Capstone Project- The Battle of Neighborhoods New restaurant in Rome ?

Introduction/Business Problem

A business man wants open a new restaurant in Rome.

**The question is: what better place to start a new restaurant in Rome?**

Rome is a big city where millions of tourists come in every month to enjoy a full Italian experience: monuments, lifestyle and – of course – food.

In 2018, 15 million tourists visited Rome.

Since 1972, the city has been divided into administrative areas, called municipi (sing. municipio). The municipi were originally 20, then 19. In 2013, their number has been reduced to 15.

List of desiderata
1. How many restaurant is available each municipia ?
2. How many similar restaurants are available ?
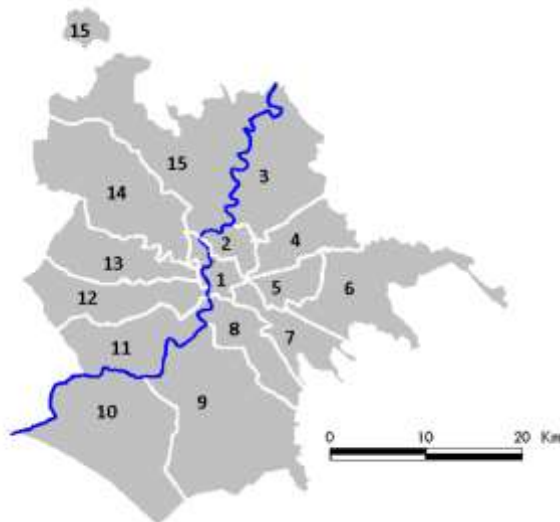
Data

1. Get Municipia Rome's coordinates from Wikipedia
2. Get population's info from Wikipedia
3. Get info on other restaurants in Rome with Foursquare.

Methodology

- Collect data from Foursquare

- Show heat map of data location
- Segmenting and clustering and analyze data

Municipia in Rome

	Neighborhood	Latitude	Longitude
0	I	41.9029	12.4855
1	II	41.9224	12.4983
2	III	41.9425	12.5410
3	IV	41.9216	12.5537
4	V	41.8913	12.5510
5	VI	41.8930	12.4827
6	VII	41.8501	12.5642
7	VIII	41.8599	12.4982
8	IX	41.7683	12.5069
9	X	41.7564	12.3496
10	XI	41.8389	12.4438
11	XII	41.8695	12.4323
12	XIV	41.9265	12.4037
13	XV	41.9409	12.4708
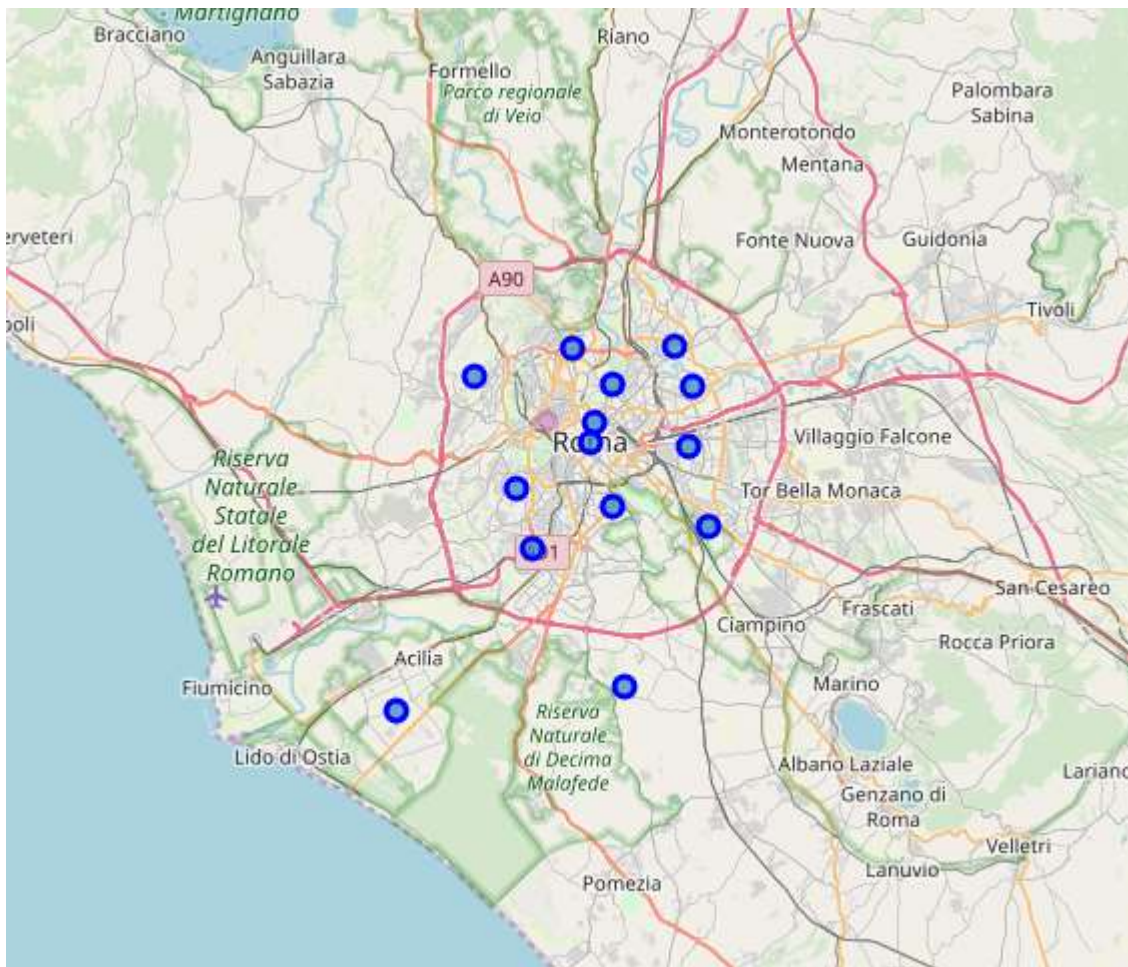
Forsquare API explore data

rome_venues							
265	XV	41.9409	12.4708	sweety gelato Roma	41.938318	12.468476	Ice Cream Shop
266	XV	41.9409	12.4708	Bakery House	41.938557	12.469234	Cupcake Shop
267	XV	41.9409	12.4708	Da Brando	41.939736	12.469564	Restaurant
268	XV	41.9409	12.4708	Gelateria Mondi	41.937862	12.467650	Ice Cream Shop
269	XV	41.9409	12.4708	Pompi	41.938354	12.466219	Dessert Shop
270	XV	41.9409	12.4708	Acquolina Hostaria	41.942580	12.473828	Italian Restaurant
271	XV	41.9409	12.4708	T-Bone Station	41.941614	12.470620	Steakhouse
272	XV	41.9409	12.4708	Charlie	41.937688	12.466808	Wine Bar
273	XV	41.9409	12.4708	River Chateau Hotel Rome	41.939280	12.469110	Hotel
274	XV	41.9409	12.4708	Giangusto	41.938553	12.468946	Sandwich Place
275	XV	41.9409	12.4708	zenzero	41.942530	12.471920	Asian Restaurant

```python
rome_v1 = rome_venues.groupby('Neighborhood').count()
rome_v1 = rome_v1.reset_index()
rome_v1.head()
rome_v1 = rome_v1[['Neighborhood','Venue']]
rome_v1.plot(kind='bar',x='Neighborhood',y='Venue',color='red')
```
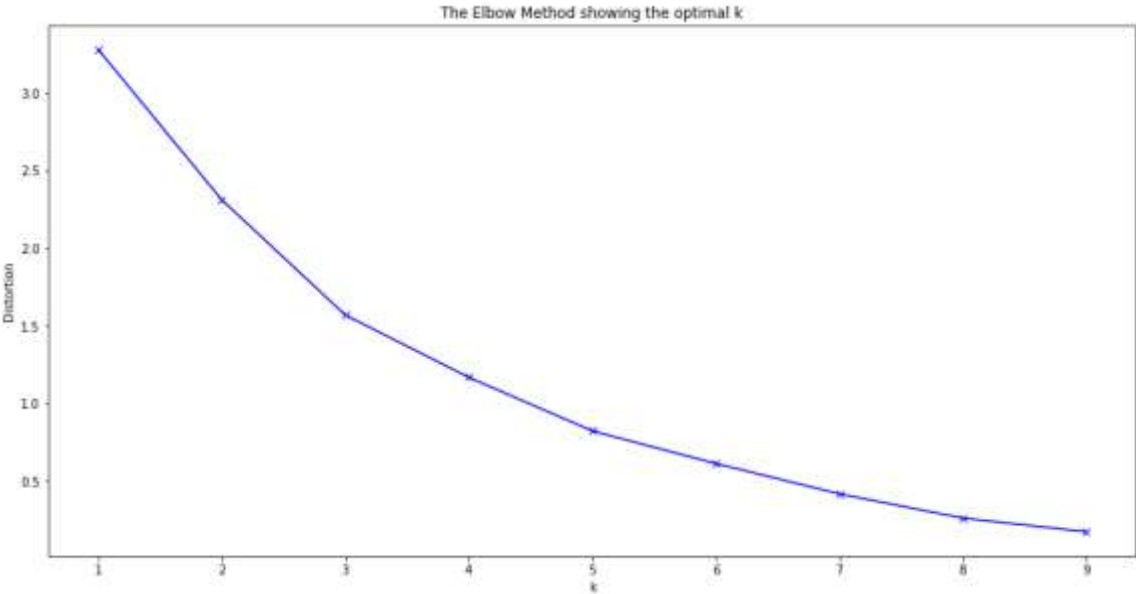
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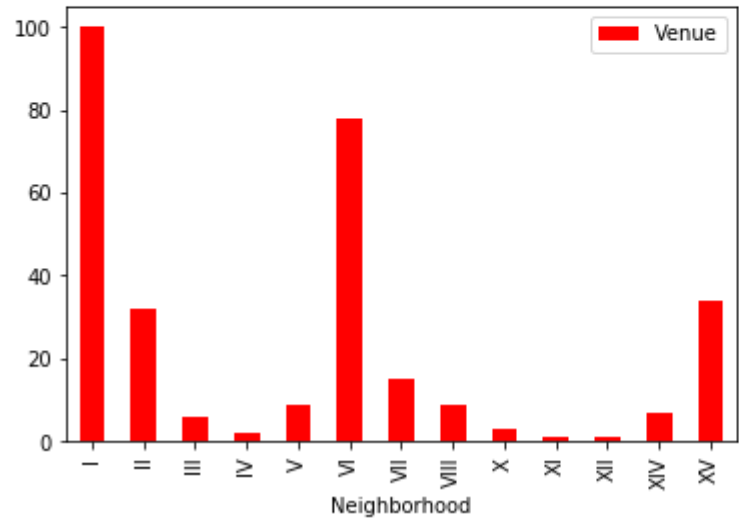
Heatmap of restaurant location
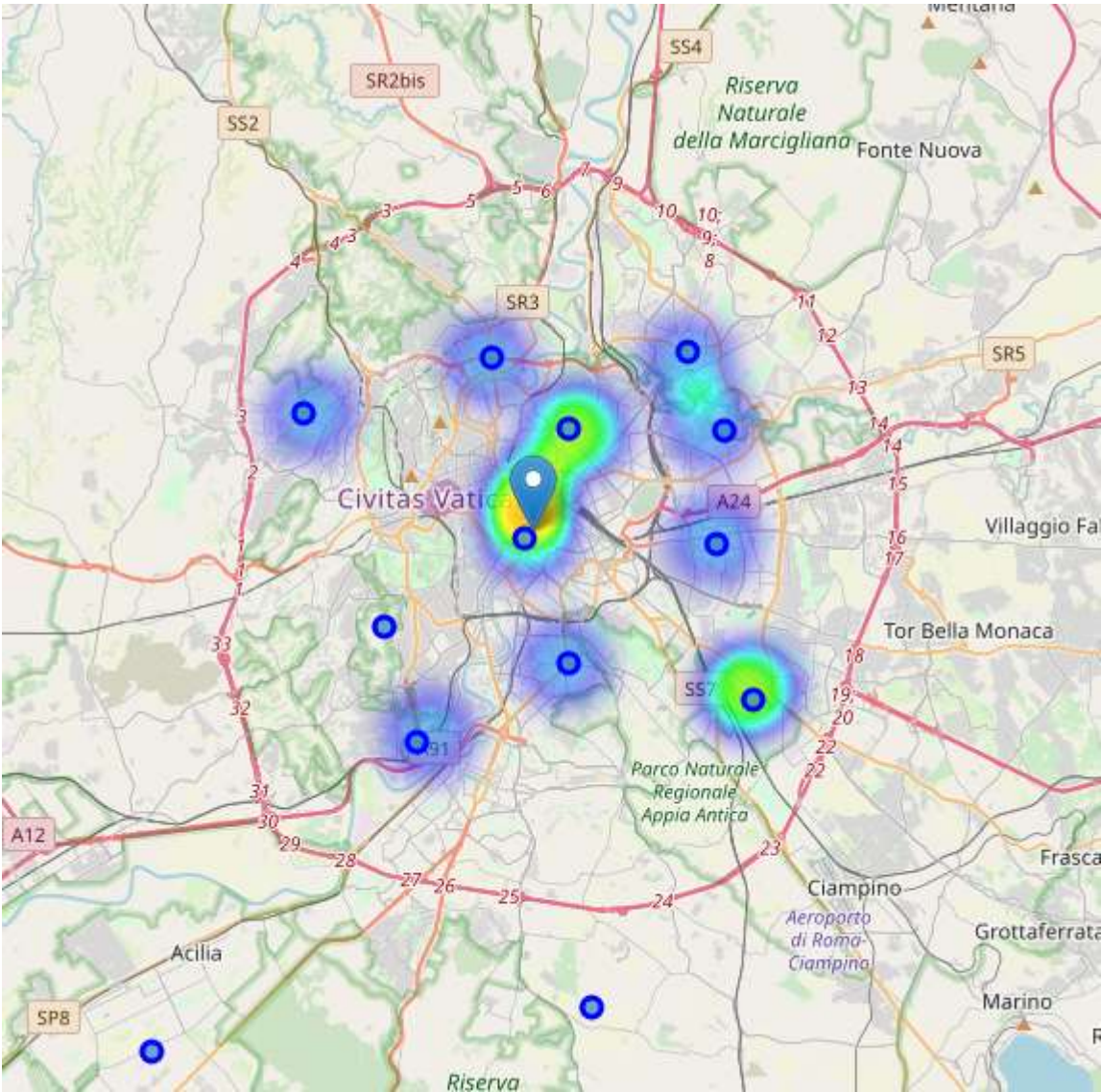
K-Means cluster analysis

The Elbow Method showing the optimal k


```
# add clustering labels
neighborhoods_venues_sorted.insert(0, 'Cluster Labels', kmeans.labels_)
rome_merged = dfMunicipi
rome_merged = rome_merged.join(neighborhoods_venues_sorted.set_index('Neighborhood'), on='Neighborhood')
rome_merged.head() # check the last columns!
```

	Neighborhood	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
0	I	41.9029	12.4855	0.0	Italian Restaurant	Hotel	Plaza	Ice Cream Shop	Boutique	Café
1	II	41.9224	12.4983	0.0	Italian Restaurant	Seafood Restaurant	Hotel	Plaza	Restaurant	Ice Cream Shop
2	III	41.9425	12.5410	0.0	Plaza	Italian Restaurant	Café	Basketball Stadium	Wine Bar	Fast Food Restaurant
3	IV	41.9216	12.5537	3.0	Gym Pool	Pizza Place	Wine Bar	Fast Food Restaurant	Cupcake Shop	Dessert Shop
4	V	41.8913	12.5510	0.0	Café	Pizza Place	Noodle House	Italian Restaurant	Gym	Basketball Court
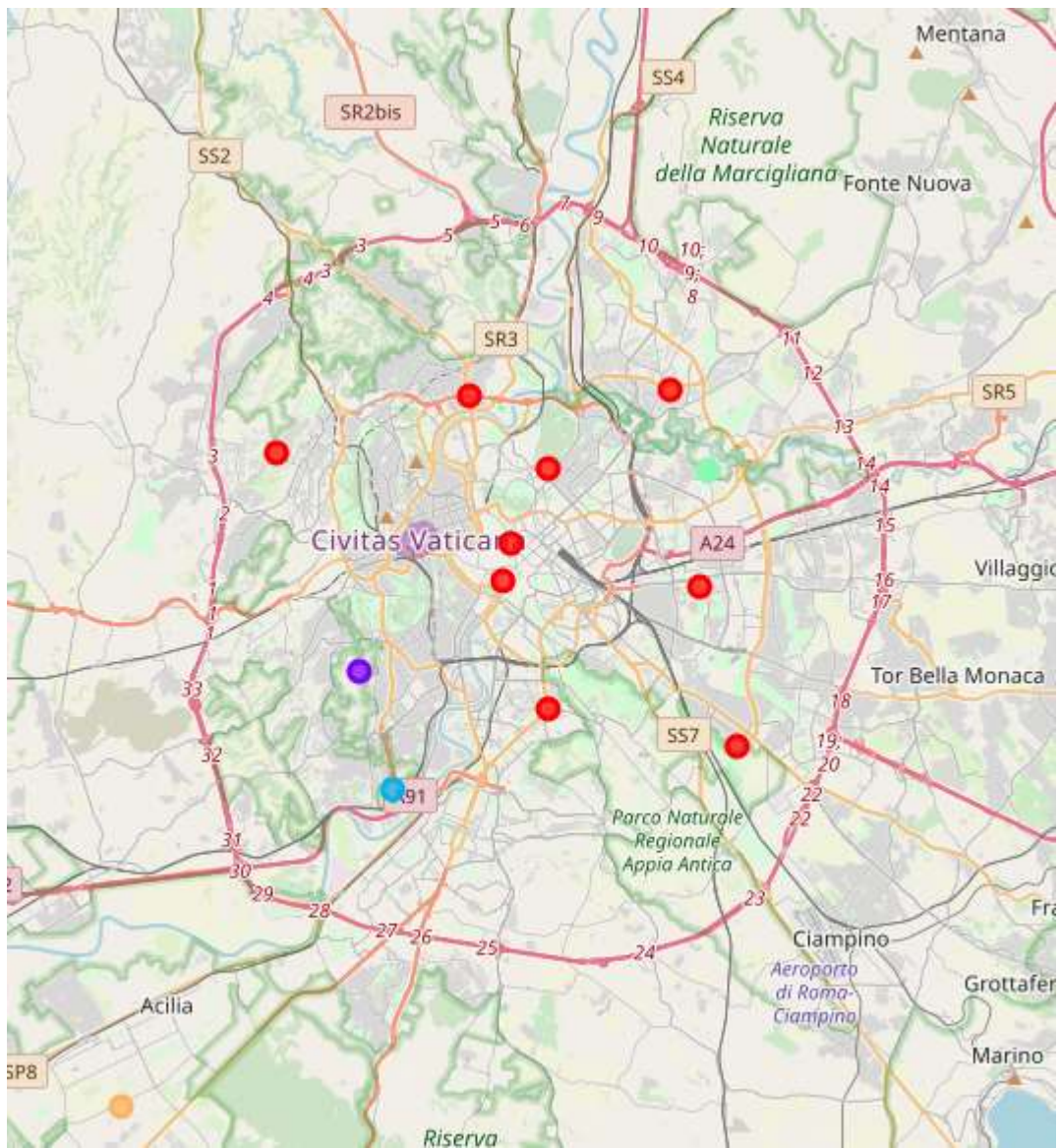
Discussion

Rome is a big city where millions of tourists come in every month to enjoy a full Italian experience: monuments, lifestyle and – of course – food.

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I user HeatMap to show restaurant location.

I used the Kmeans algorithm as part of this clustering study. When I tested the Elbow method, I set

the optimum k value to 5.

Conclusion

Rome is a city that offers many possibilities to investors.

This work offers investors interesting information in order to evaluate both the optimal position and the type of restaurant to be opened.