

IBM/Coursera

Applied Data Science Capstone

Capstone Project

The Battle of Restaurants in Hong Kong

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1. Background

Hong Kong, which is an international city in the world, has a huge flow of people coming and leaving Hong Kong everyday. As a result, Hong Kong includes different countries of people and each place may have its own cultures. The diversity of culture forms different restaurants with different foods from different countries and cities. Not only Hong Kong local food, it also includes Chinese food, Korean food, Indian food while it also has western food. There are not only one or two restaurants for a specific type, for each kind of food, both have a certain amount of restaurants providing food for people. Different kinds of restaurants can provide different foods which suit everyone's culture and let them eat their country's food in Hong Kong. Also, it can let other people in Hong Kong try different types of food around the world.

Even though Hong Kong is an international city, it is only a small place, however, it contains a huge amount of restaurants with different foods. As a result, through this project, I would like to investigate the most popular restaurant in Hong Kong, and choose the best place for opening a restaurant in Hong Kong, with the following kind of food.

2. Business Problem

Assuming we are investors, and we want to open a new restaurant in Hong Kong, however, the main point is that we should decide the location where we should open the restaurant and which type of food we should open.

To solve the above problem, the first thing is that we need to know the restaurant situation in Hong Kong. We need to know how many restaurants in Hong Kong and which district has the largest number of restaurants.

Secondly, we would like to know how many types of food in Hong Kong with the most popular food type.

Thirdly, we need to know what is the most popular restaurant in Hong Kong and whether we should open the same type of food.

Through the above process, doing the steps step by step can help us know more about the restaurant situation in Hong Kong and decide where we should open the restaurant with the specific food.

3. Problem Statement

1. How many restaurants in Hong Kong?
2. Which district has the largest number of restaurants?
3. How many types of food in Hong Kong?
4. What is the most popular food type?
5. What is the most popular restaurant in Hong Kong?
6. Where should we open the restaurant?
7. Which food should we provide?

4. Data

To investigate the restaurants in Hong Kong, some dataset must be required. The following will be the data that will be used in the project.

4.1. Hong Kong districts name with the following locations

As Hong Kong has 18 districts, we need to obtain the districts name and the following location which are the latitude and longitude of these districts.

For Hong Kong districts data, it will be collected through <https://www.geodatos.net/en/coordinates/hong-kong> which contains the districts name of Hong Kong with the corresponding coordinates

	District	Coordinates
0	Hong Kong	22.27832, 114.17469
1	Kowloon	22.31667, 114.18333
2	Tsuen Wan	22.37137, 114.11329
3	Yuen Long Kau Hui	22.45, 114.03333
4	Tung Chung	22.28783, 113.94243
5	Sha Tin	22.38333, 114.18333
6	Tuen Mun	22.39175, 113.97157
7	Tai Po	22.45007, 114.16877
8	Sai Kung	22.38333, 114.26667
9	Yung Shue Wan	22.22623, 114.11241
10	Ngong Ping	22.25556, 113.90391
11	Sok Kwu Wan	22.20453, 114.13159
12	Tai O	22.25515, 113.86309
13	Central	22.28299, 114.15846
14	Wan Chai	22.28142, 114.17258
15	Sham Shui Po	22.33023, 114.15945
16	Wong Tai Sin	22.35, 114.18333

As the coordinates include latitude and longitude, we split the coordinates into two columns.

	District	Coordinates	Latitude	Longitude
0	Hong Kong	22.27832, 114.17469	22.27832	114.17469
1	Kowloon	22.31667, 114.18333	22.31667	114.18333
2	Tsuen Wan	22.37137, 114.11329	22.37137	114.11329
3	Yuen Long Kau Hui	22.45, 114.03333	22.45000	114.03333
4	Tung Chung	22.28783, 113.94243	22.28783	113.94243
5	Sha Tin	22.38333, 114.18333	22.38333	114.18333
6	Tuen Mun	22.39175, 113.97157	22.39175	113.97157
7	Tai Po	22.45007, 114.16877	22.45007	114.16877
8	Sai Kung	22.38333, 114.26667	22.38333	114.26667
9	Yung Shue Wan	22.22623, 114.11241	22.22623	114.11241
10	Ngong Ping	22.25556, 113.90391	22.25556	113.90391
11	Sok Kwu Wan	22.20453, 114.13159	22.20453	114.13159
12	Tai O	22.25515, 113.86309	22.25515	113.86309
13	Central	22.28299, 114.15846	22.28299	114.15846
14	Wan Chai	22.28142, 114.17258	22.28142	114.17258
15	Sham Shui Po	22.33023, 114.15945	22.33023	114.15945
16	Wong Tai Sin	22.35, 114.18333	22.35000	114.18333

4.2. Restaurants in Hong Kong with location, name, categories

We need to obtain the restaurant's location, name, id, categories, etc for analysing the result.

For information of restaurants in Hong Kong, these data will be collected through FourSquare api.

Index	District	ID	Name	Category
0	Hong Kong	560e8177498eec19033d3851	The Optimist	Spanish Restaurant
1	Hong Kong	53b508c1498ee296db480fea	Kam's Roast Goose (甘牌燒鵝)	Cantonese Restaurant
2	Hong Kong	5282091711d293929eb9139f	Zahrabel	Lebanese Restaurant
3	Hong Kong	4b794ce0f964a520e9f22ee3	Wooloomooloo Steakhouse	Steakhouse
4	Hong Kong	4b13d798f964a520a49923e3	Sang Kee Seafood Restaurant (生記海鮮飯店)	Seafood Restaurant
...
315	Sham Shui Po	5cd3fdc4588e36002cd9a270	Years (素年)	Japanese Restaurant
316	Sham Shui Po	58ddc08437318110dcab5c78	Golden Café (黃金冰室)	Cha Chaan Teng
317	Sham Shui Po	4ca6f13576d3a093be99066b	Ming Fat (明發)	Dumpling Restaurant
318	Sham Shui Po	5986c721c4df1d5dfae7510d	Sun Hang Yuen (新香園)	Cha Chaan Teng
319	Sham Shui Po	568a7f45498e112e6625d571	Go Go Restaurant (高高酒家)	Cantonese Restaurant

There are a total 320 rows which there are 320 restaurants in Hong Kong.

Then we try to get more information, i.e. Likes, rating and tips.

District	ID	Name	Category	Likes	Rating	Tips
0 Hong Kong	560e8177498eec19033d3851	The Optimist	Spanish Restaurant	119	8.3	33
1 Hong Kong	53b508c1498ee296db480fea	Kam's Roast Goose (甘牌燒鵝)	Cantonese Restaurant	229	8.2	77
2 Hong Kong	5282091711d293929eb9139f	Zahrabel	Lebanese Restaurant	17	8.1	8
3 Hong Kong	4b794ce0f964a520e9f22ee3	Wooloomooloo Steakhouse	Steakhouse	231	8.1	97
4 Hong Kong	4b13d798f964a520a49923e3	Sang Kee Seafood Restaurant (生記海鮮飯店)	Seafood Restaurant	76	8.7	28

5. Result

5.1. How many restaurants in Hong Kong?

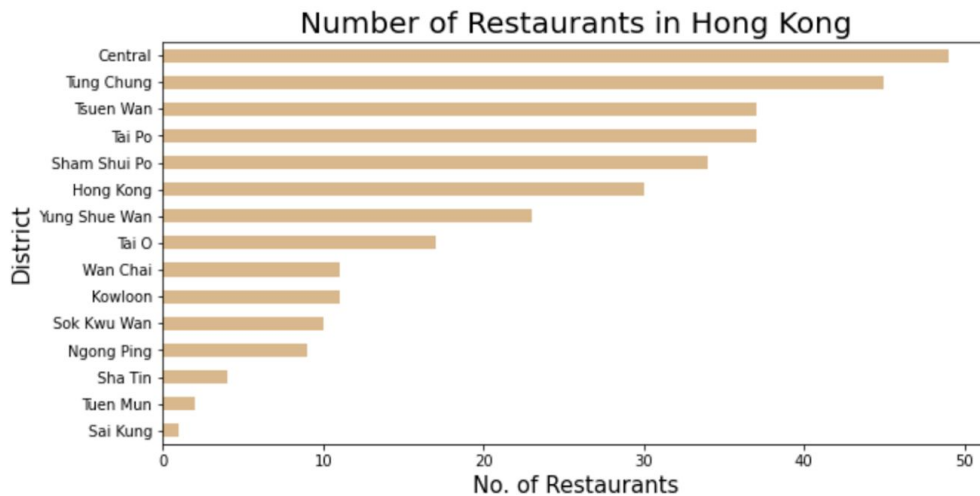
Index	District		ID		Name	Category
0	0	Hong Kong	560e8177498eec19033d3851		The Optimist	Spanish Restaurant
1	1	Hong Kong	53b508c1498ee296db480fea	Kam's Roast Goose (甘牌燒鵝)		Cantonese Restaurant
2	2	Hong Kong	5282091711d293929eb9139f		Zahrabel	Lebanese Restaurant
3	3	Hong Kong	4b794ce0f964a520e9f22ee3	Woolloomooloo Steakhouse		Steakhouse
4	4	Hong Kong	4b13d798f964a520a49923e3	Sang Kee Seafood Restaurant (生記海鮮飯店)		Seafood Restaurant
...
315	315	Sham Shui Po	5cd3fdc4588e36002cd9a270		Years (素年)	Japanese Restaurant
316	316	Sham Shui Po	58ddc08437318110dcab5c78	Golden Café (黃金冰室)		Cha Chaan Teng
317	317	Sham Shui Po	4ca6f13576d3a093be99066b	Ming Fat (明發)		Dumpling Restaurant
318	318	Sham Shui Po	5986c721c4df1d5dfae7510d	Sun Hang Yuen (新香園)		Cha Chaan Teng
319	319	Sham Shui Po	568a7f45498e112e6625d571	Go Go Restaurant (高高酒家)		Cantonese Restaurant

320 rows × 5 columns

From the Foursquare website, there are a total 320 restaurants in Hong Kong.

5.2. Which district has the largest number of restaurants?

```
restaurants.groupby('District')['ID'].count().sort_values().plot.barh(figsize=(10,5), color='blue')
plt.title('Number of Restaurants in Hong Kong', fontsize = 20)
plt.xlabel('No. of Restaurants', fontsize=15)
plt.ylabel('District', fontsize = 15)
plt.xticks(rotation = 'horizontal')
plt.show()
```



```
restaurants.groupby('District')['ID'].count()
```

```
District
Central          49
Hong Kong        30
Kowloon          11
Ngong Ping        9
Sai Kung          1
Sha Tin           4
Sham Shui Po     34
Sok Kwu Wan      10
Tai O            17
Tai Po           37
Tsuen Wan        37
Tuen Mun         2
Tung Chung       45
Wan Chai         11
Yung Shue Wan    23
Name: ID, dtype: int64
```

Central has the largest number of restaurants which 49 restaurants.

5.3. How many types of food in Hong Kong?

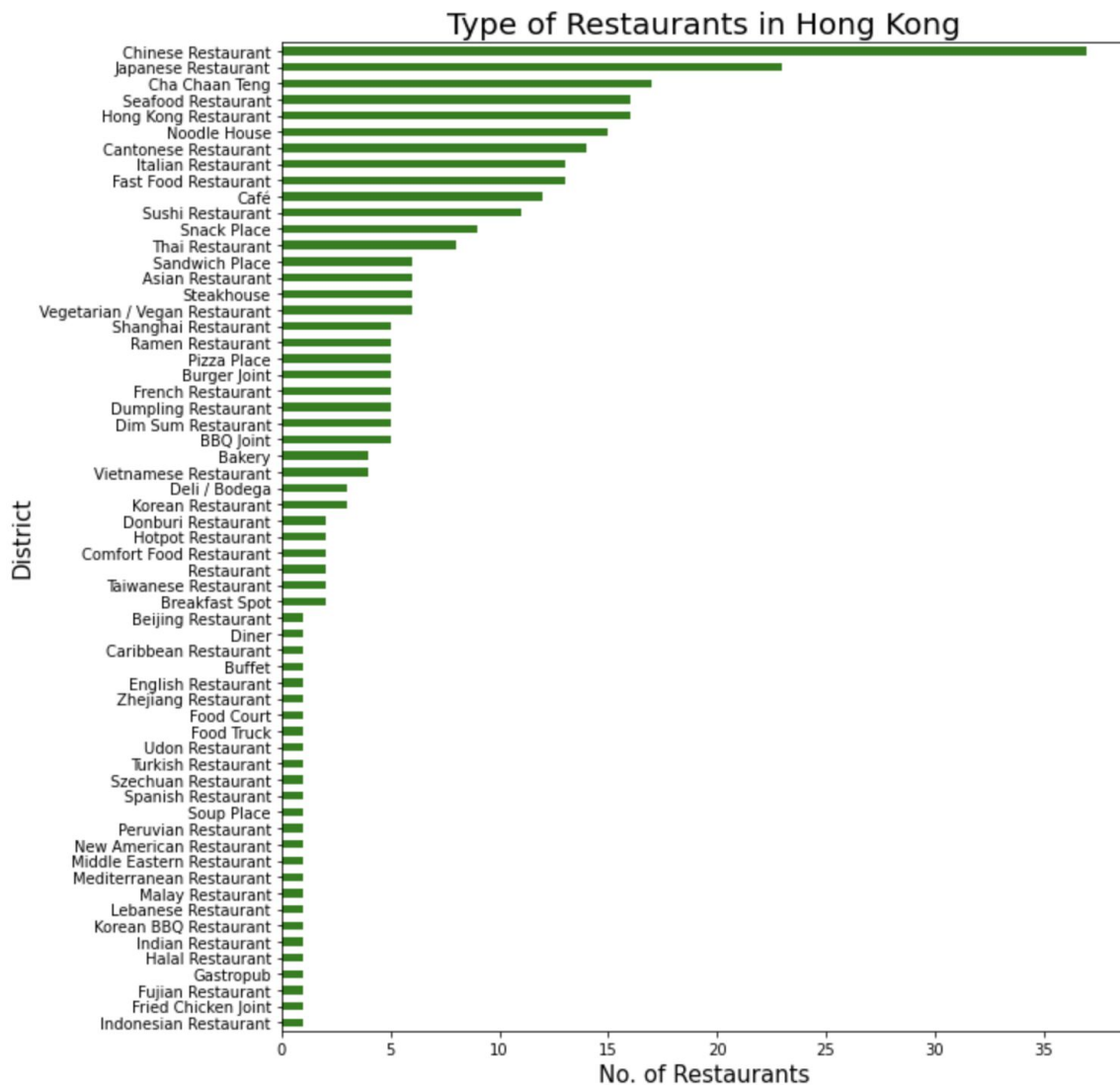
```
restaurants.groupby('Category')['ID'].count().sort_values(ascending=False)
```

```
Category
Chinese Restaurant      37
Japanese Restaurant     23
Cha Chaan Teng          17
Seafood Restaurant      16
Hong Kong Restaurant    16
..
Halal Restaurant        1
Gastropub               1
Fujian Restaurant       1
Fried Chicken Joint     1
Indonesian Restaurant    1
Name: ID, Length: 61, dtype: int64
```

From the Foursquare website, there are a total 61 types of restaurants in Hong Kong.

5.4. What is the most popular food type?

```
restaurants.groupby('Category')['ID'].count().sort_values().plot.barh(figsize=(10,12), color='g')
plt.title('Type of Restaurants in Hong Kong', fontsize = 20)
plt.xlabel('No. of Restaurants', fontsize=15)
plt.ylabel('District', fontsize = 15)
plt.xticks(rotation = 'horizontal')
plt.show()
```



```
restaurants.groupby('Category')['ID'].count().sort_values(ascending=False)
```

```
Category
Chinese Restaurant    37
Japanese Restaurant   23
Cha Chaa Teng         17
Seafood Restaurant    16
Hong Kong Restaurant  16
..
Halal Restaurant      1
Gastropub             1
Fujian Restaurant    1
Fried Chicken Joint   1
Indonesian Restaurant 1
Name: ID, Length: 61, dtype: int64
```

The most popular food type is Chinese Restaurant, with 49 restaurants in Hong Kong.

5.5. What is the most popular restaurant in Hong Kong?

5.5.1. By Likes

```
restaurantDetails.sort_values(by='Likes', ascending=False, axis=0)
```

	District	ID	Name	Category	Likes	Rating	Tips
237	Ngong Ping	5305caeb498e391fd4b9caf0	Mott 32 (卅二公館)	Dim Sum Restaurant	433	9.0	135
253	Sok Kwu Wan	4ed70871be7b3567163a9b79	Yat Lok Restaurant (一樂燒鵝)	Cantonese Restaurant	368	8.0	160
233	Yung Shue Wan	4b0e380af964a520115623e3	Zuma	Japanese Restaurant	335	8.7	141
3	Hong Kong	4b794ce0f964a520e9f22ee3	Woolloomooloo Steakhouse	Steakhouse	231	8.1	97
1	Hong Kong	53b508c1498ee296db480fea	Kam's Roast Goose (甘牌燒鵝)	Cantonese Restaurant	229	8.2	77
...
138	Tung Chung	4ce7f263678aa0936f76e5ea	Yuen Kee (苑記粉麵茶餐廳)	Hong Kong Restaurant	0	5.8	1
74	Hong Kong	4d97344d9079b1f7fb6b0c0a	都好燒臘粉麵茶餐廳	Cha Chaa Teng	0	5.7	1
107	Tsuen Wan	54955896498ee220d8ff34b6	Italian Tomato	Bakery	0	5.5	5
145	Tung Chung	5bfa59872be425002c4c5bab	三不館車仔麵	Noodle House	0	5.8	1
124	Tsuen Wan	518e2077498eb3a9a3ae0942	Local Farmer	Café	0	5.1	8

By Likes, Mott 32 (卅二公館) has the most likes which has 433 likes.

The second one is Yat Lok Restaurant (一樂燒鵝) which has 368 likes.

For Zuma, it is the third one, which has 335 likes.

5.5.2. By Ratings

```
restaurantDetails.sort_values(by='Rating', ascending=False, axis=0)
```

	District	ID	Name	Category	Likes	Rating	Tips
226	Yung Shue Wan	4c7fa26501df37045bb4e6ac	Mandarin Grill + Bar (文華扒房+酒吧)	Steakhouse	55	9.2	15
237	Ngong Ping	5305caeb498e391fd4b9caf0	Mott 32 (卅二公館)	Dim Sum Restaurant	433	9.0	135
227	Yung Shue Wan	4b0588d8f964a520dbdc22e3	Man Wah (文華廳)	Cantonese Restaurant	38	8.8	16
275	Central	4b0588d8f964a520d5dc22e3	One Harbour Road (港灣壹號)	Chinese Restaurant	40	8.7	17
4	Hong Kong	4b13d798f964a520a49923e3	Sang Kee Seafood Restaurant (生記海鮮飯店)	Seafood Restaurant	76	8.7	28
...
124	Tsuen Wan	518e2077498eb3a9a3ae0942	Local Farmer	Café	0	5.1	8
125	Tung Chung	5d4e92d394da0b0007bb6330	Holibay Brunch	Café	0	5.1	8
126	Tung Chung	5b6e86dd7564f7003987c952	Bricklane Deli	Breakfast Spot	2	5.1	8
127	Tung Chung	4e08719cb61c60b0454b1b96	雲味園小鍋米線	Noodle House	1	5.1	8
120	Tsuen Wan	4b8138eaf964a5200e9b30e3	Pizza Hut (必勝客)	Pizza Place	8	4.9	10

By Rating, Mandarin Grill + Bar (文華扒房+酒吧) has the highest rating which has a 9.2 rating.

The second one is Mott 32 (卅二公館) which the rating is 9.0.

For Man Wah (文華廳), it is the third one, which is 8.8 rating.

5.5.3. By Tips

```
restaurantDetails.sort_values(by='Tips', ascending=False, axis=0)
```

	District	ID	Name	Category	Likes	Rating	Tips
253	Sok Kwu Wan	4ed70871be7b3567163a9b79	Yat Lok Restaurant (一樂燒鵝)	Cantonese Restaurant	368	8.0	160
233	Yung Shue Wan	4b0e380af964a520115623e3	Zuma	Japanese Restaurant	335	8.7	141
237	Ngong Ping	5305caeb498e391fd4b9caf0	Mott 32 (卅二公館)	Dim Sum Restaurant	433	9.0	135
3	Hong Kong	4b794ce0f964a520e9f22ee3	Woolloomooloo Steakhouse	Steakhouse	231	8.1	97
235	Yung Shue Wan	4b1947f3f964a5206dda23e3	L'Atelier de Joël Robuchon	French Restaurant	105	7.9	95
...
35	Kowloon	4d3d5e943ec9a35ddd8b5081	Pizza Hut (必勝客)	Pizza Place	0	5.9	0
34	Kowloon	4f1278dee4b0044a24589bfa	Yoshinoya (吉野家)	Donburi Restaurant	3	5.9	0
30	Kowloon	4bee93863686c9b6e7a3246e	McDonald's (麥當勞)	Fast Food Restaurant	1	5.9	0
31	Kowloon	4c43080bce54e21e59750d1a	Banyan Seafood Restaurant (新榕記海鮮酒家)	Chinese Restaurant	0	5.9	0
36	Kowloon	5bbdf4e315173e002c5bb320	Itamama (意樂餐廳)	Italian Restaurant	2	5.9	0

By Tips, Yat Lok Restaurant (一樂燒鵝) has the largest number of tips which has 160 tips.

The second one is Zuma which has 141 tips.

For Mott 32 (卅二公館), it is the third one, which has 135 tips.

To conclude, even though different rankings have different results, Mott 32 (卅二公館) which is a Dim Sum Restaurant, shows the best result among all 3 rankings that has 433 likes, 135 tips with 9.0 rating. Apart from Mott 32 (卅二公館), Zuma, which is a Japanese Restaurant, and Yat Lok Restaurant (一樂燒鵝), which is a Cantonese Restaurant, both have a great result in the ranking that Zuma has 335 likes, 141 tips with 8.7 rating while Yat Lok Restaurant (一樂燒鵝) has 368 likes, 160 tips with 8.0 rating.

5.6. Where should we open the restaurant?

According to the number of restaurants among all the districts in Hong Kong. Central has the largest number of restaurants. It will be a great choice of opening a restaurant there.

Also, there are many companies in Central. Everyday many people go to Central and work, then have lunch and dinner nearby. The huge flow of people can ensure that there are enough potential customers for a new restaurant. As a result, Central will be a good place.

5.7. Which food should we provide?

As mentioned before, the most popular food type is Chinese food. There are 49 Chinese restaurants in Hong Kong. Also, for popular restaurants which are Dim Sum Restaurant, Japanese Restaurant and Cantonese Restaurant. For Dim Sum Restaurant and Cantonese Restaurant, both actually are a kind of Chinese food. Therefore, Chinese food would be a good choice to open a restaurant.

6. Limitation

6.1. Not enough data

From the data collected from Foursquare, there are only 320 restaurants in Hong Kong. However, Hong Kong has many more restaurants that even for a district, it can have more than several hundreds of restaurants. Moreover, too little data volume may also cause a problem that it cannot reflect the actual favourite of people. As Hong Kong people seldom use Foursquare and there is only a little data, the data volume may not be large enough to reflect the result. To improve the result, we can try to get the data from OpenRice, which is a famous website in Hong Kong which includes most of the restaurants in Hong Kong with different ratings and comments. It may have a more detailed result for analysis.

6.2. Other factors may also affect the decision

In our problem, we only need to consider the location and food type for opening a restaurant. However, there are many factors that can affect the decision. For example, we may need to consider the price of the food, the quality, average income of customer, competitors, rent, etc. These all factors may affect the revenue of a restaurant and the answer can be totally different from the original one.

7. Conclusion

To conclude, according to the result found and analysis made, Central will be a good place for opening a new restaurant with Chinese food.

