



FRENCH RESTAURANT IN BANGALORE

Open a New French Restaurant

ABSTRACT

Identifying the locations in Bangalore to open a new French Restaurant

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Applied Data Science Capstone

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Introduction

Bangalore is the fastest growing city of **Asia** and is the **Fifth largest city in India**, **Bangalore** is the Silicon Valley of India and thus boost a population which lies in the age group of **20-45 years**. **Bangalore** has a high density of Restaurant, through this project I will try to identify locations which has low density of Restaurants and also I will try to identify locations which has high potential for opening a French Restaurant.

This project will be beneficial to all the **stakeholders** who wants to open a **New French Restaurant** in the city of **Bangalore, India**. As in this project I will try to identify all the **locations** which will be optimal to open a **French Restaurant** and the locations which are less crowded with restuarent especially **French Restaurant**.

The criterion to choose the location for the Restaurant will be:

- The density or number of restaurants in a Neighborhood
- The type of restaurants in a Neighborhood
- The distance of the nearest French Restaurant from the Neighborhood
- Location of the Neighborhood (to determine the affordability and accessibility)

Data Requirement

Data's that I will require for this project are:

- Location data of Bangalore, India
- List of all the neighborhood of Bangalore along with locations coordinates
- Number of restaurants in a Neighborhoods
- The type of restaurant in a Neighborhoods

The list of all the neighborhoods of Bangalore will be obtained from www.finkode.com.

The locations data will be obtained using Google Maps API geocoding. Restaurant data will be obtained using Foursquare API.

The above data will help me to determine the optimal locations for opening a restaurant in Bangalore and recommend locations to open a French Restaurant to potential stakeholders.

Methodology

Data Cleaning

The list of all the neighborhoods of Bangalore will be obtained from www.finkode.com and transformed into pandas data frame “**df1**”. The features of the of **df1** district was dropped as it same for all the row.

	Post Office	District	Pincode
0	A F Station Yelahanka S.O	Bangalore	560063
1	Adugodi S.O	Bangalore	560030
2	Agara B.O	Bangalore	560034
3	Agram S.O	Bangalore	560007
4	Amruthahalli B.O	Bangalore	560092

Renamed the column name “Post Office” to “Neighborhood” and dropping “S.O” & “B.O” from column Neighborhood.

	Neighborhood	Postal_Code
0	A F Station Yelahanka	560063
1	Adugodi	560030
2	Agara	560034
3	Agram	560007
4	Amruthahalli	560092

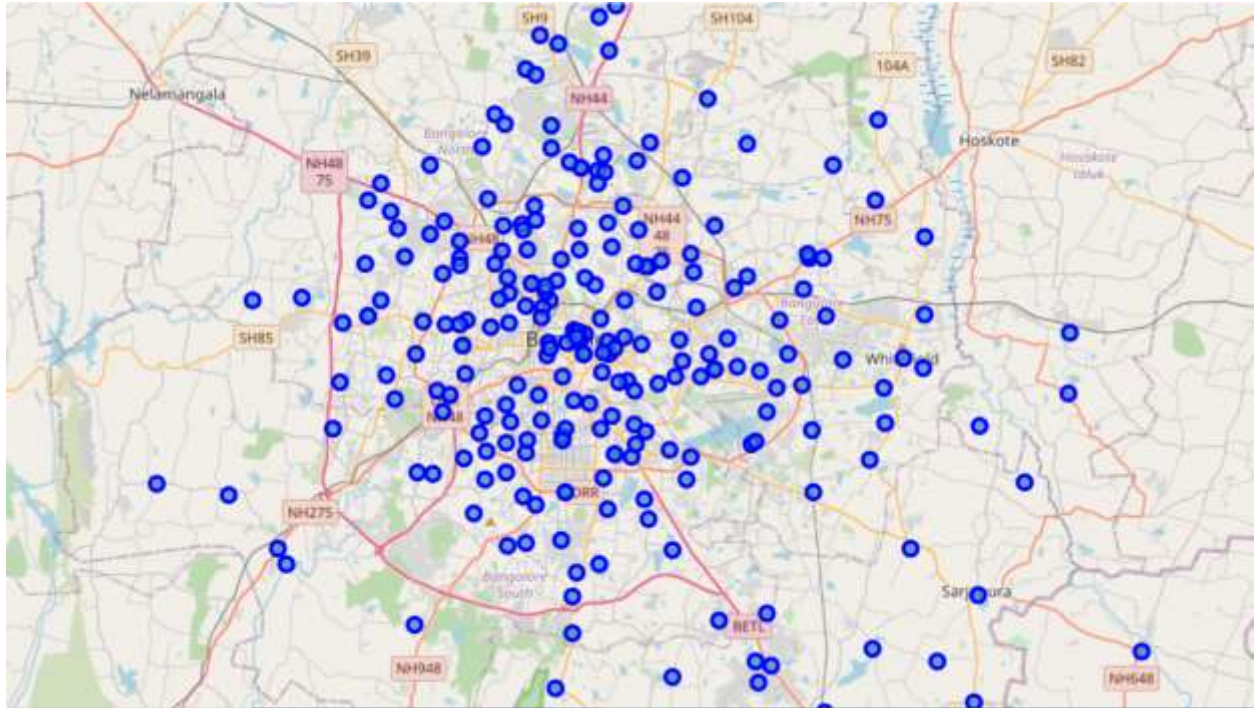
Loaded the locations data of all the Neighborhood using google maps API and appending it with the **df1**.

	Neighborhood	latitude	longitude
0	A F Station Yelahanka	13.137243	77.610284
1	Adugodi	12.942004	77.608304
2	Agara	12.923065	77.646453
3	Agram	12.957993	77.630838
4	Amruthahalli	13.065879	77.604206

Now we loaded the location data of Bangalore from Foursquare agent

```
latitude of Bangalore is : 12.9791198
longitude of Bangalore is : 77.5912997
```

Visualized the map of Bangalore with all the Neighborhoods.



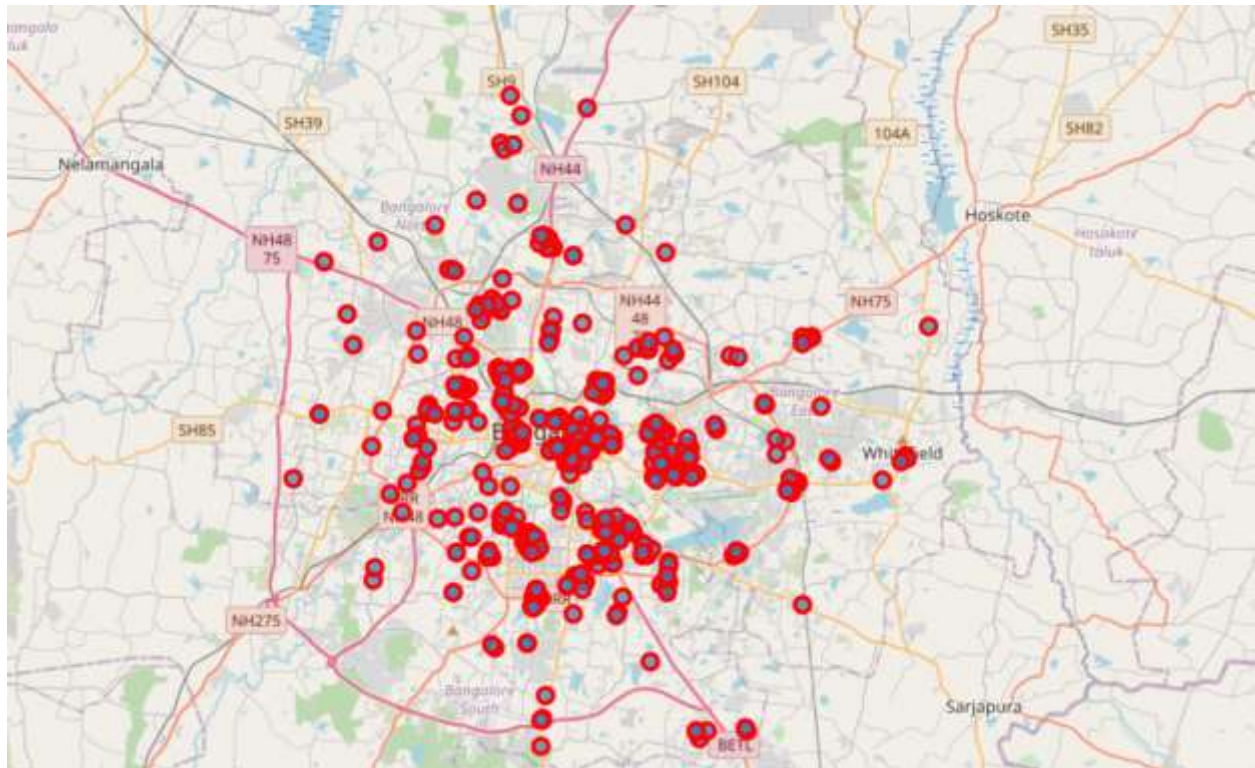
Loaded the nearby venue details of all the neighborhoods of Bangalore within a radius of 500m into a data frame **df5**.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Adugodi	12.942004	77.608304	Bharathi Refreshments(South Indian Food) - Adu...	12.943388	77.607840	Fast Food Restaurant
1	Adugodi	12.942004	77.608304	Stoneart	12.941271	77.608701	Design Studio
2	Adugodi	12.942004	77.608304	adigas	12.940589	77.608780	Indian Restaurant
3	Adugodi	12.942004	77.608304	adugodi	12.942543	77.607353	Bus Station
4	Agara	12.923065	77.646453	Grigliato	12.922214	77.645357	Italian Restaurant

Filtering the Nearby venue by venue category 'Restaurant' into a data frame **df6**.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Adugodi	12.942004	77.608304	Bharathi Refreshments(South Indian Food) - Adu...	12.943388	77.607840	Fast Food Restaurant
2	Adugodi	12.942004	77.608304	adigas	12.940589	77.608780	Indian Restaurant
4	Agara	12.923065	77.646453	Grigliato	12.922214	77.645357	Italian Restaurant
5	Agara	12.923065	77.646453	Sichuan	12.921083	77.645143	Chinese Restaurant
6	Agara	12.923065	77.646453	Biryani Zone	12.920138	77.645004	Hyderabadi Restaurant

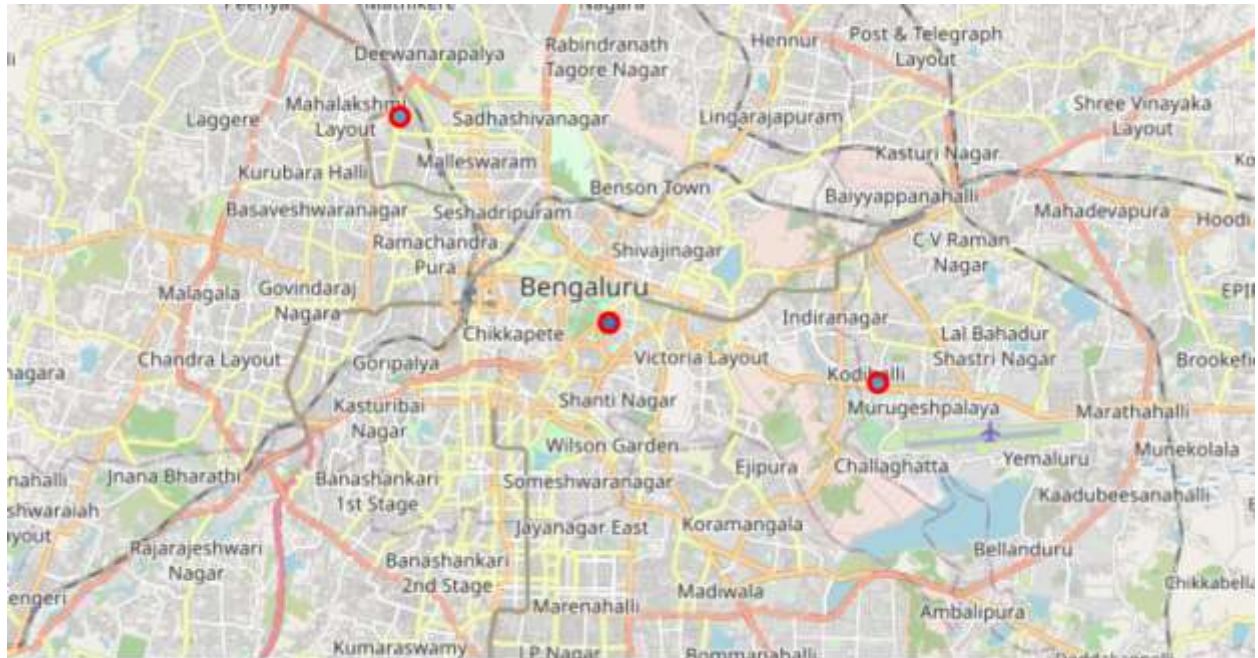
We visualized all the Restaurants in Bangalore, from the plot we found that in all the Neighborhoods near the center of the Bangalore was clustered with high density of restaurant.



Filtered the data frame df5 to identify how many French restaurant are there in Bangalore

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
192	Bangalore City	12.971599	77.594563	Café Noir	12.971995	77.596001	French Restaurant
286	Bangalore International Airport	13.198635	77.706593	Café Noir	13.200013	77.708640	French Restaurant
367	Bestamalanahalli	12.971599	77.594563	Café Noir	12.971995	77.596001	French Restaurant
492	Chudenapura	12.971599	77.594563	Café Noir	12.971995	77.596001	French Restaurant
1037	Jalavayuvihar	12.971599	77.594563	Café Noir	12.971995	77.596001	French Restaurant
1717	Maikand Lines	12.971599	77.594563	Café Noir	12.971995	77.596001	French Restaurant
1868	Milk Colony	13.007876	77.557630	Café Noir	13.011400	77.558295	French Restaurant
1953	NAL	12.960894	77.651490	Le Cirque Signature	12.960797	77.648597	French Restaurant
2421	Venkatarangapura	12.971599	77.594563	Café Noir	12.971995	77.596001	French Restaurant

Visualized the three French Restaurant (Café Noir, Cafe Noir & Le Cirque Signature)



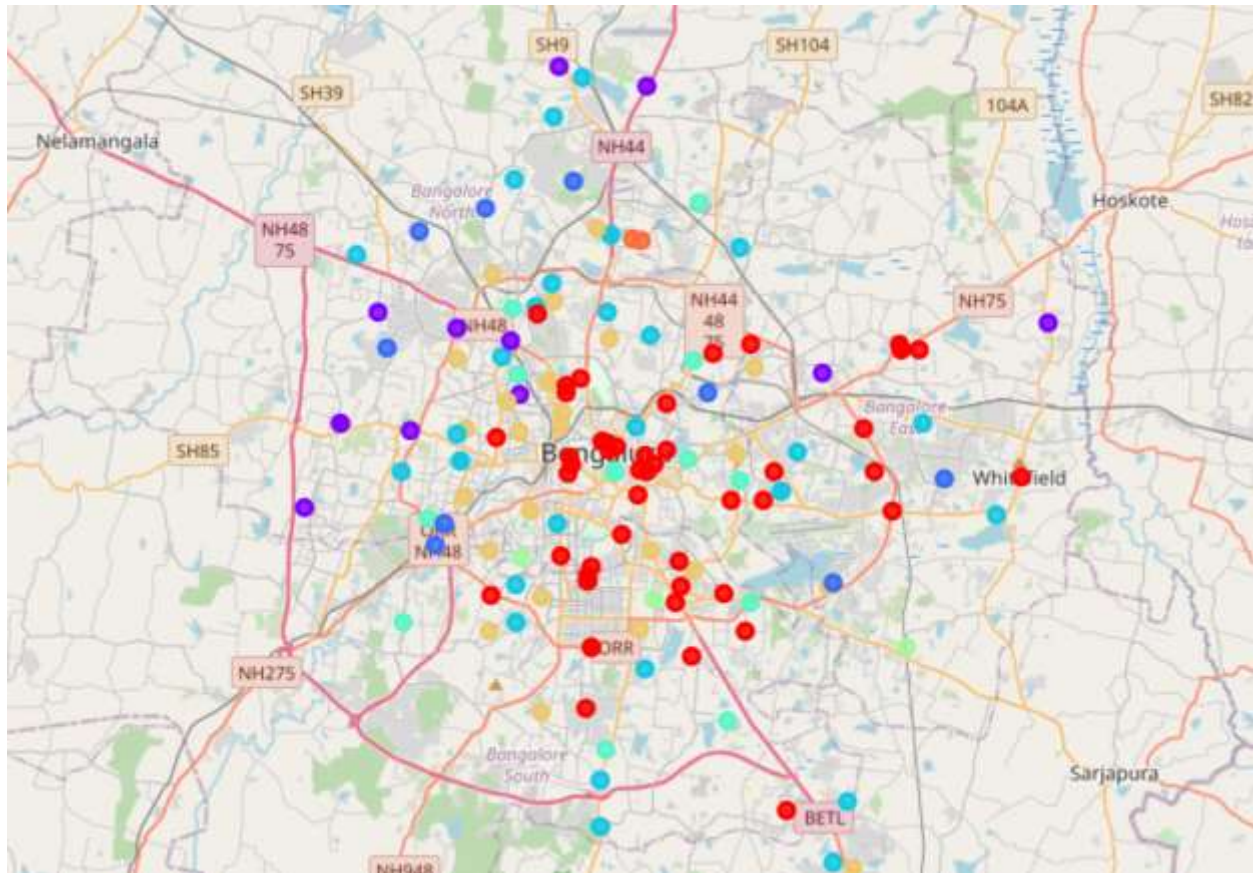
Now, we analyzed each Neighborhood and used K Means clustering with 8 clusters to group these Neighborhoods into clusters to identify which types of Neighborhood is similar to Neighborhood which contains French restaurants as these Neighborhoods will be our candidates to open a new French Restaurant.

We remove all the columns from df6 except “Venue Category” and made dummy variables of “Venue Category” using one hot coding. Then we ran the K Means Clustering with 8 clusters to get the labels of each Neighborhood.

We then appended the resulting data frame with df4 to get df14.

	Neighborhood	latitude	longitude	Venue	label
0	Adugodi	12.942004	77.608304	2	6
1	Agara	12.923065	77.646453	4	4
2	Anandnagar (Bangalore)	13.031328	77.591313	1	3
3	Ashoknagar (Bangalore)	12.971885	77.607009	26	0
4	Attibele	12.778963	77.770203	2	5

We visualized clusters into Bangalore map.



Results

We found that there are total 553 restaurants in Bangalore and among them 3 are French Restaurants (Café Noir, Café Noir & Le Cirque Signature).

We also found that these restaurants fall into 9 Neighborhoods and the Neighborhoods belong to cluster 4.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue_x	Venue Latitude	Venue Longitude	Venue Category	Venue_y	label
176	Bangalore City	12.971599	77.594563	Café Noir	12.971995	77.596001	French Restaurant	18	4
265	Bangalore International Airport	13.198635	77.706583	Café Noir	13.200013	77.708540	French Restaurant	8	4
342	Bestamaramahalli	12.971599	77.594563	Café Noir	12.971995	77.596001	French Restaurant	18	4
459	Chudenapurli	12.971599	77.594563	Café Noir	12.971995	77.596001	French Restaurant	18	4
970	Jaiavayuvihar	12.971599	77.594563	Café Noir	12.971995	77.596001	French Restaurant	18	4
1625	Malkand Lines	12.971599	77.594563	Café Noir	12.971995	77.596001	French Restaurant	18	4
1768	Milk Colony	13.007876	77.557630	Café Noir	13.011400	77.555295	French Restaurant	13	4
1845	NAL	12.960694	77.651490	Le Cirque Signature	12.960797	77.648597	French Restaurant	8	0
2281	Venkataramapurli	12.971599	77.594563	Café Noir	12.971995	77.596001	French Restaurant	18	4

There are 18 Neighborhoods in Cluster 4, which are candidates, but we have seen that in the Neighborhoods which has French restaurant has medium density of restaurants i.e. 18.

So, we our candidate Neighborhoods belongs to Cluster 4 and has number of restaurants greater than or equal to 18.

Discussion

When we searched nearby venues of the Neighborhoods from the Foursquare, we took radius as 500m so that we get all the venues and do not miss any, this led to overlapping entries of Restaurants for many Neighborhoods. As we found that there are 3 French restaurants in Bangalore, but we got 9 Neighborhoods which contains these three French restaurants.

We have considered only those locations which are like these 9 Neighborhoods and whose restaurant density is medium. We found that eligible locations are near to the center of the city.

Conclusion

We got 7 locations which are suitable to open a new French Restaurant.

	Neighborhood	latitude_x	longitude_x	Venue_x	label_x	latitude_y	longitude_y	Venue_y	label_y
0	Bangalore City	12.971599	77.594563	18	4	12.971599	77.594563	18	4
1	Bestamahanahalli	12.971599	77.594563	18	4	12.971599	77.594563	18	4
2	Chudenapura	12.971599	77.594563	18	4	12.971599	77.594563	18	4
3	H.A.L II Stage H.O	12.968478	77.642574	20	4	12.968478	77.642574	20	4
4	Jalavayuvihar	12.971599	77.594563	18	4	12.971599	77.594563	18	4
5	Malkand Lines	12.971599	77.594563	18	4	12.971599	77.594563	18	4
6	Venkatarangapura	12.971599	77.594563	18	4	12.971599	77.594563	18	4