Data Science Capstone Report

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Introduction/Business Problem

Chennai, also known as Madras is the capital of the Indian state of Tamil Nadu. Located on the Coromandel Coast off the Bay of Bengal, it is a primary cultural, economic and educational centre of South India. According to the 2011 Indian census, it is the sixth-most populous city and fourth-most populous urban agglomeration in India. The city together with the adjoining regions constitutes the Chennai Metropolitan Area, which is the 36th-largest urban area by population in the world. Chennai has an area of 1,189 km2 and a population over 8 million.

This this analysis we are going to see the feasibility of opening different cuisines of restaurants in different zones of Chennai. A zone can be treated as the equivalent of a Borough in other parts of the world. A zone contains many neighbourhoods.

This analysis will be conducted with the help of Chloropleth maps as they are easy to read and explore.

So the question that will be answered is:

1) Which zone in Chennai sees a high frequency of restaurants?
2) What is the price range of restaurants by zone?
3) What is the popularity of a particular cuisine by zone in Chennai?
4) Which Zones in Chennai have similar characteristics based on restaurants they contain?
   This will help people to explore new markets for different cuisines.

Data:

1) Restaurant data:
   https://www.kaggle.com/phiitm/chennai-zomato-restaurants-data?select=Zomato+Chennai+Listing+2020.csv
2) Geodata:
   https://raw.githubusercontent.com/datameet/Municipal_Spatial_Data/master/Chennai/Zones.geojson

Methodology:

1. Import data of all restaurants.

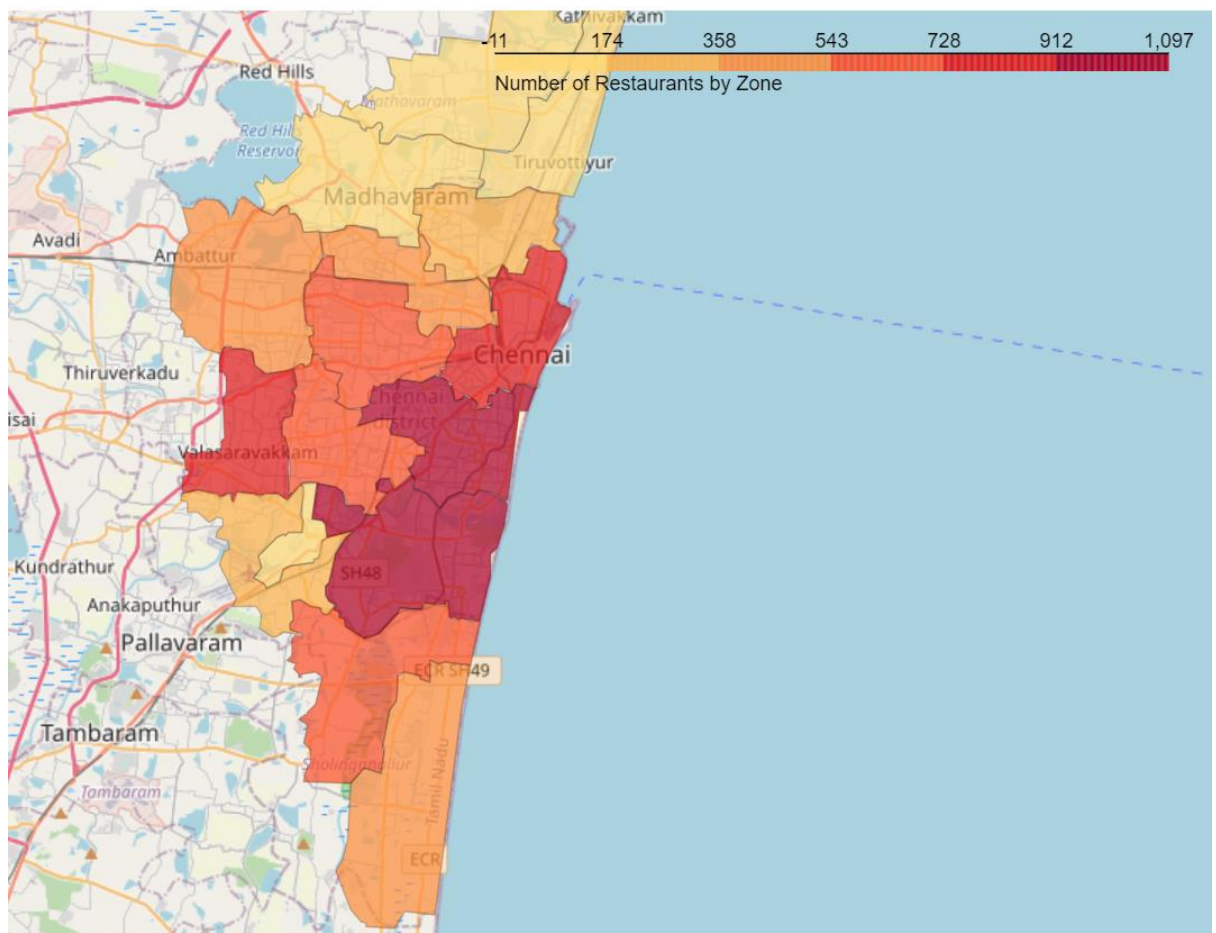|	Zomato URL	Name of Restaurant	Address	Location	Cuisine	Top Dishes	Price for 2	Dining Rating	Dining Rating Count	Delivery Rating	Delivery Rating Count	Features
0	https://www.zomato.com/chennai/yaa-mohaideen-b...	Yaa Mohaideen Briyani	336 & 338, Main Road, Pallavaram, Chennai	Pallavaram	['Biryani']	['Bread Halwa', ' Chicken 65', ' Mutton Biryan...	500.0	4.3	1500	4.3	9306	['Home Delivery', 'Indoor Seating']
1	https://www.zomato.com/chennai/sukkubhai-biriy...	Sukkubhai Biriyani	New 14, Old 11/3Q, Railway Station Road, MKN ...	Alandur	['Biryani', ' North Indian', ' Mughlai', ' Des...	['Beef Biryani', ' Beef Fry', ' Paratha', ' Pa...	1000.0	4.4	3059	4.1	39200	['Home Delivery', 'Free Parking', 'Table booki...
2	https://www.zomato.com/chennai/ss-hyderabad-bi...	SS Hyderabad Biryani	98/339, Arcot Road, Opposite Gokulam Chit Fun...	Kodambakkam	['Biryani', ' North Indian', ' Chinese', ' Ara...	['Brinjal Curry', ' Tandoori Chicken', ' Chick...	500.0	4.3	1361	4.4	10500	['Home Delivery', 'Indoor Seating']
3	https://www.zomato.com/chennai/kfc-perambur	KFC	10, Periyar Nagar, 70 Feet Road, Near Sheeba ...	Perambur	['Burger', ' Fast Food', ' Finger Food', ' Bev...	['Zinger Burger']	500.0	4.0	1101	4.0	11200	['Home Delivery', 'Free Parking', 'Card Upon D...
4	https://www.zomato.com/chennai/tasty-kitchen-p...	Tasty Kitchen	135B, SRP Colony, Peravallur, Near Perambur, ...	Perambur	['Chinese', ' Biryani', ' North Indian', ' Che...	['Mutton Biryani', ' Chicken Rice', ' Tomato R...	450.0	4.2	617	4.1	22400	['Home Delivery', 'Indoor Seating']

2. Import Neighbourhood data.

	Ward Name	Zone Name
0	KATHIVAKKAM	THIRUVOTTRIYUR (Zone 1)
1	ENNORE	THIRUVOTTRIYUR (Zone 1)
2	ERNAVOOR	THIRUVOTTRIYUR (Zone 1)
3	AJAX	THIRUVOTTRIYUR (Zone 1)
4	TIRUVOTTRIYUR	THIRUVOTTRIYUR (Zone 1)

3. Clean the data to obtain a data frame comfortable to work with

	Name of Restaurant	Location	Cuisine	Price for 2	Zone
0	Yaa Mohaideen Briyani	Pallavaram	['Biryani']	500.0	NaN
1	Sukkubhai Biriyani	Alandur	['Biryani', ' North Indian', ' Mughlai', ' Des...	1000.0	Zone 12
2	SS Hyderabad Biryani	Kodambakkam	['Biryani', ' North Indian', ' Chinese', ' Ara...	500.0	Zone 9
3	KFC	Perambur	['Burger', ' Fast Food', ' Finger Food', ' Bev...	500.0	Zone 4
4	Tasty Kitchen	Perambur	['Chinese', ' Biryani', ' North Indian', ' Che...	450.0	Zone 4
...	...	...	...	...	...
12027	CK's Sandwiches	Porur	['Sandwich']	350.0	Zone 11
12028	CK's Sandwiches	Kolathur	['Sandwich']	350.0	Zone 6
12029	CK's Sandwiches	Anna Nagar East	['Sandwich']	350.0	Zone 8
12030	CK's Sandwiches	Ramapuram	['Sandwich']	350.0	Zone 11
12031	CK's Sandwiches	Sholinganallur	['Sandwich']	350.0	Zone 15

12032 rows × 5 columns

4. Plot Chloropleth Maps for understanding the data and answering the questions posed. These maps can be inferential for the question under consideration and exploratory with reference to the upcoming questions.

Average Price for 2 in Zomato Restaurants by Zone in Chennai

Italian Restaurants listed by Zomato in Chennai by Zone

Average Price for 2 in Zomato Restaurants by Zone in Chennai
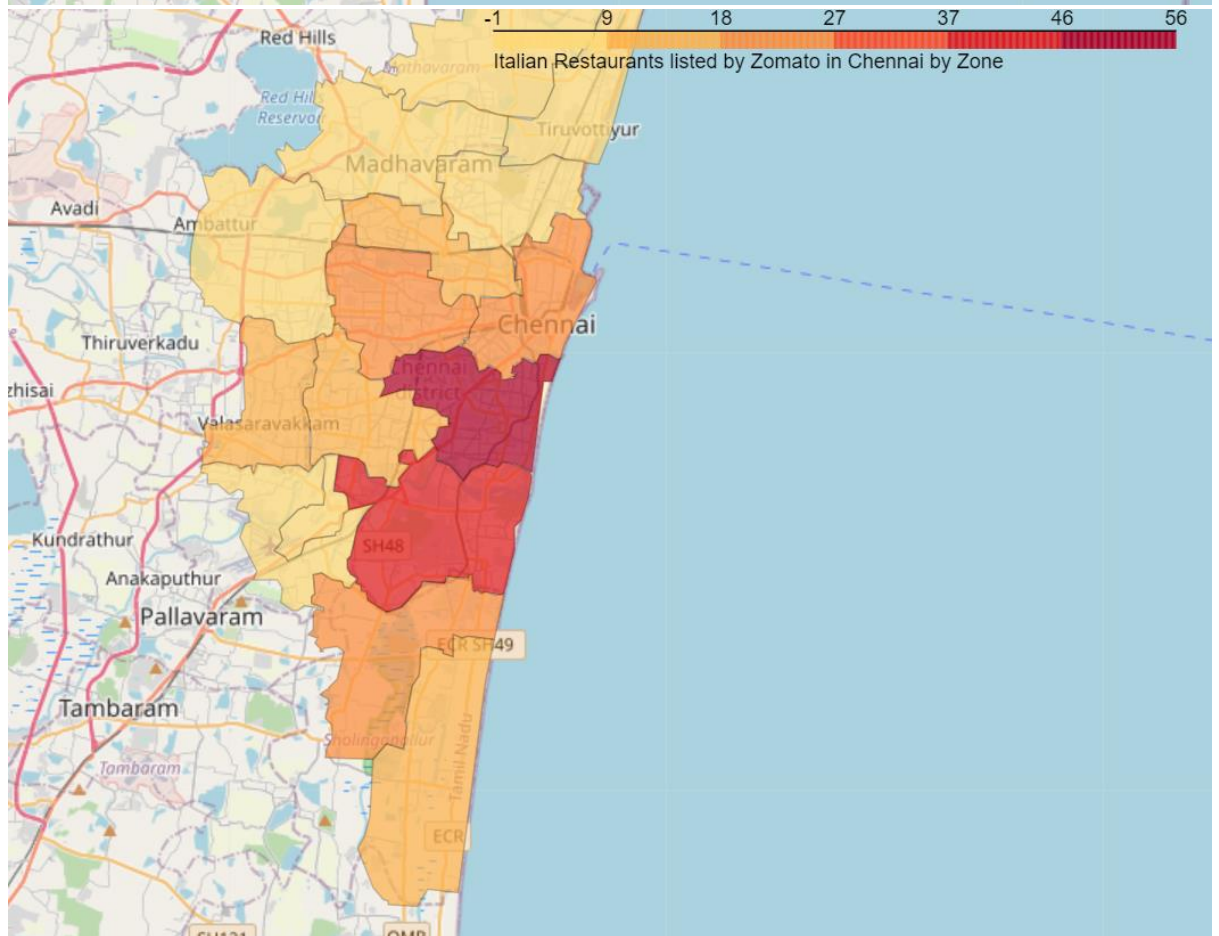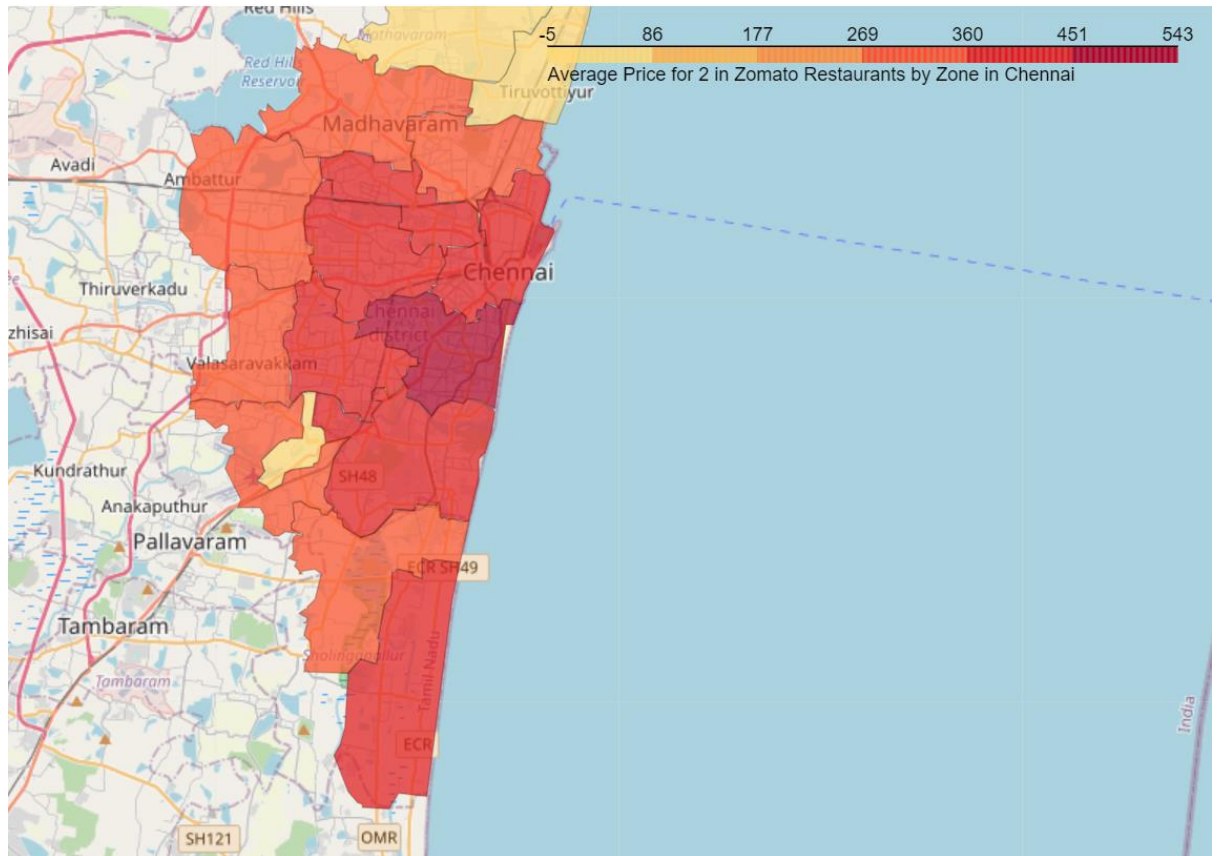
5. Create a dataframe suitable to perform KMeans Clustering to identify similar neighbourhoods.

	Zone	Biryani	North Indian	Mughlai	Desserts	Beverages	Chinese	Arabian	Burger	Fast Food	...	Grill	Bubble Tea	Raw Meats	Paan	Mishti	Charcoal Chicken	Odia	Bihari
0	St. Thomas Mount	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Zone 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Zone 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	Zone 3	13.0	12.0	1.0	3.0	7.0	19.0	1.0	4.0	17.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	Zone 4	51.0	76.0	8.0	17.0	46.0	110.0	10.0	11.0	77.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Zone 9	179.0	342.0	47.0	104.0	195.0	355.0	35.0	27.0	244.0	...	1.0	2.0	0.0	1.0	0.0	0.0	0.0	0.0
6	Zone 5	133.0	306.0	27.0	59.0	138.0	330.0	30.0	18.0	187.0	...	0.0	1.0	0.0	0.0	0.0	1.0	0.0	1.0
7	Zone 6	62.0	116.0	12.0	33.0	74.0	134.0	13.0	12.0	101.0	...	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
8	Zone 7	63.0	118.0	12.0	28.0	76.0	124.0	9.0	4.0	97.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	Zone 8	108.0	206.0	23.0	51.0	127.0	238.0	30.0	17.0	169.0	...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Zone 10	96.0	147.0	10.0	56.0	117.0	183.0	13.0	10.0	147.0	...	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
11	Zone 11	151.0	262.0	17.0	63.0	176.0	315.0	24.0	26.0	232.0	...	0.0	2.0	0.0	3.0	1.0	0.0	0.0	0.0
12	Zone 12	47.0	72.0	5.0	22.0	51.0	89.0	7.0	6.0	59.0	...	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
13	Zone 13	190.0	352.0	27.0	87.0	187.0	386.0	36.0	29.0	247.0	...	0.0	0.0	0.0	3.0	0.0	1.0	0.0	0.0
14	Zone 14	121.0	222.0	27.0	48.0	136.0	258.0	16.0	22.0	190.0	...	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0

6. Perform KMeans Clustering to cluster the Zones
7. Plot a map of the clusters
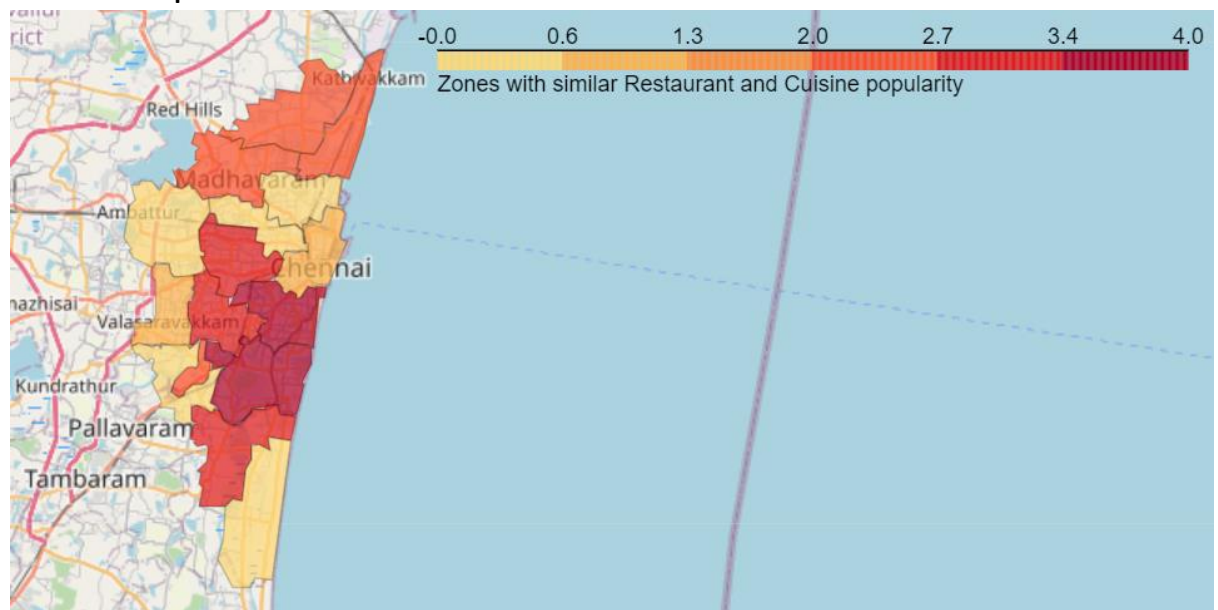
8. Use the maps to get intuitive and good inferences.

Results:

In the map we observe many patterns for different cuisines in the city. We can observe which zone in Chennai sees a high frequency of restaurants. We can see the price range of restaurants by zone. We can see the popularity of a particular cuisine of choice by zone in Chennai. We also observe 5 clusters of zones by cuisine popularity

Discussion:

Some interesting observations we can see from the maps are

Average price in restaurants decreases concentrically as we move away from the city centre. North Indian Cuisine is move popular near the beaches. Most foreign cuisine is popular only in the central zones. Given the popularity of some restaurants in zones as seen on the map we can extrapolate and show other zones where they may be popular.

Conclusion:

The Code can be used to figure out the feasibility of opening a restaurant of a particular cuisine in a particular Zone.