

Bangkok : the district of food

Introduction

Bangkok is one of the most exciting cities in the world especially if you are a food lover. Bangkok is very famous on food. People always have a hard time when they have to determine what to eat.

In this project, we will provide a dining and restaurant guide for people who plans to travel to Bangkok or even the local people by recommending the top 10 type of restaurant in each district. In addition, this project may useful for a stakeholder who wants to open a restaurant in Bangkok.



Thai style food

Data Sets and APIs

- Bangkok District location data

We will use the table provide in

https://en.wikipedia.org/wiki/List_of_districts_of_Bangkok by scraping the website with package Beautiful soup.

- Foursquare API

This project would use Four-square API as its data gathering source to obtained the venue and restaurant information. Foursquare is a location-based online social network, and Foursquare Places API offers real-time access to its global database for developers to explore the attributes of commercial venues.

Methodology

Data collection

1. Bangkok District location data

We use python package Beautiful soup to collect the table data of Bangkok district location from <https://www.notion.so/Bangkok-the-district-of-food-51d5662f73d440ee80d4c67c910f5619#af6b74fa4664482cb37c6b298f753626>

The data that we obtains consists of 50 rows and 8 columns

	District(Khet)	MapNr	Post-code	Thai	Popu-lation	No. ofSubdis-tractsKhwaeng	Latitude	Longitude
0	Bang Bon	50	10150	บางบอน	105161	4	13.659200	100.399100
1	Bang Kapi	6	10240	บางกะปิ	148465	2	13.765833	100.647778
2	Bang Khae	40	10160	บางแค	191781	4	13.696111	100.409444
3	Bang Khen	5	10220	บางเขน	189539	2	13.873889	100.596389
4	Bang Kho Laem	31	10120	บางคอแหลม	94956	3	13.693333	100.502500
5	Bang Khun Thian	21	10150	บางขุนเทียน	165491	2	13.660833	100.435833
6	Bang Na	47	10260	บางนา	95912	2	13.680081	100.591800
7	Bang Phlat	25	10700	บางพลัด	99273	4	13.793889	100.505000
8	Bang Rak	4	10500	บางรัก	45875	5	13.730833	100.524167
9	Bang Sue	29	10800	บางซื่อ	132234	2	13.809722	100.537222

The first 10 rows of geolocation 50 district in Bangkok

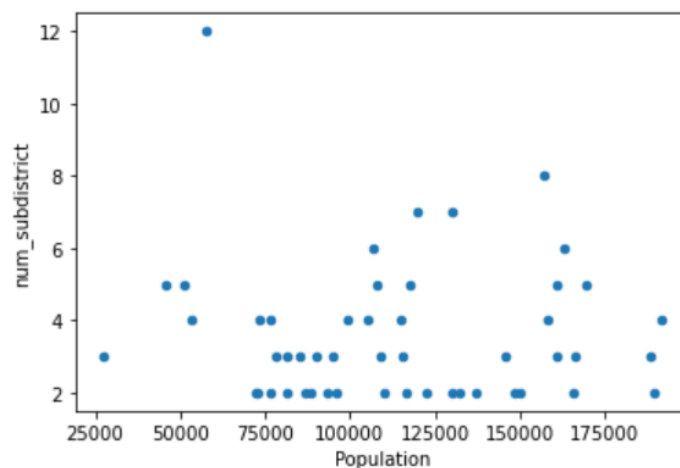
For the propose of analysis of this project, we drop the irrelevant columns such as MapNr,Post-code and rename the other for meaningful names. We present the first 5 row here

	District	Population	num_subdistrict	Latitude	Longitude
0	Bang Bon	105161	4	13.659200	100.399100
1	Bang Kapi	148465	2	13.765833	100.647778
2	Bang Khae	191781	4	13.696111	100.409444
3	Bang Khen	189539	2	13.873889	100.596389
4	Bang Kho Laem	94956	3	13.693333	100.502500

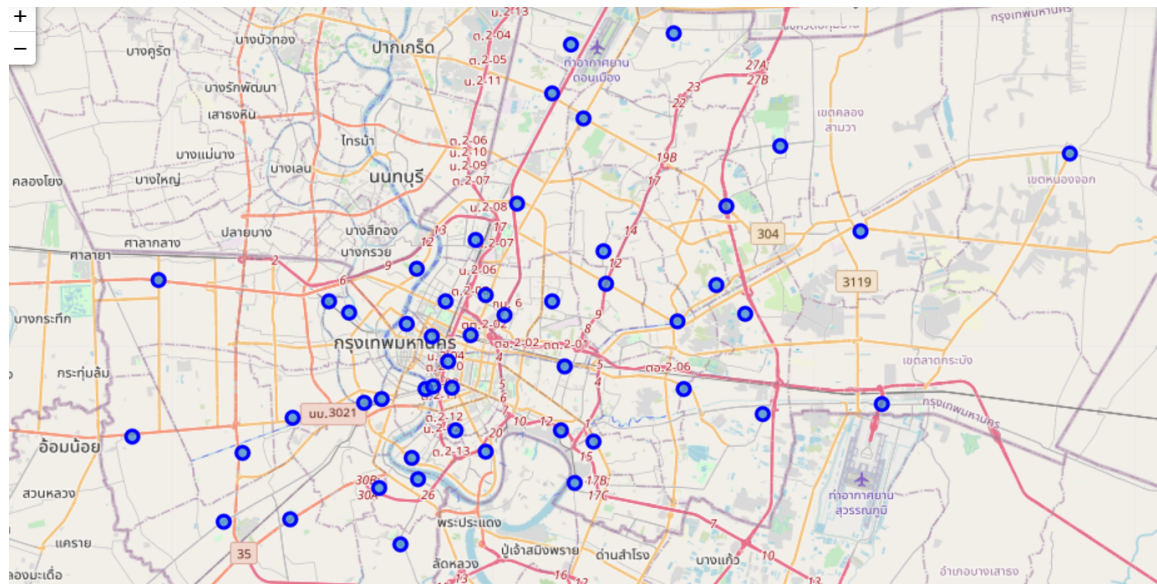
There are 5 columns

- District - the name of district
- Population - number of population for each district
- num_subdistrict - number of subdistrict
- Latitude - Latitude of the district
- Longitude - Longitude of the district

We use scatter plot to find some relationship between number of population and number of subdistrict but we found that there is not correlated



Now we put the data of coordinate to the map using the package folium to visualize the location.



map of district of Bangkok using folium

We done the exploration of our first data. We will introduce you another source of data Foursquare API

2. Foursquare API

We want to gather the location of restaurant nearby the district location. We use the Foursquare API to query the top 100 nearby each district with a radius of 2000 meters. In this project we interested only the category of food venue which has **categoryid = 4d4b7105d754a06374d8125**

<https://developer.foursquare.com/docs/build-with-foursquare/categories>

Here is the example of dataframe after called API from foursquares, we found 4118 food venue near by which has 82 unique sub categories

	District	DistrictLatitude	DistrictLongitude	VenueName	VenueLatitude	VenueLongitude	VenueCategory
0	Bang Bon	13.6592	100.3991	ชาหนุมางหว่า	13.657136	100.395230	Thai Restaurant
1	Bang Bon	13.6592	100.3991	เจ๊โน้ ก๋วยเตี๋ยวเป็ดตุ๋น	13.654137	100.405323	Noodle House
2	Bang Bon	13.6592	100.3991	KFC	13.670449	100.405502	Fast Food Restaurant
3	Bang Bon	13.6592	100.3991	Burger King (เบอร์เกอร์คิง)	13.670830	100.405089	Fast Food Restaurant
4	Bang Bon	13.6592	100.3991	หมูสะเต๊ะแม่คำไร	13.653672	100.391620	Satay Restaurant

	Count
Noodle House	677
Thai Restaurant	597
Café	329
Asian Restaurant	226
Japanese Restaurant	202
Som Tum Restaurant	170
Chinese Restaurant	158
Restaurant	143
Fast Food Restaurant	134
Seafood Restaurant	131
Hotpot Restaurant	131
Steakhouse	115
Bakery	113
BBQ Joint	108
Food Court	55

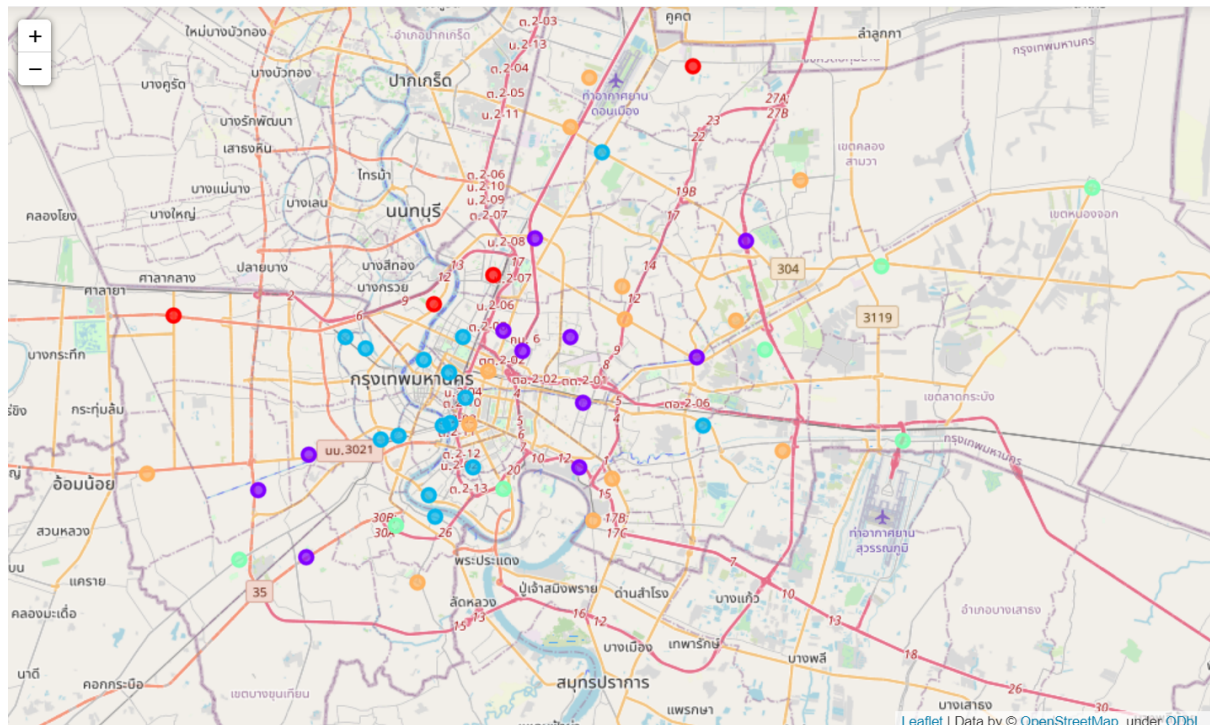
Methodology

- K-Means Clustering

This project applies K-mean clustering unsupervised machine learning algorithm to cluster the district based on the type of food venue such as Noodle House, Thai Restaurant, Café. This would give a better understanding of the similarities and dissimilarities between the chosen neighborhoods to retrieve more insights and to conclude with ease which neighborhood wins over other.

In this project, we use k=5 is the number of cluster. We applied K-means clustering to data based on 10 most common food venue for each district then we put it to map again for visualize propose.

	District	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	9th Most Common Venue	10th Most Common Venue
0	Bang Bon	Thai Restaurant	Noodle House	Asian Restaurant	Café	Chinese Restaurant	Som Tum Restaurant	Fast Food Restaurant	Food Truck	Food	Food Court
1	Bang Kapi	Noodle House	Thai Restaurant	Som Tum Restaurant	Japanese Restaurant	Fast Food Restaurant	Steakhouse	Shabu-Shabu Restaurant	BBQ Joint	Hotpot Restaurant	Chinese Restaurant
2	Bang Khae	Japanese Restaurant	Fast Food Restaurant	Hotpot Restaurant	Thai Restaurant	Seafood Restaurant	Bakery	Steakhouse	Noodle House	Café	Som Tum Restaurant
3	Bang Khen	Noodle House	Thai Restaurant	Asian Restaurant	Fast Food Restaurant	Som Tum Restaurant	Hotpot Restaurant	Café	Steakhouse	Vietnamese Restaurant	Bakery
4	Bang Kho Laem	Thai Restaurant	Noodle House	Hotpot Restaurant	Chinese Restaurant	Asian Restaurant	Seafood Restaurant	Japanese Restaurant	BBQ Joint	Restaurant	Breakfast Spot
5	Bang Khun Thian	Thai Restaurant	Noodle House	Hotpot Restaurant	Japanese Restaurant	Steakhouse	Pizza Place	Fast Food Restaurant	Café	Soup Place	Seafood Restaurant



Results

We got 5 cluster based on K-means clustering of 10 most common food venue.
Let's explore for each cluster

- Cluster 0 : Red

	District	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	9th Most Common Venue	10th Most Common Venue
3	Bang Khen	0	Noodle House	Thai Restaurant	Asian Restaurant	Fast Food Restaurant	Som Tum Restaurant	Hotpot Restaurant	Café	Steakhouse	Vietnamese Restaurant	Bakery
32	Phra Khanong	0	Noodle House	Fast Food Restaurant	Thai Restaurant	Italian Restaurant	Chinese Restaurant	Japanese Restaurant	Café	Hotpot Restaurant	Pizza Place	Food Court
35	Prawn	0	Som Tum Restaurant	Café	Noodle House	Italian Restaurant	Thai Restaurant	Food Truck	Burger Joint	Restaurant	Asian Restaurant	BBQ Joint

Considering Cluster 0, the 1-5 common venue consists of Noodle house, Thai restaurant and found many of western restaurant.

- Cluster 1 : Purple

	District	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	9th Most Common Venue	10th Most Common Venue
7	Bang Phlat	1	Thai Restaurant	Noodle House	Café	Asian Restaurant	Bakery	Fast Food Restaurant	Vietnamese Restaurant	BBQ Joint	Som Tum Restaurant	Japanese Restaurant
17	Dusit	1	Noodle House	Thai Restaurant	Café	Asian Restaurant	Som Tum Restaurant	Chinese Restaurant	Italian Restaurant	Food Court	Japanese Restaurant	Hotpot Restaurant
38	Sai Mai	1	Noodle House	Thai Restaurant	Café	Restaurant	Seafood Restaurant	Vietnamese Restaurant	Asian Restaurant	Steakhouse	Pizza Place	Fast Food Restaurant
44	Thawi Watthana	1	Noodle House	Thai Restaurant	Café	Asian Restaurant	Bakery	Chinese Restaurant	Breakfast Spot	Diner	Restaurant	Hainan Restaurant

Considering Cluster 1, the pattern is solid than the cluster 0 mainly common with Noodle House, Thai Restaurant, Café follow by Asian restaurant.

- Cluster 2 : Sky blue

	District	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	9th Most Common Venue	10th Most Common Venue
14	Chom Thong	2	Thai Restaurant	Hotpot Restaurant	Asian Restaurant	Noodle House	BBQ Joint	Food Truck	Food Court	Restaurant	Soup Place	Japanese Restaurant
24	Lat Krabang	2	Thai Restaurant	Noodle House	Café	Som Tum Restaurant	Asian Restaurant	Bakery	Restaurant	Japanese Restaurant	Seafood Restaurant	BBQ Joint
26	Min Buri	2	Thai Restaurant	Asian Restaurant	Restaurant	Diner	Café	Seafood Restaurant	Steakhouse	Food Truck	Noodle House	Halal Restaurant
40	Saphan Sung	2	Thai Restaurant	Noodle House	Asian Restaurant	Japanese Restaurant	Fast Food Restaurant	Halal Restaurant	Café	Hotpot Restaurant	Food Truck	Bakery
49	Yan Nawa	2	Thai Restaurant	Café	Japanese Restaurant	Som Tum Restaurant	Bakery	Seafood Restaurant	Steakhouse	Noodle House	Asian Restaurant	Restaurant

Considering Cluster 2, the 1st most common venue for this cluster is Thai restaurants followed by Noodle or Asian restaurant and found a lot of

- Cluster 3 : Light green

	District	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	9th Most Common Venue	10th Most Common Venue
0	Bang Bon	3	Thai Restaurant	Noodle House	Asian Restaurant	Café	Chinese Restaurant	Som Tum Restaurant	Fast Food Restaurant	Food Truck	Food	Food Court
4	Bang Kho Laem	3	Thai Restaurant	Noodle House	Hotpot Restaurant	Chinese Restaurant	Asian Restaurant	Seafood Restaurant	Japanese Restaurant	BBQ Joint	Restaurant	Breakfast Spot
6	Bang Na	3	Noodle House	Thai Restaurant	Café	Fast Food Restaurant	Som Tum Restaurant	Asian Restaurant	Food Court	Restaurant	Food Truck	Seafood Restaurant
9	Bang Sue	3	Thai Restaurant	Noodle House	Som Tum Restaurant	Café	Fast Food Restaurant	BBQ Joint	Hotpot Restaurant	Steakhouse	Seafood Restaurant	Chinese Restaurant
10	Bangkok Noi	3	Noodle House	Thai Restaurant	Som Tum Restaurant	Japanese Restaurant	Steakhouse	Café	Asian Restaurant	Seafood Restaurant	BBQ Joint	Bakery
11	Bangkok Yai	3	Noodle House	Thai Restaurant	Asian Restaurant	Steakhouse	Japanese Restaurant	Café	Hotpot Restaurant	Food Truck	Chinese Restaurant	Fast Food Restaurant
12	Bueng Kum	3	Thai Restaurant	Noodle House	Café	Japanese Restaurant	Fast Food Restaurant	Restaurant	Chinese Restaurant	Bakery	Som Tum Restaurant	Hotpot Restaurant
16	Don Mueang	3	Noodle House	Thai Restaurant	Café	Fast Food Restaurant	Restaurant	Japanese Restaurant	Breakfast Spot	Buffet	Asian Restaurant	Snack Place
20	Khlong Sam Wa	3	Noodle House	Restaurant	Thai Restaurant	Diner	Chinese Restaurant	Food Truck	Buffet	Café	Japanese Restaurant	Soup Place
23	Lak Si	3	Noodle House	Thai Restaurant	Café	Restaurant	Food Court	Fast Food Restaurant	Chinese Restaurant	Som Tum Restaurant	Japanese Restaurant	Bakery
28	Nong Khaem	3	Noodle House	Thai Restaurant	Café	Hotpot Restaurant	Restaurant	Fast Food Restaurant	Steakhouse	Food Court	Chinese Restaurant	Som Tum Restaurant
36	Rat Burana	3	Noodle House	Thai Restaurant	Chinese Restaurant	Hotpot Restaurant	Asian Restaurant	Diner	BBQ Joint	Japanese Restaurant	Seafood Restaurant	Café
42	Suan Luang	3	Noodle House	Thai Restaurant	Asian Restaurant	Café	Japanese Restaurant	Som Tum Restaurant	Chinese Restaurant	Fast Food Restaurant	Seafood Restaurant	Steakhouse
46	Thung Khru	3	Noodle House	Café	Thai Restaurant	Som Tum Restaurant	Hotpot Restaurant	Halal Restaurant	Asian Restaurant	Bakery	Food Court	Chinese Restaurant
47	Wang Thonglang	3	Noodle House	Thai Restaurant	Restaurant	Café	Fast Food Restaurant	Hotpot Restaurant	Chinese Restaurant	Asian Restaurant	Som Tum Restaurant	BBQ Joint

Considering Cluster 3, the biggest cluster : the top two most common venue for this cluster are Thai restaurants or Noodle or Asian restaurant and most has cafe in common

- Cluster 4 : Orange

	District	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	9th Most Common Venue	10th Most Common Venue
8	Bang Rak	4	Noodle House	Thai Restaurant	Café	Seafood Restaurant	Chinese Restaurant	French Restaurant	Japanese Restaurant	Italian Restaurant	Restaurant	BBQ Joint
21	Khlong San	4	Noodle House	Chinese Restaurant	Thai Restaurant	Café	Seafood Restaurant	Asian Restaurant	Restaurant	Hotpot Restaurant	Indian Restaurant	French Restaurant
25	Lat Phrao	4	Noodle House	Thai Restaurant	Café	Chinese Restaurant	Restaurant	Japanese Restaurant	Hotpot Restaurant	BBQ Joint	Steakhouse	Sushi Restaurant
39	Samphanthawong	4	Noodle House	Chinese Restaurant	Café	Thai Restaurant	Seafood Restaurant	Asian Restaurant	Restaurant	Breakfast Spot	Italian Restaurant	Cantonese Restaurant
45	Thon Buri	4	Noodle House	Thai Restaurant	Seafood Restaurant	Asian Restaurant	Café	Chinese Restaurant	Steakhouse	Hotpot Restaurant	Japanese Restaurant	BBQ Joint

Considering Cluster 3, the first common venue for this cluster is Noodle followed by Thai or Chinese restaurants and has some Japanese or seafood in common

Discussion

In this study, we found that the population can vary with no correlated of number of subdistrict. Different approaches of exploratory analysis are applied to find insights of the data. We apply K-means clustering when $k=5$ to cluster and visualizing the locations of each venue cluster, labeled by different colors for different clusters. Moreover, tables demonstrating the neighborhoods and its most common venues in each cluster are also included in the report. We found that it is hard to distinguish each cluster. It might due to there are many type of the restaurant which some is vary similar. For better solution in the next study, grouping the similar of restaurant type would benefit.

Conclusion

As we found in this research, there are many kind of restaurant throug Bangkok. People can apply the findings to see the most common restaurant type in each neighborhood. The findings are valuable for both visitors and business persons. The visitors can see the findings in order to find where to visit in each area. Business persons can find the gap to open their business in the neighborhood.

References

https://en.wikipedia.org/wiki/List_of_districts_of_Bangkok

<https://developer.foursquare.com/docs/places-api/>