

In which neighborhood can I live in Gaziantep?

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1. Introduction

1.1. Description & Discussion of the Background

There are many factors that will determine which neighborhood you want to live in. for example; crowds, parks, restaurants or cafes affect our choice. For some of us, we would prefer less crowded or near hospitals. Gaziantep is one of the cities famous for its food culture. It is a city that is in the UNESCO cultural heritage at the moment (<https://en.unesco.org/creative-cities/gaziantep>). Promotional video <https://www.youtube.com/watch?v=V5gvWa7PWIM> This project will be grouped only by considering the social facilities and population crowds of the central neighborhoods in Gaziantep. Basic features will be determined for each group. It will help the neighborhood preferences that people want to live in.

2. Data acquisition and cleaning

2.1 Data

In this project, we need five types of data;

1. Neighborhood list
2. The population in each neighborhood
3. The venues in each neighborhood
4. The rent rate (TL/m2) in each neighborhood
5. The sales rate (TL/m2) in each neighborhood

From a web search, I got four sources:

1. www.nufusu.com/ilce/sehitkamil_gaziantep-nufusu (Neighborhood list and population)
2. "https://www.nufusu.com/ilce/sahinbey_gaziantep-nufusu" (Neighborhood list and population)
3. Foursquare API for getting venues place in neighborhoods
4. <https://www.endeksa.com/tr/> (rent rate & sales rate)

2.2 Getting Data

Firstly, I downloaded the neighborhood list of Şehitkamil and Şahinbey borough and the population density of 2019 as a pandas dataframe from the relevant web pages. Secondly, I combined the list and correct some neighborhood name. Thirdly, I downloaded Rent Rate and Sales Rate.

Then, I added it to neighborhoods database

Finally, I found latitude and longitude values of each neighborhood from "geopy.geocoders" module. Cleaned data is given in Figure 1.

Out[9]:

	year	borough	Neighborhood	populations	rent_rate	sales_rate	latitude	longitude
0	2019	Şehitkamil	Seyrantepe	31.038	8	1576	37.074184	37.419598
1	2019	Şehitkamil	Batıkent	29.010	12	2518	37.074242	37.332576
2	2019	Şehitkamil	Güvenevler	28.945	12	2622	37.091903	37.333514
3	2019	Şehitkamil	Atatürk	26.372	12	2507	37.061176	37.379309
4	2019	Şehitkamil	Belkız	20.784	8	1809	37.097496	37.420558
5	2019	Şehitkamil	Mevlana	19.313	5	1938	37.092528	37.384692
6	2019	Şehitkamil	Selimiye	19.312	6	2614	37.095641	37.379414
7	2019	Şehitkamil	8 Şubat	17.843	7	2243	37.091954	37.375211
8	2019	Şehitkamil	Zeytinli, Şehitkamil	17.338	7	2899	37.085517	37.361805
9	2019	Şehitkamil	Şirinevler	16.913	9	1571	37.063787	37.419635
10	2019	Şehitkamil	Burak	16.833	8	1627	37.097137	37.435348
11	2019	Şehitkamil	Karacaoğlan	15.847	8	1961	37.088012	37.385216
12	2019	Şehitkamil	Beykent	15.376	7	1432	37.124922	37.406337
13	2019	Şehitkamil	Göllüce	14.980	8	1600	37.073167	37.406395
14	2019	Şehitkamil	Eyüp Sultan	14.807	6	2442	37.084227	37.393945
15	2019	Şehitkamil	Değirmişem	14.735	10	1774	37.069393	37.364631
16	2019	Şehitkamil	Mücahitler	14.669	12	2189	37.078598	37.362943
17	2019	Şehitkamil	Onat Kutlar	14.576	7	2485	37.065969	37.372998
18	2019	Şehitkamil	Yukanbeylerbeyi	14.049	8	2003	37.125480	37.388549
19	2019	Şehitkamil	Merveşehir	13.966	8	1536	37.092007	37.392960
20	2019	Şahinbey	Karataş, Şahinbey	43.801	9	1744	37.015827	37.349222
21	2019	Şahinbey	Yeditepe	41.666	9	1744	37.036910	37.328316
22	2019	Şahinbey	Güneykent	40.255	13	1653	37.024714	37.318763
23	2019	Şahinbey	Şahintepe	39.921	9	1878	37.016005	37.336137
24	2019	Şahinbey	Güneş	33.648	9	1779	37.036226	37.360391
25	2019	Şahinbey	Akkent	29.447	10	1972	37.015383	37.374017
26	2019	Şahinbey	Bülbülzade	28.106	10	1805	37.027880	37.343983
27	2019	Şahinbey	Barak	24.669	7	1429	37.044899	37.415522
28	2019	Şahinbey	Vatan	23.852	5	1544	37.041977	37.403594
29	2019	Şahinbey	İstiklal	22.222	6	1677	37.047847	37.352559
30	2019	Şahinbey	Mavikent	21.453	9	1636	37.004709	37.383176
31	2019	Şahinbey	Konak, Şahinbey	19.227	7	1176	37.052359	37.341933
32	2019	Şahinbey	Onur	16.411	7	1602	37.044498	37.362841
33	2019	Şahinbey	Beydilli, Şahinbey	15.802	6	1617	37.045962	37.396819
34	2019	Şahinbey	Yeşilevler	15.268	5	1344	37.041598	37.344933
35	2019	Şahinbey	Dumlupınar	14.977	9	1872	37.037599	37.384007
36	2019	Şahinbey	60.Yıl	14.894	7	1379	37.046225	37.341767
37	2019	Şahinbey	Ertuğrulgazi	14.728	9	1772	37.042277	37.381095
38	2019	Şahinbey	75.Yıl	14.660	9	1693	37.037836	37.346088
39	2019	Şahinbey	Binevler	14.373	15	1829	37.051657	37.331170

Figure 1. Neighborhoods Data Frame Screenshot

In the second section, I used the Foursquare API in order to get the venue list in neighborhoods. In API, I arranged a radius is 1000 m and limit is 100. I convert request to the database. The screenshot is given in Figure 2.

Getting Avenue from Foursquare API

3] :

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	V
0	Seyrantepe	37.074184	37.419598	Seyrantepe Park	37.072523	
1	Seyrantepe	37.074184	37.419598	Seyir Tepesi	37.072686	
2	Seyrantepe	37.074184	37.419598	Ayıntap Alüminyum	37.081086	
3	Seyrantepe	37.074184	37.419598	Seyyah Kebap	37.076675	
4	Seyrantepe	37.074184	37.419598	Seyrantepe Spor Tesisleri	37.075631	

Figure 2. The Screenshot from all_venues database

3. Methodology

In Gaziantep, there 9 boroughs but only two of them (Şahinbey & Şehitkamil) downtown. So that, in this project, I select to study these boroughs. Also, there are villages and I dismiss that from the neighborhood list. Then I got the populations, rent rate, and sales rate for each neighborhood. Then I got latitudes and longitude of all neighborhoods in order to get the venues. Then I will cluster analysis for neighborhoods. For model features, I will use venue categories, populations, rent rates, and sales rates. The map of Gaziantep with selected neighborhoods is given Figure 3.

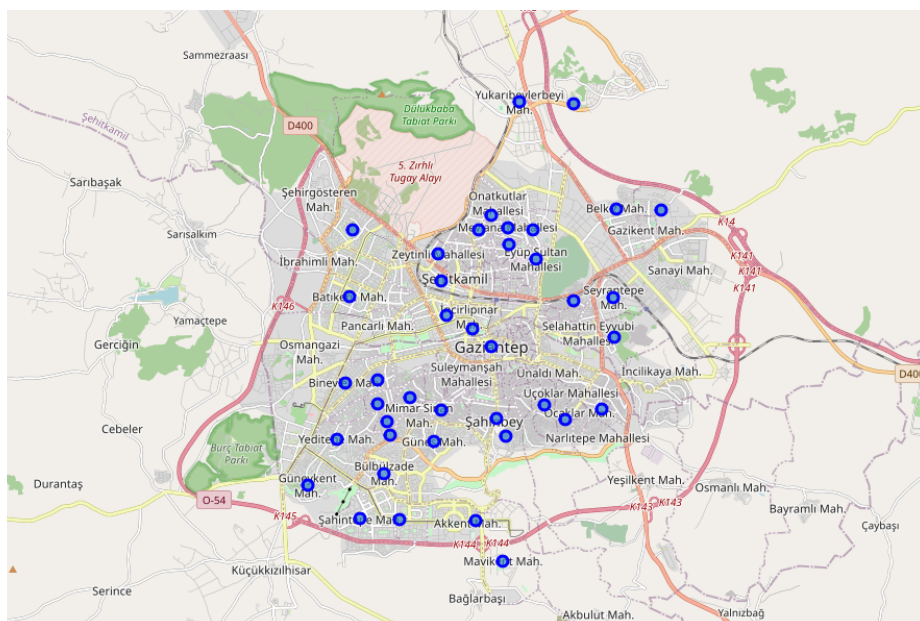


Figure 3. The Map of The Gaziantep

While the relatively dense population is in the Karataş neighborhood, it is at least in Merveşehir.

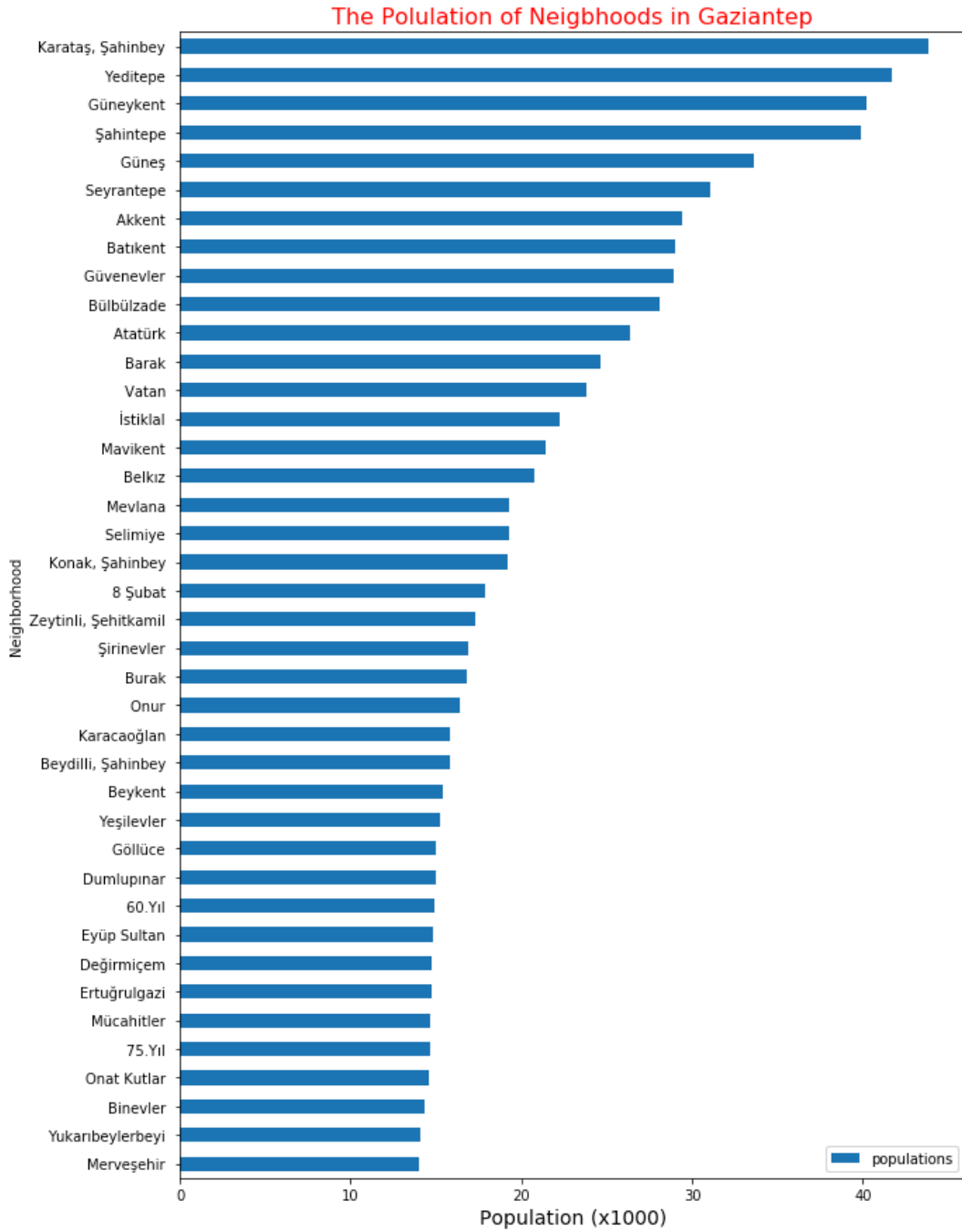


Figure 4. Comparative graph of the population of the neighborhoods

Although there is a relationship between the sales prices and the rental prices, this relationship cannot be said to be at the same level for each neighborhood, so both variables will be included in the neighborhoods cluster as a variable.

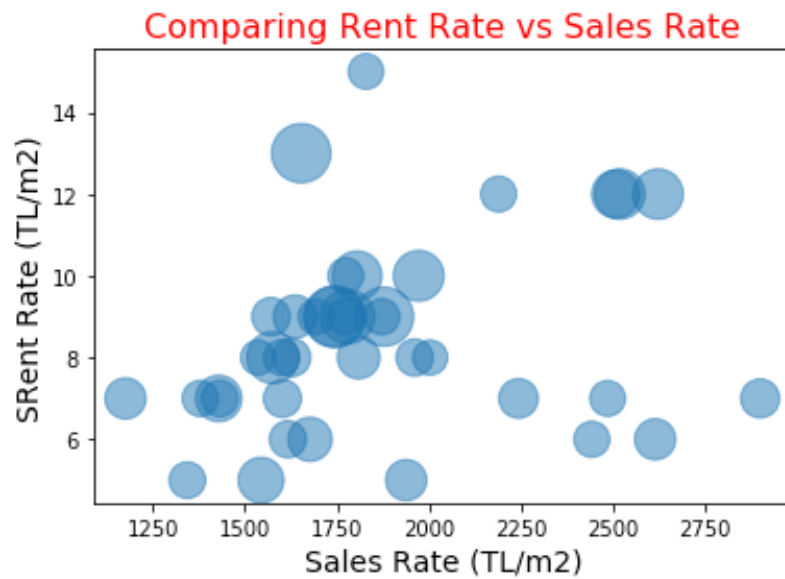


Figure 5. The Scatter Plot of Sales vs. Rent

According to the venue categories frequency, the most popular venues are a cafe and dessert shop. In Gaziantep, there is a special Dessert (Baklava), also it is served in Café

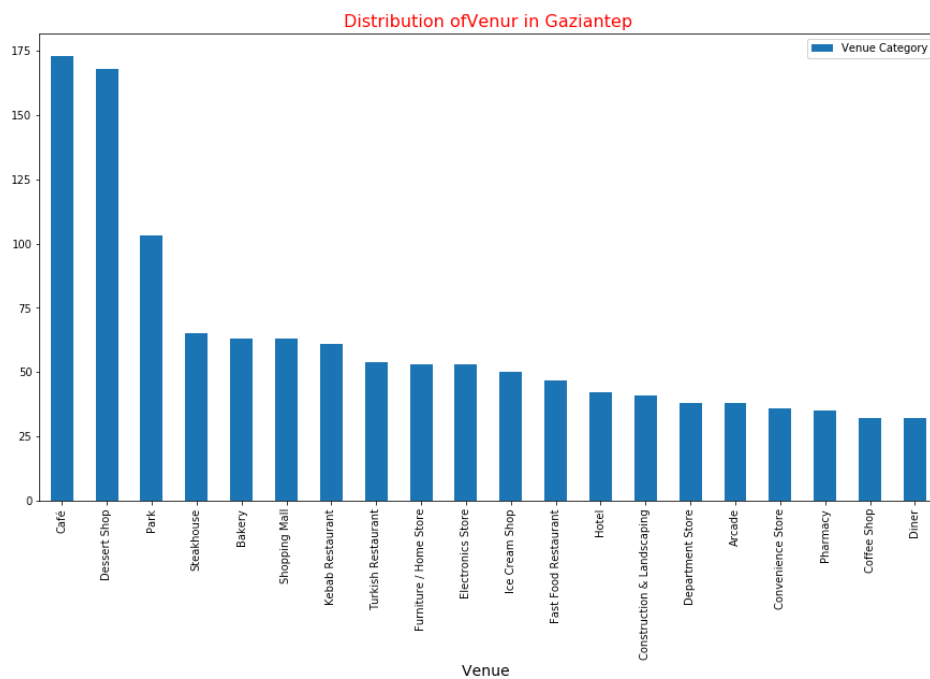


Figure 6. The Frequency of The Venue

4. Analyzing Data

In order to analyze data, firstly one-hot encoding is done. Before I add population, sales rate, and rent rate to the database I rescaled them with a min-max scaler.

To determine the optimal k value, I use the graph inertia values. Then I select k is 5.

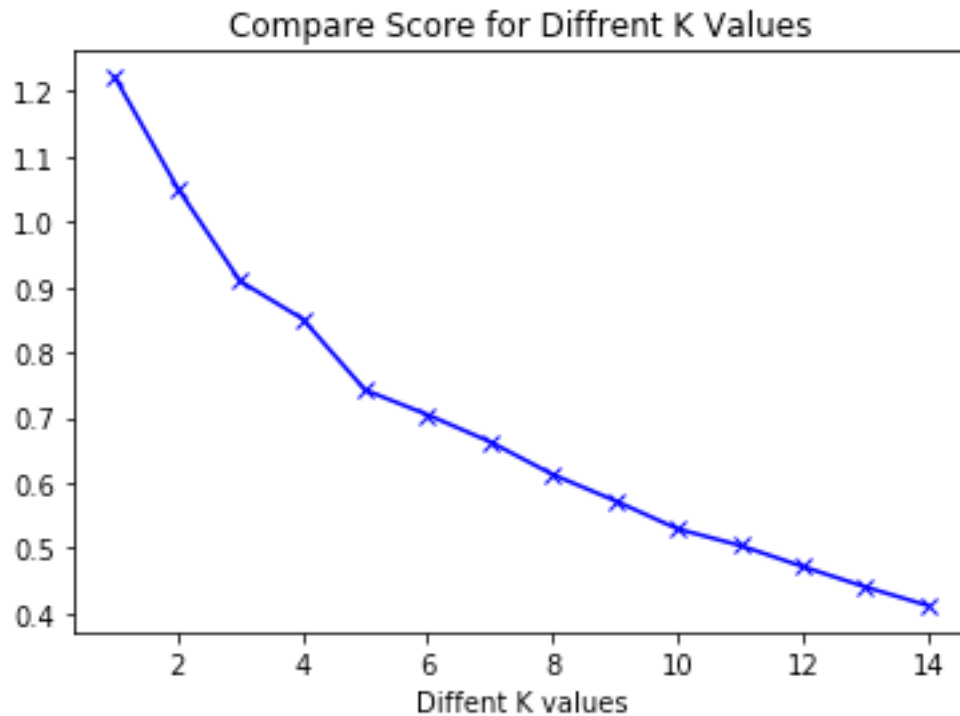


Figure 7. The Inertia Graphs

I set the number of clusters is 5 to kmeans model.

5. Result

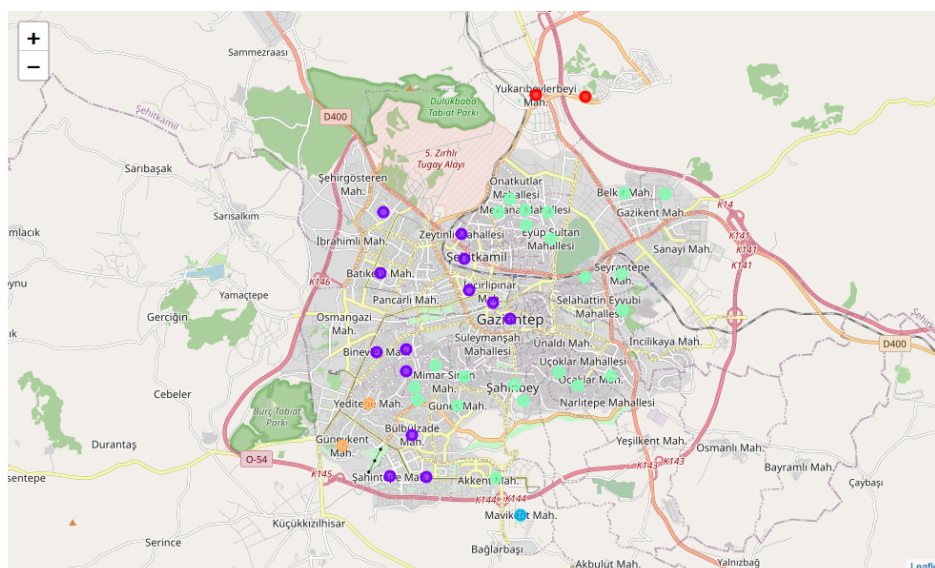


Figure 8. The Map of Neighborhoods Clusters

I determined the top 10 features of the neighborhood in each cluster.

Cluster-1

	Neighborhood	sales_rate	latitude	longitude	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
12	Beykent	1432	37.124922	37.406337	0	Mountain	Construction & Landscaping	Italian Restaurant	Buffet	Movie Theater	Park	Perfume Shop	Dessert Shop	Racecar
18	Yukanbeylerbeyi	2003	37.125480	37.388549	0	Moving Target	Ice Cream Shop	Dessert Shop	Soccer Stadium	Business Service	Shopping Mall	Construction & Landscaping	Stadium	rent_rate

Figure 9. The Screenshot for Cluster-1

Cluster-1

	Neighborhood	sales_rate	latitude	longitude	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
1	Batıkent	2518	37.074242	37.332576	1	Café	Furniture / Home Store	Ice Cream Shop	Dessert Shop	sales_rate	Turkish Restaurant	Coffee Shop	Arcade
2	Güvenevler	2622	37.091903	37.333514	1	Café	Park	populations	Dessert Shop	rent_rate	Gym / Fitness Center	Gym	Grocery Store
3	Atatürk	2507	37.061176	37.379309	1	Dessert Shop	Hotel	Kebab Restaurant	Historic Site	Café	Turkish Restaurant	Restaurant	rent_rate
8	Zeytinli, Şehitkamil	2899	37.085517	37.361805	1	Steakhouse	Turkish Restaurant	Hotel	Diner	Dessert Shop	Seafood Restaurant	Department Store	Kofte Place
15	Değirmişem	1774	37.069393	37.364631	1	Café	Dessert Shop	Jewelry Store	Kebab Restaurant	Clothing Store	Electronics Store	Fast Food Restaurant	rent_rate
16	Mücahitler	2189	37.078598	37.362943	1	Hotel	Dessert Shop	Kebab Restaurant	Café	Steakhouse	Gym / Fitness Center	Turkish Restaurant	populations
17	Onat Kutlar	2485	37.065969	37.372998	1	Hotel	Dessert Shop	Café	Kebab Restaurant	Art Gallery	Restaurant	Turkish Restaurant	Fast Food Restaurant
20	Karataş, Şahinbey	1744	37.015827	37.349222	1	populations	rent_rate	Dessert Shop	Café	Steakhouse	Arcade	Ice Cream Shop	Park
23	Şahintepe	1878	37.016005	37.336137	1	Café	Dessert Shop	Arcade	Park	Ice Cream Shop	Fast Food Restaurant	rent_rate	Department Store
26	Bülbülzade	1805	37.027880	37.343983	1	Café	Dessert Shop	Construction & Landscaping	Bakery	Gym	Electronics Store	Doner Restaurant	Basketball Stadium
31	Konak, Şahinbey	1176	37.052359	37.341933	1	Dessert Shop	populations	Café	Park	Steakhouse	rent_rate	Electronics Store	Plaza
36	60.Yıl	1379	37.046225	37.341767	1	Dessert Shop	Electronics Store	Park	populations	Steakhouse	Fast Food Restaurant	Bakery	Furniture / Home Store
39	Binevler	1829	37.051657	37.331170	1	Café	Smoke Shop	Gym / Fitness Center	Clothing Store	Furniture / Home Store	Dessert Shop	Steakhouse	Soccer Field

Figure 10. The Screenshot for Cluster-2

Cluster-3

	Neighborhood	sales_rate	latitude	longitude	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
30	Mavikent	1636	37.004709	37.383176	2	Auto Garage	Other Repair Shop	populations	Auto Workshop	Grocery Store	rent_rate	Big Box Store	Movie Theater	Buffet	Bar

Figure 11. The Screenshot for Cluster-2

Cluster-4

	Neighborhood	sales_rate	latitude	longitude	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
0	Seyrantepe	1576	37.074184	37.419598	3	Furniture / Home Store	Department Store	Big Box Store	Steakhouse	Park	Fast Food Restaurant	Bus Stop	Food Court
4	Belkız	1809	37.097496	37.420558	3	Park	Steakhouse	Restaurant	Electronics Store	Department Store	Dessert Shop	Bakery	
5	Mevlana	1938	37.092528	37.384692	3	Park	Dessert Shop	rent_rate	populations	Department Store	Shopping Mall	Pool	Ice Cream Shop
6	Selimiye	2614	37.095641	37.379414	3	Dessert Shop	Construction & Landscaping	Park	Men's Store	rent_rate	Bakery	Electronics Store	Steakhouse
7	8 Şubat	2243	37.091954	37.375211	3	rent_rate	Shopping Mall	populations	Park	Steakhouse	Dessert Shop	Café	Ice Cream Shop
9	Şirinevler	1571	37.063787	37.419635	3	rent_rate	Pet Store	Park	Bus Station	Jewelry Store	Food Court	Shopping Mall	Furniture / Home Store
10	Burak	1627	37.097137	37.435348	3	Bakery	Park	Electronics Store	Department Store	Soccer Stadium	Mountain	rent_rate	Coffee Shop
11	Karacaoğlan	1961	37.088012	37.385216	3	populations	Dessert Shop	Bakery	Park	Pharmacy	rent_rate	Kebab Restaurant	Restaurant
13	Göllüce	1600	37.073167	37.406395	3	Café	Shopping Mall	Pharmacy	Mobile Phone Shop	Garden	Construction & Landscaping	Baby Store	Salon
14	Eyüp Sultan	2442	37.084227	37.393945	3	Furniture / Home Store	Park	rent_rate	Cafeteria	Rental Car Location	Shopping Mall	Arts & Entertainment	
19	Merveşehir	1536	37.092007	37.392960	3	Furniture / Home Store	Pool	Breakfast Spot	Shopping Mall	Bakery	populations	rent_rate	Pharmacy
24	Güneş	1779	37.036226	37.360391	3	Pharmacy	Convenience Store	Arts & Entertainment	Big Box Store	Grocery Store	Park	Bar	
25	Akkent	1972	37.015383	37.374017	3	Pool	Steakhouse	rent_rate	Recreation Center	Athletics & Sports	Scenic Lookout	Big Box Store	Bagel Shop
27	Barak	1429	37.044899	37.415522	3	Dessert Shop	Furniture / Home Store	Bakery	Café	Park	Business Service	Soup Place	Street Food
28	Vatan	1544	37.041977	37.403594	3	Bakery	Park	Café	Convenience Store	Plaza	Arcade	Moving Target	Supermarket
29	İstiklal	1677	37.047847	37.352559	3	Park	Convenience Store	Dessert Shop	Arts & Entertainment	rent_rate	Plaza	Department Store	Soccer Field

Figure 12. The Screenshot for Cluster-2

Cluster-5

	Neighborhood	sales_rate	latitude	longitude	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
21	Yeditepe	1744	37.036910	37.328316	4	Café	Coffee Shop	Ice Cream Shop	Dessert Shop	Fast Food Restaurant	Pizza Place	Convenience Store	Park	Bagel Shop
22	Güneykent	1653	37.024714	37.318763	4	Café	Gym	Coffee Shop	Dessert Shop	Ice Cream Shop	Kebab Restaurant	Gym / Fitness Center	Diner	Arcade

Figure 13. The Screenshot for Cluster-2

6. Discussion

According to the results of the analysis, the clustering results overlap with my own observations. These results can be used to live or work. You can choose neighborhood alternatives according to your priorities. For example, if you want a social activity based lifestyle, you can choose a neighborhood from cluster-5. If you are interested in vehicle trading or repair business, you can choose Cluster-3.

7. Conclusion

As a result, the neighborhood's social facilities and the crowd will affect our neighborhood selection. This short report can be used as a guide in neighborhood selection.