Gökhan Karakuleli Capstone Final Project

Introduction and Business Problem

İzmir constitutes 5.3% of Turkey with a 4,113,072 population in 2015. The city ranks 3rd among 81 cities both in terms of size and socioeconomic development. İzmir is also an attraction center for the investors with its logistics infrastructure, qualified workforce and multi-sector structure. The fact that almost half of its population of 4 million are under the age of 30, makes İzmir a city full of life. The city hosts tens of thousands of university students, educates scientists, artists, business leaders and academics. It is a rapidly growing city on the Central Aegean coast of Turkey.

First, we need to find all the boroughs and locations of Izmir to find the district where my client wants to open his café. In the meantime, since the target audience will be students, the location of the surrounding universities and schools should be determined. In addition to this, we should try to determine their position in the cafes that may competitor and to ensure that the competition is less.

Data

Wikipedia will be used to find districts in Izmir.

(https://tr.wikipedia.org/wiki/%C4%B0zmir%27in_il%C3%A7eleri)

Open Street Map, which is offered as open source, will be used to find the geographical locations of the boroughs.

Foursquare API will be used to find cafes, schools and universities around 2500 meters of district centers using

Using all the information above, we will try to find the most suitable cafe for our customers.

Methodology

Finding the Boroughs of Izmir

With the help of the "BeautifulSoup" web scraping tool library, 29 Boroughs extracted from https://tr.wikipedia.org/wiki/%C4%B0zmir%27in_il%C3%A7eleri

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['Aliağa', 'Balçova', 'Bayındır', 'Bayraklı', 'Bergama', 'Beydağ', 'Bornova', 'Buca', 'Çeşme', 'Çiğ
li', 'Dikili', 'Foça', 'Gaziemir', 'Güzelbahçe', 'Karabağlar', 'Karaburun', 'Karşıyaka', 'Kemalpaş
a', 'Kınık', 'Kiraz', 'Konak', 'Menderes', 'Menemen', 'Narlıdere', 'Ödemiş', 'Seferihisar', 'Selçu
k', 'Tire', 'Torbalı', 'Urla']
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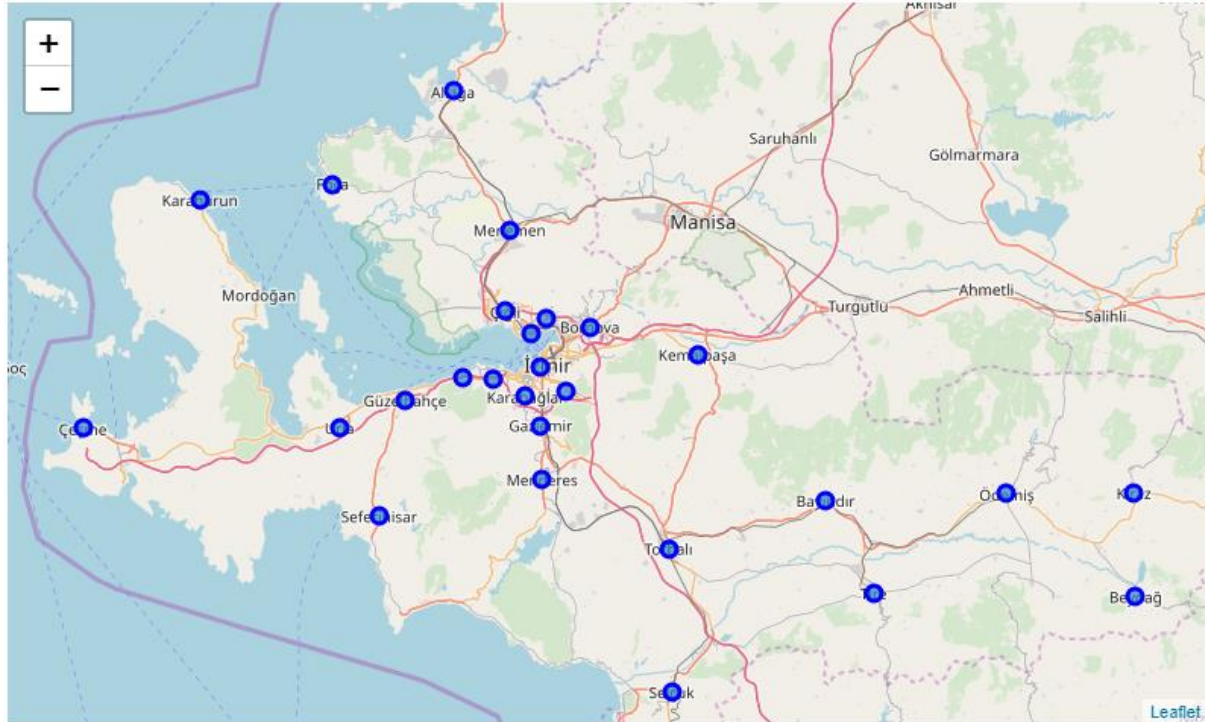
Finding the geographical locations of the Boroughs

To find the locations of each Borough, Geopy library was used. Geopy makes it easy for Python developers to locate the coordinates of addresses, cities, countries, and landmarks across the globe using third-party geocoders and other data sources.

	Boroughs	Latitude	Longitude
0	Aliağa	38.800972	26.972982
1	Balçova	38.392398	27.046805
2	Bayındır	38.220605	27.647298
3	Bayraklı	38.478454	27.142653
4	Bergama	39.119154	27.177730
5	Beydağ	38.085930	28.208430
6	Bornova	38.466400	27.220555
7	Buca	38.375319	27.176830
8	Çeşme	38.324418	26.302856
9	Çiğli	38.490363	27.067442
10	Dikili	39.073872	26.890652
11	Foça	38.669356	26.754994
12	Gaziemir	38.327512	27.131535
13	Güzelbahçe	38.362744	26.886187
14	Karabağlar	38.369771	27.104592
15	Karaburun	38.646446	26.514724
16	Karşıyaka	38.458572	27.114534
17	Kemalpaşa	38.427829	27.415216
18	Kınık	39.085811	27.382399
19	Kiraz	38.230751	28.205074
20	Konak	38.410958	27.129453
21	Menderes	38.250390	27.134193
22	Menemen	38.603498	27.075211
23	Narlıdere	38.394858	26.991737
24	Ödemiş	38.231341	27.975181
25	Seferihisar	38.198330	26.839100
26	Selçuk	37.947960	27.368535
27	Tire	38.088165	27.733971
28	Torbalı	38.152313	27.362839
29	Urla	38.323941	26.767324

Map of İzmir with Boroughs

Thanks to Folium library which makes it easy to visualize data that's been manipulated in Python on an interactive leaflet map. It enables both the binding of data to a map for choropleth visualizations as well as passing rich vector/raster/HTML visualizations as markers on the map.
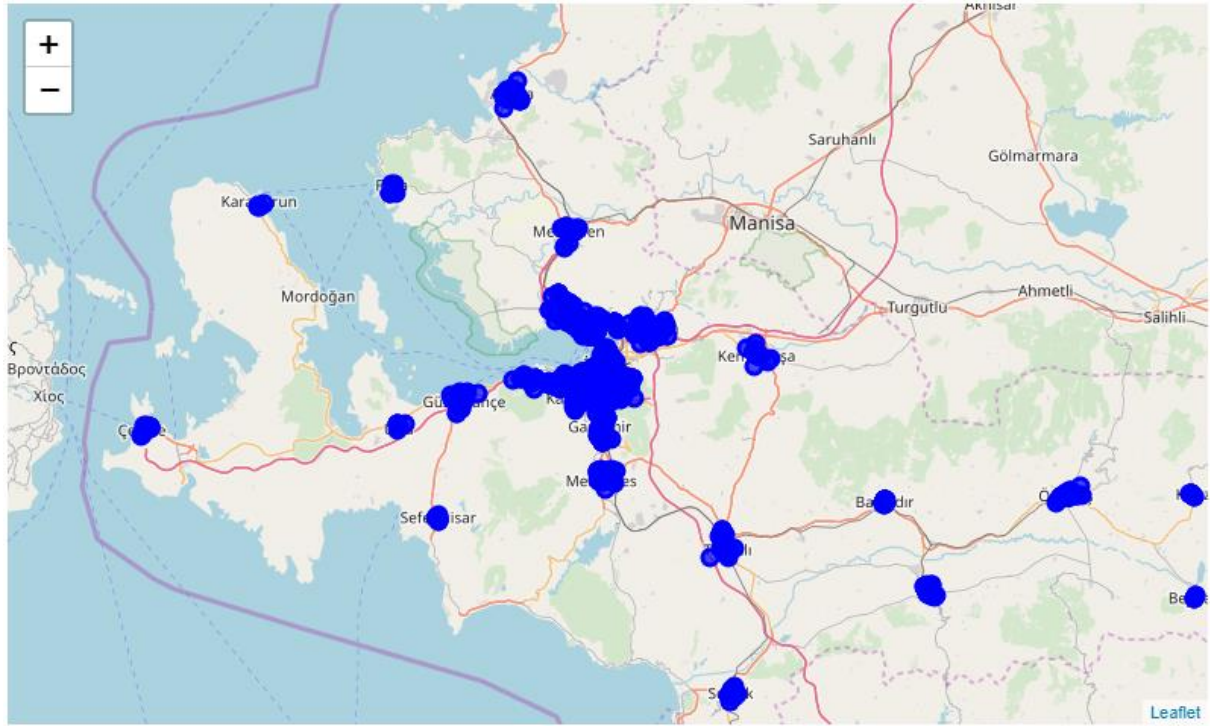

Finding Cafés, Universities and Schools with Foursquare API

Using Foursquare's database of 105 million places, it is easier to find venues or places. You can find below extracted venues and their locations visualized as above with folium.
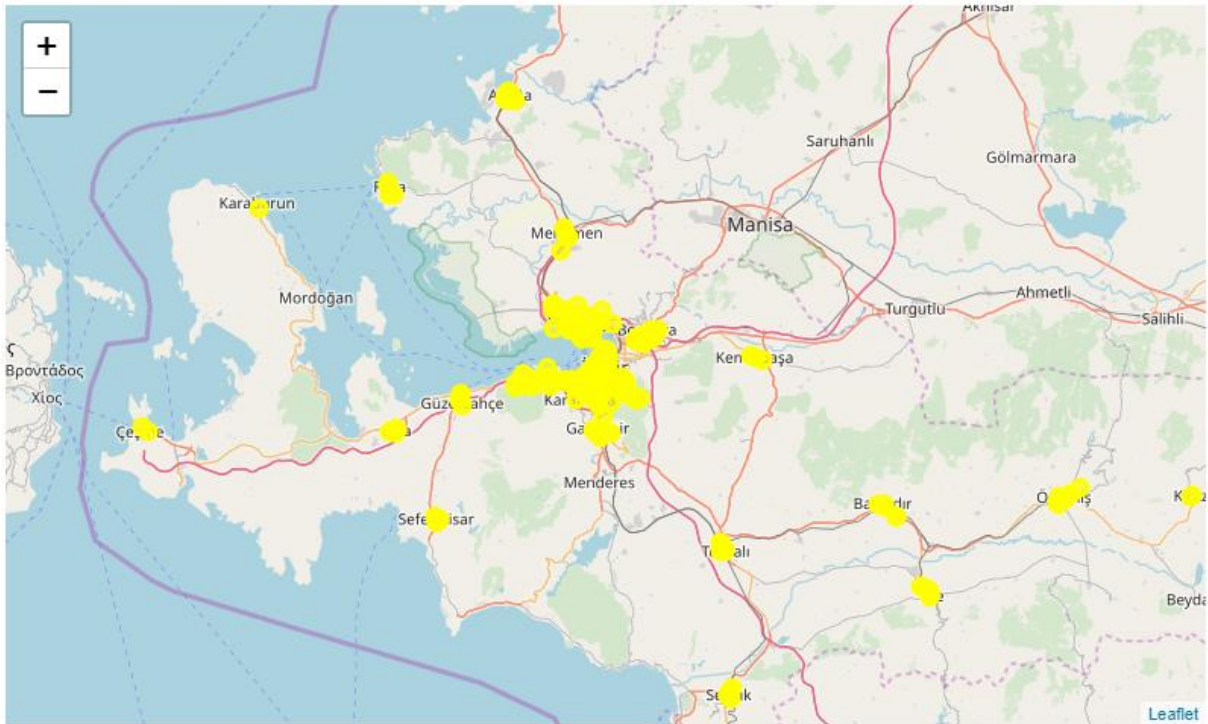
Cafes

	Boroughs	Borough Latitude	Borough Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Aliağa	38.800972	26.972982	Tiq Taq Coffee	38.802328	26.973263	Café
1	Aliağa	38.800972	26.972982	Kahve Diyarı	38.802568	26.973382	Café
2	Aliağa	38.800972	26.972982	Merkez Kafe	38.802106	26.974093	Café
3	Aliağa	38.800972	26.972982	Sanatkâr	38.801967	26.970802	Café
4	Aliağa	38.800972	26.972982	Arka Bahçe	38.802083	26.974131	Café
5	Aliağa	38.800972	26.972982	Ablanın Yeri Çay Ocağı Gözleme Evi	38.802630	26.972004	Café
6	Aliağa	38.800972	26.972982	TIQ TAQ COFFEE	38.802296	26.973318	Café
7	Aliağa	38.800972	26.972982	Körfez Pastanesi	38.800595	26.971783	Café
8	Aliağa	38.800972	26.972982	Ekmek&Gül	38.802610	26.971972	Café
9	Aliağa	38.800972	26.972982	Özsüt	38.802458	26.973373	Dessert Shop

Universities

	Boroughs	Borough Latitude	Borough Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Aliağa	38.800972	26.972982	Ege Üniversitesi Aliağa Kampüsü	38.801545	26.972477	University
1	Aliağa	38.800972	26.972982	Fatih Orta Okulu	38.791844	26.979720	University
2	Aliağa	38.800972	26.972982	Bim Öğrenci Marketi	38.796896	26.974288	University
3	Aliağa	38.800972	26.972982	ege üniversitesi aliağa myo kantin	38.792791	26.967665	University
4	Aliağa	38.800972	26.972982	Uçurumun Kenarı	38.804171	26.968556	University
5	Aliağa	38.800972	26.972982	heydar alitev endüatri meslek lisesi yangın me...	38.795029	26.967236	University
6	Aliağa	38.800972	26.972982	Heydar Aliyev Teknik ve Endustri Meslek Lisesi...	38.792104	26.977386	University
7	Aliağa	38.800972	26.972982	Ege üniversitesi bilgisayar labarotuvarı	38.792648	26.966854	University
8	Aliağa	38.800972	26.972982	Balıkesir Üniversitesi Bandırma iktisadi ve İd...	38.794781	26.962563	University
9	Aliağa	38.800972	26.972982	İzmir Ekonomi Üniversitesi	38.790786	26.983670	University

Schools

	Boroughs	Borough Latitude	Borough Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Aliağa	38.800972	26.972982	Özel Final Lisesi	38.802694	26.976166	High School
1	Aliağa	38.800972	26.972982	Aliağa Final Temel Lisesi	38.802789	26.975963	High School
2	Aliağa	38.800972	26.972982	Aliağa Lisesi	38.801888	26.967234	High School
3	Aliağa	38.800972	26.972982	Heydar Aliyev Mesleki Ve Teknik Anadolu Lisesi	38.792879	26.976940	High School
4	Aliağa	38.800972	26.972982	Heydar Aliyev Mesleki Ve Teknik Anadolu Lisesi...	38.799961	26.965677	High School
5	Aliağa	38.800972	26.972982	Heydar Aliyev Teknik ve Endustri Meslek Lisesi	38.792901	26.976967	High School
6	Aliağa	38.800972	26.972982	Aliağa Anadolu Lisesi	38.789506	26.986883	High School
7	Aliağa	38.800972	26.972982	Karşıyaka Çok Programlı Anadolu Lisesi	38.802526	26.963353	High School
8	Aliağa	38.800972	26.972982	Sınıf	38.796116	26.956579	High School
9	Aliağa	38.800972	26.972982	80.Yıl Cumhuriyet Anadolu Lisesi	38.801489	26.967822	High School

Calculations of Boroughs weighted scores by Counts of Venues

First, Number of Cafes, Universities and Schools at Boroughs are listed. After that we calculate the score by giving weight for each category.

Negative weight (-1) was selected for the Cafes to avoid as much as possible from competition, because our customer wants to open a Café.
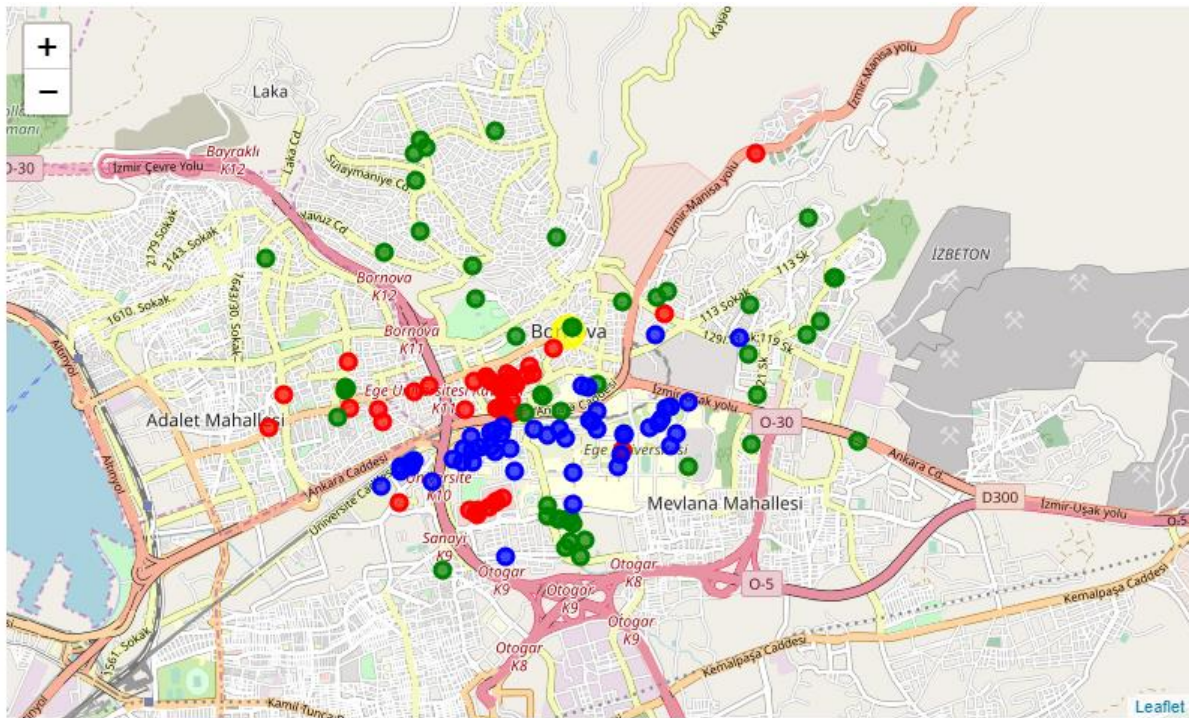
Positive Weight was selected for universities (2) and schools (1) because our primary aim to have students as customer. University Students was given higher weight hence they are good customers.

	Boroughs	Latitude	Longitude	Cafe	Schools	Universities
0	Aliağa	38.800972	26.972982	50.0	28.0	18.0
1	Balçova	38.392398	27.046805	50.0	43.0	50.0
2	Bayındır	38.220605	27.647298	49.0	28.0	7.0
3	Bayraklı	38.478454	27.142653	50.0	48.0	21.0
4	Bergama	39.119154	27.177730	50.0	46.0	16.0
5	Beydağ	38.085930	28.208430	14.0	5.0	0.0
6	Bornova	38.466400	27.220555	50.0	49.0	50.0
7	Buca	38.375319	27.176830	50.0	50.0	48.0
8	Çeşme	38.324418	26.302856	50.0	17.0	2.0
9	Çiğli	38.490363	27.067442	50.0	49.0	25.0
10	Dikili	39.073872	26.890652	50.0	9.0	3.0
11	Foça	38.669356	26.754994	49.0	8.0	4.0
12	Gaziemir	38.327512	27.131535	50.0	43.0	10.0
13	Güzelbahçe	38.362744	26.886187	47.0	21.0	5.0
14	Karabağlar	38.369771	27.104592	50.0	49.0	22.0
15	Karaburun	38.646446	26.514724	38.0	4.0	1.0
16	Karşıyaka	38.458572	27.114534	50.0	49.0	37.0
17	Kemalpaşa	38.427829	27.415216	49.0	35.0	4.0
18	Kınık	39.085811	27.382399	30.0	29.0	4.0
19	Kiraz	38.230751	28.205074	19.0	11.0	2.0
20	Konak	38.410958	27.129453	50.0	49.0	45.0
21	Menderes	38.250390	27.134193	48.0	40.0	0.0
22	Menemen	38.603498	27.075211	50.0	26.0	5.0
23	Narlıdere	38.394858	26.991737	50.0	14.0	12.0
24	Ödemiş	38.231341	27.975181	50.0	40.0	10.0
25	Seferihisar	38.198330	26.839100	49.0	8.0	4.0
26	Selçuk	37.947960	27.368535	50.0	31.0	11.0
27	Tire	38.088165	27.733971	50.0	42.0	13.0
28	Torbalı	38.152313	27.362839	50.0	48.0	5.0
29	Urla	38.323941	26.767324	50.0	9.0	4.0

	Boroughs	Score
0	Bornova	49.0
1	Buca	46.0
2	Balçova	43.0
3	Konak	39.0
4	Karşıyaka	23.0
5	Çiğli	-1.0
6	Karabağlar	-7.0
7	Bayraklı	-10.0
8	Bergama	-22.0
9	Beydağ	-23.0
10	Kiraz	-23.0
11	Kınık	-23.0
12	Tire	-32.0
13	Aliağa	-36.0
14	Gaziemir	-37.0
15	Ödemiş	-40.0
16	Torbalı	-42.0
17	Selçuk	-47.0
18	Kemalpaşa	-55.0
19	Bayındır	-56.0
20	Menderes	-56.0
21	Narlıdere	-62.0
22	Güzelbahçe	-63.0
23	Menemen	-64.0
24	Karaburun	-70.0
25	Çeşme	-79.0
26	Seferihisar	-82.0
27	Foça	-82.0
28	Urla	-83.0
29	Dikili	-85.0

Conclusion

The Best Place to open a Café for students for our customer is Highest rate Borough "Bornova" with the score of 49 which can be shown above, and the worst place is Dikili with the score -85. If you aiming to serve students Bornova is the right place.

Yellow – Center of Bornova
Red – Cafes
Green – Schools
Blue – Universities

Future Recommendations

To avoid the limitations of the Foursquare it is better to have paid subscription because finding all venues needs a full access.

The collected venues data could be including some missing or misleading information thus all information collected from foursquare should be elaborated more thoroughly.

More categories could lead more accurate solution. Such as office venues, housing prices, demographical distribution etc.

To selection of the weights could be select differently after the additional categories are included.