

Where to open an Italian restaurant in Tokyo metropolitan area

NING LI

April,25 2019

1 Introduction

1.1 Background

Tokyo metropolitan area is a bustling area consisting of 23 districts and dozens of surrounding municipalities. The 23 districts area is the heart of Tokyo with nearly 10 million residents as well as lots of business activities[1].

Many businesses decide to set up shop in 23 districts area because of its large population, multicultural atmosphere as well as its astonishingly well-developed infrastructures which are essential for business development.

1.2 Problem

This project is based on an assumption that a business entity has decided to open an Italian restaurant in Tokyo. However, the stakeholders can't decide which district serves as the optimal location for them.

In order to help with them make the decision, I will utilize Foursquare location data to explore and cluster various venues in each of 23 districts in Tokyo.

The output should be a whole picture from which one can observe the following:

- ① Districts sorted with most venues,
- ② Types of venues located in those respective districts
- ③ The clustered map output

1.3 Interest

Although the above assumption is to open an Italian restaurant, the analysis performed in this project should generally interest any entrepreneur who wants to establish a business in Tokyo 23 district area since it presents an overall understanding of types of venues located in each district.

2 Data

2.1 Data Sources

The longitude and latitude data used in this analysis were downloaded from [Geospatial Information Authority of Japan](#)[2].

In order to present a complete picture number of residents by district was also presented as a histogram. The statistics was published by Tokyo Metropolitan Office.

Venue exploration was carried using Foursquare API.

2.2 Sample Data

For example the longitude and latitude dataset prepared for Foursquare will look like those shown in Table 1.

Table 1 Longitude and latitude dataset processed for Foursquare Analysis

	District Name	Longitude	Latitude
0	Chiyoda	139.75361	35.69389
1	Chuo	139.77222	35.67083
2	Minato	139.75167	35.65806
.	.	.	.
.	.	.	.
.	.	.	.

3. Exploratory data analysis

3.1 Create a map with 23 districts markers

First, a dataframe was created containing all the latitude, longitude data of 23 districts. Then a map was created with blue markers showing the 23 districts.

The map is shown in Figure 1.

Figure 2 A sample of sorted top 5 popular venues of each district.

3.3 Group data to show top popular venues in all the districts

Finally group the data to present categories of top 10 most popular venues in all the 23 districts. A part of output result is shown as following:

	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	adachi	Convenience Store	Bus Stop	Grocery Store	Intersection	Restaurant	Ramen Restaurant	Donburi Restaurant	BBQ Joint	Furniture / Home Store	Music Venue
1	arakawa	Convenience Store	Park	Bus Stop	Tram Station	General Entertainment	Café	Indian Restaurant	Intersection	Italian Restaurant	Chinese Restaurant
2	bunkyo	Baseball Stadium	Convenience Store	Ramen Restaurant	Coffee Shop	Café	Concert Hall	Italian Restaurant	Japanese Restaurant	BBQ Joint	Korean Restaurant
3	chiyoda	Convenience Store	Café	Ramen Restaurant	Coffee Shop	Chinese Restaurant	Historic Site	Japanese Curry Restaurant	Japanese Restaurant	Sake Bar	Dumpling Restaurant
4	chuo	Japanese Restaurant	Coffee Shop	Ramen Restaurant	Soba Restaurant	Sushi Restaurant	Italian Restaurant	Convenience Store	Hotel	Wine Bar	Kaiseki Restaurant

Figure 3 Partial output of top 10 most popular venues in all 23 districts.

3.4 Cluster districts and create a clustered map

With all the data in hand, the districts were clustered into 5 clusters by similarity in the categories of popular venues. The created map is shown in Figure 4.

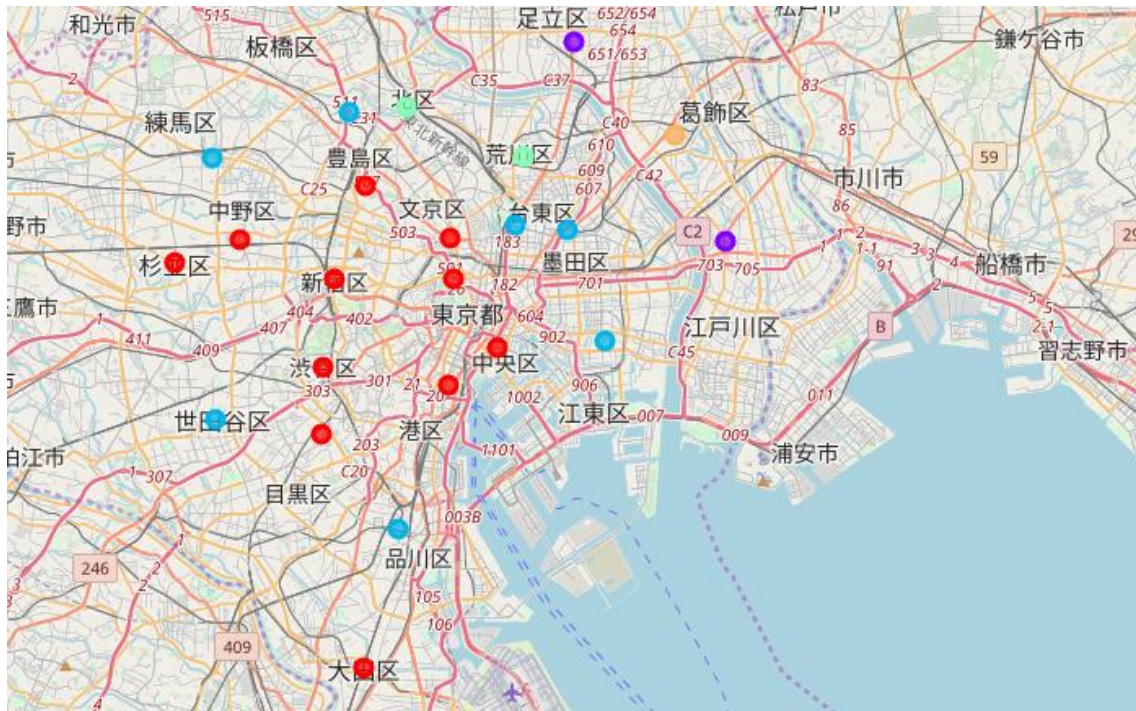


Figure 4 Clustered districts shown in the map

The categories of top 10 most popular venues for each cluster are shown in

Figure 5-9.

	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	chiyoda	0	Convenience Store	Café	Ramen Restaurant	Coffee Shop	Chinese Restaurant	Historic Site	Japanese Curry Restaurant	Japanese Restaurant	Sake Bar	Dumpling Restaurant
1	chuo	0	Japanese Restaurant	Coffee Shop	Ramen Restaurant	Soba Restaurant	Sushi Restaurant	Italian Restaurant	Convenience Store	Hotel	Wine Bar	Kaiseki Restaurant
2	minato	0	Japanese Restaurant	BBQ Joint	Chinese Restaurant	Convenience Store	Yoshoku Restaurant	Ramen Restaurant	Park	Coffee Shop	Tonkatsu Restaurant	Steakhouse
3	shinjuku	0	Bar	Sake Bar	Ramen Restaurant	BBQ Joint	Japanese Restaurant	Yakitori Restaurant	Soba Restaurant	Chinese Restaurant	Shabu-Shabu Restaurant	Rock Club
4	bunkyo	0	Baseball Stadium	Convenience Store	Ramen Restaurant	Coffee Shop	Café	Concert Hall	Italian Restaurant	Japanese Restaurant	BBQ Joint	Korean Restaurant
9	meguro	0	Japanese Restaurant	Café	BBQ Joint	Italian Restaurant	Ramen Restaurant	Coffee Shop	French Restaurant	Yakitori Restaurant	Thai Restaurant	Bakery
10	ota	0	Ramen Restaurant	Sake Bar	Japanese Restaurant	Chinese Restaurant	Bed & Breakfast	Tonkatsu Restaurant	Italian Restaurant	Sushi Restaurant	Steakhouse	Noodle House
12	shibuya	0	Café	Record Shop	Ramen Restaurant	Rock Club	Nightclub	Clothing Store	Japanese Restaurant	Furniture / Home Store	Chinese Restaurant	BBQ Joint
13	nakano	0	Ramen Restaurant	Sake Bar	Japanese Restaurant	Bar	Café	Italian Restaurant	Japanese Curry Restaurant	Theater	BBQ Joint	Convenience Store
14	suginami	0	Coffee Shop	Shopping Mall	Ramen Restaurant	Café	Italian Restaurant	Chinese Restaurant	Grocery Store	Sushi Restaurant	Shabu-Shabu Restaurant	BBQ Joint
15	toyoshima	0	Ramen Restaurant	Sake Bar	Japanese Restaurant	Café	Sushi Restaurant	Coffee Shop	Pizza Place	Pet Café	Bookstore	Bar

Figure 5 categories of top 10 most popular venues for first cluster

	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
20	adachi	1	Convenience Store	Bus Stop	Grocery Store	Intersection	Restaurant	Ramen Restaurant	Donburi Restaurant	BBQ Joint	Furniture / Home Store	Music Venue
22	edokawa	1	Convenience Store	Grocery Store	Unagi Restaurant	Restaurant	Electronics Store	Concert Hall	Clothing Store	Furniture / Home Store	Bus Stop	Park

Figure 6 categories of top 10 most popular venues for second cluster

	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
5	daito	2	Convenience Store	Sake Bar	Ramen Restaurant	Hotel	Art Museum	Bookstore	Bath House	Café	Soba Restaurant	Cocktail Bar
6	sumida	2	Convenience Store	Japanese Restaurant	Unagi Restaurant	Soba Restaurant	Sake Bar	Café	Coffee Shop	Ramen Restaurant	Wagashi Place	Park
7	koto	2	Convenience Store	Coffee Shop	Ramen Restaurant	Sake Bar	Japanese Restaurant	Donburi Restaurant	Chinese Restaurant	Supermarket	Park	Japanese Curry Restaurant
8	shinagawa	2	Convenience Store	Ramen Restaurant	Donburi Restaurant	Chinese Restaurant	Italian Restaurant	Coffee Shop	Japanese Restaurant	Sake Bar	Diner	Theater
11	setagaya	2	Convenience Store	Café	Ramen Restaurant	Sake Bar	Tram Station	Park	Bakery	Bath House	Shanghai Restaurant	Beer Bar
18	itahashi	2	Convenience Store	Ramen Restaurant	Japanese Restaurant	Shopping Mall	Noodle House	Grocery Store	Indian Restaurant	Dessert Shop	Drugstore	Sake Bar
19	nerima	2	Ramen Restaurant	Convenience Store	Grocery Store	Café	Sake Bar	Italian Restaurant	Coffee Shop	BBQ Joint	Chinese Restaurant	Boutique

Figure 7 categories of top 10 most popular venues for third cluster

	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
16	kita	3	Convenience Store	Ramen Restaurant	Intersection	Park	Theater	Japanese Restaurant	Coffee Shop	Soba Restaurant	Bed & Breakfast	Bath House
17	arakawa	3	Convenience Store	Park	Bus Stop	Tram Station	General Entertainment	Café	Indian Restaurant	Intersection	Italian Restaurant	Chinese Restaurant

Figure 8 categories of top 10 most popular venues for fourth cluster

	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
21	katsushika	4	Supermarket	Intersection	Convenience Store	Bus Stop	Discount Store	Sushi Restaurant	Office	Motorcycle Shop	Clothing Store	Grocery Store

Figure 9 categories of top 10 most popular venues for fifth cluster

3.5 Initial examination of clusters

A first examination of five clusters tells us that the second, fourth and fifth clusters can be discarded since the most popular venues in those clusters are less related to restaurants and bars.

A further examination of the first and third cluster reveals that in the third cluster, the most popular venue type is almost all listed as Convenience Store. This may be a negative factor since it means residents in this area may prefer grab-and-go than dining in a restaurant. Therefore, it seems the districts in the first cluster may be a more appropriate option to open an Italian restaurant.

3.6 Supplementary Population Data

In order to have better knowledge about the market situation in various districts.

A histogram was prepared as Figure 10 showing number of residents by district.

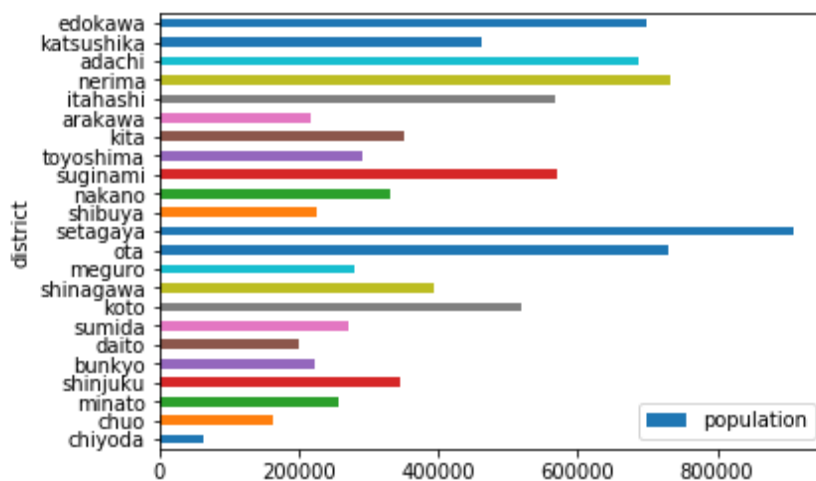


Figure 10 Number of residents by district.

From the above figure one can observe that Setagaya district has the largest population more than 800,000 and is followed by Ota and Nerima districts.

3.7 Further analysis and location decision

So it seems that Setagaya district is the most promising since it has the largest population. However, cluster analysis reveals that Setagaya district belongs to the Third Cluster and the most popular type of venue in this particular district is Convenience Store.

Furthermore, Ota district is located in the First Cluster and Nerima is located in the same Cluster as Setagaya.

Therefore, the final choice seems to fall between Setagaya and Ota districts. Let us have a closer look of the top 10 most popular types of venue in these two particular districts.

	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
10	ota	0	Ramen Restaurant	Sake Bar	Japanese Restaurant	Chinese Restaurant	Bed & Breakfast	Tonkatsu Restaurant	Italian Restaurant	Sushi Restaurant	Steakhouse	Noodle House
11	setagaya	2	Convenience Store	Café	Ramen Restaurant	Sake Bar	Tram Station	Park	Bakery	Bath House	Shanghai Restaurant	Beer Bar

Figure 11 Categories of Top 10 Most Popular Venues in Setagaya and Ota districts.

Nine of the top 10 most popular venues in Ota district are restaurants and bars and Italian restaurant is even ranked at No.7

On the other hand, Convenience Store, Tram Station, Park, Bath House are among those most popular venues in Setagaya. It seems residents in this area prefer a grab-and-go eating style and furthermore enjoy other types of activities for leisure.

Therefore, I will suggest to open the Italian restaurant in Ota district since people in this area enjoy immensely dining-out and already have somehow preference for Italian restaurant.

4. Discussion

The cluster analysis combined with population data present a more comprehensive analysis to carry out the judgement call. At first glance, Setagaya district appears to be the best candidate thanks to its large population hence bigger market. However, further cluster analysis revealed characteristics of popular venues in various districts which reflects behavior habits of residents of respective district. By combining multiple analysis methods we can have better understanding of the situation and make more informed decisions.

5. Conclusion

Although this analysis was carried out with assumption of selecting location for an Italian restaurant. The methodology and analysis should be applicable for other types of business ventures as well.

Reference

[1] Statistics data retrieved from Statistics of Tokyo website

<http://www.toukei.metro.tokyo.jp/juukiy/jy-index.htm>

[2] Longitude and latitude data retrieved from Geospatial Information

Authority of Japan

http://www.gsi.go.jp/KOKUJYOHO/CENTER/kendata/tokyo_heso.pdf