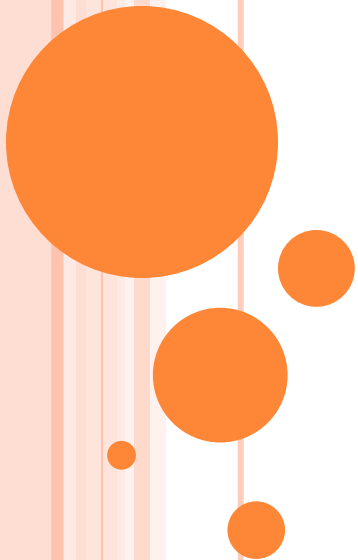


COURSERA CAPSTONE PROJECT

*ANALYZING THE PLACES NEAR OFFICE SPACES
TO OPEN NEW RESTAURANTS IN BANGALORE.*

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EXPLORING NEW RESTAURANT NEIGHBORHOOD BANGALORE

- In this project we have taken a scenario where a person wants to open a new restaurant in the nearby space of an IT office in Bangalore.
- As opening the new restaurant in these areas is costly affair, it becomes important to analyze the places and existing restaurants around the offi
- With the help of Machine Learning, we can not only determine the probable areas but the cuisines can also be analyzedces to get a clear idea of the competition there.



BUSINESS DESCRIPTION

- You need a spot that draws crowds, is easily accessible, and has the potential for growth.
- It makes sense to take your time, as you're looking for the right space.
- You might also want to do some research to find out spaces for restaurants that describe the market conditions which exist in the location.
- Whether you decide to rent space or build from scratch, selecting a location is one of the biggest decisions you'll make as an owner.



DATA ACQUISITION

- The data is extracted from a website using the web scrapping using BeautifulSoup Python Library to extract the data. The data is converted to Pandas dataframe for further processing.
- Then *Geopy* package is used to get the coordinates (latitude and longitude) for each and every location provided.
- This is done using Folium Package to ensure the data we have picked have good enough spread throughout the city and we have picked up the data which covers all the area (majority) in Bangalore.



DATA VIEW

Company_Name	Company_Address	Comapany_Code	latitude	longitude
Accenture Services Pvt Ltd	71 Cunningham Road\rBangalore - 560 052	560052	12.9902	77.596
Accord Software & Systems Pvt Ltd	# 37, K.R. Colony, Domlur Layout, \r\nBangalor...	560071	12.9576	77.6404
Acme Insurance Services Pvt Ltd	3rd Floor, Monarch Chambers, \r122, Infantry R...	560001	-33.0381	137.576
Adaptec (India) Pvt Ltd	No:5 , First Floor, \r\nSalarpuria Infinity\r\n...	560029	12.9262	77.5974
Adea International Pvt Ltd	No.319/1, Bommanahalli\r\nHosur Main Road\r\nB...	560068	12.9003	77.6198
Aditi Technologies Pvt Ltd	224/16 Ramana Maharishi Rd\r\nBangalore 560 080	560080	13.0001	77.5833
Affiliated Computer Services of India (P) Ltd ...	Level 2, Creator Block International Tech Park...	560066	12.9536	77.7158
Ajax.com Pvt Ltd	#1, 3rd Floor Maruthi Complex, \r\nAbove Food ...	560032	13.0253	77.5984
Akamai Technologies India Pvt Ltd	Salarpuria Ascent\r\n#77, Jyothi Nivas College...	560095	12.9375	77.6179
Altair Engineering India Pvt Ltd	Mercury 2B Block, 5th Floor,\r\nPrestige Tech ...	560078	12.9005	77.5704
Antares Systems Ltd	#24, 1st Floor, Sudha Complex, \r\n3rd Stage, ...	560079	12.9859	77.5381
ANZ Information Technology Pvt. Ltd.	Cherry Hills\r\nEmbassy Golf Links Business Pa...	560071	12.9576	77.6404

FOURSQUARE API USAGE TO GET NEIGHBORHOOD DETAILS

- Using the Foursquare API to get all the Venue details to further categorize it in different category

```
In [138]: bangalore_venues.head(20)
```

```
Out[138]:
```

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	247 Learning Solutions Pvt Ltd	12.980207	77.614153	Westside	12.982570	77.610713	Shopping Mall
1	247 Learning Solutions Pvt Ltd	12.980207	77.614153	Mysore Saree Udyog	12.981433	77.610214	Women's Store
2	247 Learning Solutions Pvt Ltd	12.980207	77.614153	Chaipatty ulsoor	12.976061	77.615338	Tea Room
3	247 Learning Solutions Pvt Ltd	12.980207	77.614153	Vashi's House of Jeans	12.981449	77.610308	Clothing Store
4	247 Learning Solutions Pvt Ltd	12.980207	77.614153	Bobby's Punjabi Dhaba	12.983826	77.613955	Indian Restaurant
5	247 Learning Solutions Pvt Ltd	12.980207	77.614153	Cafe Coffee Day Ulsoor Lake	12.979498	77.618151	Café
6	247 Learning Solutions Pvt Ltd	12.980207	77.614153	Sreeraj Lassi Bar	12.982748	77.610739	Juice Bar
7	247 Learning Solutions Pvt Ltd	12.980207	77.614153				
8	247 Learning Solutions Pvt Ltd	12.980207	77.614153				
9	247 Learning Solutions Pvt Ltd	12.980207	77.614153				
10	247 Learning Solutions Pvt Ltd	12.980207	77.614153				
11	247 Learning Solutions Pvt Ltd	12.980207	77.614153				
12	247 Learning Solutions Pvt Ltd	12.980207	77.614153				
13	247 Learning Solutions Pvt Ltd	12.980207	77.614153				
14	247 Learning Solutions Pvt Ltd	12.980207	77.614153				
15	247 Learning Solutions Pvt Ltd	12.980207	77.614153				
16	247 Learning Solutions Pvt Ltd	12.980207	77.614153				
17	247 Learning Solutions Pvt Ltd	12.980207	77.614153				
18	247 Learning Solutions Pvt Ltd	12.980207	77.614153				
19	247 Learning Solutions Pvt Ltd	12.980207	77.614153				

EXPLAINING THE MACHINE LEARNING MODEL

- Obtaining the Top 10 Venues of each of the Company Name and Location.
- Grouping the data and taking the mean of all the Venue so that dataframe size is reduced and relevant data is gathered.
- Now we have got the required data to start with the Machine Learning Algorithm and get the cluster details. Initially we will be starting with 5 Clusters to segment the data.
- Merging the Original and the Top 10 venues and the ClusterLabel obtained by the model for each Neighborhood data.

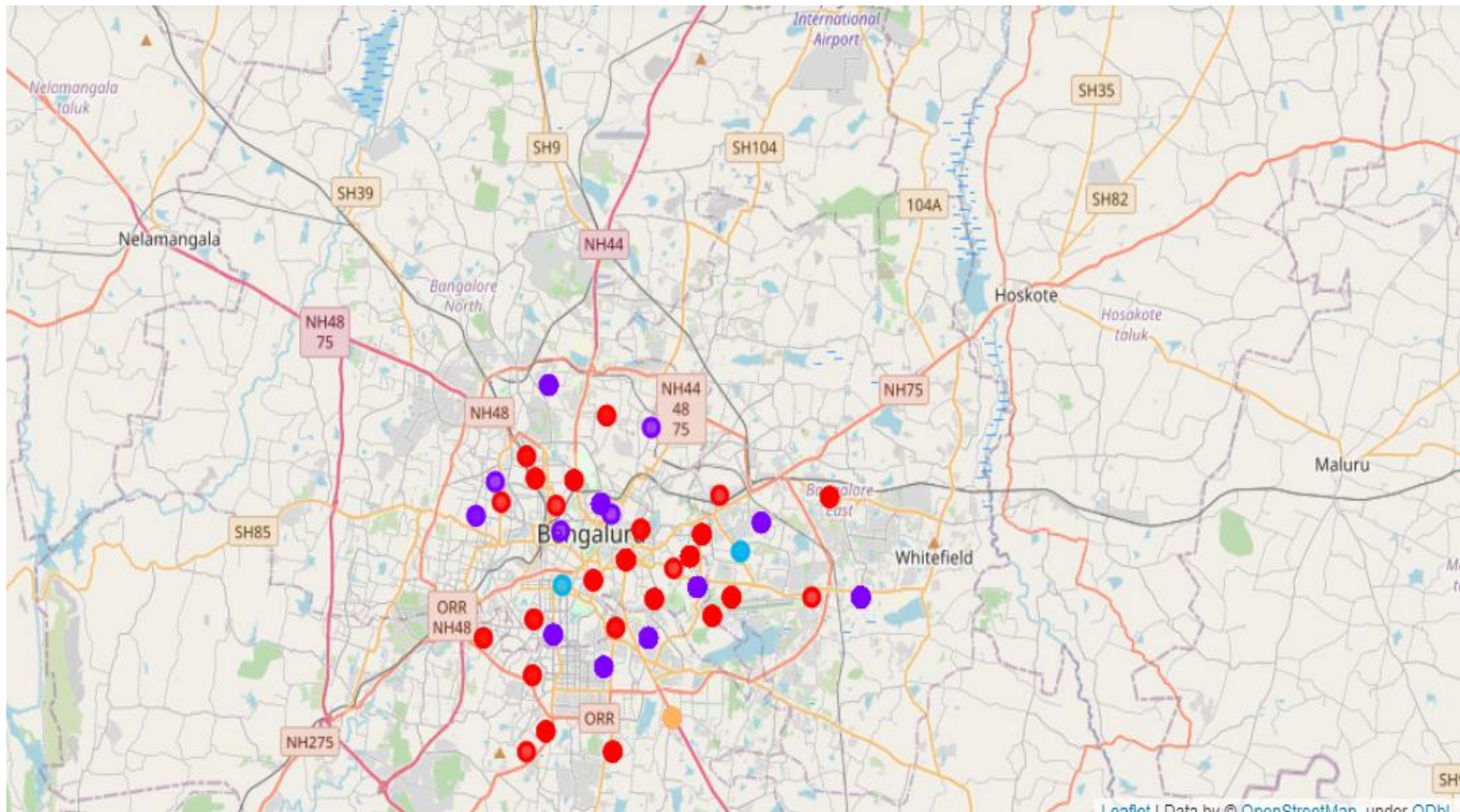


CLUSTERING AND SEGMENTATION

- Segregating the existing location details using K-Means Clustering Algorithm with 5 clusters.

	Neighborhood	Company_Address	Comapany_Code	lattitude	longitude	ClusterLabels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue
0	247 Learning Solutions Pvt Ltd	No 20, Annaswamy Mudaliar Road, Ulsoor Lake, V...	560042	12.9802	77.6142	0	Clothing Store	Women's Store	Tea Room	Multiplex	Candy Store	Café
1	Accenture Services Pvt Ltd	71 Cunningham Road\rBangalore - 560 052	560052	12.9902	77.596	1	Indian Restaurant	Coffee Shop	Café	Italian Restaurant	Pizza Place	Tea Room
2	Accord Software & Systems Pvt Ltd	# 37, K.R. Colony, Domlur Layout, \r\nBangalor...	560071	12.9576	77.6404	1	Indian Restaurant	Hotel	Pizza Place	Irish Pub	Pub	Breakfast Spot
3	Acme Insurance Services Pvt Ltd	3rd Floor, Monarch Chambers, \r122, Infantry R...	560001	-33.0381	137.576	3	Bowling Alley	Grocery Store	Beach	Café	Discount Store	Department Store
4	Adaptec (India) Pvt Ltd	No:5 , First Floor, \r\nSalarpuria Infinity\r\n...	560029	12.9262	77.5974	1	Indian Restaurant	Fast Food Restaurant	Asian Restaurant	Middle Eastern Restaurant	Women's Store	Discount Store

MAP VIEW OF THE CLUSTERED LOCATION



DISCUSSION

- So we see that how we can apply the ML Algorithm K-Means clustering algorithm to help in finding the solution and analyze the result.
- This would not have been possible with the only available data. The clusters help anyone see the data and the common venues all the cluster have near them.
- As we can clearly see that two clusters offer a great opportunity for restaurants to be opened as these places are less crowded.



CONCLUSION

- In the above study, we explored the options of the opening of new restaurants based on the current situation of the IT offices and restaurants in Bangalore.
- This algorithm is based on limited number of data .i.e. limited number of IT companies in Bangalore, but it shows the valuable aspect of the Model and usage and can be extended to include more companies name. Also, this can be useful for exploring the options in other cities too.

