



Battle of Neighborhoods

Bangkok, Thailand

Introduction

Bangkok is the capital city of Thailand that has a variety of population, culture, livelihood and still being a densely populated province. Causing various businesses who want to grow interested in starting a business from here. But problems for people who want to start a business are What business to do?, Who are the customers? , and Where to open?

This project uses the location, category of venue and population data in each Bangkok districts to analyze relationships to be the information in deciding to start a business for new businessmen or those interested.

Data Sets and APIs:

Foursquare API:

This API provides the ability to perform location search, location sharing and details about each venue. You can gather venue, tips and many useful data in easy way up to your package. In this project, I use personal package Foursquare API to get name, category and latitudes-longitudes of nearby venues around 500 meter from interested points.

Data interface:

Your current account tier is **Personal**:

- 99,500 Regular Calls / Day
- 500 Premium Calls / Day
- 2 Photos per Venue
- 2 Tips per Venue

Venue	Venue Latitude	Venue Longitude	Venue Category
ชาหมูบางหว้า	13.66	100.40	Thai Restaurant
Irashaimase Japanese Restaurant	13.66	100.40	Japanese Restaurant
ร้านต้นไม้ ริมถนนกาญจนากิจเชก	13.65	100.41	Garden Center
เจ๊ไน ก๋วยเตี๋ยวเป็ดตุ๋น	13.65	100.41	Noodle House
ส.สุข โภชนา	13.66	100.40	Chinese Restaurant
Lotus Express (โลตัส อี็กซ์เพรส)	13.66	100.40	Convenience Store
พิพารณ์ โภชนา ก๋วยเตี๋ยวเนื้อตุ๋น	13.65	100.41	Noodle House
Bussabar Steak House	13.66	100.40	Bar
7-Eleven (เซเว่น อีเลฟเว่น)	13.66	100.39	Convenience Store
ลาบร้อยเอ็ด เสือเดชะ	13.66	100.40	Som Tum Restaurant
Café Amazon (กาแฟ อเมซอน)	13.66	100.41	Coffee Shop
Black Canyon (แบล็คแคนยอน)	13.66	100.41	Café

Bangkok District Data

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

I use pandas and ssl library to scrape 50 districts of Bangkok data from above url.

Raw Data

District (Khet)	Map Nr	Post- code	Thai	Popu- lation	No. of Subdis- tricts <i>Khwaeng</i>	Latitude	Longitude
Bang Bon	50	10150	บางบอน	105,161	4	13.6592	100.3991
Bang Kapi	6	10240	บางกะปิ	148,465	2	13.765833	100.647778
Bang Khae	40	10160	บางแค	191,781	4	13.696111	100.409444
Bang Khen	5	10220	บางเขน	189,539	2	13.873889	100.596389
Bang Kho Laem	31	10120	บางคอแหลม	94,956	3	13.693333	100.5025
Bang Khun Thian	21	10150	บางขุนเทียน	165,491	2	13.660833	100.435833
Bang Na	47	10260	บางนา	95,912	2	13.680081	100.5918
Bang Phlat	25	10700	บางพลัด	99,273	4	13.793889	100.505
Bang Rak	4	10500	บางรัก	45,875	5	13.730833	100.524167
Bang Sue	29	10800	บางซื่อ	132,234	2	13.809722	100.537222
Bangkok Noi	20	10700	บางกอกน้อย	117,793	5	13.770867	100.467933
Bangkok Yai	16	10600	บางกอกใหญ่	72,321	2	13.722778	100.476389
Buong Kum	27	10240	บึงกุ่ม	145,830	3	13.785278	100.669167
Chatuchak	30	10900	จตุจักร	160,906	5	13.828611	100.559722
Chom Thong	35	10150	จอมทอง	158,005	4	13.677222	100.484722
Din Daeng	26	10400	ดินแดง	130,220	2	13.769722	100.552778
Don Mueang	36	10210	ดอนเมือง	166,261	3	13.913611	100.589722
Dusit	2	10300	ดุสิต	107,655	5	13.776944	100.520556

Population Data

From stat.bora.dopa.go.th

Big picture characteristics of people who live in each district.

Neighborhood	Male	Female	Total	House
พระนคร	23080	24621	47701	19155
ดุสิต	48615	41154	89769	31955
หนองจอก	85682	90340	176022	65048
บางรัก	22834	25393	48227	32347
บางเขน	89273	99727	189000	112614

Methodology

Start with import initial usage libraries.

Pandas : manipulate Data

Numpy : mathematic operation

Json. : manipulate json file type

Re : manipulate string

Ssl & Requests : connect with API

Matplotlib : Virtualize Data

Sklearn : Model Machine learning

```
import pandas as pd
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)
from pandas.io.json import json_normalize
import json
import numpy as np
import ssl
import re
import requests
import matplotlib.cm as cm
import matplotlib.colors as colors
from sklearn.cluster import KMeans
```

Scrape Bangkok districts data from Wikipedia

-Use pandas with ssl to get data

```
ssl._create_default_https_context = ssl._create_unverified_context
url = 'https://en.wikipedia.org/wiki/List_of_districts_of_Bangkok'
df = pd.read_html(url)[0]
df.head()
```

	District(Khet)	MapNr	Post-code	Thai	Popu-lation	No. of Subdis-tricts	Khwaeng	Latitude	Longitude
0	Bang Bon	50	10150	บางบอน	105161		4	13.66	100.40
1	Bang Kapi	6	10240	บางกะปิ	148465		2	13.77	100.65
2	Bang Khae	40	10160	บางแค	191781		4	13.70	100.41
3	Bang Khen	5	10220	บางเขน	189539		2	13.87	100.60
4	Bang Kho Laem	31	10120	บางคอแหลม	94956		3	13.69	100.50

```
] df_bangkok = df[['Thai', 'Latitude', 'Longitude']]
df_bangkok.columns = ['Neighborhood', 'Latitude', 'Longitude']
df_bangkok['Borough'] = "Bangkok"
df_bangkok.head()

/Users/rachataburin/opt/anaconda3/lib/python3.7/site-packages/
A value is trying to be set on a copy of a slice from a DataFrame
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org-pandas-docs/stable/indexing.html#view-versus-copy
This is separate from the ipykernel package so we can avoid
```

-Select useful columns ,rename them and add columns Borough.

We got 50 district in Bangkok with 4 attribute

	Neighborhood	Latitude	Longitude	Borough
0	บางบอน	13.66	100.40	Bangkok
1	บางกะปิ	13.77	100.65	Bangkok
2	บางแค	13.70	100.41	Bangkok
3	บางเขน	13.87	100.60	Bangkok
4	บางคอแหลม	13.69	100.50	Bangkok

Get latitude, longitude of Bangkok

13.7542529, 100.493087. with library geopy.

```
from geopy.geocoders import Nominatim
address = 'Bangkok'
geolocator = Nominatim()
location = geolocator.geocode(address)
latitude = location.latitude
longitude = location.longitude
print('The geographical coordinate of Bangkok are {}, {}'.format(latitude, longitude))
```

/Users/rachataburin/opt/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:3: DeprecationWarning: Using or importing the default value of a parameter named "user_agent" is strongly discouraged, as it violates the OSM nominatim API policies at <http://operations.osmfoundation.org/policies/nominatim/> and may possibly cause 403 and 429 HTTP errors. Please either specify a custom `user_agent` with `Nominatim(user_agent="my-application")` or by overriding the default value of `geocoders.options.default_user_agent = "my-application"`. In geopy 2.0 this will become an error.
 This is separate from the ipykernel package so we can avoid doing imports until

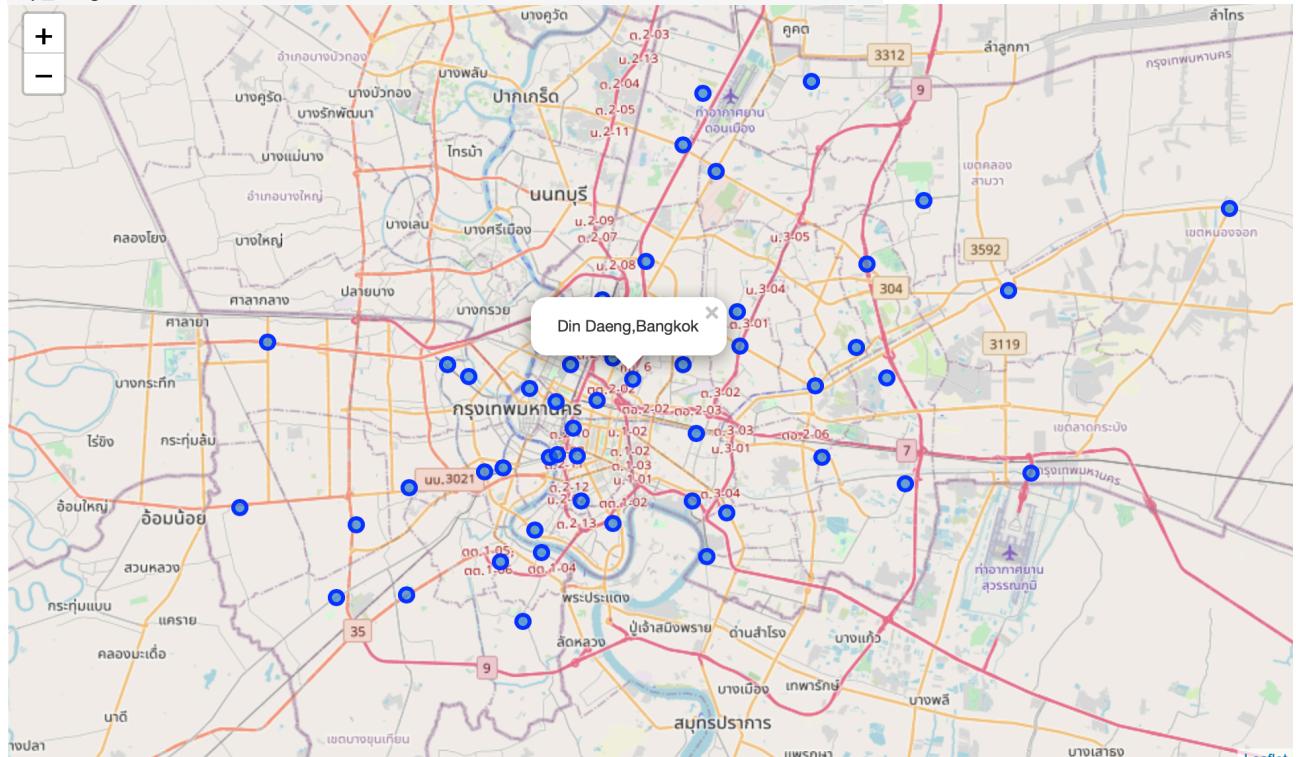
The geographical coordinate of Bangkok are 13.7542529, 100.493087.

Use folium to virtualize Bangkok location with districts

```
import folium
map_bangkok= folium.Map(location=[latitude, longitude], zoom_start=11)

# add markers to map
for lat, lng, district,city in zip(bangkok_data['Latitude'], bangkok_data[
    label = '{},{}'.format(district,city)
    label = folium.Popup(label, parse_html=True)
    folium.CircleMarker(
        [lat, lng],
        radius=5,
        popup=label,
        color='blue',
        fill=True,
        fill_color='#3186cc',
        fill_opacity=0.7,
        parse_html=False).add_to(map_bangkok)
```

map_bangkok



Set up Foursquare Client

You can get this client by register Foursquare for developer account at

<https://developer.foursquare.com>

```
: CLIENT_ID = 'XXXXX' # your Foursquare ID
CLIENT_SECRET = 'XXXXX' # your Foursquare Secret
VERSION = '20180605' # Foursquare API version

print('Your credentails:')
print('CLIENT_ID: ' + CLIENT_ID)
print('CLIENT_SECRET:' + CLIENT_SECRET)
```

```
Your credentails:
CLIENT_ID: XXXXX
CLIENT_SECRET:XXXXX
```

Use Foursquare API to get nearby venue data for each districts

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
บางบอน	13.66	100.40	ชาหมูบางหัว	13.66	100.40	Thai Restaurant
บางบอน	13.66	100.40	Irashaimase Japanese Restaurant	13.66	100.40	Japanese Restaurant
บางบอน	13.66	100.40	ร้านต้นไม้ ริมถนนกาญจนากาภิเษก	13.65	100.41	Garden Center
บางบอน	13.66	100.40	เจ๊น้ำ ก๋วยเตี๋ยวเป็ดตุ๋น	13.65	100.41	Noodle House
บางบอน	13.66	100.40	ส.สุข โภชนา	13.66	100.40	Chinese Restaurant
บางบอน	13.66	100.40	Lotus Express (โลตัส เอ็กซ์เพรส)	13.66	100.40	Convenience Store
บางบอน	13.66	100.40	พิพารรณ โภชชา ก๋วยเตี๋ยวเนื้อตุ๋น	13.65	100.41	Noodle House
บางบอน	13.66	100.40	Bussabar Steak House	13.66	100.40	Bar
บางบอน	13.66	100.40	7-Eleven (เซเว่น อีเลฟเว่น)	13.66	100.39	Convenience Store
บางบอน	13.66	100.40	ลาบว้อดยอร์ด เสือเคหะ	13.66	100.40	Som Tum Restaurant
บางบอน	13.66	100.40	Café Amazon (กาแฟ อเมซอน)	13.66	100.41	Coffee Shop
บางบอน	13.66	100.40	Black Canyon (แบล็คแคนยอน)	13.66	100.41	Café
บางบอน	13.66	100.40	Jeab Coffee Love By Bluekoff	13.66	100.39	Coffee Shop
บางบอน	13.66	100.40	บ้านพูลหลวง เอกชัย	13.66	100.40	Asian Restaurant
บางบอน	13.66	100.40	ศุนย์รวมต้นไม้ @ ถ.กาญจนา	13.66	100.41	Flower Shop
บางบอน	13.66	100.40	Café Amazon (กาแฟ อเมซอน)	13.66	100.41	Coffee Shop
บางบอน	13.66	100.40	ชาบูทอง ถูกขั้นทุม ก๋วยเตี๋ยวหมูต้มยำ (สุราษ (...)	13.66	100.39	Noodle House
บางบอน	13.66	100.40	ครัวเมืองดัง น้ำยาลิ้ง	13.66	100.39	Thai Restaurant

We get new column like Venue Category to tell which type of venue, name and latitude - longitude in 500 meter area each district coordinates.

Data shape is 2901 rows with 7 attributes

Find uniques categories type of all venue

```
print('There are {} uniques categories.'.format(len(bangkok_venues['Venue Category'].unique())))
```

There are 232 uniques categories.

Our data have many categories so I start to transform data in column venue category with one-hot encoder.

```
# one hot encoding
bangkok_onehot = pd.get_dummies(bangkok_venues[['Venue Category']], prefix="", prefix_sep="")

# add neighborhood column back to dataframe
bangkok_onehot['Neighborhood'] = bangkok_venues['Neighborhood']

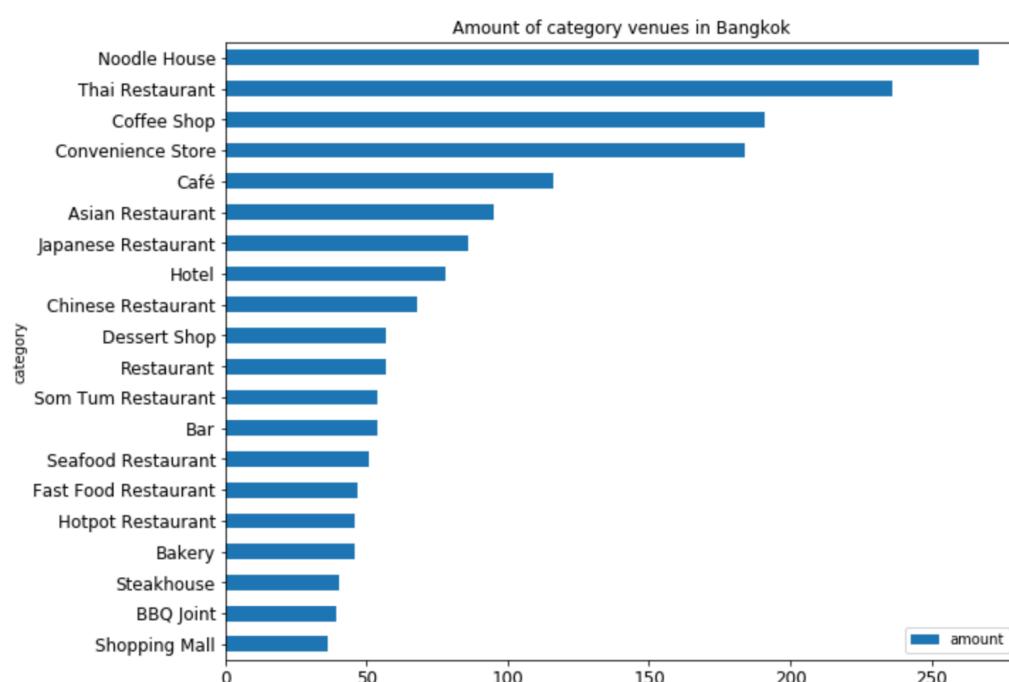
# move neighborhood column to the first column
fixed_columns = [bangkok_onehot.columns[-1]] + list(bangkok_onehot.columns[:-1])
bangkok_onehot = bangkok_onehot[fixed_columns]

bangkok_onehot.head()
```

After group by neighborhood you will see amount for each category type in district.

Neighborhood	Zoo Exhibit	Accessories Store	Airport Service	American Restaurant	Arcade	Art Gallery	Art Museum	Arts & Crafts Store	Asian Restaurant	Athletics & Sports	Auto Garage	BBQ Joint	Badminton Court	Bakery	Bar	E
คลองสาน	0	0	0	0	0	4	0	0	0	0	0	0	0	0	1	2
คลองสามวา	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
คลองเตย	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1
ศันนาฯ	0	0	0	0	0	0	0	0	0	0	0	2	0	4	0	0
จตุจักร	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1
ขอนแขวง	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1
คลองเมือง	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
ดินแดง	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
ดุสิต	0	0	0	0	0	0	0	0	4	0	0	0	1	0	2	0
ตั่งชั่น	0	0	0	0	0	0	0	0	1	0	0	0	2	2	0	0
ทวีวัฒนา	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0
ทุ่งครุ	0	0	0	0	0	0	0	0	1	0	0	2	0	3	0	0
ธนบุรี	0	0	0	0	0	0	0	0	3	0	0	0	1	0	1	0
บางกอกน้อย	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
บางกอกใหญ่	0	0	0	0	0	0	0	0	5	0	0	1	1	0	1	0
บางเขน	0	0	0	0	0	0	0	0	1	0	0	3	0	1	0	0
บางซื่อเทียน	0	0	0	0	0	0	0	0	2	0	0	1	0	2	2	0

Find Top 20 of venue category in Bangkok



Noodle house
is 1st,

Thai restaurant
is 2nd

and Coffee
shop &
Convenience
Store is 3rd-4th

Prepare Data for Clustering by mean amount for each category in district.

```
bangkok_grouped = bangkok_onehot.groupby('Neighborhood').mean().reset_index()
bangkok_grouped
```

Neighborhood	Zoo Exhibit	Accessories Store	Airport Service	American Restaurant	Arcade	Art Gallery	Art Museum	Arts & Crafts Store	Asian Restaurant	Athletics & Sports	Auto Garage	BBQ Joint	Badminton Court	Bakery	E
0 คลองสาน	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.
1 คลองสามวา	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.
2 คลองเตย	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.04	0.
3 คันนายาว	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.05	0.
4 จตุจักร	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.
5 จอมทอง	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.
6 ดอนเมือง	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.
7 ดินแดง	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.
8 ดุสิต	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.02	0.00	0.
9 ตลิ่งชัน	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.05	0.05	0.
10 ทวีวัฒนา	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.05	0.
11 ทุ่งครุ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.04	0.00	0.06	0.
12 ธนบุรี	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.02	0.00	0.
13 บางกอกน้อย	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.
14 บางกอกใหญ่	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.02	0.02	0.00	0.

Before Clustering I want to know Top 5 venue for each district

```
num_top_venues = 5

for hood in bangkok_grouped['Neighborhood']:
    print("----"+hood+"----")
    temp = bangkok_grouped[bangkok_grouped['Neighborhood'] == hood].T.reset_index()
    temp.columns = ['venue', 'freq']
    temp = temp.iloc[1:]
    temp['freq'] = temp['freq'].astype(float)
    temp = temp.round({'freq': 2})
    print(temp.sort_values('freq', ascending=False).reset_index(drop=True).head(num_top_venues))
    print('\n')

----คลองสาน----
   venue freq
0   Coffee Shop 0.07
1   Noodle House 0.07
2   Dessert Shop 0.07
3 Chinese Restaurant 0.07
4   Thai Restaurant 0.05

----ตลิ่งชัน----
   venue freq
0 Convenience Store 0.17
1   Noodle House 0.15
2   Coffee Shop 0.07
3 Badminton Court 0.05
4   Restaurant 0.05

----คลองสามวา----
   venue freq
0   Restaurant 0.09
1   Exhibit 0.09
2   Thai Restaurant 0.09
3 Japanese Restaurant 0.07
4   Noodle House 0.07
```

“ตลิ่งชัน” is my own town living for 20 years but I don't know we have Badminton Court haha.

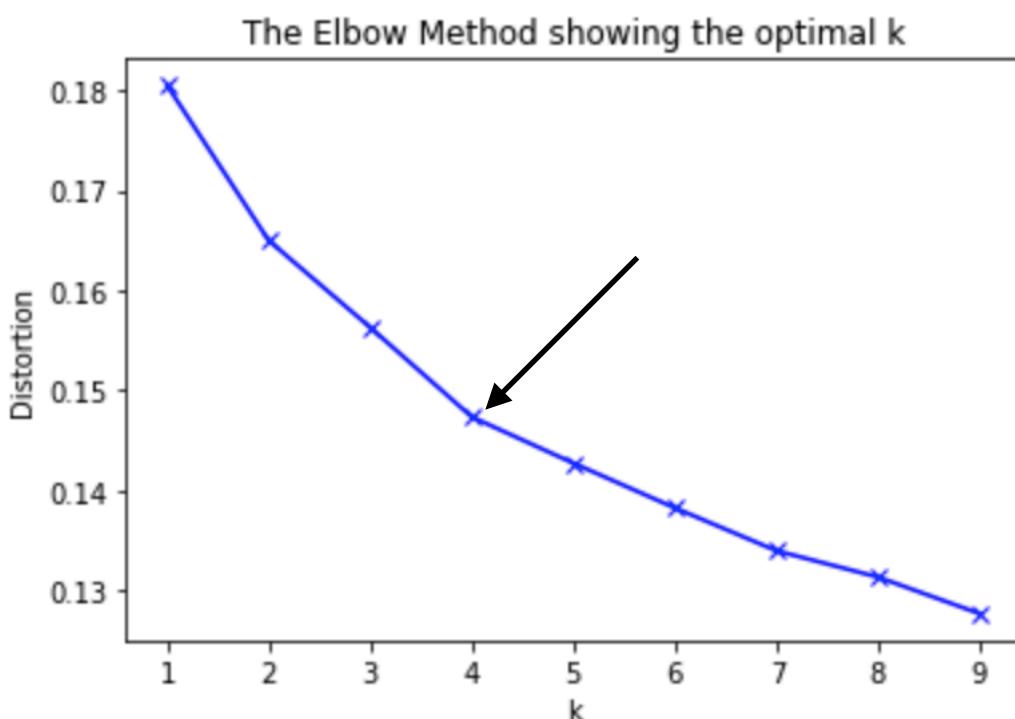
But We have Convenience Store like 7-11 in every 1-2 km.

And Generate Output to Dataframe

Neighborhood	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
คลองสาน	Coffee Shop	Dessert Shop	Noodle House	Chinese Restaurant	Thai Restaurant	Art Gallery	Hotel Bar	Café	Restaurant	Hotel
คลองสามวา	Exhibit	Restaurant	Thai Restaurant	Japanese Restaurant	Noodle House	Pub	Grocery Store	Zoo	Dessert Shop	Coffee Shop
คลองเตย	Convenience Store	Coffee Shop	Food Truck	Recording Studio	Bar	Residential Building (Apartment / Condo)	Noodle House	Chinese Restaurant	Canal	Shopping Mall
ดันນายา	Thai Restaurant	Japanese Restaurant	Coffee Shop	Bakery	Som Tum Restaurant	Noodle House	Clothing Store	Pizza Place	Ice Cream Shop	Shopping Mall
จตุจักร	Coffee Shop	Thai Restaurant	Fast Food Restaurant	Noodle House	Japanese Restaurant	Flea Market	Gym / Fitness Center	Convenience Store	Café	Shabu-Shabu Restaurant

**Use mean amount for each category in district to Clustering
 But I choose find number k to tell machine cluster district in k groups by Elbow Method**

The Elbow method is a heuristic used in determining the number of clusters in a data set. The method consists of plotting the explained variation as a function of the number of clusters, and picking the elbow of the curve as the number of clusters



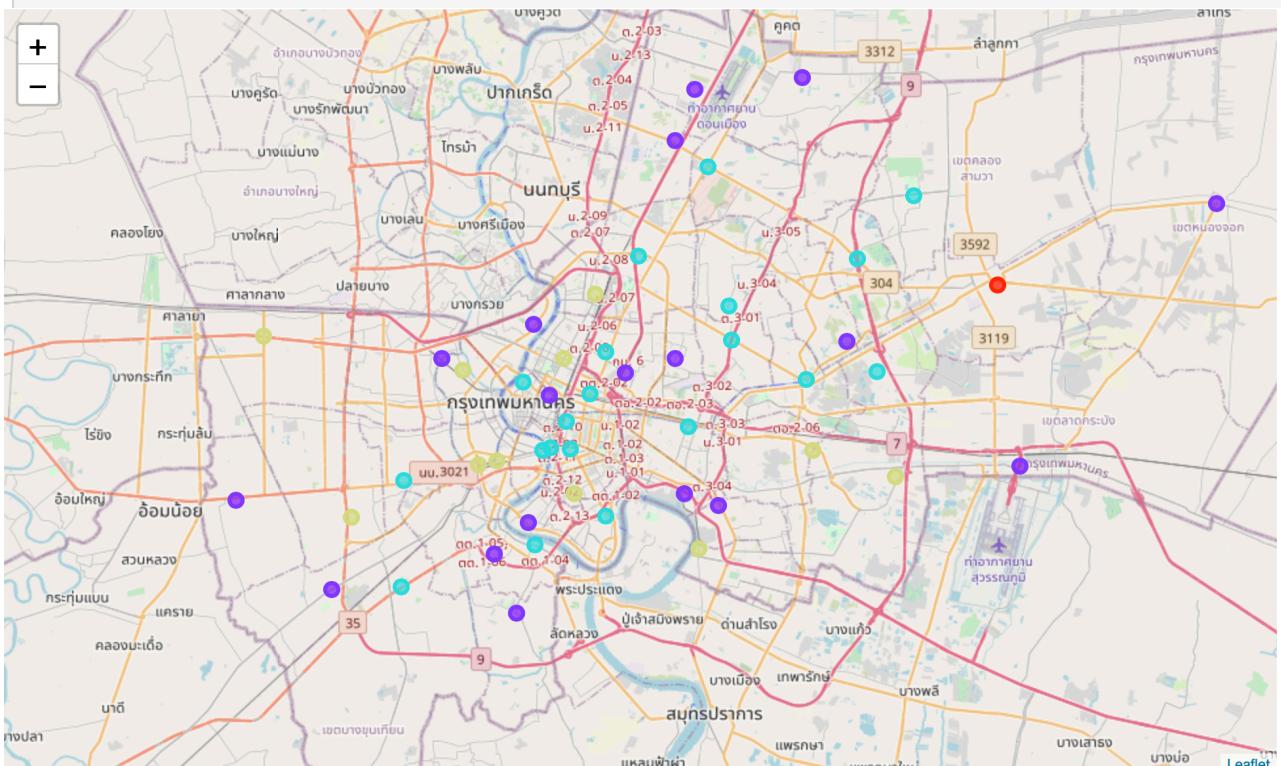
Elbow point is k =2 but It's too less. I should next Elbow point k = 4

Clustering Data by K-mean algorithm with K = 4

And you will get divided 4 group of districts

```
# set number of clusters
kclusters = 4

# run k-means clustering
kmeans = KMeans(n_clusters=kclusters, random_state=0).fit(bangkok_grouped_clustering)
```



The Last, Find and explore description for each clusters you will get information like

Neighborhood	Cluster Labels	Male	Female	Total	House
บางบอน	1	50628	55056	105684	50531
บางกอกปี	2	66559	79549	146108	104926
บางแค	3	90085	103406	193491	92959
บางเขน	2	89273	99727	189000	112614
บางดอแหลม	1	41260	45638	86898	39544
บางขุนเทียน	2	87656	98168	185824	90017
บางนา	3	42021	48104	90125	70410
บางพลัด	1	41565	49304	90869	55029
บางรัก	2	22834	25393	48227	32347
บางซื่อ	3	59086	67224	126310	75635
บางกอกน้อย	3	51407	56325	107732	49559
บางกอกใหญ่	3	31266	34886	66152	31671
ปีงกุ่ม	1	64912	77325	142237	75351
จตุจักร	2	72604	84001	156605	121352
ธนบุรี	1	71279	78820	150109	70179

What top category for each cluster/ district?

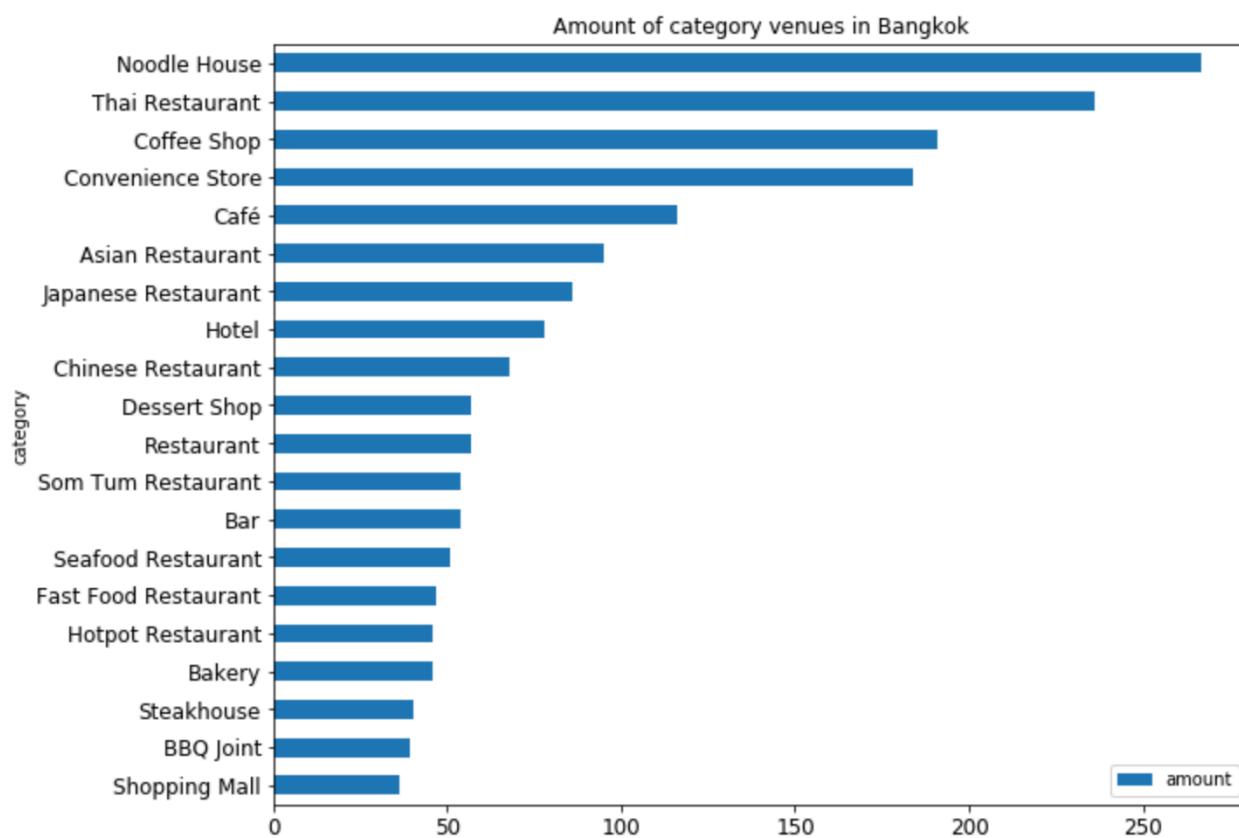
What is each cluster?

How many people in each cluster and what kind of them male or female?

Find solution strategy to decision to open new business

Result

Tops 20 of venue category in Bangkok



Noodle house is 1st,

Thai restaurant is 2nd

Coffee shop & Convenience Store is 3rd-4th

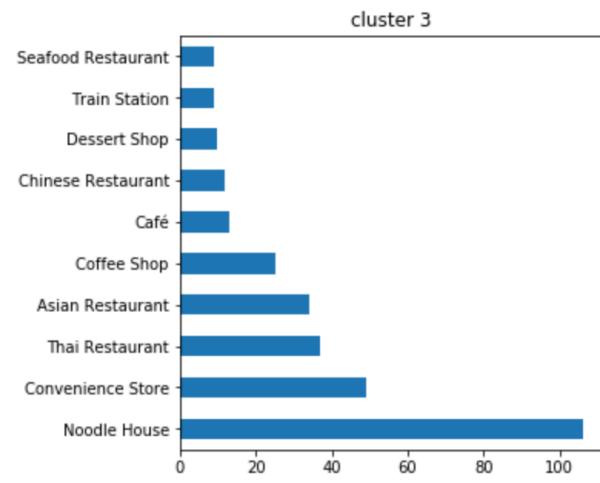
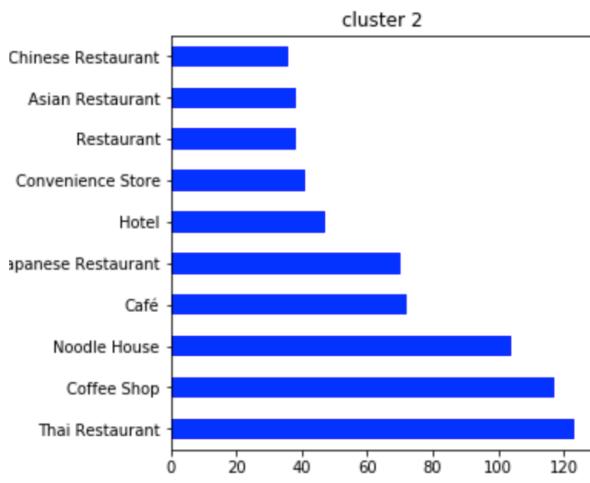
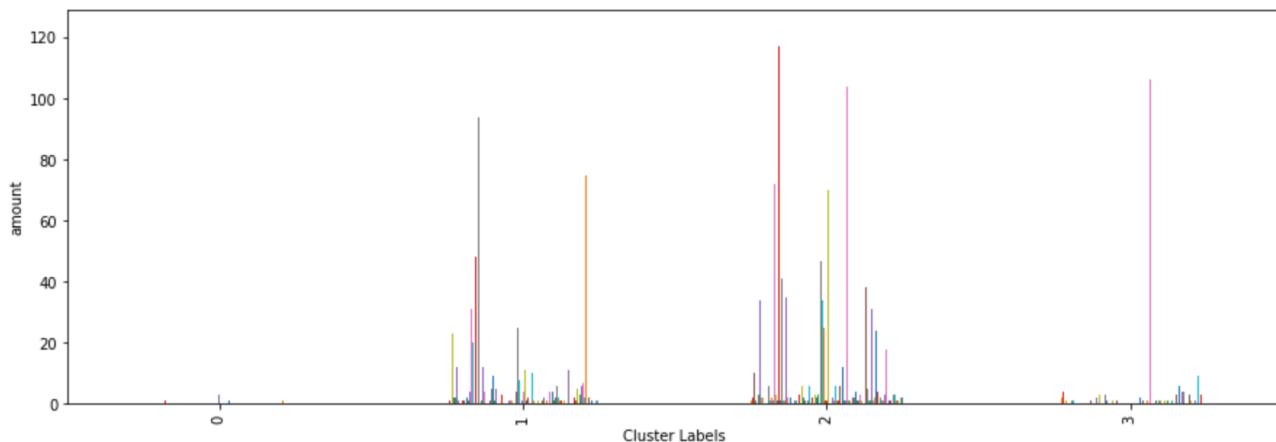
Tops 10 category and cluster group for each district in Bangkok

Cluster Labels	Neighborhood	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
2	คลองสาน	Coffee Shop	Dessert Shop	Noodle House	Chinese Restaurant	Thai Restaurant	Art Gallery	Hotel Bar	Café	Restaurant	Hotel
2	คลองสามวา	Exhibit	Restaurant	Thai Restaurant	Japanese Restaurant	Noodle House	Pub	Grocery Store	Zoo	Dessert Shop	Coffee Shop
1	คลองเตย	Convenience Store	Coffee Shop	Food Truck	Recording Studio	Bar	Residential Building (Apartment / Condo)	Noodle House	Chinese Restaurant	Canal	Shopping Mall
2	คันนายาว	Thai Restaurant	Japanese Restaurant	Coffee Shop	Bakery	Som Tum Restaurant	Noodle House	Clothing Store	Pizza Place	Ice Cream Shop	Shopping Mall
2	จตุจักร	Coffee Shop	Thai Restaurant	Fast Food Restaurant	Noodle House	Japanese Restaurant	Flea Market	Gym / Fitness Center	Convenience Store	Café	Shabu-Shabu Restaurant
1	จอมทอง	Thai Restaurant	Convenience Store	Coffee Shop	Asian Restaurant	Pet Store	Plaza	Flea Market	Electronics Store	Restaurant	Food Truck
1	ดอนเมือง	Thai Restaurant	Convenience Store	Hotel	Airport Service	Restaurant	Food Truck	Coffee Shop	Sushi Restaurant	Flea Market	Chinese Restaurant
1	ดินแดง	Convenience Store	Noodle House	Thai Restaurant	Sports Club	Dessert Shop	Gym / Fitness Center	Satay Restaurant	Market	Flea Market	Sporting Goods Shop
3	ดุสิต	Noodle House	Thai Restaurant	Convenience Store	Asian Restaurant	Café	Som Tum Restaurant	Coffee Shop	Palace	Bar	Chinese Restaurant
1	ตลิ่งชัน	Convenience Store	Noodle House	Coffee Shop	Thai Restaurant	Seafood Restaurant	Restaurant	Bakery	Badminton Court	Chinese Restaurant	Asian Restaurant
3	ทวีวัฒนา	Coffee Shop	Noodle House	Convenience Store	Asian Restaurant	Music Venue	Bakery	Clothing Store	Chinese Restaurant	Flea Market	Diner
1	ทุ่งครุ	Convenience Store	Thai Restaurant	Noodle House	Coffee Shop	Café	Som Tum Restaurant	Bakery	BBQ Joint	Snack Place	Stadium
3	ธนบุรี	Noodle House	Convenience Store	Asian Restaurant	Train Station	Thai Restaurant	Seafood Restaurant	Café	Supermarket	Bubble Tea Shop	Soup Place
3	บางกอกน้อย	Noodle House	Convenience Store	Som Tum Restaurant	Asian Restaurant	Thai Restaurant	Coffee Shop	Chinese Restaurant	Steakhouse	Park	Mobile Phone Shop
3	บางกอกใหญ่	Noodle House	Asian Restaurant	Convenience Store	Train Station	Seafood Restaurant	Coffee Shop	Farmers Market	Dessert Shop	Gym	Restaurant
2	บางกอกปี	Coffee Shop	Japanese Restaurant	Som Tum Restaurant	Noodle House	Thai Restaurant	Steakhouse	Clothing Store	Fast Food Restaurant	BBQ Joint	Ramen Restaurant
2	บางขุนเทียน	Thai Restaurant	Japanese Restaurant	Coffee Shop	Café	Steakhouse	Hotpot Restaurant	Pizza Place	Dessert Shop	Bakery	Som Tum Restaurant
1	บางคอแหลม	Thai Restaurant	Coffee Shop	Noodle House	Convenience Store	Asian Restaurant	Chinese Restaurant	Seafood Restaurant	Pub	Som Tum Restaurant	Bus Stop
3	บางซื่อ	Noodle House	Thai Restaurant	Convenience Store	Train Station	Ice Cream Shop	Asian Restaurant	Coffee Shop	Fast Food Restaurant	Hotpot Restaurant	Restaurant
3	บางนา	Noodle House	Café	Asian Restaurant	Coffee Shop	Thai Restaurant	Pier	Supermarket	Convenience Store	Electronics Store	Seafood Restaurant
1	บางบอน	Noodle House	Coffee Shop	Convenience Store	Thai Restaurant	Garden Center	Spa	Fast Food Restaurant	Gas Station	Café	Chinese Restaurant
1	บางพลัด	Convenience Store	Café	Fast Food Restaurant	Thai Restaurant	Seafood Restaurant	Coffee Shop	Flea Market	Restaurant	Cocktail Bar	Other Repair Shop
2	บางรัก	Noodle House	Thai Restaurant	Chinese Restaurant	Hotel	Café	Seafood Restaurant	Coffee Shop	Japanese Restaurant	Hostel	Shopping Mall
2	บางเขน	Convenience Store	Coffee Shop	Fast Food Restaurant	Noodle House	Hotpot Restaurant	Asian Restaurant	Bookstore	Steakhouse	Vietnamese Restaurant	Ice Cream Shop
3	บางแค	Convenience Store	Noodle House	Japanese Restaurant	Shopping Mall	Flea Market	Track	Shop & Service	Food Truck	Miscellaneous Shop	Thai Restaurant
1	ปีบูรพาศรีพัฒน์	Coffee Shop	Café	Convenience Store	Supermarket	Bakery	Park	Flea Market	Food Truck	Noodle House	Thai Restaurant
2	ปทุมวัน	Noodle House	Asian Restaurant	Chinese Restaurant	Hostel	Hotel	Dessert Shop	Thai Restaurant	Seafood Restaurant	Coffee Shop	BBQ Joint
3	ประเวศ	Noodle House	Convenience Store	Soccer Field	Toll Booth	Coffee Shop	Gym / Fitness Center	Outdoor Gym	Halal Restaurant	Pet Store	Electronics Store
1	ป้อมปราบศรีพัทฯ	Noodle House	Café	Thai Restaurant	Convenience Store	Asian Restaurant	Chinese Restaurant	Hotel	Museum	Coffee Shop	Historic Site
2	พญาไท	Café	Thai Restaurant	Coffee Shop	Bar	Japanese Restaurant	Restaurant	Sushi Restaurant	Noodle House	Hotel	Som Tum Restaurant
2	พระนคร	Thai Restaurant	Hotel	Café	Asian Restaurant	Bar	Noodle House	Massage Studio	Vegetarian / Vegan Restaurant	Spa	Hostel
1	พระโขนง	Convenience Store	Hotel	Coffee Shop	Noodle House	Fast Food Restaurant	Italian Restaurant	Bakery	Pharmacy	Chinese Restaurant	Ice Cream Shop

Rachata Burin 17 June 2020
IBM data science certificate Capstone project

2	ภาสเจริญ	Thai Restaurant	BBQ Joint	Japanese Restaurant	Coffee Shop	Convenience Store	Fast Food Restaurant	Steakhouse	Shopping Mall	Ice Cream Shop	Asian Restaurant
0	มีนบุรี	Intersection	Restaurant	Bus Station	Thai Restaurant	Massage Studio	Coffee Shop	Duty-free Shop	Donut Shop	Garden	Gaming Cafe
2	ยานนาวา	Thai Restaurant	Japanese Restaurant	Coffee Shop	Hotpot Restaurant	Café	Steakhouse	Seafood Restaurant	Fast Food Restaurant	Convenience Store	BBQ Joint
2	ราชเทวี	Noodle House	Hotel	Thai Restaurant	Coffee Shop	Hostel	Steakhouse	Japanese Restaurant	Convenience Store	Café	Massage Studio
2	ราชวรวิหาร	Noodle House	Coffee Shop	Thai Restaurant	Hotpot Restaurant	Chinese Restaurant	Seafood Restaurant	Restaurant	Fast Food Restaurant	Steakhouse	BBQ Joint
1	ลาดกระบัง	Thai Restaurant	Hotel	Café	Convenience Store	Som Tum Restaurant	Bar	Pizza Place	Restaurant	Coffee Shop	Flea Market
2	ลาดพร้าว	Noodle House	Coffee Shop	Convenience Store	Thai Restaurant	Café	BBQ Joint	Restaurant	Asian Restaurant	Som Tum Restaurant	Bookstore
2	วังทองหลาง	Coffee Shop	Convenience Store	Café	Noodle House	Thai Restaurant	Asian Restaurant	Restaurant	Pizza Place	Department Store	Fast Food Restaurant
2	วัฒนา	Café	Coffee Shop	Noodle House	Japanese Restaurant	Thai Restaurant	Hotel	Bar	Shabu-Shabu Restaurant	Supermarket	Asian Restaurant
3	สวนหลวง	Noodle House	Coffee Shop	Thai Restaurant	Asian Restaurant	Convenience Store	Som Tum Restaurant	Massage Studio	Café	Shopping Mall	Food Truck
2	สะพานสูง	Thai Restaurant	Coffee Shop	Japanese Restaurant	Noodle House	Café	Convenience Store	Restaurant	Pharmacy	Pub	Lake
2	สมพันธวงศ์	Coffee Shop	Noodle House	Dessert Shop	Thai Restaurant	Hotel	Art Gallery	Hotel Bar	Bar	Chinese Restaurant	Café
3	สาทร	Noodle House	Asian Restaurant	Convenience Store	Chinese Restaurant	Thai Restaurant	Dessert Shop	Bar	Hotel	Park	Café
1	สายไหม	Thai Restaurant	Convenience Store	Market	Diner	Noodle House	Athletics & Sports	Gym / Fitness Center	Coffee Shop	Lake	Bar
1	หนองจอก	Noodle House	Shopping Mall	Thai Restaurant	Big Box Store	Flea Market	Food Court	Doctor's Office	Snack Place	Bookstore	Supermarket
1	หนองแขม	Convenience Store	Market	Café	Bar	Chinese Restaurant	Fast Food Restaurant	Thai Restaurant	Som Tum Restaurant	Fried Chicken Joint	Dessert Shop
1	หลักสี่	Thai Restaurant	Coffee Shop	Convenience Store	Fast Food Restaurant	Food Court	Dumpling Restaurant	Japanese Restaurant	Steakhouse	Bar	Canal
1	ห้วยขวาง	Thai Restaurant	Noodle House	Convenience Store	Japanese Restaurant	Dessert Shop	Hotel	Som Tum Restaurant	BBQ Joint	Chinese Restaurant	Seafood Restaurant

What is each clusters?



Cluster 0 : Group of District which have main Intersection venue

Neighborhood	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
มีนบุรี	Intersection	Restaurant	Bus Station	Thai Restaurant	Massage Studio	Coffee Shop	Duty-free Shop	Donut Shop	Garden	Gaming Cafe

Cluster 1 : Group of District which have main Convenience Store venue

Neighborhood	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
บางบอน	1	Noodle House	Coffee Shop	Convenience Store	Thai Restaurant	Garden Center	Spa	Fast Food Restaurant	Gas Station	Café	Chinese Restaurant
บางคอแหลม	1	Thai Restaurant	Coffee Shop	Noodle House	Convenience Store	Asian Restaurant	Chinese Restaurant	Seafood Restaurant	Pub	Som Tum Restaurant	Bus Stop
บางพลัด	1	Convenience Store	Café	Fast Food Restaurant	Thai Restaurant	Seafood Restaurant	Coffee Shop	Flea Market	Restaurant	Cocktail Bar	Other Repair Shop
ปีงกุ่ม	1	Coffee Shop	Café	Convenience Store	Supermarket	Bakery	Park	Flea Market	Food Truck	Noodle House	Thai Restaurant
จอมทอง	1	Thai Restaurant	Convenience Store	Coffee Shop	Asian Restaurant	Pet Store	Plaza	Flea Market	Electronics Store	Restaurant	Food Truck
ดินแดง	1	Convenience Store	Noodle House	Thai Restaurant	Sports Club	Dessert Shop	Gym / Fitness Center	Satay Restaurant	Market	Flea Market	Sporting Goods Shop
ดอนเมือง	1	Thai Restaurant	Convenience Store	Hotel	Airport Service	Restaurant	Food Truck	Coffee Shop	Sushi Restaurant	Flea Market	Chinese Restaurant
ห้วยขวาง	1	Thai Restaurant	Noodle House	Convenience Store	Japanese Restaurant	Dessert Shop	Hotel	Som Tum Restaurant	BBQ Joint	Chinese Restaurant	Seafood Restaurant
คลองเตย	1	Convenience Store	Coffee Shop	Food Truck	Recording Studio	Bar	Residential Building (Apartment / Condo)	Noodle House	Chinese Restaurant	Canal	Shopping Mall
หลักสี่	1	Thai Restaurant	Coffee Shop	Convenience Store	Fast Food Restaurant	Food Court	Dumpling Restaurant	Japanese Restaurant	Steakhouse	Bar	Canal
ลาดกระบัง	1	Thai Restaurant	Hotel	Café	Convenience Store	Som Tum Restaurant	Bar	Pizza Place	Restaurant	Coffee Shop	Flea Market
หนองจอก	1	Noodle House	Shopping Mall	Thai Restaurant	Big Box Store	Flea Market	Food Court	Doctor's Office	Snack Place	Bookstore	Supermarket
หนองแขม	1	Convenience Store	Market	Café	Bar	Chinese Restaurant	Fast Food Restaurant	Thai Restaurant	Som Tum Restaurant	Fried Chicken Joint	Dessert Shop
พระโขนง	1	Convenience Store	Hotel	Coffee Shop	Noodle House	Fast Food Restaurant	Italian Restaurant	Bakery	Pharmacy	Chinese Restaurant	Ice Cream Shop
ป้อมปราบศัตรูพ่าย	1	Noodle House	Café	Thai Restaurant	Convenience Store	Asian Restaurant	Chinese Restaurant	Hotel	Museum	Coffee Shop	Historic Site
สายไหม	1	Thai Restaurant	Convenience Store	Market	Diner	Noodle House	Athletics & Sports Fitness Center	Coffee Shop	Lake	Bar
ดลنجขัน	1	Convenience Store	Noodle House	Coffee Shop	Thai Restaurant	Seafood Restaurant	Restaurant	Bakery	Badminton Court	Chinese Restaurant	Asian Restaurant
ทุ่งครุ	1	Convenience Store	Thai Restaurant	Noodle House	Coffee Shop	Café	Som Tum Restaurant	Bakery	BBQ Joint	Snack Place	Stadium

Cluster 2 : Group of District which have main Coffee Shop and Cafe venue

Neighborhood	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
บางกะปิ	2	Coffee Shop	Japanese Restaurant	Som Tum Restaurant	Noodle House	Thai Restaurant	Steakhouse	Clothing Store	Fast Food Restaurant	BBQ Joint	Ramen Restaurant
บางเขน	2	Convenience Store	Coffee Shop	Fast Food Restaurant	Noodle House	Hotpot Restaurant	Asian Restaurant	Bookstore	Steakhouse	Vietnamese Restaurant	Ice Cream Shop
บางซื่นทียน	2	Thai Restaurant	Japanese Restaurant	Coffee Shop	Café	Steakhouse	Hotpot Restaurant	Pizza Place	Dessert Shop	Bakery	Som Tum Restaurant
บางรัก	2	Noodle House	Thai Restaurant	Chinese Restaurant	Hotel	Café	Seafood Restaurant	Coffee Shop	Japanese Restaurant	Hostel	Shopping Mall
จตุจักร	2	Coffee Shop	Thai Restaurant	Fast Food Restaurant	Noodle House	Japanese Restaurant	Flea Market	Gym / Fitness Center	Convenience Store	Café	Shabu-Shabu Restaurant
ดันนาภิวัฒน์	2	Thai Restaurant	Japanese Restaurant	Coffee Shop	Bakery	Som Tum Restaurant	Noodle House	Clothing Store	Pizza Place	Ice Cream Shop	Shopping Mall
คลองสามวา	2	Exhibit	Restaurant	Thai Restaurant	Japanese Restaurant	Noodle House	Pub	Grocery Store	Zoo	Dessert Shop	Coffee Shop
คลองสาน	2	Coffee Shop	Dessert Shop	Noodle House	Chinese Restaurant	Thai Restaurant	Art Gallery	Hotel Bar	Café	Restaurant	Hotel
ลาดพร้าว	2	Noodle House	Coffee Shop	Convenience Store	Thai Restaurant	Café	BBQ Joint	Restaurant	Asian Restaurant	Som Tum Restaurant	Bookstore
ปทุมวัน	2	Noodle House	Asian Restaurant	Chinese Restaurant	Hostel	Hotel	Dessert Shop	Thai Restaurant	Seafood Restaurant	Coffee Shop	BBQ Joint
ภาษีเจริญ	2	Thai Restaurant	BBQ Joint	Japanese Restaurant	Coffee Shop	Convenience Store	Fast Food Restaurant	Steakhouse	Shopping Mall	Ice Cream Shop	Asian Restaurant
พญาไท	2	Café	Thai Restaurant	Coffee Shop	Bar	Japanese Restaurant	Restaurant	Sushi Restaurant	Noodle House	Hotel	Som Tum Restaurant
พระนคร	2	Thai Restaurant	Hotel	Café	Asian Restaurant	Bar	Noodle House	Massage Studio	Vegetarian / Vegan Restaurant	Spa	Hostel
ราชบูรณะ	2	Noodle House	Coffee Shop	Thai Restaurant	Hotpot Restaurant	Chinese Restaurant	Seafood Restaurant	Restaurant	Fast Food Restaurant	Steakhouse	BBQ Joint
ราชเทวี	2	Noodle House	Hotel	Thai Restaurant	Coffee Shop	Hostel	Steakhouse	Japanese Restaurant	Convenience Store	Café	Massage Studio
สัมพันธวงศ์	2	Coffee Shop	Noodle House	Dessert Shop	Thai Restaurant	Hotel	Art Gallery	Hotel Bar	Bar	Chinese Restaurant	Café
สะพานสูง	2	Thai Restaurant	Coffee Shop	Japanese Restaurant	Noodle House	Café	Convenience Store	Restaurant	Pharmacy	Pub	Lake
วังทองหลาง	2	Coffee Shop	Convenience Store	Café	Noodle House	Thai Restaurant	Asian Restaurant	Restaurant	Pizza Place	Department Store	Fast Food Restaurant
วัฒนา	2	Café	Coffee Shop	Noodle House	Japanese Restaurant	Thai Restaurant	Hotel	Bar	Shabu-Shabu Restaurant	Supermarket	Asian Restaurant
ยานนาวา	2	Thai Restaurant	Japanese Restaurant	Coffee Shop	Hotpot Restaurant	Café	Steakhouse	Seafood Restaurant	Fast Food Restaurant	Convenience Store	BBQ Joint

Cluster 3 : Group of District which have main Noodle House venue

Neighborhood	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
บางแค	3	Convenience Store	Noodle House	Japanese Restaurant	Shopping Mall	Flea Market	Track	Shop & Service	Food Truck	Miscellaneous Shop	Thai Restaurant
บางนา	3	Noodle House	Café	Asian Restaurant	Coffee Shop	Thai Restaurant	Pier	Supermarket	Convenience Store	Electronics Store	Seafood Restaurant
บางซื่อ	3	Noodle House	Thai Restaurant	Convenience Store	Train Station	Ice Cream Shop	Asian Restaurant	Coffee Shop	Fast Food Restaurant	Hotpot Restaurant	Restaurant
บางกอกน้อย	3	Noodle House	Convenience Store	Som Tum Restaurant	Asian Restaurant	Thai Restaurant	Coffee Shop	Chinese Restaurant	Steakhouse	Park	Mobile Phone Shop
บางกอกใหญ่	3	Noodle House	Asian Restaurant	Convenience Store	Train Station	Seafood Restaurant	Coffee Shop	Farmers Market	Dessert Shop	Gym	Restaurant
ดุสิต	3	Noodle House	Thai Restaurant	Convenience Store	Asian Restaurant	Café	Som Tum Restaurant	Coffee Shop	Palace	Bar	Chinese Restaurant
ประเวศ	3	Noodle House	Convenience Store	Soccer Field	Toll Booth	Coffee Shop	Gym / Fitness Center	Outdoor Gym	Halal Restaurant	Pet Store	Electronics Store
สาทร	3	Noodle House	Asian Restaurant	Convenience Store	Chinese Restaurant	Thai Restaurant	Dessert Shop	Bar	Hotel	Park	Café
สวนหลวง	3	Noodle House	Coffee Shop	Thai Restaurant	Asian Restaurant	Convenience Store	Som Tum Restaurant	Massage Studio	Café	Shopping Mall	Food Truck
ทวีวัฒนา	3	Coffee Shop	Noodle House	Convenience Store	Asian Restaurant	Music Venue	Bakery	Clothing Store	Chinese Restaurant	Flea Market	Diner
ธนบุรี	3	Noodle House	Convenience Store	Asian Restaurant	Train Station	Thai Restaurant	Seafood Restaurant	Café	Supermarket	Bubble Tea Shop	Soup Place

Population for each cluster

This data tells we have female more than male in every cluster around 6% and show amount of people in each cluster

Cluster Labels	Male	Female	Total	House
0	0.47	0.53	142586	0.43
1	0.47	0.53	2231569	0.51
2	0.47	0.53	2051343	0.57
3	0.47	0.53	1240766	0.53

Discussions

My result is depend on area around coordinate input from Foursquare API .It doesn't have all venue in each district but only around 500 meter from coordinate input.And my analysis is not predictive or regression model but use to support in decision. I can't conclude that you show open this in that place or in that district

But I want you to see overall picture what almost people open in each districts to be guide line for you to create business model for your own.

Conclusion

From our result, I know top venue categories and district clusters area in Bangkok after that I want to know, if I'm a new contractor is trying to start my own business, Which venue categories and district clusters area should I open?

I have many ways to decide which venue category I should open.

For about Category

If I have no choice in mind,

- * I can start with top category like Noodle House,Thai Restaurant,Coffee Shop or Convenience Store. On the other hand,
- * I can start with non-popular category like Hainan Restaurant,Gaming Cafe or Organic Grocery.

For about District

If I decide to open Noodle house,I have many way to decide too.

- * I can open at cluster labels number 3 which has the most amount of Noodle house venues in Bangkok.
- * I can open at some district in other cluster which hasn't many Noodle house venue like สายไหม ,บางพลัด or มีนบุรี.
- * I can open at some district which my venue have influence.Example, I know in cluster 2 most popular categories are cafe and coffee shop so I can open import coffee beans shop in this cluster.

For about Population

- * In every clusters in Bangkok have female more than male around 6%, so It will be useful for female's product.