

## **What Restaurant to Open in Which Part of Singapore?**

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Report is part of IBM Data Science Professional Certificate requirement.

**Executive Summary:**

There may be three train of thoughts that may surface from the results presented from this report (can be seen under **5.0 Discussion**):

1. One would like to open a restaurant of the most common type of cuisine from the cluster as the people from that cluster love that cuisine.
2. One would avoid opening a restaurant of the most common type of cuisine from the cluster so as to avoid competition.
3. Given people from same region behave similarly, one would be attracted to open the most common cuisine from other clusters of the same region.

## **1.0 Introduction**

### **1.1 Background**

Singapore is a country in Southeast Asia with a population of around 5.7 million residents (Wikipedia 2021). Singapore's location, skilled workforce, low tax rates, advanced infrastructure and zero-tolerance against corruption has attracted a large amount of foreign investment into the country (Bank 2015). Tourism is a major income for the Singaporean economy. Singaporean pride themselves as having one of the most diverse cuisine in the world.

## 1.2 Problem Statement

For administrative purposes, Singapore is divided into 5 districts: Central region, South West, North East, South West and South East. Finding which cuisine is popular in each district may give a potential restauranter an edge in his/her decision making to open a restaurant in that district.

## 1.3 Point of Interest

This report is interested in finding the most popular cuisine in each of the 5 districts in Singapore.

## 2.0 Data Acquisition and Cleaning

Data used in this report is acquired from list of postal districts (Urban Redevelopment Authority Singapore 2021) as well as its respective postcode and is categorized into the 5 distinct districts in Singapore (Mapanet/ Divex 2021). These data are compiled into a csv file and a link for the csv file can be seen under **2.1 Data Sources**.

### 2.1 Data Sources

Singapore postal obtained from the various sources mentioned in **2.0 Data Acquisition and Cleaning** are compiled into a csv file for ease of handling. The file is uploaded to my github for references and the link is:

- [https://github.com/edbertfernando/Coursera\\_Capstone/blob/main/Singapore\\_Postal.csv](https://github.com/edbertfernando/Coursera_Capstone/blob/main/Singapore_Postal.csv)

Another data used in this report is from Foursquare. Foursquare data will be used for segmentation and clustering.

### 2.2 Data Cleaning

The first few rows of the csv data file can be seen as follow:

```
sg = pd.read_csv("File:/content/Singapore_Postal.csv")
sg.head()
```

	Postcode	General Location	Regions
0	48616	Raffles Place	Central Singapore
1	69531	Cecil	Central Singapore
2	18985	Marina	Central Singapore
3	59108	People's Park	Central Singapore
4	79914	Anson	Central Singapore

Grouping Singapore's general locations into the distinct 5 regions.

```
# Grouping data to find Regions with highest number of area
sg.groupby('Regions').count()
```

	Postcode	General Location
Regions		
Central Singapore	22	22
North East	16	16
North West	15	15
South East	15	15
South West	13	13

From the table,

Central Singapore has the highest number of locations.

Using Geocode.xyz, I decided to find the latitude and longitude of each of the general location in Singapore. The file is uploaded to my github and the link to the file is as follows:

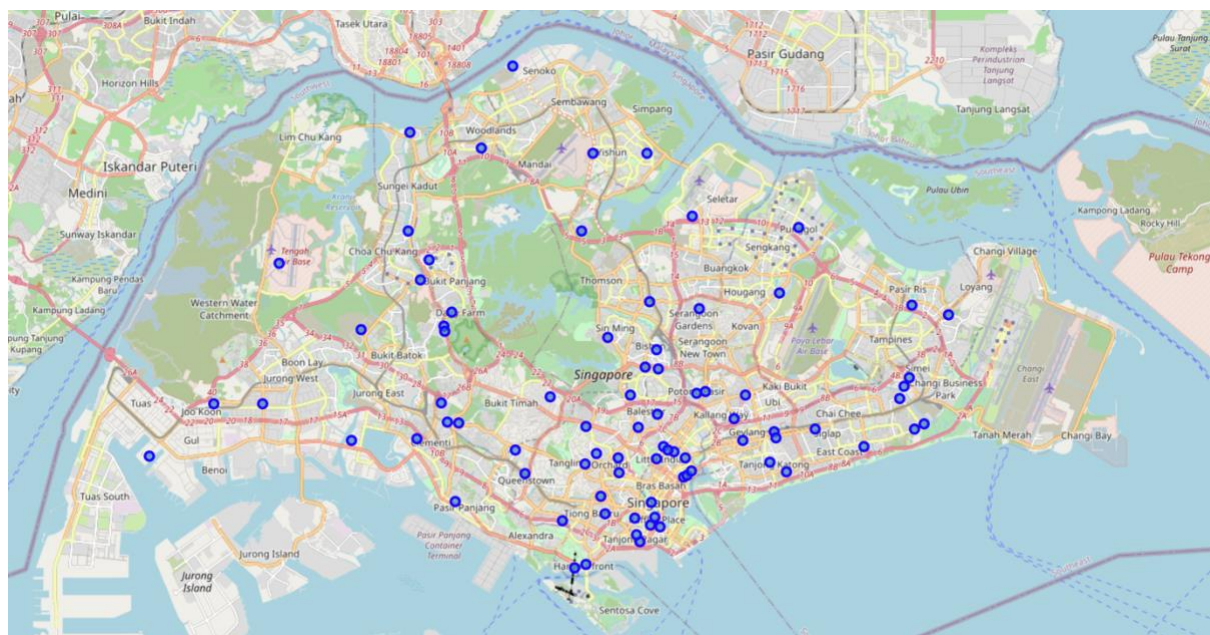
- [https://github.com/edbertfernando/Coursera\\_Capstone/blob/main/Singapore%20LongLang.csv](https://github.com/edbertfernando/Coursera_Capstone/blob/main/Singapore%20LongLang.csv)

Combining the two data frames gives the following:

```
# Combine the two dataframe
sg = sg.join(sg_latlong)
sg.head()
```

	Postcode	General Location	Regions	Latitude	Longitude
0	48616	Raffles Place	Central Singapore	1.28468	103.85070
1	69531	Cecil	Central Singapore	1.28135	103.84909
2	18985	Marina	Central Singapore	1.28077	103.85266
3	59108	People's Park	Central Singapore	1.28425	103.84278
4	79914	Anson	Central Singapore	1.27488	103.84495

From the data of latitude and longitude of the different locations in Singapore, a map can be created with pointed area on it.



### 3.0 Methodology

For this project, the methodology used will be similar to the one taught in Week 3 lab of IBM Data Science capstone.

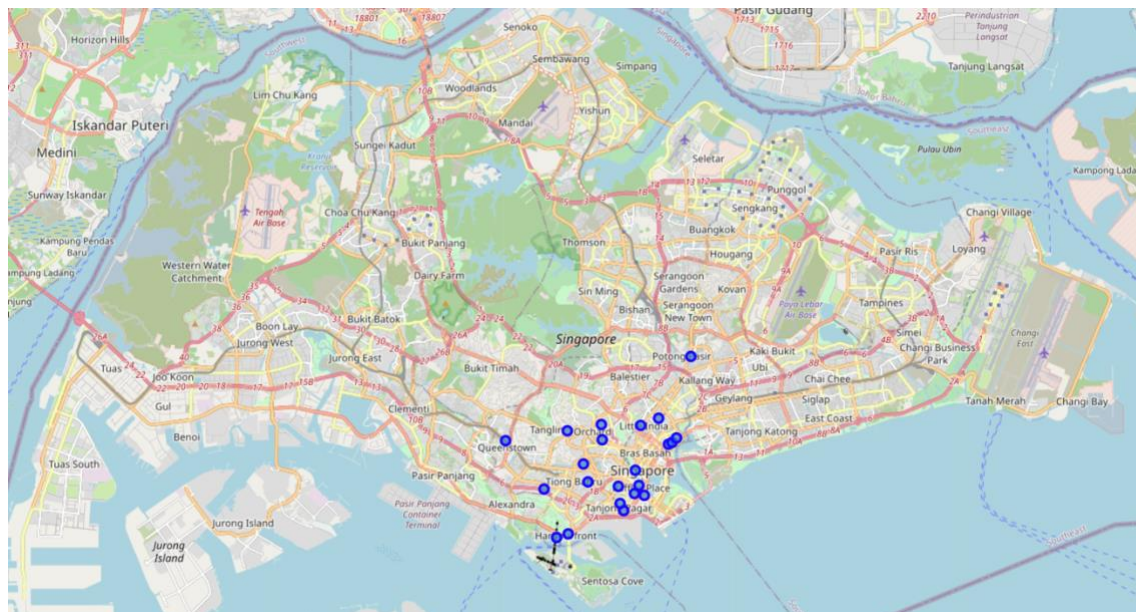
For each of the locations above, the corresponding longitude and latitude is obtained. Foursquare API is used to explore the neighborhoods in the 5 areas: Central region, South West, North East, South West and South East. The common venue categories in each neighborhood are explored using the explore function and neighborhoods are group into clusters.

K-means clustering algorithm is used and Folium library is used to visualize the neighborhoods of these 5 clusters.

#### 3.1 Central Singapore

Since the methodology for the 5 regions are very similar, only the methodology for Central Singapore will be displayed to avoid the report being too long.

The dataframe is sliced and dataframe of respective region. Geographical coordinates for each region is obtained from worldpostal.com. A map of each region is created using latitude



and longitude values obtained from worldpostal.com. Markers are added to the map for ease of visualization. The map below is a map of Central Singapore as well as the markers:

100 venues with its name, category and geographical locations within 500 meters range of Central Singapore is obtained from Foursquare. The first 5 rows can be seen as follow:

```

100 venues were returned by Foursquare for Central Singapore.
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:45: FutureWarning: pandas.io.json.json_normalize is deprecated, use pandas.json_normalize instead

```

	name	categories	lat	lng
0	Virgin Active	Gym / Fitness Center	1.284608	103.850815
1	1-Altitude	Cocktail Bar	1.284794	103.851151
2	The Salad Shop	Salad Place	1.285523	103.851177
3	CULINARYON	Comfort Food Restaurant	1.284876	103.850933
4	The Sandwich Shop	Sandwich Place	1.284266	103.852673

The dataframe is combined with the general location as well as the district to form the following:

## 4.0 Results

```

Raffles Place
Cecil
Marina
People's Park
Anson
Tanjong Pagar
Bukit Merah
Queenstown
Tiong Bahru
Telok Blangah
Habourfront
High Street
Beach Road
Middle Road
Golden Mile
Little India
Jalan Besar
Orchard
Cairnhill
River Valley
Tanglin
Bidadari
(1543, 7)

```

	Area	Area Latitude	Area Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Raffles Place	1.28468	103.8507	Virgin Active	1.284608	103.850815	Gym / Fitness Center
1	Raffles Place	1.28468	103.8507	1-Altitude	1.284794	103.851151	Cocktail Bar
2	Raffles Place	1.28468	103.8507	The Salad Shop	1.285523	103.851177	Salad Place
3	Raffles Place	1.28468	103.8507	CULINARYON	1.284876	103.850933	Comfort Food Restaurant
4	Raffles Place	1.28468	103.8507	The Sandwich Shop	1.284266	103.852673	Sandwich Place

Using one hot encoding, the top 8 most common venues each location from each of the 5 districts can be found below (only the first 5 locations from each districts will be displayed). For each location, it is divided into 3 clusters.

### Central Singapore

	Area	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
0	Anson	Coffee Shop	Japanese Restaurant	Hotel	Korean Restaurant	Ramen Restaurant	Italian Restaurant	Bakery	BBQ Joint
1	Beach Road	Thai Restaurant	Hotel	Café	Cocktail Bar	Bakery	Italian Restaurant	Restaurant	Indonesian Restaurant
2	Bidadari	Bus Station	Fast Food Restaurant	Convenience Store	Coffee Shop	Supermarket	Soccer Field	Food Court	Snack Place
3	Bukit Merah	Food Court	Fast Food Restaurant	Ice Cream Shop	Bakery	Café	Supermarket	Chinese Restaurant	Noodle House
4	Cairnhill	Hotel	Café	Japanese Restaurant	Chinese Restaurant	Asian Restaurant	American Restaurant	Italian Restaurant	Pool

1<sup>st</sup> Cluster:

2<sup>nd</sup> Cluster:

	Regions	Cluster Labels	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
10	Central Singapore	1	Chinese Restaurant	Japanese Restaurant	Fast Food Restaurant	Clothing Store	Toy / Game Store	Department Store	Spa	Frozen Yogurt Shop

3<sup>rd</sup> Cluster:

	Regions	Cluster Labels	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
2	Central Singapore	2	Coffee Shop	Café	Japanese Restaurant	Gym / Fitness Center	Chinese Restaurant	Sandwich Place	Hotel	Food Court
3	Central Singapore	0	Chinese Restaurant	Noodle House	Food Court	Hostel	Vegetarian / Vegan Restaurant	Spa	Japanese Restaurant	Italian Restaurant
4	Central Singapore	0	Coffee Shop	Japanese Restaurant	Hotel	Korean Restaurant	Ramen Restaurant	Italian Restaurant	Bakery	BBQ Joint
5	Central Singapore	0	Coffee Shop	Italian Restaurant	Japanese Restaurant	Bakery	Ramen Restaurant	Hotel	Korean Restaurant	Spanish Restaurant
6	Central Singapore	0	Food Court	Fast Food Restaurant	Ice Cream Shop	Bakery	Café	Supermarket	Chinese Restaurant	Noodle House
7	Central Singapore	0	Chinese Restaurant	Pet Store	Fast Food Restaurant	Asian Restaurant	Coffee Shop	Noodle House	Bakery	Ice Cream Shop
8	Central Singapore	0	Chinese Restaurant	Seafood Restaurant	Asian Restaurant	Bakery	Café	Hotel	Coffee Shop	Noodle House
9	Central Singapore	0	Japanese Restaurant	Chinese Restaurant	Fast Food Restaurant	Toy / Game Store	Clothing Store	Bakery	Multiplex	Cosmetics Shop
11	Central Singapore	0	Hotel	Yoga Studio	Nightclub	Japanese Restaurant	Italian Restaurant	Bar	Art Gallery	Shopping Mall
12	Central Singapore	0	Thai Restaurant	Hotel	Café	Cocktail Bar	Bakery	Italian Restaurant	Restaurant	Indonesian Restaurant
13	Central Singapore	0	Thai Restaurant	Hotel	Café	Vietnamese Restaurant	Italian Restaurant	Coffee Shop	Indonesian Restaurant	Bakery
14	Central Singapore	0	Thai Restaurant	Vietnamese Restaurant	Coffee Shop	Food Court	Park	Supermarket	Sandwich Place	French Restaurant
15	Central Singapore	0	Indian Restaurant	Vegetarian / Vegan Restaurant	Hotel	Café	Asian Restaurant	North Indian Restaurant	Hostel	Chinese Restaurant
16	Central Singapore	0	Indian Restaurant	Chinese Restaurant	BBQ Joint	Coffee Shop	Café	Hotel	Asian Restaurant	Food Court
17	Central Singapore	0	Shopping Mall	Clothing Store	Boutique	Hotel	Japanese Restaurant	Hotpot Restaurant	Bubble Tea Shop	Chinese Restaurant
18	Central Singapore	0	Hotel	Café	Japanese Restaurant	Chinese Restaurant	Asian Restaurant	American Restaurant	Italian Restaurant	Pool
19	Central Singapore	0	Chinese Restaurant	Supermarket	Coffee Shop	Japanese Restaurant	Bakery	Asian Restaurant	Café	Indian Restaurant
20	Central Singapore	0	Café	Japanese Restaurant	Bar	Spa	Hotel	Bus Station	Chinese Restaurant	Lounge
21	Central Singapore	0	Bus Station	Fast Food Restaurant	Convenience Store	Coffee Shop	Supermarket	Soccer Field	Food Court	Snack Place

North East Singapore

	Area	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
0	Ang Mo Kio	Coffee Shop	Food Court	Asian Restaurant	Snack Place	Japanese Restaurant	Bubble Tea Shop	Fast Food Restaurant	Seafood Restaurant
1	Balestier	Chinese Restaurant	Asian Restaurant	Noodle House	Hotel	Dessert Shop	Food Court	Indian Restaurant	Food
2	Bishan	Coffee Shop	Food Court	Ice Cream Shop	Café	Bubble Tea Shop	Supermarket	Japanese Restaurant	Chinese Restaurant
3	Braddell	Chinese Restaurant	Seafood Restaurant	Coffee Shop	Dessert Shop	Asian Restaurant	Trail	Food Court	Market
4	Hougang	Bus Station	Asian Restaurant	Noodle House	Vegetarian / Vegan Restaurant	Park	Food Court	Bakery	Coffee Shop

1<sup>st</sup> Cluster:

	Regions	Cluster Labels	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
4	North East	0	Indian Restaurant	Chinese Restaurant	Café	Asian Restaurant	Vegetarian / Vegan Restaurant	Hotel	Food Court	Restaurant
8	North East	0	Chinese Restaurant	Bakery	Food Court	Italian Restaurant	Convenience Store	Coffee Shop	Indian Restaurant	Noodle House
9	North East	0	Bus Station	Asian Restaurant	Noodle House	Vegetarian / Vegan Restaurant	Park	Food Court	Bakery	Coffee Shop

2<sup>nd</sup> Cluster:

	Regions	Cluster Labels	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
10	North East	1	Bus Station	Asian Restaurant	Garden	High School	Chinese Restaurant	Food Court	Fried Chicken Joint	French Restaurant

3<sup>rd</sup> Cluster:

	Regions	Cluster Labels	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
0	North East	2	Coffee Shop	Fast Food Restaurant	Hotel	Bed & Breakfast	Indian Restaurant	Supermarket	Bakery	Pool
1	North East	2	Café	Coffee Shop	Hotel	Japanese Restaurant	Ramen Restaurant	Hainan Restaurant	Asian Restaurant	Italian Restaurant
2	North East	2	Chinese Restaurant	Asian Restaurant	Noodle House	Hotel	Dessert Shop	Food Court	Indian Restaurant	Food
3	North East	2	Chinese Restaurant	Fast Food Restaurant	Seafood Restaurant	Thai Restaurant	Electronics Store	Metro Station	Gastropub	Steakhouse
5	North East	2	Chinese Restaurant	Café	Seafood Restaurant	Food Court	Coffee Shop	Bistro	Vegetarian / Vegan Restaurant	Asian Restaurant
6	North East	2	Chinese Restaurant	Seafood Restaurant	Coffee Shop	Dessert Shop	Asian Restaurant	Trail	Food Court	Market
7	North East	2	Bus Station	Convenience Store	Coffee Shop	Fast Food Restaurant	Food Court	Supermarket	Snack Place	Soccer Field
11	North East	2	Coffee Shop	Food Court	Ice Cream Shop	Café	Bubble Tea Shop	Supermarket	Japanese Restaurant	Chinese Restaurant
12	North East	2	Coffee Shop	Food Court	Asian Restaurant	Snack Place	Japanese Restaurant	Bubble Tea Shop	Fast Food Restaurant	Seafood Restaurant
13	North East	2	Chinese Restaurant	Café	Thai Restaurant	Ice Cream Shop	Bakery	Food Court	Coffee Shop	Sushi Restaurant
14	North East	2	Asian Restaurant	Thai Restaurant	Indian Restaurant	Massage Studio	Bus Stop	Chinese Restaurant	Pub	German Restaurant
15	North East	2	Other Repair Shop	Food & Drink Shop	Sushi Restaurant	Women's Store	Frozen Yogurt Shop	Diner	Discount Store	Dumpling Restaurant

North West Singapore

	Area	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
0	Ardmore	Hotel	Japanese Restaurant	Bar	Chinese Restaurant	Steakhouse	Spa	Wine Bar	Lounge
1	Bukit Panjang	Grocery Store	Halal Restaurant	Light Rail Station	Supermarket	Bus Station	Basketball Court	Dog Run	Convenience Store
2	Bukit Timah	Japanese Restaurant	Café	Track Stadium	Dance Studio	Flower Shop	Fast Food Restaurant	Sandwich Place	Italian Restaurant
3	Choa Chu Kang	Coffee Shop	Indonesian Restaurant	Café	Shopping Mall	Light Rail Station	Karaoke Bar	Convenience Store	Bubble Tea Shop
4	Dairy Farm	Trail	Thrift / Vintage Store	Wine Bar	Dog Run	Cocktail Bar	Coffee Shop	Convenience Store	Dance Studio

1<sup>st</sup> Cluster:

	Regions	Cluster Labels	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
0	North West	1	Hotel	Japanese Restaurant	Bar	Chinese Restaurant	Steakhouse	Spa	Wine Bar	Lounge
1	North West	1	Japanese Restaurant	Café	Track Stadium	Dance Studio	Flower Shop	Fast Food Restaurant	Sandwich Place	Italian Restaurant
2	North West	1	Bakery	Italian Restaurant	Seafood Restaurant	Bistro	Gourmet Shop	Pet Store	Butcher	Japanese Restaurant
3	North West	1	Dessert Shop	Bus Stop	Pool	Food Court	Stables	Office	Wine Bar	Cocktail Bar
5	North West	1	Bakery	Pet Store	Seafood Restaurant	Gelato Shop	Garden Center	Food Court	Indian Restaurant	Dessert Shop
6	North West	1	Trail	Thrift / Vintage Store	Wine Bar	Dog Run	Cocktail Bar	Coffee Shop	Convenience Store	Dance Studio
8	North West	1	Coffee Shop	Indonesian Restaurant	Café	Shopping Mall	Light Rail Station	Karaoke Bar	Convenience Store	Bubble Tea Shop
9	North West	1	Arcade	Coffee Shop	Convenience Store	Bus Station	Wine Bar	Fast Food Restaurant	Dance Studio	Deli / Bodega
10	North West	1	Food Court	Shopping Mall	Convenience Store	Fast Food Restaurant	Board Shop	Fried Chicken Joint	Coffee Shop	Deli / Bodega
11	North West	1	Convenience Store	Bus Stop	Restaurant	Building	Dog Run	Park	Wine Bar	Dessert Shop
12	North West	1	Food Court	American Restaurant	Bus Stop	Bus Station	Seafood Restaurant	Chinese Restaurant	Shopping Mall	Indian Restaurant
13	North West	1	Thai Restaurant	Indian Restaurant	Asian Restaurant	Fast Food Restaurant	Bar	Food Court	Fried Chicken Joint	Bakery
14	North West	1	Pier	Fish Market	Wine Bar	Dog Run	Cocktail Bar	Coffee Shop	Convenience Store	Dance Studio

2<sup>nd</sup> Cluster:

3<sup>rd</sup> Cluster:

	Regions	Cluster Labels	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
7	North West	2	Grocery Store	Halal Restaurant	Light Rail Station	Supermarket	Bus Station	Basketball Court	Dog Run	Convenience Store



South East Singapore

1<sup>st</sup> Cluster:

	Regions	Cluster Labels	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
4	South East	0	Hotpot Restaurant	Asian Restaurant	Food Court	Malay Restaurant	Chinese Restaurant	BBQ Joint	Restaurant	Snack Place
9	South East	0	Bus Station	Ice Cream Shop	Food Court	Dessert Shop	Supermarket	Malay Restaurant	Yoga Studio	Electronics Store
0	Angiredu	Gas Station	Food Court	Coffee Shop	Asian Restaurant	Restaurant	Convenience Store	Bakery	Dishu	
1	Amber Road	Japanese Restaurant	Hotel	Café	Coffee Shop	Chinese Restaurant	Shopping Mall	Indian Restaurant	Asian Restaurant	
2	Bedok	Asian Restaurant	Noodle House	Malay Restaurant	Chinese Restaurant	Dessert Shop	Shopping Mall	Playground	Café	
3	Changi	Chinese Restaurant	Indian Restaurant	Bus Stop	Noodle House	Seafood Restaurant	Juice Bar	Coffee Shop	Electronics Store	
4	Eastwood	Bus Station	Ice Cream Shop	Food Court	Dessert Shop	Supermarket	Malay Restaurant	Yoga Studio	Electronics Store	

2<sup>nd</sup> Cluster:

	Regions	Cluster Labels	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
0	South East	1	Chinese Restaurant	Noodle House	Seafood Restaurant	Vegetarian / Vegan Restaurant	Steakhouse	Indian Restaurant	Japanese Restaurant	Dim Sum Restaurant
11	South East	2	Chinese Restaurant	Indian Restaurant	Bus Stop	Noodle House	Seafood Restaurant	Juice Bar	Coffee Shop	Electronics Store
3	South East	1	Italian Restaurant	Noodle House	Pizza Place	Ice Cream Shop	Chinese Restaurant	Café	Bus Stop	Fried Chicken Joint
5	South East	1	Japanese Restaurant	Hotel	Café	Coffee Shop	Chinese Restaurant	Shopping Mall	Indian Restaurant	Asian Restaurant
6	South East	1	Asian Restaurant	Noodle House	Malay Restaurant	Chinese Restaurant	Dessert Shop	Shopping Mall	Playground	Café
7	South East	1	Yoga Studio	Indian Restaurant	Chinese Restaurant	Gas Station	Pub	Italian Restaurant	Electronics Store	Coffee Shop
8	South East	1	Bus Station	Ice Cream Shop	Food Court	Dessert Shop	Supermarket	Malay Restaurant	Yoga Studio	Electronics Store
10	South East	1	Grocery Store	Fast Food Restaurant	Asian Restaurant	Bakery	Bus Line	Supermarket	Spa	Convenience Store
12	South East	1	Coffee Shop	Snack Place	Sandwich Place	Chinese Restaurant	Food Court	Shopping Mall	Café	Noodle House
13	South East	1	Asian Restaurant	Seafood Restaurant	Japanese Restaurant	Food Court	Sandwich Place	Factory	Bus Station	Dessert Shop
14	South East	1	Restaurant	Food Court	Tennis Court	Seafood Restaurant	Yoga Studio	Dumpling Restaurant	Club House	Coffee Shop

3<sup>rd</sup> Cluster:

South West Singapore

	Area	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
0	Clementi New Town	Food Court	Bakery	Café	Pie Shop	Ice Cream Shop	Park	Pet Store	Chinese Restaurant
1	Clementi Park	Military Base	Gym / Fitness Center	Bus Stop	Playground	Plaza	Café	Bus Line	Food Court
2	Farrer Park	Indian Restaurant	Chinese Restaurant	Café	Hotel	Vegetarian / Vegan Restaurant	Asian Restaurant	North Indian Restaurant	Community Center
3	Hillview	Gym Pool	Sandwich Place	Beer Bar	Café	Chinese Restaurant	Coffee Shop	Dessert Shop	Gym / Fitness Center
4	Holland Road	Bakery	Ice Cream Shop	Italian Restaurant	Dessert Shop	Noodle House	Bar	Park	Pizza Place

1<sup>st</sup> Cluster:

	Regions	Cluster Labels	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
11	South West	0	Food & Drink Shop	Warehouse Store	Dog Run	Comfort Food Restaurant	Community Center	Convenience Store	Cosmetics Shop	Department Store

## 2<sup>nd</sup> Cluster:

Regions	Cluster Labels	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
0 South West	1	College Cafeteria	Italian Restaurant	Chinese Restaurant	Restaurant	Dog Run	Lounge	Breakfast Spot	Malay Restaurant
1 South West	1	Clothing Store	Pub	Ice Cream Shop	French Restaurant	Residential Building (Apartment / Condo)	Noodle House	Dim Sum Restaurant	Comfort Food Restaurant
2 South West	1	Food Court	Bakery	Café	Pie Shop	Ice Cream Shop	Park	Pet Store	Chinese Restaurant
3 South West	1	Indian Restaurant	Chinese Restaurant	Café	Hotel	Vegetarian / Vegan Restaurant	Asian Restaurant	North Indian Restaurant	Community Center
4 South West	1	Bakery	Ice Cream Shop	Italian Restaurant	Dessert Shop	Noodle House	Bar	Park	Pizza Place
5 South West	1	Military Base	Gym / Fitness Center	Bus Stop	Playground	Plaza	Café	Bus Line	Food Court
6 South West	1	Coffee Shop	Boat or Ferry	Dumpling Restaurant	Community Center	Convenience Store	Cosmetics Shop	Department Store	Dessert Shop
8 South West	1	Coffee Shop	Bus Line	Food Court	Grocery Store	Bagel Shop	Bakery	Convenience Store	Cosmetics Shop
9 South West	1	Boat or Ferry	Pier	Dumpling Restaurant	Comfort Food Restaurant	Community Center	Convenience Store	Cosmetics Shop	Department Store
10 South West	1	Gym Pool	Sandwich Place	Beer Bar	Café	Chinese Restaurant	Coffee Shop	Dessert Shop	Gym / Fitness Center
12 South West	1	Convenience Store	Warehouse Store	Gym / Fitness Center	Comfort Food Restaurant	Community Center	Cosmetics Shop	Department Store	Dessert Shop

## 3<sup>rd</sup> Cluster:

Regions	Cluster Labels	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
7 South West	2	Fast Food Restaurant	Museum	Bus Station	Warehouse Store	Snack Place	Fried Chicken Joint	Italian Restaurant	Chinese Breakfast Place

## 5.0 Discussion

Based on the clusters for each region above, the most popular cuisine, counted and weighted based on the most common venues in each cluster. The 1<sup>st</sup> most common venue is given a weight of 8 and the 8<sup>th</sup> most common venue is given a weight of 1. Only restaurants are considered as it is the problem this report wanted to address. The results can be summarized as follow:

	Region				
	Central	North East	North West	South East	South West
Cluster 1	Chinese	Chinese	Coffee Shop	Malay	Comfort Food
Cluster 2	Chinese	Asian	Coffee Shop	Chinese	Chinese
Cluster 3	Coffee Shop	Coffee Shop	Halal Food	Chinese	Fast Food

Assumption made here is that café is different from coffee shop. In Singapore, locals often refer to coffee shop as kopitiam (a local version of coffee shop with very different menus from cafés).

There may be some ambiguity in the data provided from Foursquare such as noodle restaurant, Asian restaurant, comfort food, halal food and fast food. These can be categorized further but given the data provided, the author is unable to classify them and hence treat them as a distinct cuisine.

## 6.0 Conclusion

In conclusion, the table presented under **5.0 Discussion** gives the most common venue for each cluster from each region in Singapore. This can give a potential restauranter of what type of cuisine is most common and depending on his/her judgement, whether to open the most common cuisine in the area or to avoid opening.

## 7.0 References

Bank, W 2015, *CPIB Corruption Statistics 2015*.

Mapanet/ Divex 2021, *Postal codes of Central Singapore, Singapore*, viewed 16 March 2021, <[http://www.mapanet.eu/EN/Postal\\_Codes/?c=SG&n=2&r0=00&r1=01&r2=&r3=&r4=&l=0](http://www.mapanet.eu/EN/Postal_Codes/?c=SG&n=2&r0=00&r1=01&r2=&r3=&r4=&l=0)>.

Urban Redevelopment Authority Singapore 2021, *List of Postal Districts*, viewed 15 March 2021, <[https://www.ur.gov.sg/realEstateIIWeb/resources/misc/list\\_of\\_postal\\_districts.htm](https://www.ur.gov.sg/realEstateIIWeb/resources/misc/list_of_postal_districts.htm)>.

Wikipedia 2021, 'Singapore', *Wikipedia*, viewed 15 March 2021, <<https://en.wikipedia.org/w/index.php?title=Singapore&oldid=1011112018>>.