CLUSTER OF ROME DISTRICTS

Introduction

A real estate company located in Rome wants to understand better the differencees between the neighborhoods to offer a tailored service to its customers as well as evaluated what are the best districts where they can invest.
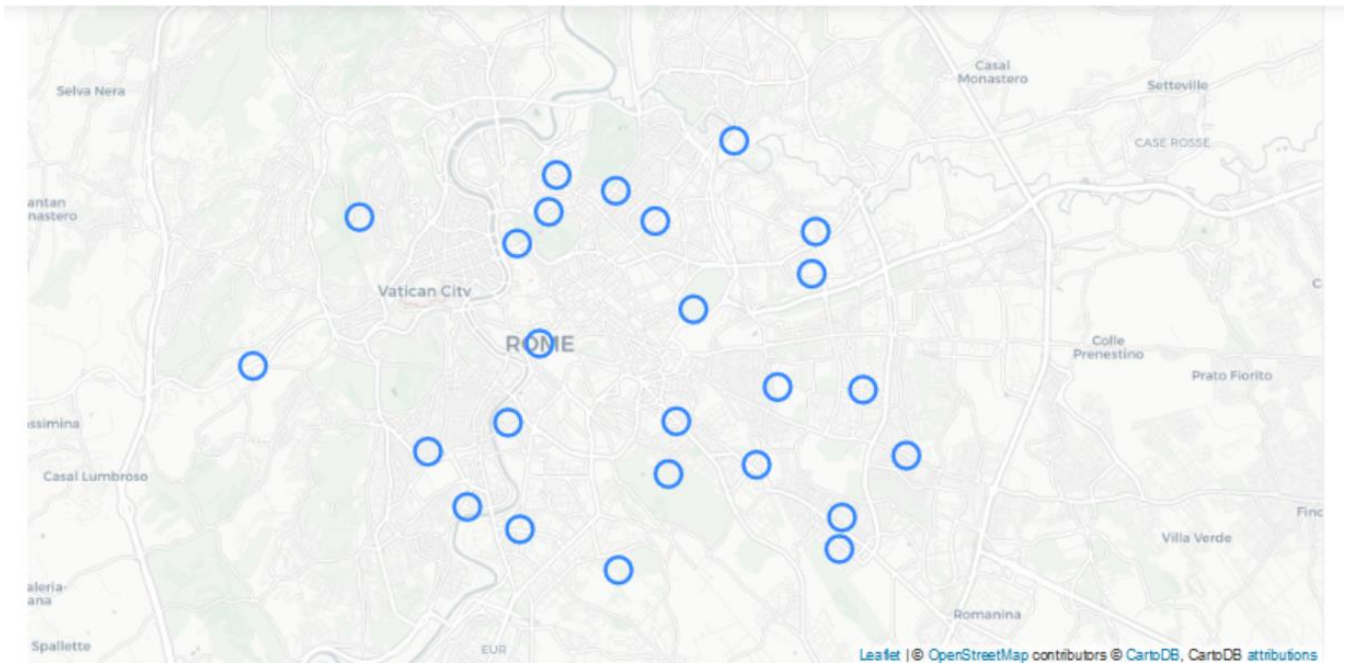
To tackle the problem faced by the company, we use the data we have about the various disticts to extract from FourSquare their main feautures and then we use k-means to cluster the districts.

Data

We create a dataset of addresses of the Rome Districts, they are 19. And, using the Geopy library we add to this datset the latitude and longitude.
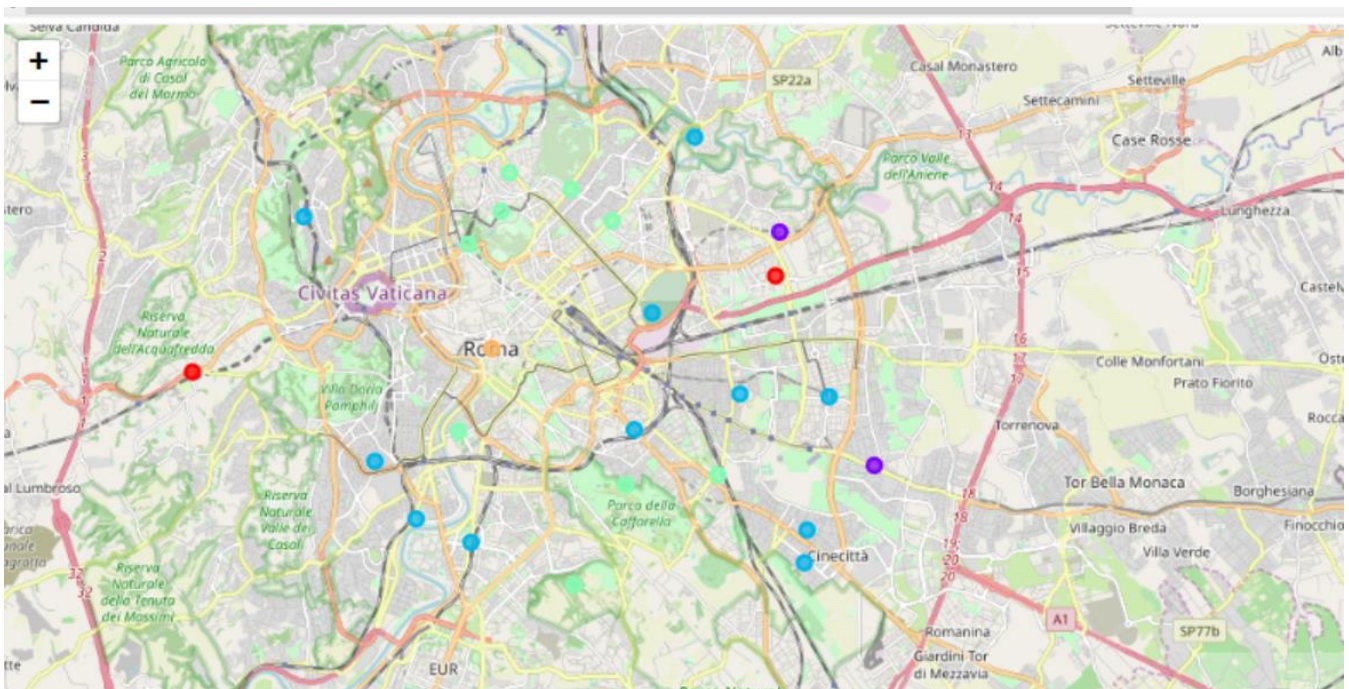
	Rione	Città	Stato	ADDRESS	latitude	longitude
0	Flaminio	Rome	Italy	Flaminio, Rome, Italy	41.912829	12.477139
1	Parioli	Rome	Italy	Parioli, Rome, Italy	41.925949	12.487320
2	Pinciano	Rome	Italy	Pinciano, Rome, Italy	41.918781	12.485332
3	Salario	Rome	Italy	Salario, Rome, Italy	41.922978	12.502636
4	Nomentano	Rome	Italy	Nomentano, Rome, Italy	41.917002	12.512918
5	Tiburtino	Rome	Italy	Tiburtino, Rome, Italy	41.899855	12.523146
6	Prenestino-Labicano	Rome	Italy	Prenestino-Labicano, Rome, Italy	41.885017	12.545122
7	Tuscolano	Rome	Italy	Tuscolano, Rome, Italy	41.869865	12.539586
8	Appio-Latino	Rome	Italy	Appio-Latino, Rome, Italy	41.867904	12.516418
9	Ostiense	Rome	Italy	Ostiense, Rome, Italy	41.857283	12.477881
10	Portuense	Rome	Italy	Portuense, Rome, Italy	41.861613	12.463827
11	Gianicolense	Rome	Italy	Gianicolense, Rome, Italy	41.872284	12.453519
12	Aurelio	Rome	Italy	Aurelio, Rome, Italy	41.889055	12.408148
13	Trionfale	Rome	Italy	Trionfale, Rome, Italy	41.917920	12.435704
14	Della Vittoria	Rome	Italy	Della Vittoria, Rome, Italy	41.878270	12.518708
15	Monte Sacro	Rome	Italy	Monte Sacro, Rome, Italy	41.932756	12.533670
16	Prenestino-Centocelle	Rome	Italy	Prenestino-Centocelle, Rome, Italy	41.884513	12.567184
17	Trieste	Rome	Italy	Trieste, Rome, Italy	41.893320	12.482932
18	Testaccio	Rome	Italy	Testaccio, Rome, Italy	41.878065	12.474757
19	Ardeatino	Rome	Italy	Ardeatino, Rome, Italy	41.849430	12.503643

Let's create a map with the data that we have. The blue circles represent the various districts of the city

Analysis

Using the features collected with the FourSquare API we are able to cluster using k-means the various districts.

	Rione	Città	Stato	ADDRESS	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 Com...
0	Flaminio	Rome	Italy	Flaminio, Roma, Italy	41.912529	12.477139	3	Italian Restaurant	Hotel	Plaza	Pizza Place	Wine Shop	Museum	Monu... Lan
1	Parioli	Rome	Italy	Parioli, Roma, Italy	41.925949	12.467320	3	Italian Restaurant	Seafood Restaurant	Café	Sandwich Place	Hotel	Asian Restaurant	Univ
2	Pinciano	Rome	Italy	Pinciano, Roma, Italy	41.915761	12.485332	3	Hotel	Italian Restaurant	Sushi Restaurant	Art Museum	Café	Dog Run	
3	Salario	Rome	Italy	Salario, Roma, Italy	41.922975	12.502636	3	Italian Restaurant	Seafood Restaurant	Cocktail Bar	Restaurant	Café	Hotel	
4	Nomentano	Rome	Italy	Nomentano, Roma, Italy	41.917002	12.512915	3	Hotel	Italian Restaurant	Art Museum	Supermarket	Park	Diner	S M
5	Tiburtino	Rome	Italy	Tiburtino, Roma, Italy	41.899555	12.523146	2	Italian Restaurant	Burger Joint	Gym / Fitness Center	Lounge	Other Nightlife	Paper / Office Supplies Store	
6	Prenestino-Labicano	Rome	Italy	Prenestino-Labicano, Roma, Italy	41.885017	12.545122	2	Pizza Place	Market	Dessert Shop	Grocery Store	Italian Restaurant	Wine Shop	H
7	Tuscolano	Rome	Italy	Tuscolano, Roma, Italy	41.869565	12.539556	3	Pool	Italian Restaurant	Sandwich Place	Japanese Restaurant	Kebab Restaurant	Fried Chicken Joint	Fas Rest
8	Appio-Latino	Rome	Italy	Appio-Latino, Roma, Italy	41.867904	12.516418	3	Italian Restaurant	Pub	Supermarket	Thai Restaurant	Gym	Seafood Restaurant	
9	Ostiense	Rome	Italy	Ostiense, Roma, Italy	41.857283	12.477881	2	Italian Restaurant	Café	Pizza Place	Clothing Store	Ice Cream Shop	Pub	C Rest
10	Portuense	Rome	Italy	Portuense, Roma, Italy	41.861613	12.463527	2	Pizza Place	Italian Restaurant	Fast Food Restaurant	Seafood Restaurant	Cupcake Shop	Soccer Field	Moto
11	Gianicolense	Rome	Italy	Gianicolense, Roma, Italy	41.872254	12.453519	2	Café	Pizza Place	Italian Restaurant	Mediterranean Restaurant	Plaza	Brewery	Ice
12	Aurelio	Rome	Italy	Aurelio, Roma, Italy	41.889055	12.405145	0	Italian Restaurant	Bar	Hostel	Gym	Grocery Store	Pool	Bus S
13	Trionfale	Rome	Italy	Trionfale, Roma, Italy	41.917920	12.425704	2	Italian Restaurant	Supermarket	Pizza Place	Gym / Fitness Center	Gym	Electronics Store	Depa
14	Della Vittoria	Rome	Italy	Della Vittoria, Roma, Italy	41.875270	12.515705	2	Dessert Shop	Pizza Place	Plaza	Italian Restaurant	Ice Cream Shop	Clothing Store	Steak
15	Monte Sacro	Rome	Italy	Monte Sacro, Roma, Italy	41.932756	12.533670	2	Pizza Place	Cocktail Bar	Café	Boutique	Ice Cream Shop	Japanese Restaurant	Gas
16	Prenestino-Centocelle	Rome	Italy	Prenestino-Centocelle, Roma, Italy	41.884513	12.567184	2	Chinese Restaurant	Seafood Restaurant	Pub	Multiplex	Fast Food Restaurant	Roman Restaurant	G
17	Trieste	Rome	Italy	Trieste, Roma, Italy	41.893320	12.452932	4	Historic Site	Temple	Monument / Landmark	History Museum	Plaza	Scenic Lookout	T
18	Testaccio	Rome	Italy	Testaccio, Roma, Italy	41.875065	12.474737	3	Italian Restaurant	Sandwich Place	Plaza	Café	Roman Restaurant	Pizza Place	M
19	Ardeatino	Rome	Italy	Ardeatino, Roma, Italy	41.849430	12.503643	3	Italian Restaurant	Café	Gym Pool	Plaza	Asian Restaurant	Garden	O

Conclusion

In conclusion, there are now 5 cluster grouped for similarity intragroup upon which the company can base their decision