BKK coffee

Introduction/Business Problem

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- Coffee shop owner in Phaya Thai wants to find location for her new branches

- Criteria of a district
  - Population age 18-40 above average
  - Top 10 Population age 18-40 per 1 coffee shop (including her one)
  - Similar venue characteristics to Phaya Thai
  - If more than 1 district that fit all criteria, pick the one with most population age 18-40 per 1 coffee shop (including her one)
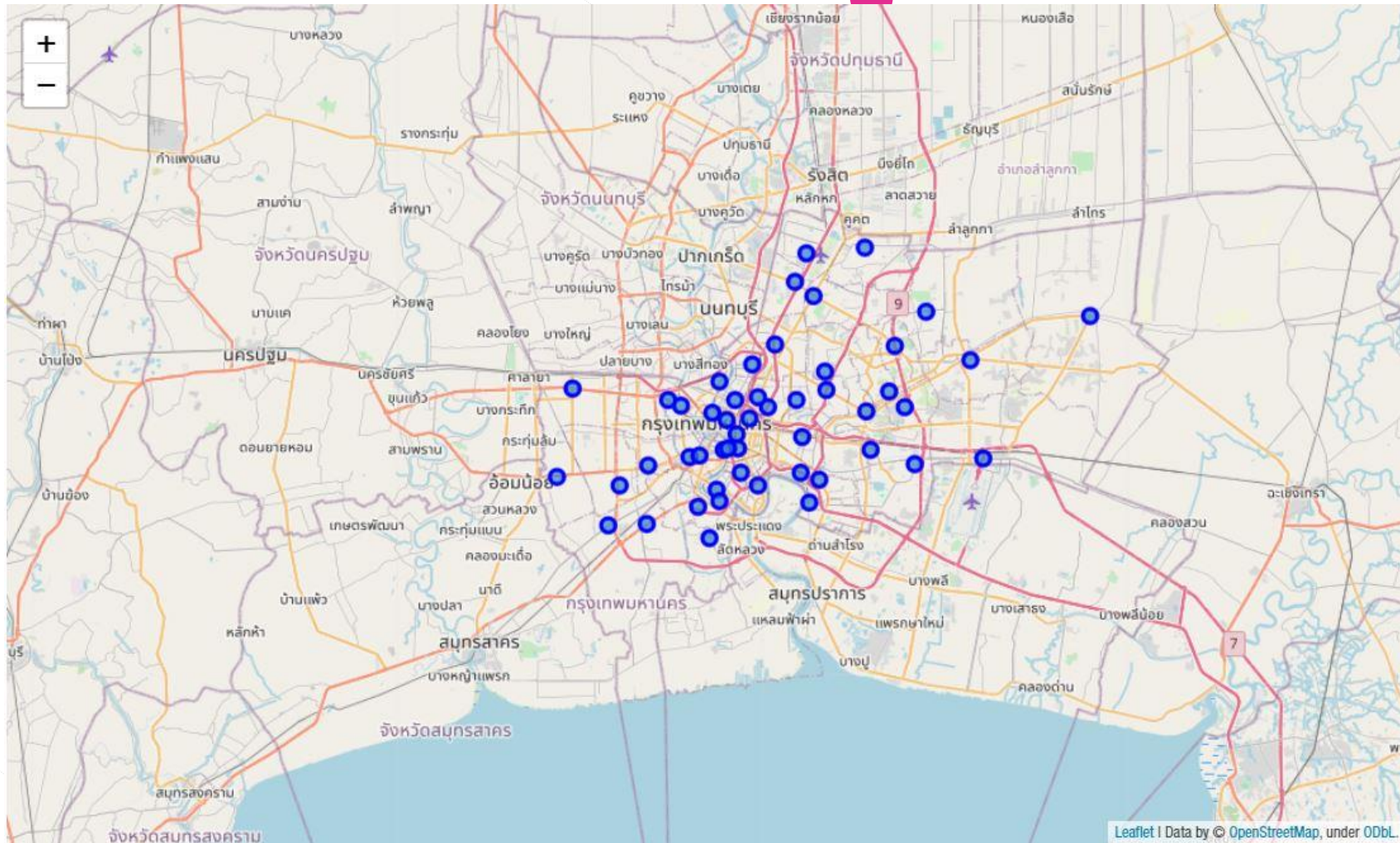
Data

- Wikipedia - List of districts of Bangkok
  - Name, latitude and longitude

- Official Statistics Registration of Thailand
  - number of population in each district group by age.

- FoursquareAPI
  - Name, category, latitude longitude of venues

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Methodology

- Stage 1
- The data of number of population in each district of Bangkok group by age was pooled and clean and merge with the data from Wikipedia.
- There are 50 districts in Bangkok

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	District	Latitude	Longitude	Population18_40
0	Bang Bon	13.6592	100.3991	33565
1	Bang Kapi	13.76583	100.6478	46041
2	Bang Khae	13.69611	100.4094	62257
3	Bang Khen	13.87389	100.5964	61167
4	Bang Kho Laem	13.69333	100.5025	25477
5	Bang Khun Thian	13.66083	100.4358	61456
6	Bang Na	13.68008	100.5918	29449
7	Bang Phlat	13.79389	100.505	27858
8	Bang Rak	13.73083	100.5242	10924
9	Bang Sue	13.80972	100.5372	38954
10	Bangkok Noi	13.77087	100.4679	31408
11	Bangkok Yai	13.72278	100.4764	20839
12	Bueng Kum	13.78528	100.6692	44623
13	Chatuchak	13.82861	100.5597	50305
14	Chom Thong	13.67722	100.4847	47742
15	Din Daeng	13.76972	100.5528	36669
16	Don Mueang	13.91361	100.5897	60739
17	Dusit	13.77694	100.5206	28227
18	Huai Khwang	13.77667	100.5794	29568
19	Khan Na Yao	13.8271	100.6743	28308
20	Khlong Sam Wa	13.85972	100.7042	67490
21	Khlong San	13.73028	100.5097	20415
22	Khlong Toei	13.70806	100.5839	31062
23	Lak Si	13.8875	100.5789	33504
24	Lat Krabang	13.72232	100.7597	60729
25	Lat Phrao	13.80361	100.6075	36377
26	Min Buri	13.81389	100.7481	45691
27	Nong Chok	13.85556	100.8625	59228
28	Nong Khaem	13.70472	100.3489	50783
29	Pathum Wan	13.74494	100.5222	13543
30	Phasi Charoen	13.71472	100.4372	40079
31	Phaya Thai	13.78	100.5428	22875
32	Phra Khanong	13.70222	100.6017	29393
33	Phra Nakhon	13.76444	100.4992	13291
34	Pom Prap Sattru Phai	13.75806	100.5131	11602
35	Prawet	13.71694	100.6944	59059
36	Rat Burana	13.68222	100.5056	25149
37	Ratchathewi	13.75889	100.5344	21085
38	Sai Mai	13.91917	100.6458	66690
39	Samphanthawong	13.73139	100.5142	6068
40	Saphan Sung	13.77	100.6847	30840
41	Sathon	13.70806	100.5264	22426
42	Suan Luang	13.73028	100.6514	41484
43	Taling Chan	13.77694	100.4567	31932
44	Thawi Watthana	13.7878	100.3638	24147
45	Thon Buri	13.725	100.4858	33565
46	Thung Khru	13.6472	100.4958	39991
47	Wang Thonglang	13.7864	100.6087	33944
48	Watthana	13.74222	100.5858	20433
49	Yan Nawa	13.69694	100.5431	24005

The map of Bangkok districts

Methodology (Continue)

Stage 2

Use data from Foursquare API, limited only 200 venues, within radius 1500 m from center of each district

Selected only venues with 'Coffee shop' category and show number of coffee shops in each district

There are total 288 coffee shops acquired

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	District	Coffee shop
0	Bang Bon	3
1	Bang Kapi	10
2	Bang Khae	2
3	Bang Khen	4
4	Bang Kho Laem	9
5	Bang Khun Thian	10
6	Bang Na	4
7	Bang Phlat	5
8	Bang Rak	6
9	Bang Sue	3
10	Bangkok Noi	4
11	Bangkok Yai	3
12	Bueng Kum	5
13	Chatuchak	13
14	Chom Thong	3
15	Din Daeng	9
16	Don Mueang	10
17	Dusit	7
18	Huai Khwang	4
19	Khan Na Yao	5
20	Khlong Sam Wa	3
21	Khlong San	4
22	Khlong Toei	14
23	Lak Si	11
24	Lat Krabang	0
25	Lat Phrao	10
26	Min Buri	3
27	Nong Chok	4
28	Nong Khaem	1
29	Pathum Wan	4
30	Phasi Charoen	5
31	Phaya Thai	10
32	Phra Khanong	9
33	Phra Nakhon	3
34	Pom Prap Sattru Phai	2
35	Prawet	0
36	Rat Burana	9
37	Ratchathewi	7
38	Sai Mai	1
39	Samphanthawong	5
40	Saphan Sung	8
41	Sathon	6
42	Suan Luang	8
43	Taling Chan	5
44	Thawi Watthana	3
45	Thon Buri	6
46	Thung Khru	5
47	Wang Thonglang	9
48	Watthana	9
49	Yan Nawa	5
	Sum	288

Methodology (Continue)

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- Stage 3
- Use data from Foursquare API again, but this time use number of distinct categories in each district, to find the frequency and characteristics of venues in each one.
- Number of all venues collected: 3927
- Then, in each district, the data will be grouped by venue category. Frequency of venue category in one hot encoding form is used to analyze the characteristics of venues in each district.
- Afterwards, Bangkok districts will be clustered by K-mean clustering. Using 6 as number of clusters. Districts that are in a same cluster as Phaya Thai will be assumed to have similar characteristics to Phaya Thai
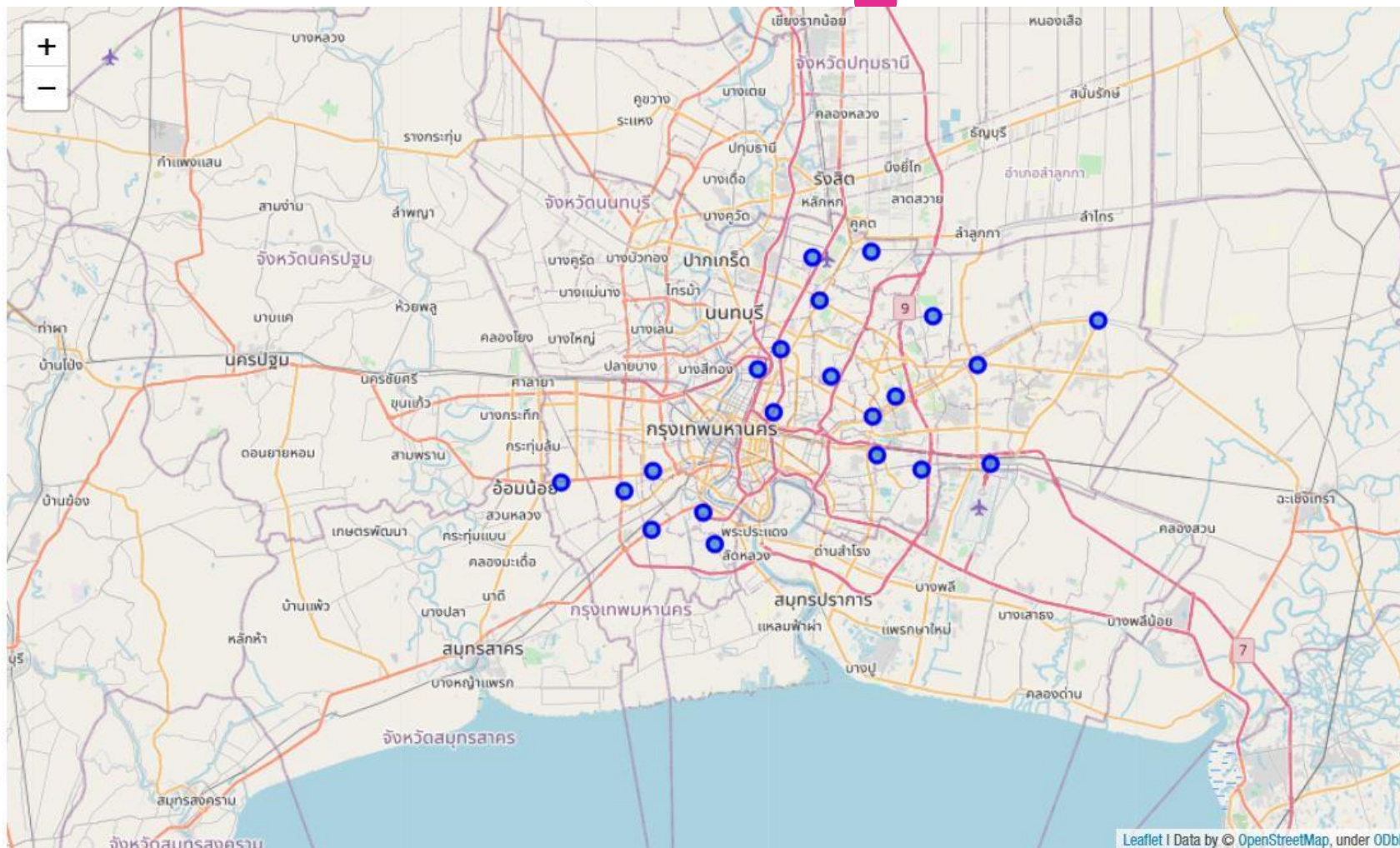
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The district(s) that met
- all criteria will be
selected as a result

Results (1)

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	District	Population18_40
1	Bang Kapi	46041
2	Bang Khae	62257
3	Bang Khen	61167
4	Bang Khun Thian	61456
5	Bang Sue	38954
6	Bueng Kum	44623
7	Chatuchak	50305
8	Chom Thong	47742
9	Din Daeng	36669
10	Don Mueang	60739
11	Khlong Sam Wa	67490
12	Lat Krabang	60729
13	Lat Phrao	36377
14	Min Buri	45691
15	Nong Chok	59228
16	Nong Khaem	50783
17	Phasi Charoen	40079
18	Prawet	59059
19	Sai Mai	66690
20	Suan Luang	41484
21	Thung Khru	39991

- Table : Population age 18-40 above average

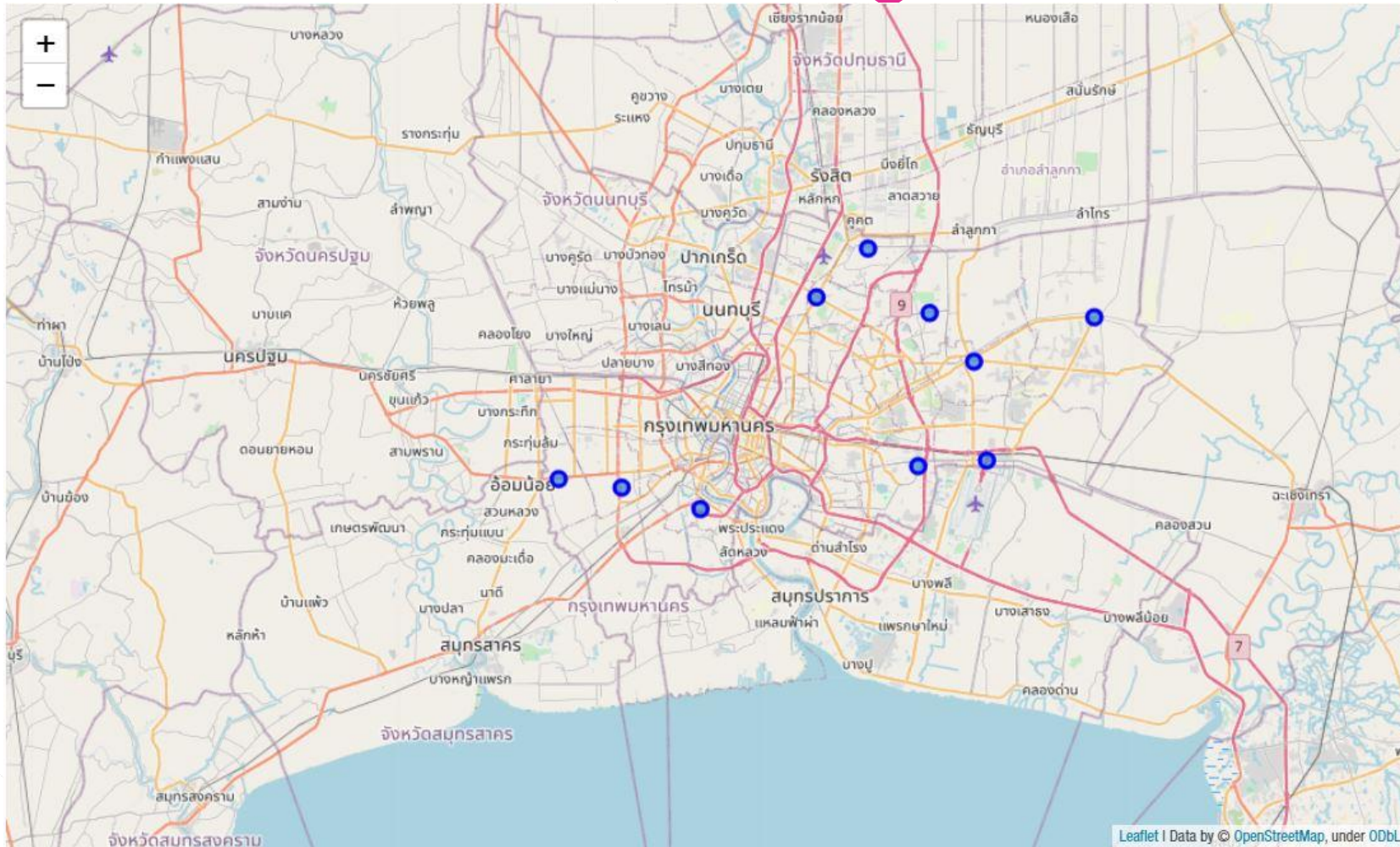# Location of districts which have above average population

Results (2)

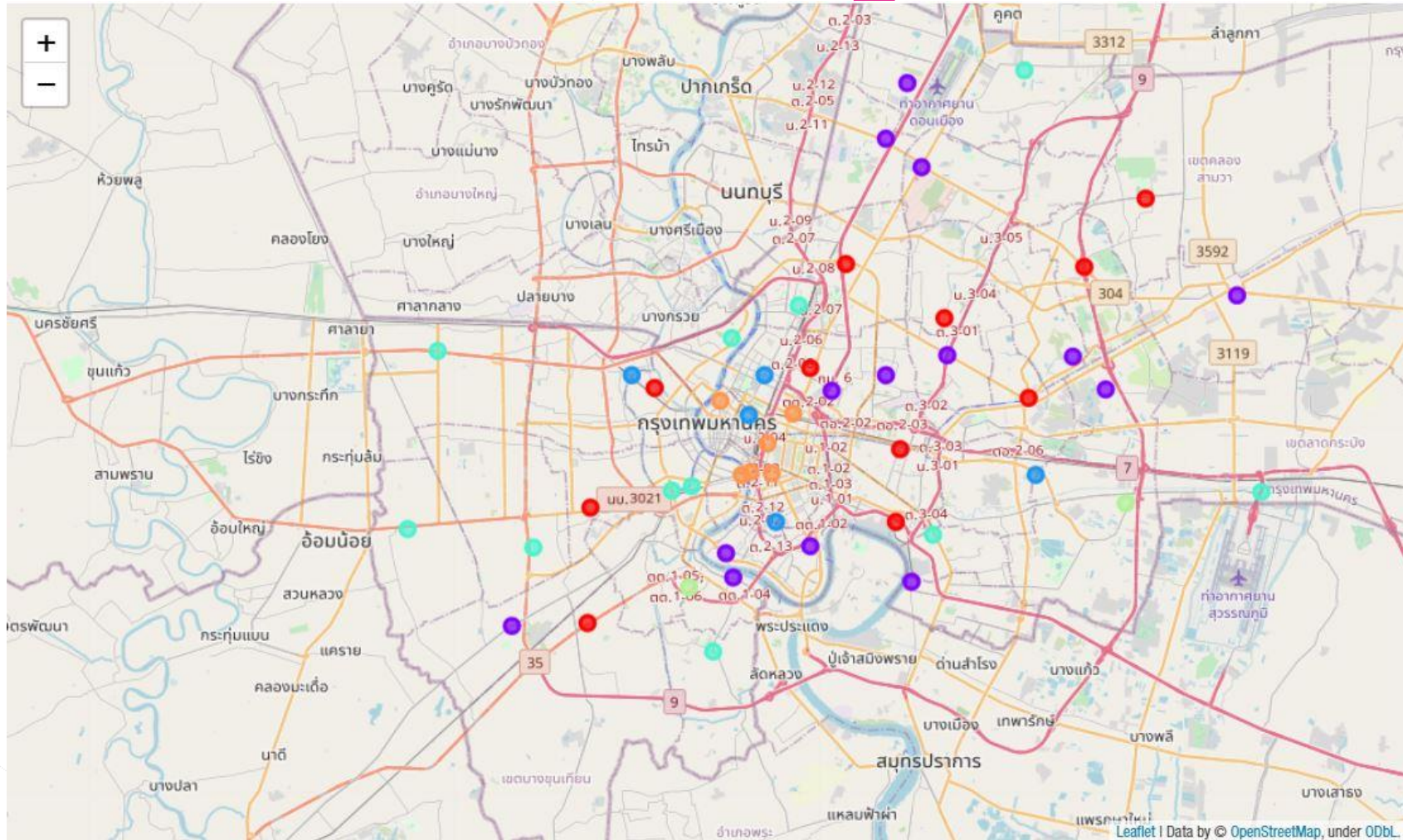|	District	Population18_40	Coffee shop	Including her	Per Person
1	Lat Krabang	60729	0	1	60729
2	Prawet	59059	0	1	59059
3	Sai Mai	66690	1	2	33345
4	Nong Khaem	50783	1	2	25391.5
5	Bang Khae	62257	2	3	20752.33
6	Khlong Sam Wa	67490	3	4	16872.5
7	Bang Khen	61167	4	5	12233.4
8	Chom Thong	47742	3	4	11935.5
9	Nong Chok	59228	4	5	11845.6
10	Min Buri	45691	3	4	11422.75

- Table : Top 10 Population age 18-40 per coffee shop including her one

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Location of district with top 10 Population age 18-40 per coffee shop including her one

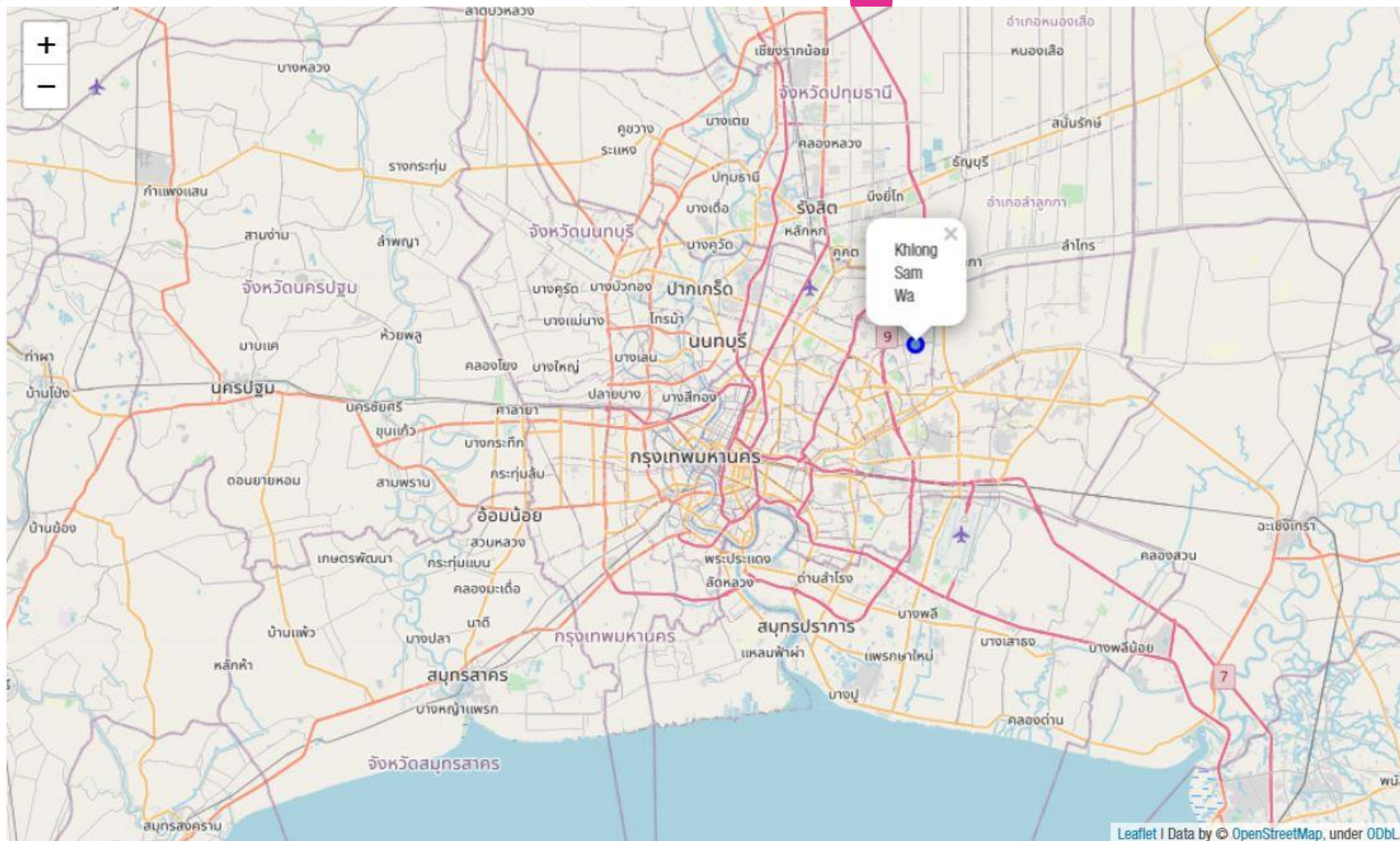# 3) The map shows result after clustering Bangkok districts into 6 clusters

Result (3)

- Phaya Thai is in cluster label 1.
- The districts in cluster label 1 are Bang Kapi, Bangkok Noi, Chatuchak, Khan Na Yao, Khlong Sam Wa, Khlong Toei, Lat Phrao, Phasi Charoen, Phaya Thai, and Watthana

The district that met all criteria is 'Khlong Sam Wa'

Discussion

From the results, the following recommendations can be made:

- There is only 1 district that fits all criteria, that is 'Khlong Sam Wa', Hence, it is the recommended location for this client

- Other choices to consider are Lat Krabang and Prawet since these 2 have no already existing coffee shop in this data frame

- From the observation, the districts with more population and less already existed coffee shops are mostly situated at outskirts of Bangkok

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Discussion

There are some points to concern of when using this data and study

- The data from foursquareAPI is limited to only 200 venues per district and only within a radius of 1500 metres.

- There is no data on coffee carts which are common in bangkok.

- Seeing that there are many types of coffee shops and a wide range of prices per 1 cup, the next evaluation should include the price of location, GDP, and more information of each district.

- This study was created during the COVID-19 crisis and it affects economics around the world including Bangkok, leading to a change in the number of shops and venues in Bangkok. Thus, the study should be performed again after this situation subsides.

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Conclusion

- The best location for this client's next coffee shop branch is 'Khlong Sam Wa' based on population, coffee shops and other venues of each district. Next appropriate choices are Lat Krabang and Prawet.

- This study is limited due to some reasons and it should be performed again to follow the trend of economics around the world.

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