible to extract and derive the useful Insights from the available data. We can meticulously study the existing Market of our Hypothesis/Model/Product. We have to establish our facts with the data and visualization.

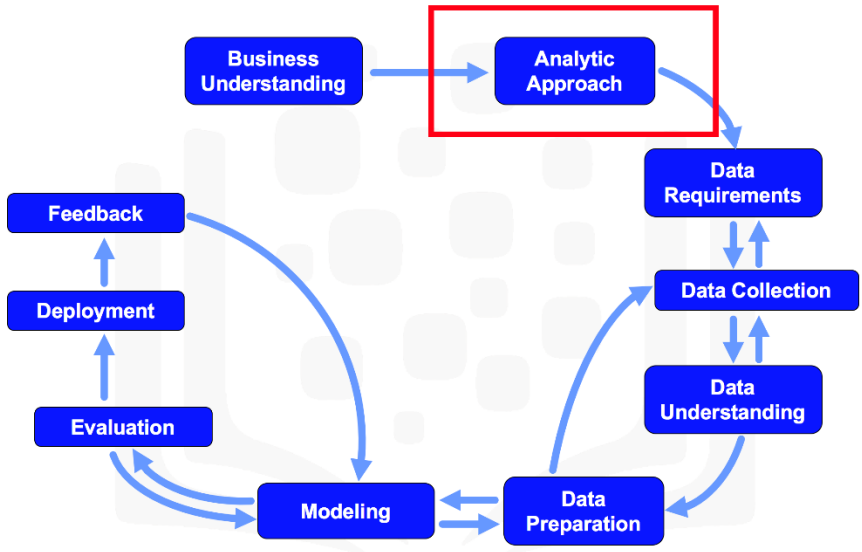
Our requirement is to build a model which can analyze the existing Restaurants in a city and can suggest where a new Restaurant can be opened depending on the type of Cuisine or the Customer category or the Initial Budget we have for the Business.

A detailed models has to be build considering the popularity of the locality, cuisines, price range and the customer category we can target. To fulfill the Business Requirement we have to study the existing data about the market, finding out the various parameters associated with the Business which are to be considered. The derived insights can help us in providing better customer service which will lead to the better customer satisfaction. Based on the Model we can determine which Cuisines we can involve in the Menu which can affect the Traffic in the new Restaurant.

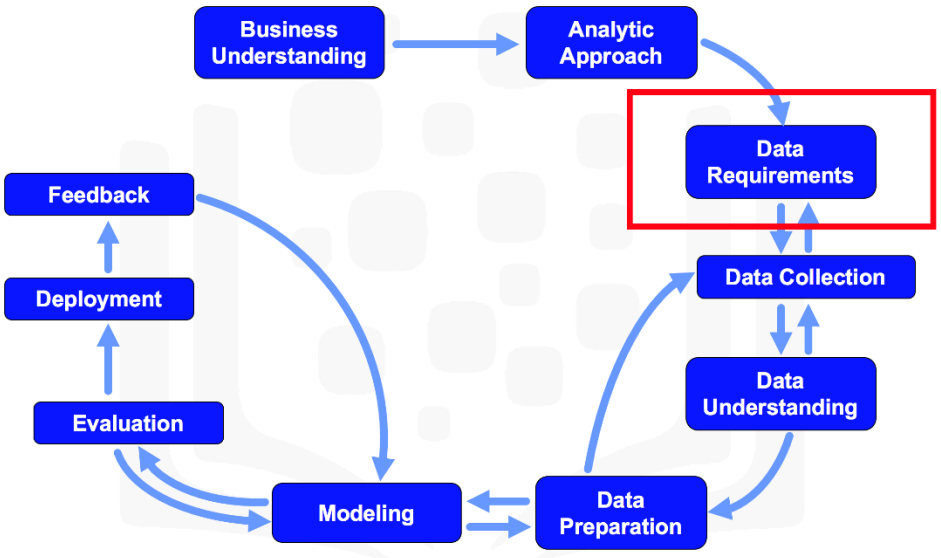


Methodology

At this point, we realize that automating the process of determining the cuisine of a given dish is not a straightforward problem as we need to come up with a way that is very robust to the many cuisines and their variations.



We have to perform various analytics approach to get the right data for our Model. Once we have got the right data, we can go ahead and apply the appropriate Algorithm.



Data

Fetching the data:

1. City areas has been fetched from Website : mapsofindia
   https://www.mapsofindia.com/chandigarh/localities/
2. Location of the areas are derived using the Google API.

3. Restaurant data has been collected from the Zomato API in the form of .json files.

Data Processing:

Data Processing has been done on the following categories:

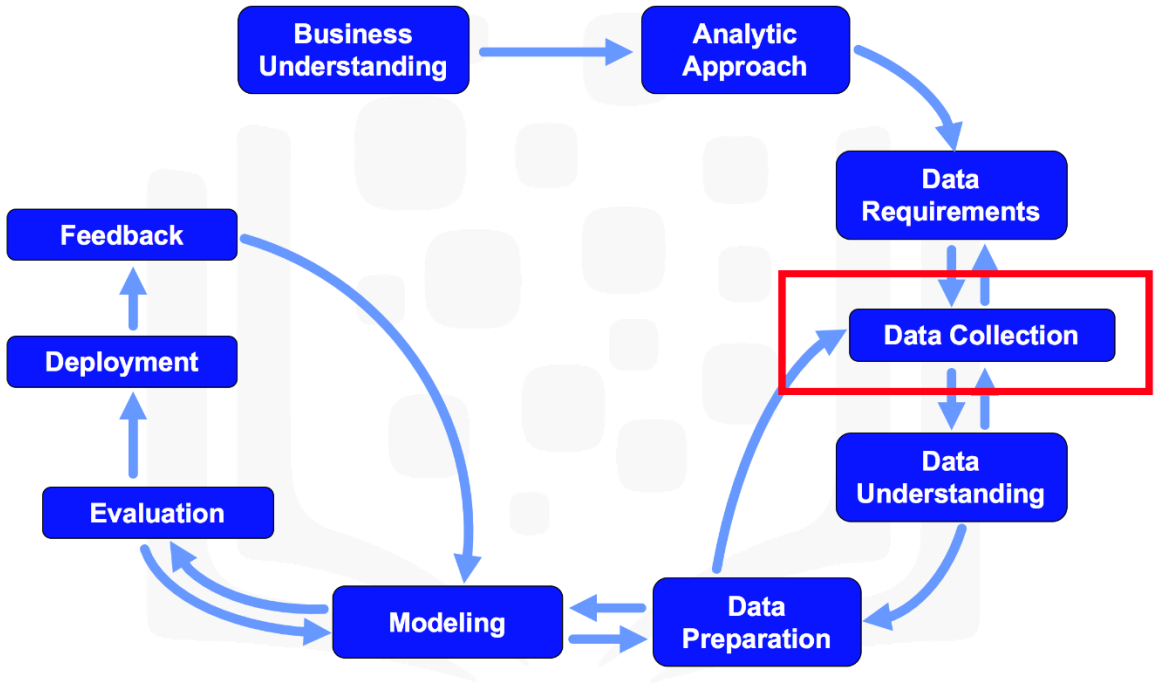
1. Cuisine
2. City
3. Location
4. Popularity of the location
5. Price range of Restaurant

The collected data has been stored in the Comma Separated Value File (CSV). Each restaurant in the dataset is uniquely identified by its Restaurant Id. Every Restaurant contains the following variables:

- **City:** City in which restaurant is located
- **Area:** Area of the City in which restaurant is located
- **Area Latitude:** Latitude coordinate of the restaurant's location
- **Area Longitude:** Longitude coordinate of the restaurant's location
- **Popularity Index:** Popularity of the area of city
- **Nightlife Index:** Popularity at night of the area of city
- **Top Cuisines:** Famous Cuisines of the area of city
- **Restaurant Id:** Unique id of every restaurant across various cities of the world
- **Restaurant Name:** Name of the restaurant
- **Cuisines:** Cuisines offered by the restaurant
- **Average Cost for two:** Cost for two people in different currencies
- **Price range:** range of price of food
- **Has Online delivery:** yes/ no
- **Has Table booking:** yes/no
- **Aggregate Rating:** Average rating out of 5
- **Rating text:** text on the basis of rating of rating
- **Votes:** Number of ratings casted by people
- **Locality:** Number of ratings casted by people
- **Address:** Location in the city
- **Latitude:** Latitude coordinate of the restaurant's location
- **Longitude**: Longitude coordinate of the restaurant's location

Now that the data collection stage is complete, data scientists typically use descriptive statistics and visualization techniques to better understand the data and get acquainted with it. Data scientists, essentially, explore the data to:

1. understand its content,
2. assess its quality,
3. discover any interesting preliminary insights, and,
4. Determine whether additional data is necessary to fill any gaps in the data.



Below is the Sample of our collected Data in the JSON format.


```
▼ root: {} 4 keys
  ▶ location: {} 9 keys
  ▶ popularity: {} 9 keys
    link: "https://www.zomato.com/chandigarh/sector-34-chandigarh-restaurants"
  ▼ nearby_restaurants: [] 9 items
    ▼ 0: {} 1 key
      ▼ restaurant: {} 32 keys
        ▶ R: {} 1 key
          apikey: "f4c850268294012ef371d71202772caa"
          id: "123806"
          name: "Chandigarh Flavours"
          url: "https://www.zomato.com/chandigarh/chandigarh-flavours-sector-46?utm_source=api_basic_user&utm_medium=api&utm_campaign=v2.1"
        ▶ location: {} 9 keys
          switch_to_order_menu: 0
          cuisines: "North Indian, Chinese"
          average_cost_for_two: 550
          price_range: 2
          currency: "Rs."
          offers: [] 0 items
```

```
# View the categories DataFrame
categories_df = pd.read_csv(os.path.join(csv_path,"zomato_categories.csv"),index_col='id')
categories_df.head()
```

id	name
1	Delivery
2	Dine-out
3	Nightlife
4	Catching-up
5	Takeaway

▼ root: {} 4 keys

Filter...

results_found: 257

results_start: 0

results_shown: 20

▼ restaurants: [] 20 items

▼ 0: {} 1 key

▼ restaurant: {} 34 keys

▶ R: {} 1 key

apikey: "f4c850268294012ef371d71202772caa"

id: "121820"

name: "24/7 All Day Dining - The Lalit Chandigarh"

url: "https://www.zomato.com/24-7RestaurantChandigarh?utm_source=api_basic_user&utm_medium=api&utm_campaign=v2.1"

▶ location: {} 9 keys

switch_to_order_menu: 0

cuisines: "Italian, North Indian"

average_cost_for_two: 3000

price_range: 4

currency: "Rs."

offers: [] 0 items

opentable_support: 0

is_zomato_book_res: 1

mezzo_provider: "ZOMATO_BOOK"

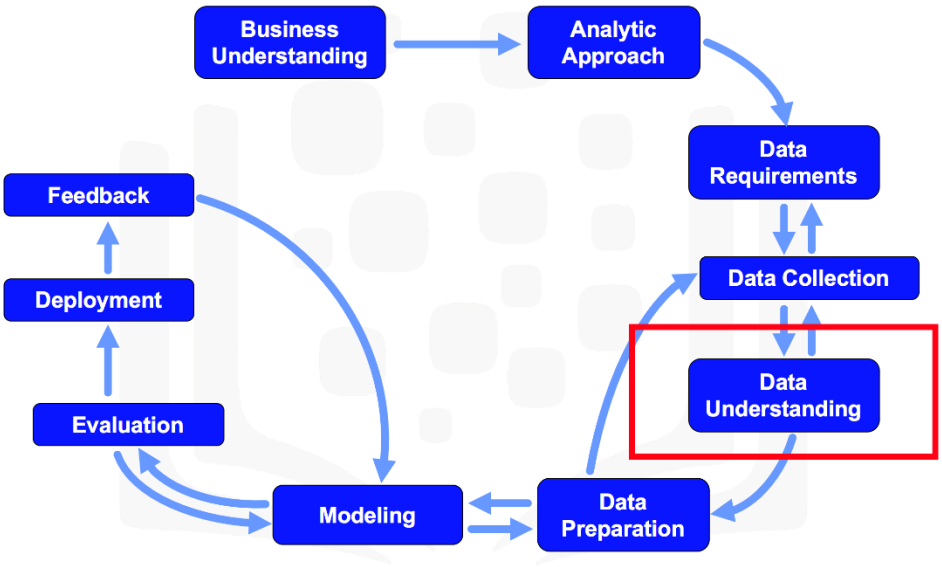
is_book_form_web_view: 0

book_form_web_view_url: ""

thumb: "https://b.zmtcdn.com/data/res_imagery/121820_RESTAURANT_1411202922_3f50d1a685ff60293c1e0633fd4a4bda_c.jpg?fit=around%7C200%3A200&crop=200%3A200%3B%2A%2C%2A"

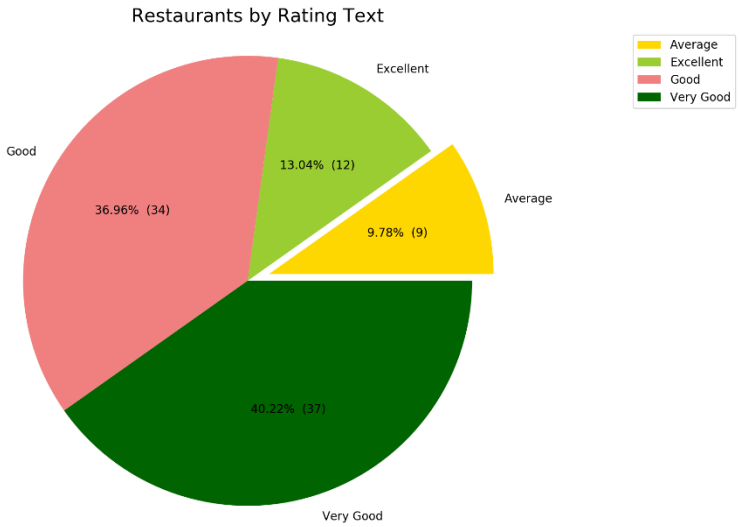
Data Understanding

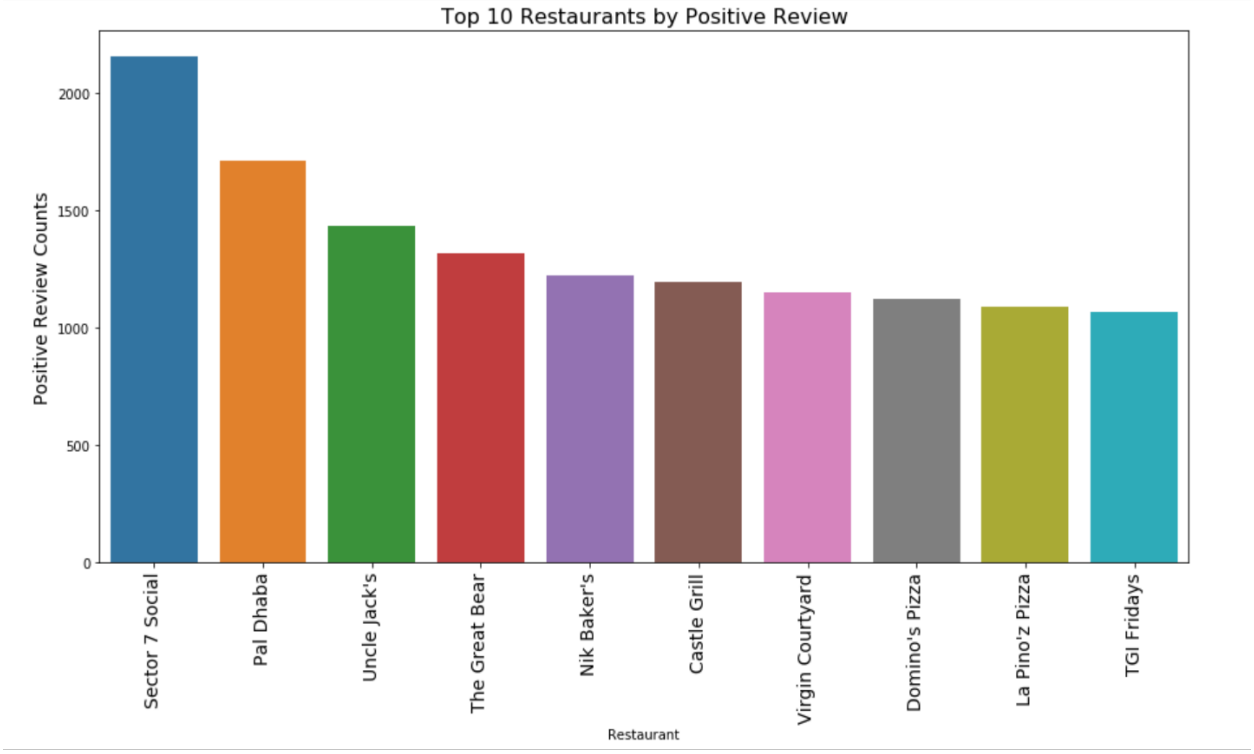
Now as we have collected the Data from Various sources we have to understand the Data through various methods. We will use Python for the Data Wrangling, cleaning and manipulation.

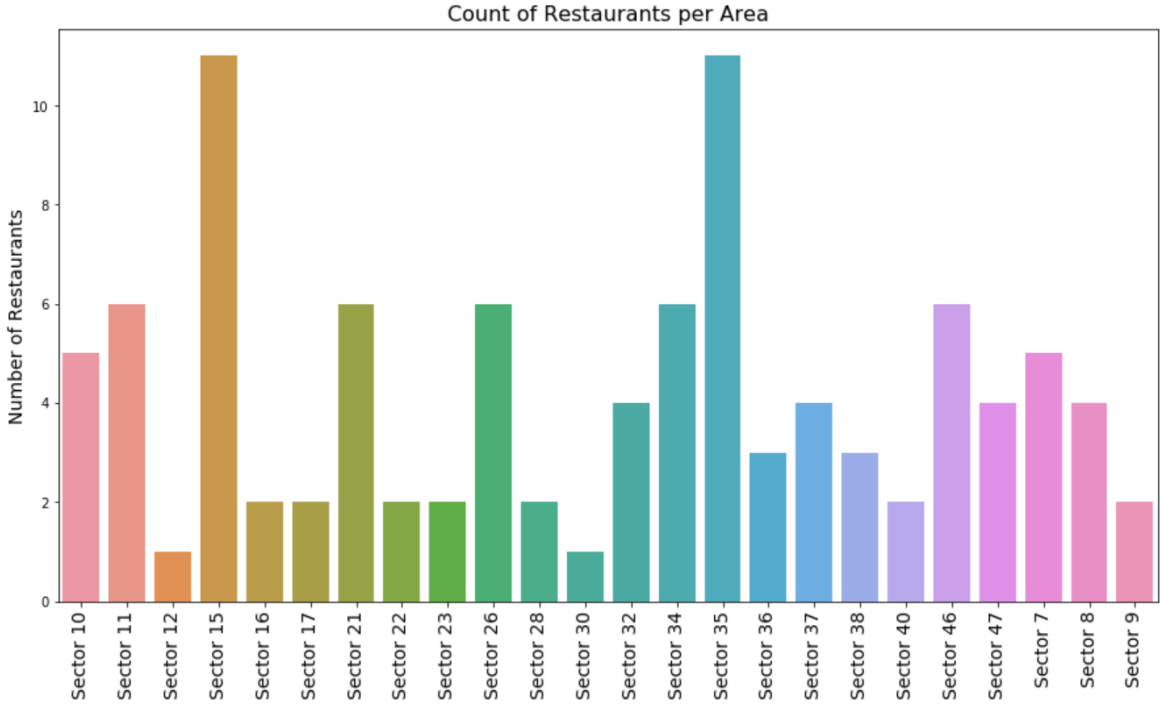


We will be doing various techniques to convert the JSON data into Tabular format so we can perform the visualization on it.

```
# Extract data from the JSON file
categories = [cat['categories'] for cat in json.load(open(os.path.join(raw_path,'zomato_categories.json'),"r"))['result']['categories']]
# Save data to a CSV file
pd.DataFrame(data=categories).to_csv(os.path.join(csv_path,"zomato_categories.csv"), index=False)
print("File saved.")
```




Top 10 Restaurants by Positive Review
Positive Review Counts
0
500
1000
1500
2000
Sector 7 Social
Pal Dhaba
Uncle Jack's
The Great Bear
Nik Baker's
Castle Grill
Virgin Courtyard
Domino's Pizza
La Pino'z Pizza
TGI Fridays
Restaurant


Count of Restaurants per Area
Number of Restaurants
0
2
4
6
8
10
Sector 10
Sector 11
Sector 12
Sector 15
Sector 16
Sector 17
Sector 21
Sector 22
Sector 23
Sector 26
Sector 28
Sector 30
Sector 32
Sector 34
Sector 35
Sector 36
Sector 37
Sector 38
Sector 40
Sector 46
Sector 47
Sector 7
Sector 8
Sector 9

Data Preparation

Now as we have the understanding of the data, we can extract the data into the format which will be easy for the Clustering Algorithm. We would be performing One Hot Encoding and other manipulations to bring the data into the format along with the required parameters.

[3]:
```
chd_cluster_areas_df = pd.read_csv(os.path.join(csv_path,"zomato_city_areas.csv"),usecols=['area','popularity_index','nightlife_index'
                                                                                          ,'restaurants_count','top_cuisines'])

# Split the top_cuisines into multiple columns
areas_cuisine = pd.DataFrame(chd_cluster_areas_df['top_cuisines'].str.split(',',expand=True))
areas_cuisine.columns=['cuisine_1','cuisine_2','cuisine_3','cuisine_4','cuisine_5']
# Add the cuisines to the Clustering Dataframe
chd_cluster_areas_df = chd_cluster_areas_df.join(areas_cuisine,how='outer').drop(columns='top_cuisines')

# View the Areas
chd_cluster_areas_df.head()
```

[3]:

	area	popularity_index	nightlife_index	restaurants_count	cuisine_1	cuisine_2	cuisine_3	cuisine_4	cuisine_5
0	Sector 26	3.77	1.02	6	North Indian	Fast Food	Chinese	Bakery	Street Food
1	Sector 21	4.97	5.00	5	North Indian	Chinese	Fast Food	Continental	Italian
2	Sector 11	4.60	4.16	5	North Indian	Fast Food	Chinese	Continental	Cafe
3	Sector 10	3.77	1.02	5	North Indian	Fast Food	Chinese	Bakery	Street Food
4	Sector 17	4.47	3.32	2	North Indian	Fast Food	Cafe	Chinese	Italian

We have already segregated the Areas and their respective details like Nightlife Index, Popularity and the Top Cuisines. We need to bring the data into the format which should be acceptable by the machine learning Algorithms. Code reusability should be achieved by defining a function and then calling it for different categories. we can refer the below code to split the existing data from CSV into the below format which will be useful.

Perform one Hot Encoding for top Cuisines of Area

[4]:
```
# Get the onehot encoding for cuisine
def get_cusine_onehot(df,column,drop_col=0):
    onehot = pd.get_dummies(df[[column]],prefix="",prefix_sep="")
    # Drop the column from dataframe
    if drop_col > 0:
        df.drop(columns=[column],inplace=True)
    # Loop through the new columns of encoded values
    for col in onehot.columns.tolist():
        # Check if column already present in the Dataframe
        if col in df.columns.tolist():
            df[col] = df[col] | onehot[col]
        else:
            df[col] = onehot[col]
    return df
```

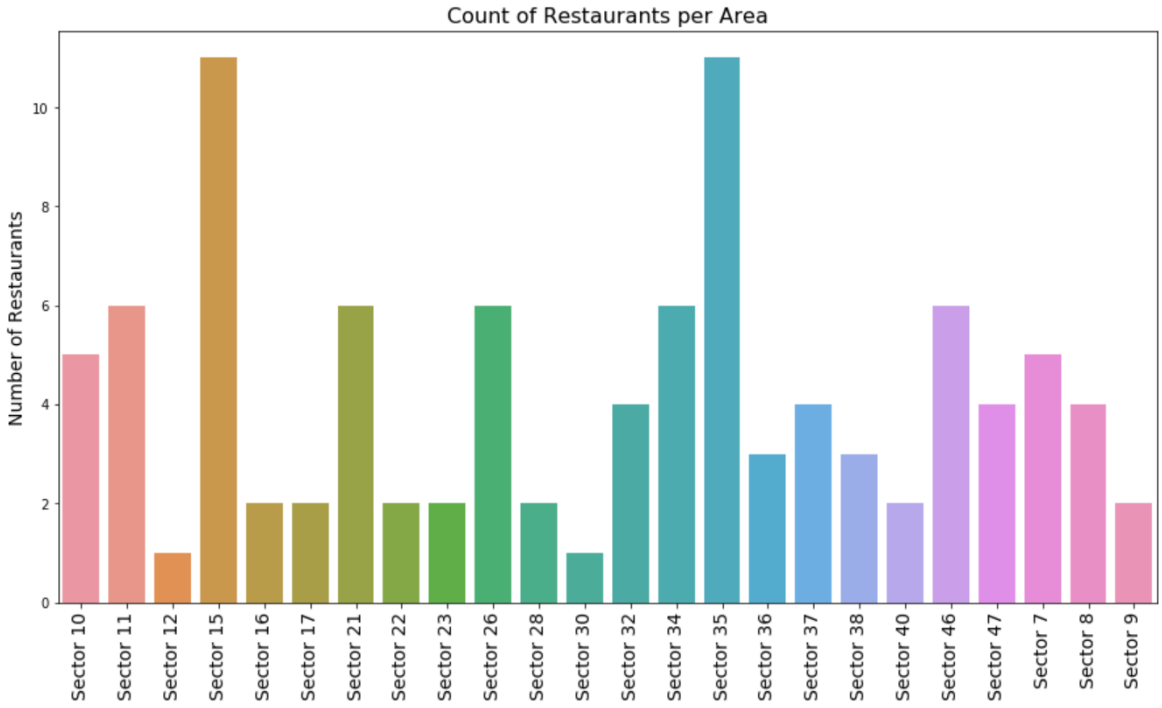
[5]:
```
get_cusine_onehot(chd_cluster_areas_df,'cuisine_1',drop_col=1)
get_cusine_onehot(chd_cluster_areas_df,'cuisine_2',drop_col=1)
get_cusine_onehot(chd_cluster_areas_df,'cuisine_3',drop_col=1)
get_cusine_onehot(chd_cluster_areas_df,'cuisine_4',drop_col=1)
get_cusine_onehot(chd_cluster_areas_df,'cuisine_5',drop_col=1)

# View the new Values
chd_cluster_areas_df.head()
```

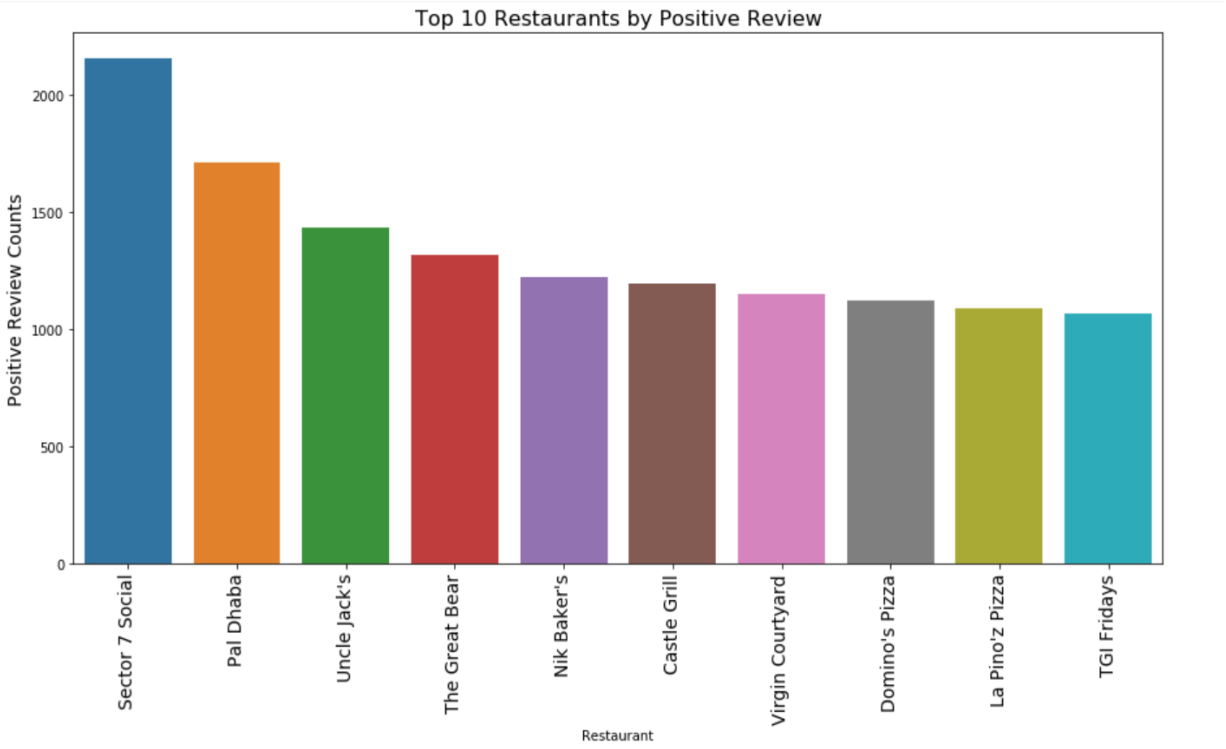
[5]:

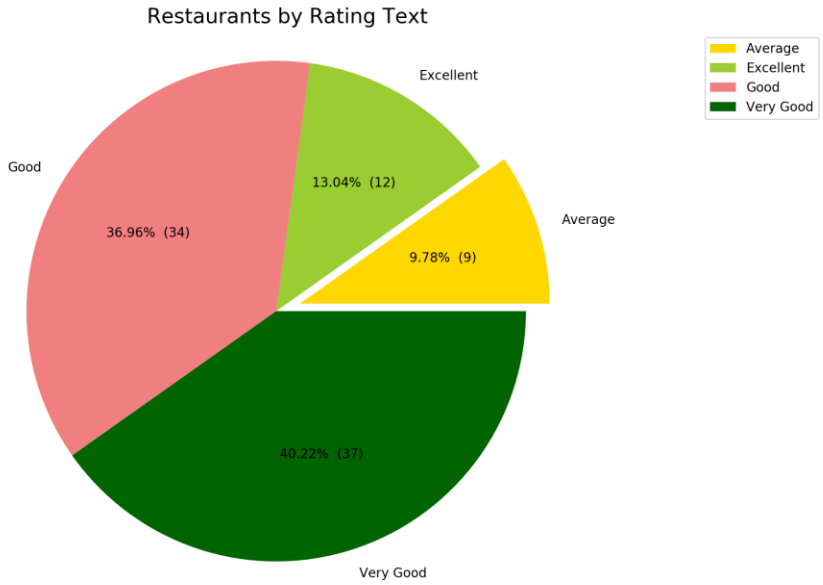
	area	popularity_index	nightlife_index	restaurants_count	North Indian	Chinese	Fast Food	Cafe	Continental	Bakery	Beverages	Street Food	Italian	Mithai
0	Sector 26	3.77	1.02	6	1	1	1	0	0	1	0	1	0	0
1	Sector 21	4.97	5.00	5	1	1	1	0	1	0	0	0	1	0
2	Sector 11	4.60	4.16	5	1	1	1	1	1	0	0	0	0	0
3	Sector 10	3.77	1.02	5	1	1	1	0	0	1	0	1	0	0

Observation

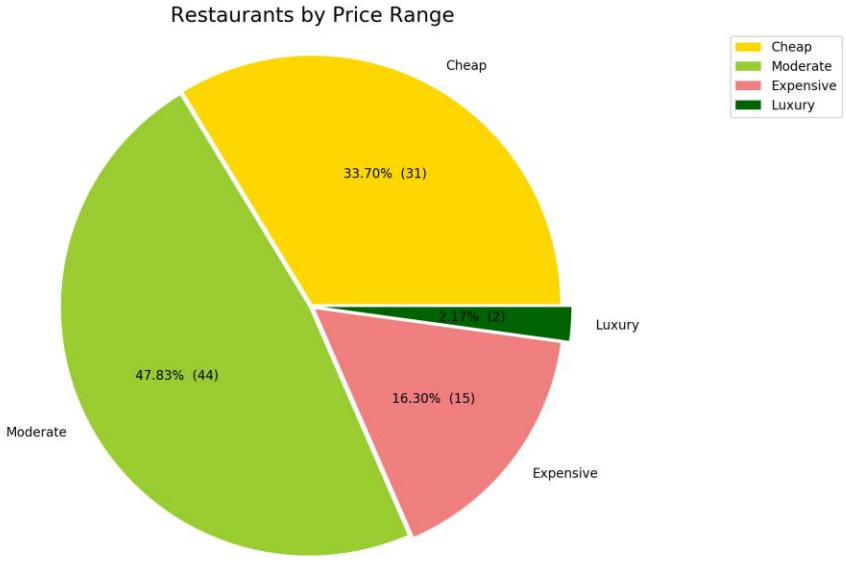
Below are the various observation we have seen in our Analysis.



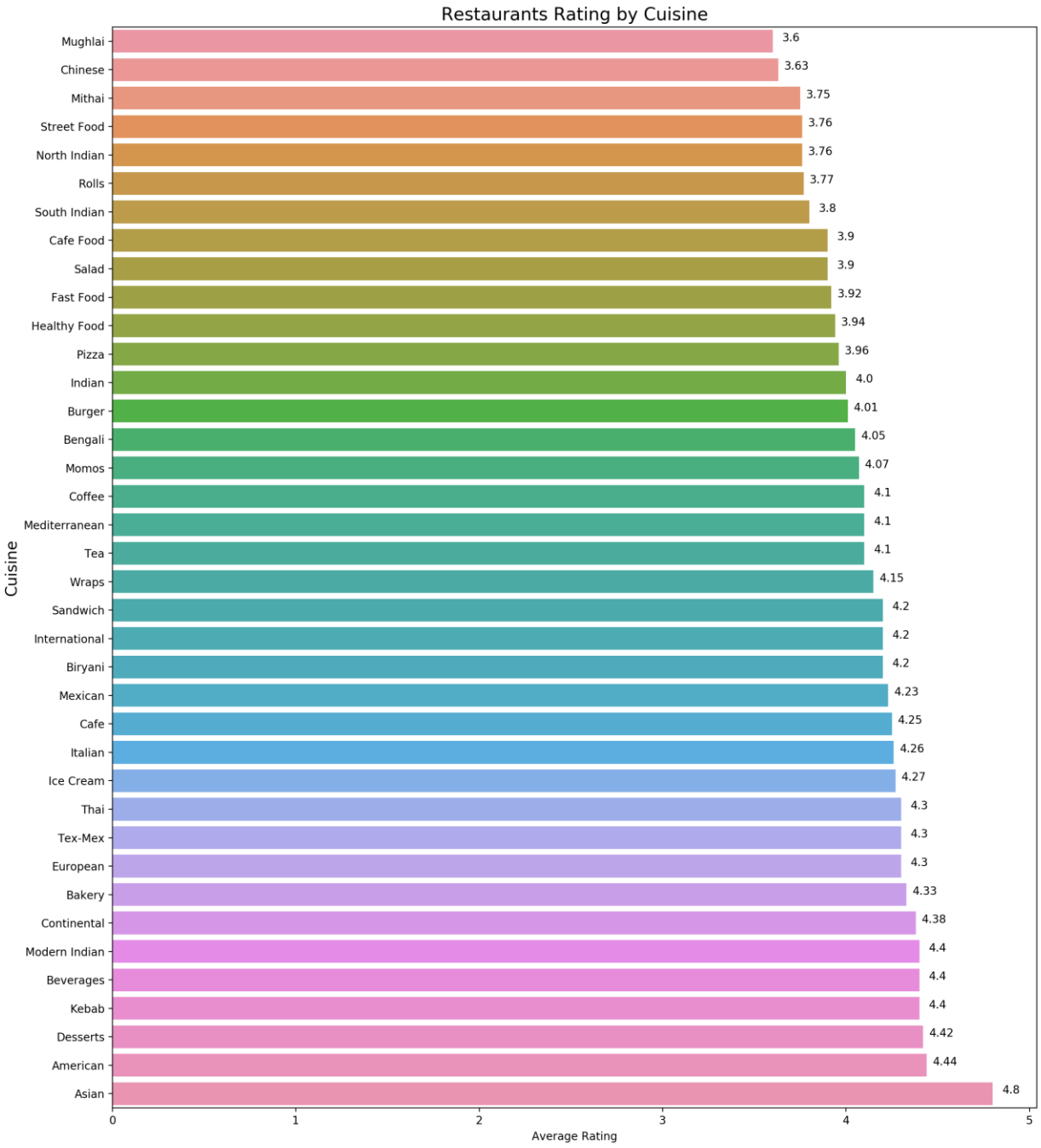


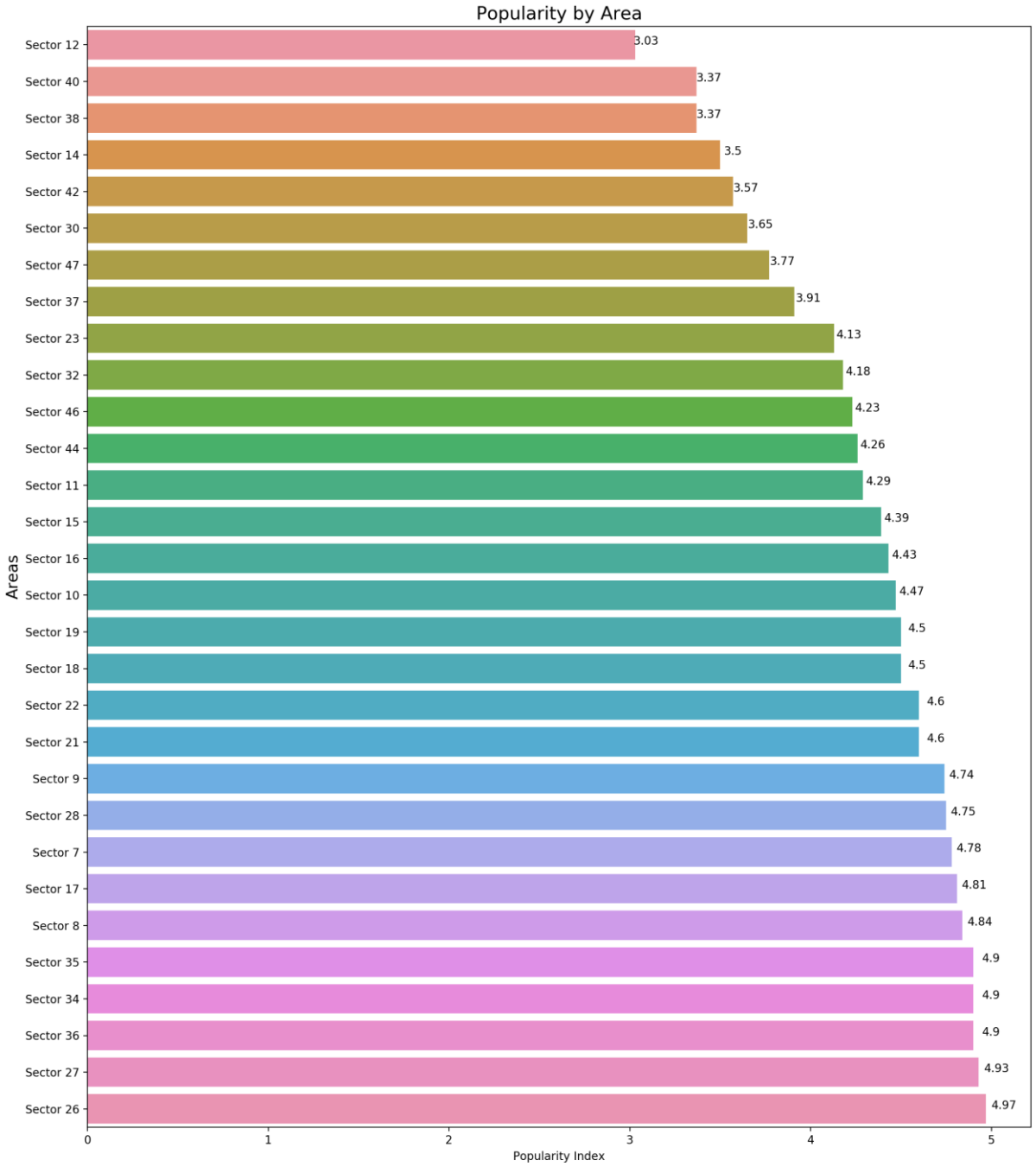


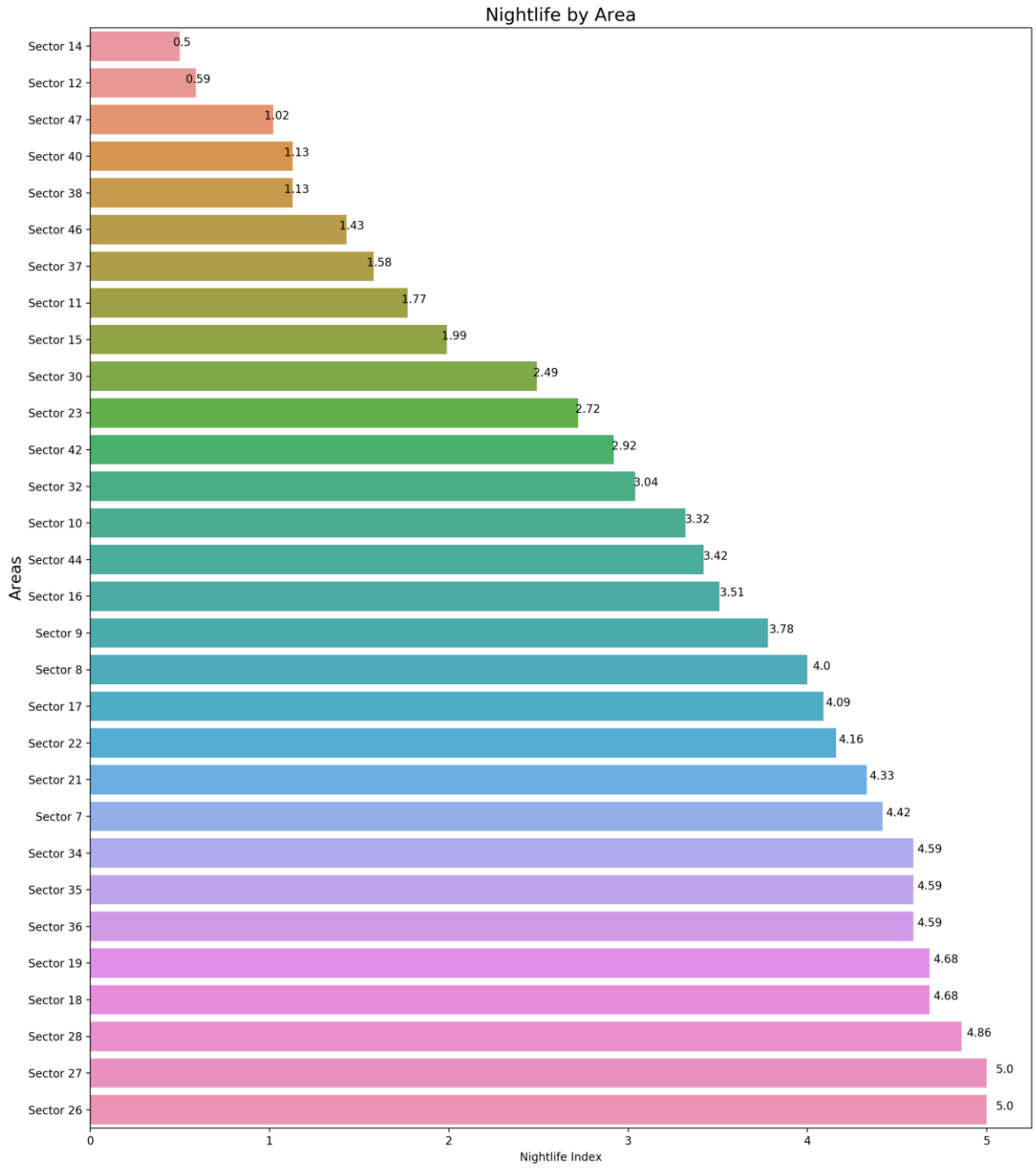
Almost all of the Restaurants have received the Positive reviews

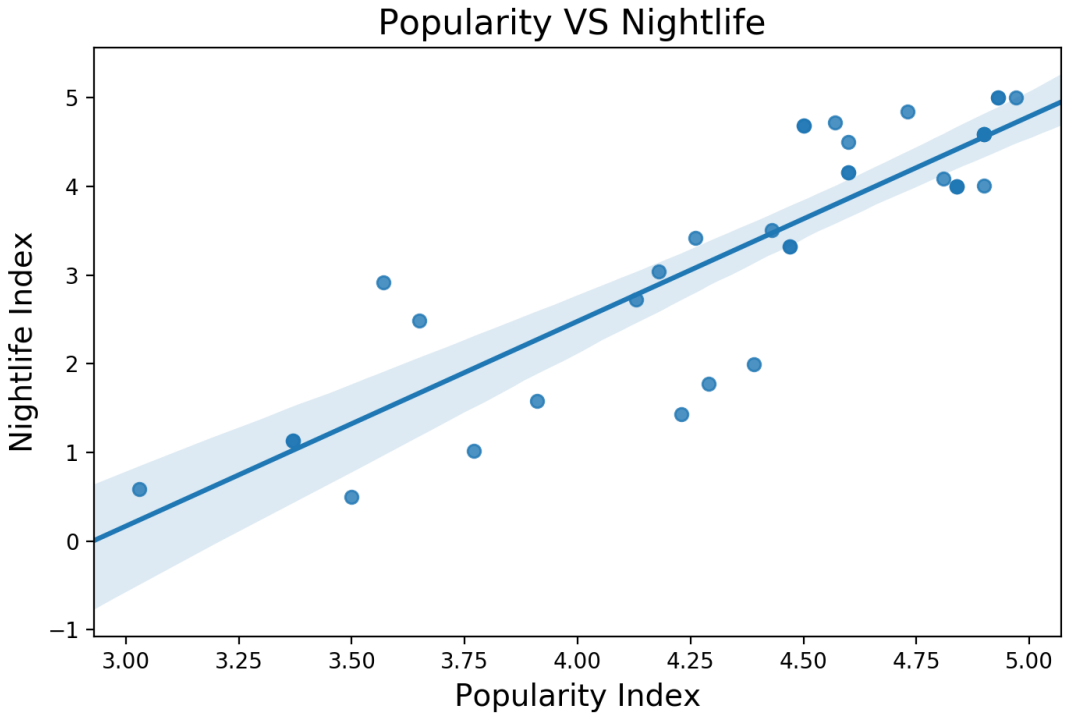


We can see most of the Restaurants are cheap and moderately in terms of expenses.


Restaurants Rating by Cuisine
Cuisine
Mughlai 3.6
Chinese 3.63
Mithai 3.75
Street Food 3.76
North Indian 3.76
Rolls 3.77
South Indian 3.8
Cafe Food 3.9
Salad 3.9
Fast Food 3.92
Healthy Food 3.94
Pizza 3.96
Indian 4.0
Burger 4.01
Bengali 4.05
Momos 4.07
Coffee 4.1
Mediterranean 4.1
Tea 4.1
Wraps 4.15
Sandwich 4.2
International 4.2
Biryani 4.2
Mexican 4.23
Cafe 4.25
Italian 4.26
Ice Cream 4.27
Thai 4.3
Tex-Mex 4.3
European 4.3
Bakery 4.33
Continental 4.38
Modern Indian 4.4
Beverages 4.4
Kebab 4.4
Desserts 4.42
American 4.44
Asian 4.8
0
1
2
3
4
5
Average Rating


Popularity by Area
Areas
Sector 12
Sector 40
Sector 38
Sector 14
Sector 42
Sector 30
Sector 47
Sector 37
Sector 23
Sector 32
Sector 46
Sector 44
Sector 11
Sector 15
Sector 16
Sector 10
Sector 19
Sector 18
Sector 22
Sector 21
Sector 9
Sector 28
Sector 7
Sector 17
Sector 8
Sector 35
Sector 34
Sector 36
Sector 27
Sector 26
3.03
3.37
3.37
3.5
3.57
3.65
3.77
3.91
4.13
4.18
4.23
4.26
4.29
4.39
4.43
4.47
4.5
4.5
4.6
4.6
4.74
4.75
4.78
4.81
4.84
4.9
4.9
4.9
4.93
4.97
0
1
2
3
4
5
Popularity Index


Nightlife by Area
Areas
Sector 14
Sector 12
Sector 47
Sector 40
Sector 38
Sector 46
Sector 37
Sector 11
Sector 15
Sector 30
Sector 23
Sector 42
Sector 32
Sector 10
Sector 44
Sector 16
Sector 9
Sector 8
Sector 17
Sector 22
Sector 21
Sector 7
Sector 34
Sector 35
Sector 36
Sector 19
Sector 18
Sector 28
Sector 27
Sector 26
0.5
0.59
1.02
1.13
1.13
1.43
1.58
1.77
1.99
2.49
2.72
2.92
3.04
3.32
3.42
3.51
3.78
4.0
4.09
4.16
4.33
4.42
4.59
4.59
4.59
4.68
4.68
4.86
5.0
5.0
0
1
2
3
4
5
Nightlife Index

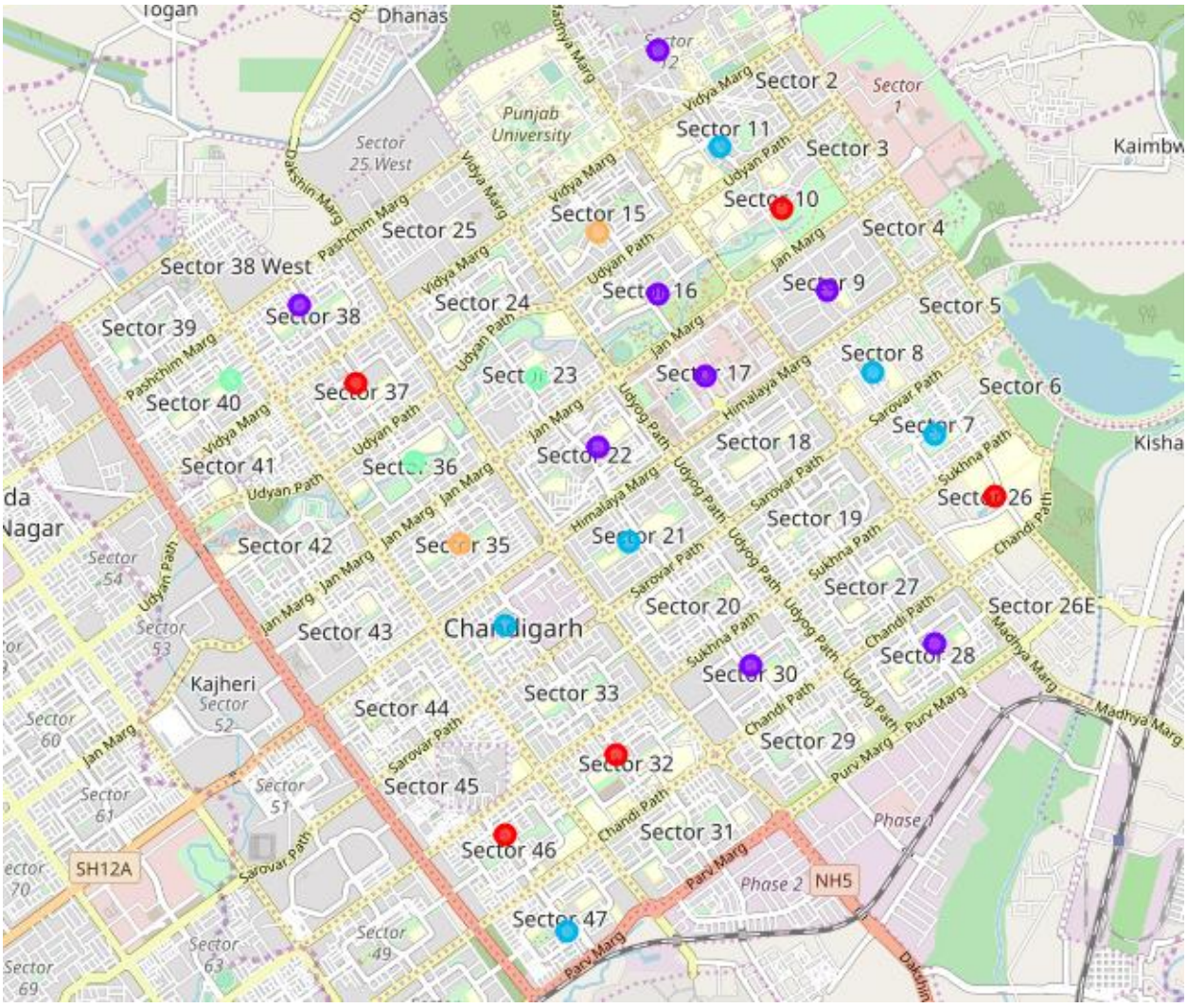


We can observe the more an Area has Nightlife index more popular they are and vice versa for both the Indexes.

Conclusion

After analyzing all the available data and charts we can determine the below points.

- If we are planning to open an Expensive Restaurant serving North Indian, Fast food and other Cuisines then Sector 15 and Sector 35 are our best options.
- If we are planning to open a mid-Range Restaurant serving Beverages, Fast food, Chinese or Street Food then Sector 36, 23 and 40 are best options due to vicinity with other sectors.
- If we are planning to open a low cost, mid-range Restaurant serving North India, Continental, Chinese, Cafe we can choose Sector 12,17,22 and nearby vicinity.
- If we are planning to open a new bakery then possible choices are Sector 10,26,32,37,46



Expensive and busy Areas having North Indian and Fast Food

Cafes, Continental and Italian Cuisines are predominant in the Areas

Bakeries, Chinese and Café Cuisines are predominant in the Areas