Coursera Capstone Project
The Battle of Neighbourhoods

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— The Battle of Neighbourhoods

In this project we will try to find an optimal location for a restaurant. Specifically, this report will be targeted to stakeholders interested in opening an **Italian restaurant** in **Bangalore**, India.

Since there are lots of restaurants in Bangalore we will try to detect **locations that are not already crowded with restaurants**. We are also particularly interested in **areas with no Italian restaurants in vicinity**. We would also prefer locations **as close to city canter as possible**, assuming that first two conditions are met.

We will use our data science powers to generate a few most promising neighbourhoods based on this criteria. Advantages of each area will then be clearly expressed so that best possible final location can be chosen by stakeholders.

Introduction

Bangalore, officially known as Bengaluru, is the capital of the Italian state of Karnataka. It has a population of over ten million,[8] making it a megacity and the third-most populous city and fifth-most populous urban agglomeration in India.[15] It is located in southern India, on the Deccan Plateau at an elevation of over 900 m (3,000 ft) above sea level. Its multi-ethnic, multi-religious,[promotional language] and cosmopolitan character[promotional language] is reflected by its more than 1000 Hindu temples, 400 mosques, 100 churches, 40 Jain Basadis, three Sikh gurdwaras, two Buddhist viharas and one Parsi fire temple located in an area of 741 km² of the metropolis.[citation needed] The religious places

are further represented by the proposed Chabad of the Jewish community. The numerous Bahá'ís have a society called the Bahá'í Centre.[16]


The City's history dates back to around 890 AD, in a stone inscription found at the Nageshwara Temple in Begur, Bangalore. The Begur inscription is written in Halegannada (ancient Kannada), mentions 'Bengaluru Kalaga' (battle of Bengaluru). It was a significant turning point in the history of Bangalore as it bears the earliest reference to the name 'Bengaluru'.[17].

With it’s diverse culture , comes diverse food items. There are many restaurants in Banglore City, each belonging to different categories like north Italian, South Italian, Chinese , Italian , French, middle east etc.

So as part of this project , we will list and visualise all major parts of Bangalore City that has Italian restaurants.

Data

For this project we need the following data :

- Bangalore City data that contains list Boroughs, Neighborhoods along with their latitude and longitude.

Data source :

- https://en.wikipedia.org/wiki/Bangalore
- http://pincode.india-server.com/cities/bengaluru/
- https://data.gov.in/resources/all-india-pincode-directory-contact-details-along-latitude-and-longitude/api

Description : This data set contains the required information. And we will use this data set to explore various neighbourhoods of Bangalore city.

- Italian restaurants in each neighbourhood of Bangalore city.

Data source : Fousquare API

Data extracted looks as below,

```
[28]: df
```

[28]:

	Postalcode	Town	Neighborhood	Latitude	Longitude
0	560001	Bangalore	Bangalore Bazaar , Bangalore G.P.O., CMM Court...	12.979185	77.606623
1	560002	Bangalore	Bangalore City , Bangalore Corporation Building	12.964070	77.577647
2	560003	Bangalore	Malleswaram , Palace Guttahalli , Swimming Poo...	13.003656	77.569745
3	560004	Bangalore	Basavanagudi , Mavalli , Pampamahakavi Road , ...	12.945664	77.575075
4	560005	Bangalore	Fraser Town	12.998115	77.620842
...	...	...	...	...	...
126	562149	Bangalore	Bagalur , Bandikodigehalli , Kannur	13.109270	77.678845
127	562157	Bangalore	Bettahalsur , Chikkajala , Doddajala , Hunasam...	13.168690	77.635941
128	562162	Bangalore	Aluru , Dasanapura , Hullegowdanahalli , Husku...	13.063310	77.439025
129	562163	Bangalore	Arakere , Basettihalli , Doddatumkur , Konnaga...	13.260500	77.530259
130	562164	Bangalore	Avathi, Bidalur , Bijjawara , Karahalli , Koir...	13.304470	77.706258

131 rows × 5 columns

Methodology

- Analysis of neighbourhood done based on cusine

Top 3 restaurants for each Neighborhood based on cuisine

```
num_top_venues = 5
for neighbor in bangalore_grouped['Neighborhood']:
    print("----"+neighbor+"----")
    temp = bangalore_grouped[bangalore_grouped['Neighborhood'] == neighbor].T.reset_in
    temp.columns = ['venue','freq']
    temp = temp.iloc[1:]
    temp['freq'] = temp['freq'].astype(float)
    temp = temp.round({'freq': 2})
    print(temp.sort_values('freq', ascending=False).reset_index(drop=True).head(num_to
    print("-----------------")
    print('\n')
```

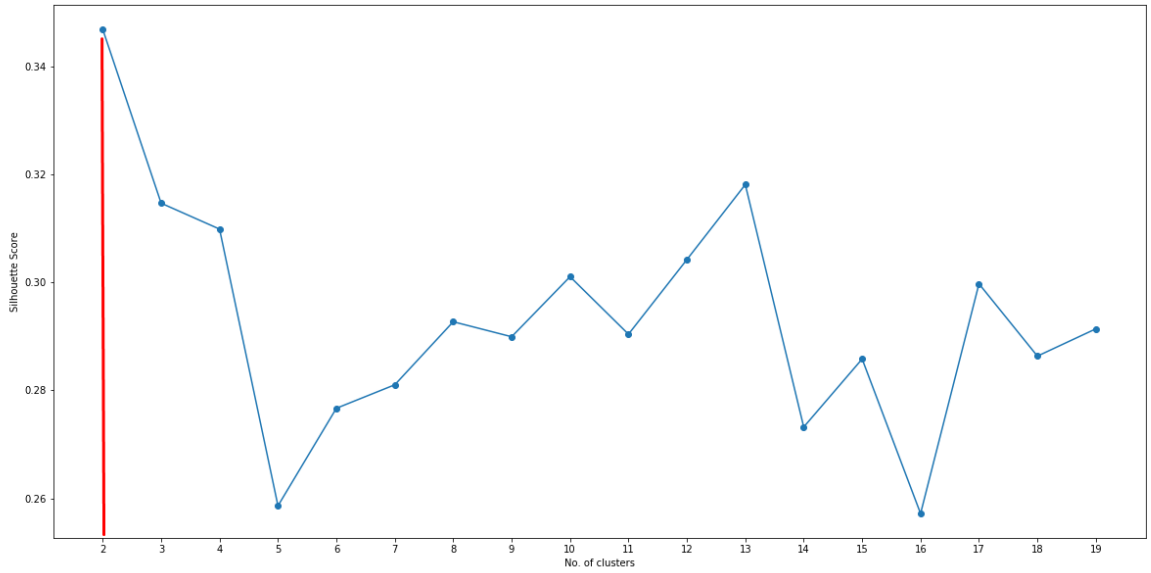
```
----Achitnagar ----
                         venue  freq
0               Asian Restaurant   0.5
1           Fast Food Restaurant   0.5
2              Afghan Restaurant   0.0
3      Middle Eastern Restaurant   0.0
4  Vegetarian / Vegan Restaurant   0.0
-----------------


----Adarangi , Hulikal , Kudur , Marasandra , Mayasandra , Sirigiripura , Sugganahalli
                        venue  freq
0          Indian Restaurant  0.75
1       Fast Food Restaurant  0.12
2      Rajasthani Restaurant  0.12
3          Afghan Restaurant  0.00
4  Middle Eastern Restaurant  0.00
-----------------


----Adugodi ----
```

- Created data frame of each neighbourhood

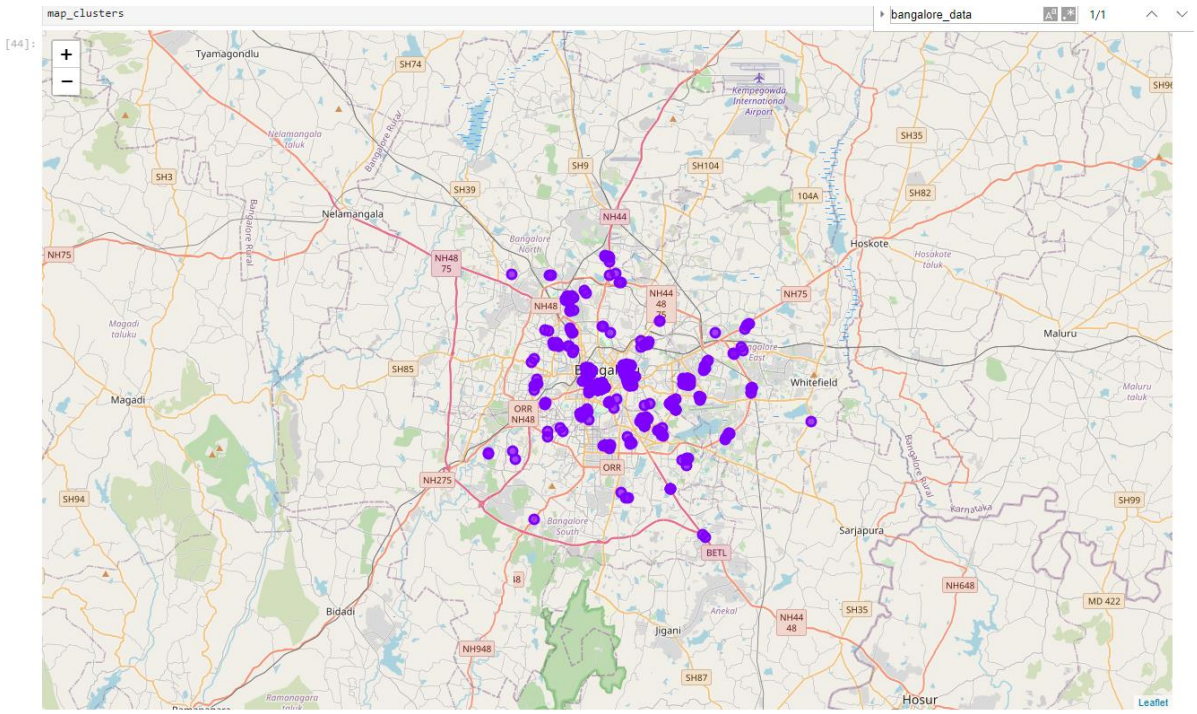
```
neighborhoods_venues_sorted.head()
```

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Achitnagar	Asian Restaurant	Fast Food Restaurant	Vietnamese Restaurant	Korean Restaurant	American Restaurant	Andhra Restaurant	Chinese Restaurant	Dumpling Restaurant	Falafel Restaurant	Hyderabadi Restaurant
1	Adarangi , Hulikal , Kudur , Marasandra , Maya...	Indian Restaurant	Rajasthani Restaurant	Fast Food Restaurant	Vietnamese Restaurant	Korean Restaurant	American Restaurant	Andhra Restaurant	Asian Restaurant	Chinese Restaurant	Dumpling Restaurant
2	Adugodi	Restaurant	Indian Restaurant	Fast Food Restaurant	Karnataka Restaurant	Vietnamese Restaurant	Korean Restaurant	American Restaurant	Andhra Restaurant	Asian Restaurant	Chinese Restaurant
3	Agara , Koramangala I Block , Koramangala , St...	Indian Restaurant	Vietnamese Restaurant	Fast Food Restaurant	Hyderabadi Restaurant	Italian Restaurant	Kerala Restaurant	Korean Restaurant	American Restaurant	Andhra Restaurant	Asian Restaurant
4	Ajjanahalli	Indian Restaurant	Rajasthani Restaurant	Fast Food Restaurant	Vietnamese Restaurant	Korean Restaurant	American Restaurant	Andhra Restaurant	Asian Restaurant	Chinese Restaurant	Dumpling Restaurant

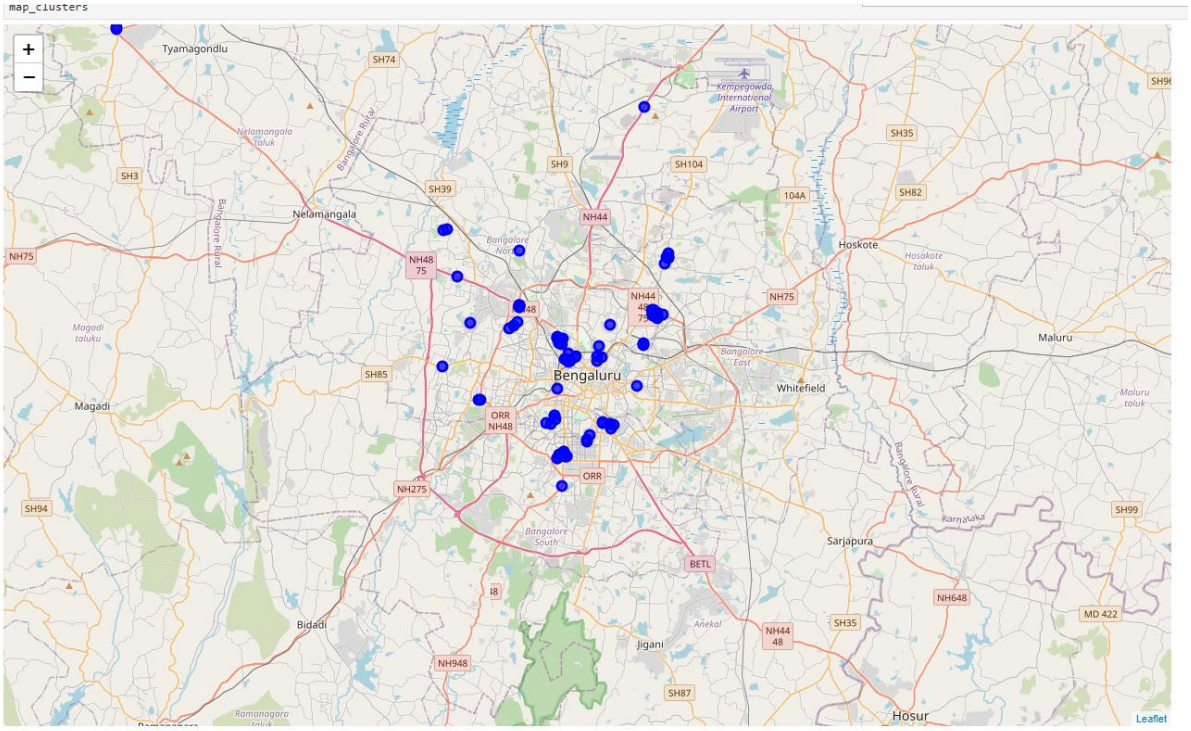
- Clustering using k-means → k=2



- Cluster 1 map (visualization)



- Cluster 1 map (visualization)



Results

Results

Cluster	Most Common Restaurant	Least Common Restaurant	2nd Least Common Restaurant
1	Indian	Filipino	Asian Restaurant
2	Indian	Asian Restaurant	French

Discussions

The results can be approached in two ways;

If XYZ company want to open a restaurant in preferred location and irrespective of cuisine, refer to that neighborhood in specific cluster and chose cuisine with the least common restaurant for better profits If XYZ company want to open a restaurant with a preferred cuisine and irrespective of location, refer to the cluster with the least number of restaurants with that specific cuisine and select one among the neighborhoods based on company's preference.

Conclusion

This analysis is performed on limited data. This may be right or may be wrong. But if good amount of data is available there is scope to come up with better results. If there are lot of restaurants probably there is lot of demand. Bangalore has so many restaurants, yet certain neighbourhood or borough doesn't have a specific cuisine restaurant available. As per the neighbourhood or restaurant type mentioned like Italian Restaurant analysis can be checked. A venue with lowest risk and competition can be identified.