

The Restaurant Scene in Singapore

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IBM Datascience Capstone Project

Business Problem

- a) What are the different types of restaurants across different planning areas in Singapore?
- b) Where should an entrepreneur open an Indian restaurant based on the ethnic population?

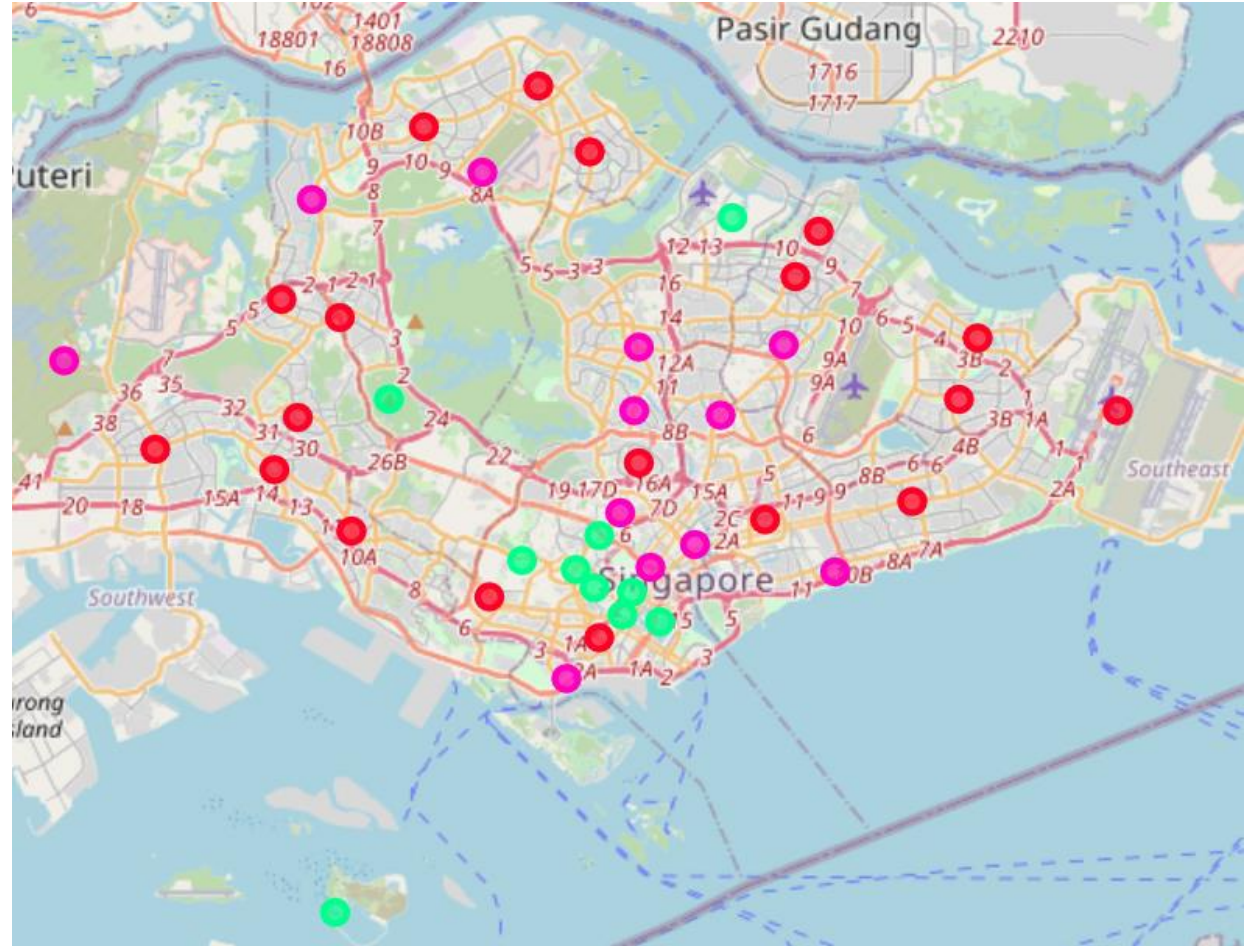
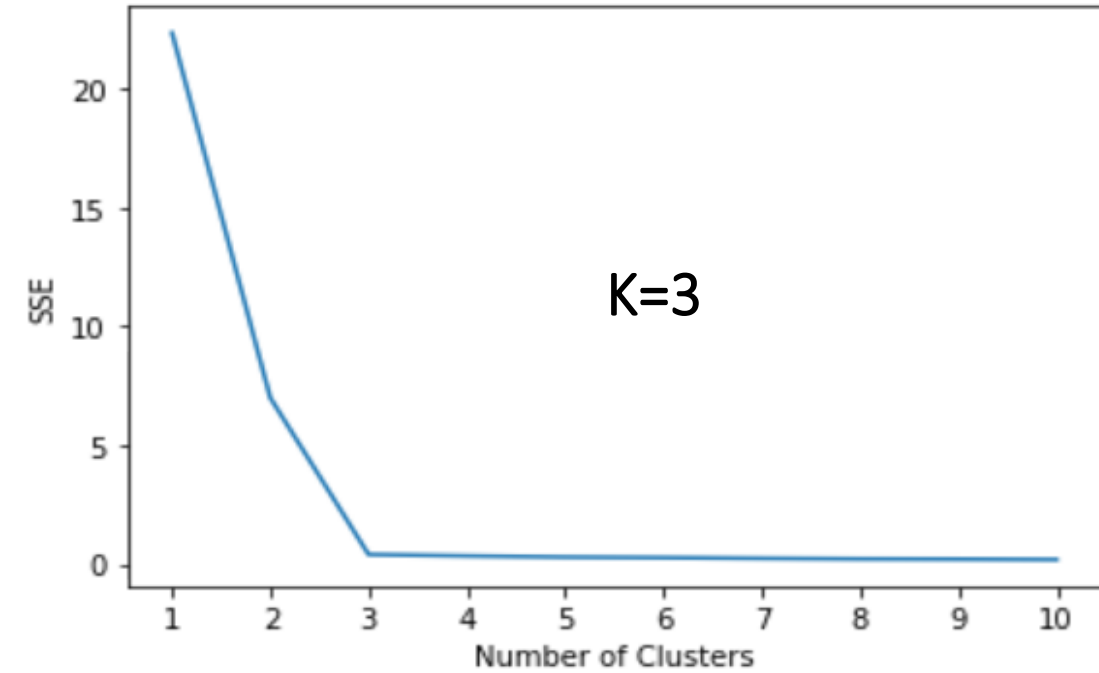
Data Sources

- Get list of planning areas from Wikipedia
- Get latest population dataset and population by ethnic groups from statistics department of Singapore
- Get geolocations using Nominatim geocoder.
- Get a list of restaurant types for each planning areas using FourSquare API.

Methodology

- Data cleaning and wrangling of all datasets.
- Acquiring the latitudes and longitudes of all planning areas using Nominatim.
- The types of restaurants for each planning area is obtained using FourSquare API.
- Using K-means to cluster the planning areas based on the type of restaurants and the 2nd largest ethnic group.
- Visualize and analyze the different clusters.

Optimal K and Mapping the clusters



Pink – Cluster 0; Red – Cluster 1; Green – Cluster 2

Cluster Details

	Planning Area	Pop	Max	2nd	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	Density
0	Ang Mo Kio	162670	Chinese	Indians	Chinese Restaurant	Food Court	Noodle House	Japanese Restaurant	Asian Restaurant	11669.0
2	Bishan	87560	Chinese	Indians	Chinese Restaurant	Food Court	Asian Restaurant	Seafood Restaurant	Noodle House	11491.0
4	Bukit Merah	151700	Chinese	Indians	Japanese Restaurant	Chinese Restaurant	Korean Restaurant	Food Court	Sushi Restaurant	10579.0
12	Hougang	228130	Chinese	Indians	Chinese Restaurant	Food Court	Fast Food Restaurant	Noodle House	Asian Restaurant	16377.0
15	Kallang	101680	Chinese	Indians	Chinese Restaurant	Thai Restaurant	Restaurant	Italian Restaurant	Indian Restaurant	11088.0
16	Mandai	2060	Chinese	Indians	Food Court	Fast Food Restaurant	Malay Restaurant	Noodle House	Dim Sum Restaurant	175.0
17	Marine Parade	46230	Chinese	Indians	Noodle House	Asian Restaurant	Chinese Restaurant	Italian Restaurant	Bar	7554.0
20	Novena	49440	Chinese	Indians	Indian Restaurant	Chinese Restaurant	Food Court	Seafood Restaurant	Noodle House	5506.0
27	Rochor	12730	Chinese	Indians	Indian Restaurant	Vegetarian / Vegan Restaurant	Chinese Restaurant	Restaurant	Japanese Restaurant	7858.0
31	Serangoon	117070	Chinese	Indians	Chinese Restaurant	Noodle House	Asian Restaurant	Italian Restaurant	Korean Restaurant	11591.0
34	Sungei Kadut	680	Chinese	Indians	Asian Restaurant	Food Court	Fast Food Restaurant	Japanese Restaurant	Bar	43.0
38	Western Water Catchment	640	Chinese	Indians	Fast Food Restaurant	Chinese Restaurant	Food Court	Restaurant	Halal Restaurant	9.0

Cluster = 0: containing Indians have Asian restaurants and surprisingly lesser number of Indian restaurants.

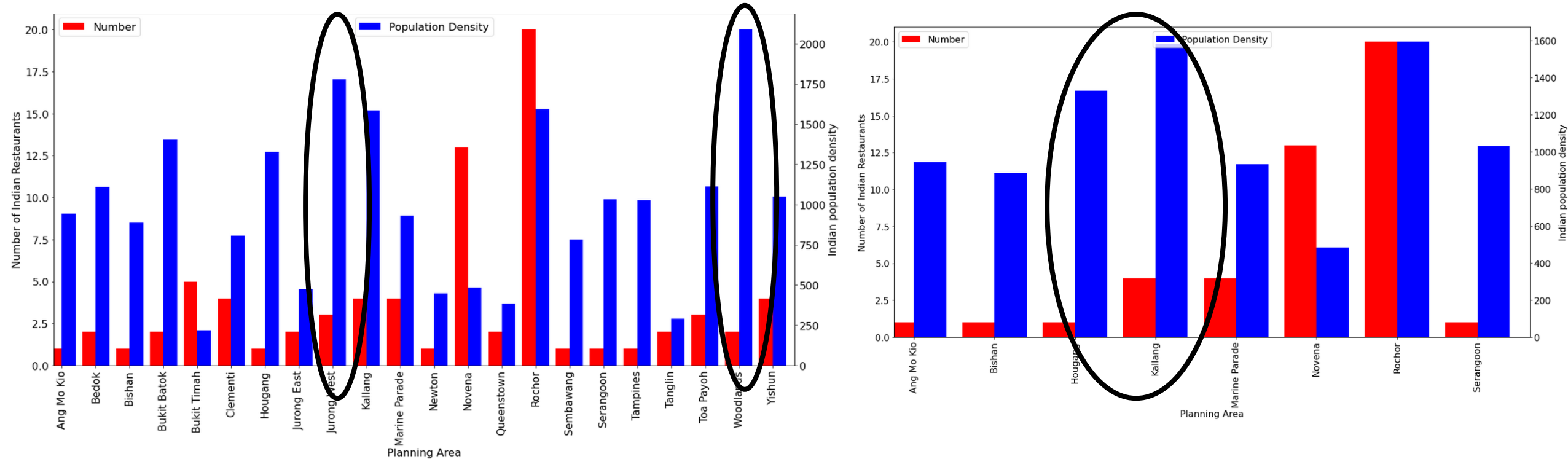
	Planning Area	Pop	Max	2nd	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	Density
1	Bedok	277720	Chinese	Malay	Chinese Restaurant	Food Court	Asian Restaurant	Seafood Restaurant	Japanese Restaurant	12804.0
3	Bukit Batok	158510	Chinese	Malay	Chinese Restaurant	Food Court	Japanese Restaurant	Fast Food Restaurant	Vegetarian / Vegan Restaurant	14242.0
5	Bukit Panjang	138790	Chinese	Malay	Fast Food Restaurant	Food Court	Asian Restaurant	Sushi Restaurant	Indonesian Restaurant	15438.0
7	Changi	1860	Chinese	Malay	Fast Food Restaurant	Yunnan Restaurant	Chinese Restaurant	Juice Bar	Latin American Restaurant	46.0
8	Choa Chu Kang	192480	Chinese	Malay	Fast Food Restaurant	Food Court	Chinese Restaurant	Italian Restaurant	Food & Drink Shop	31502.0
9	Clementi	92210	Chinese	Malay	Chinese Restaurant	Food Court	Japanese Restaurant	Indian Restaurant	Noodle House	9717.0
11	Geylang	110450	Chinese	Malay	Chinese Restaurant	Food Court	Asian Restaurant	Seafood Restaurant	BBQ Joint	11457.0
13	Jurong East	78840	Chinese	Malay	Chinese Restaurant	Food Court	Japanese Restaurant	Vegetarian / Vegan Restaurant	American Restaurant	4422.0
14	Jurong West	263050	Chinese	Malay	Fast Food Restaurant	Food Court	Asian Restaurant	Chinese Restaurant	Japanese Restaurant	17907.0
22	Outram	18330	Chinese	Malay	Chinese Restaurant	Asian Restaurant	Noodle House	Italian Restaurant	Japanese Restaurant	13380.0
23	Pasir Ris	147340	Chinese	Malay	Food Court	Fast Food Restaurant	Asian Restaurant	Seafood Restaurant	Italian Restaurant	9810.0
24	Punggol	174700	Chinese	Malay	Fast Food Restaurant	Food Court	Chinese Restaurant	Asian Restaurant	Japanese Restaurant	18704.0
25	Queenstown	96110	Chinese	Malay	Chinese Restaurant	Seafood Restaurant	Food Court	Asian Restaurant	French Restaurant	4704.0
29	Sembawang	102840	Chinese	Malay	Chinese Restaurant	Fast Food Restaurant	Asian Restaurant	Food Court	Seafood Restaurant	8334.0
30	Sengkang	249670	Chinese	Malay	Fast Food Restaurant	Food Court	Chinese Restaurant	Indonesian Restaurant	Sushi Restaurant	23576.0
35	Tampines	260380	Chinese	Malay	Fast Food Restaurant	Food Court	Thai Restaurant	Japanese Restaurant	Noodle House	12464.0
37	Toa Payoh	122220	Chinese	Malay	Chinese Restaurant	Food Court	Asian Restaurant	Seafood Restaurant	Noodle House	14960.0
39	Woodlands	255350	Chinese	Malay	Food Court	Fast Food Restaurant	Chinese Restaurant	Asian Restaurant	Indian Restaurant	18790.0
40	Yishun	221940	Chinese	Malay	Chinese Restaurant	Asian Restaurant	Food Court	Indian Restaurant	Thai Restaurant	10449.0

Cluster =1: Chinese restaurants and fast-food restaurants/food courts were part of areas that large population density and had Chinese and Malay as the largest ethnic groups.

	Planning Area	Pop	Max	2nd	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	Density
6	Bukit Timah	78180	Chinese	Others	Chinese Restaurant	Korean Restaurant	Indian Restaurant	Food Court	Italian Restaurant	4460.0
10	Downtown Core	2970	Chinese	Others	Japanese Restaurant	Italian Restaurant	Cocktail Bar	Modern European Restaurant	Dim Sum Restaurant	684.0
18	Museum	500	Chinese	Others	Japanese Restaurant	Restaurant	Asian Restaurant	Whisky Bar	Bar	602.0
19	Newton	8250	Chinese	Others	Chinese Restaurant	Japanese Restaurant	Italian Restaurant	Seafood Restaurant	Asian Restaurant	3986.0
21	Orchard	810	Chinese	Others	Japanese Restaurant	Sushi Restaurant	Chinese Restaurant	Asian Restaurant	Indonesian Restaurant	844.0
26	River Valley	10090	Chinese	Others	Japanese Restaurant	Hotpot Restaurant	Chinese Restaurant	Sushi Restaurant	Dumpling Restaurant	6818.0
28	Seletar	280	Chinese	Others	Asian Restaurant	Restaurant	Southern / Soul Food Restaurant	Food Court	Bar	27.0
32	Singapore River	3100	Chinese	Others	Japanese Restaurant	Noodle House	Italian Restaurant	Bar	Food Court	3229.0
33	Southern Islands	1940	Chinese	Others	Yunnan Restaurant	Italian Restaurant	Food & Drink Shop	Food Court	Food Truck	320.0
36	Tanglin	21900	Chinese	Others	French Restaurant	Chinese Restaurant	Italian Restaurant	Modern European Restaurant	Seafood Restaurant	2870.0

Cluster = 2: Areas which have neither Malay or Indians as the 2nd largest ethnic groups, there is a variety of Asian and non-Asian restaurants. These areas are also popular tourist destinations.

Indian Restaurants in Singapore



- From the bar plots it is seen that the best areas to open an Indian restaurant is at Kallang and Hougang which has the next best population density after Rochor which has the maximum number of Indian restaurants.
- However, there are areas where Indians are the 3rd largest ethnic group but still have higher Indian population density like Woodlands and Jurong west where an Indian restaurant could be successful.

Conclusion

- The planning areas were divided into 3 clusters based on the type of restaurants and 2nd maximum ethnic group.
- The clusters containing Indians surprisingly have Asian restaurants and lesser number of Indian restaurants. Based on the Indian population density, places like Kallang and Hougang will be a popular destination for an Indian restaurant.
- There are other areas where despite Indians being the 3rd largest ethnic group, the Indian population density is slightly higher than Rochor which has the maximum number of Indian restaurants like Woodlands and Jurong West where Indian restaurants could be successful.