

Predicting where to place an Italian restaurant in Barcelona city

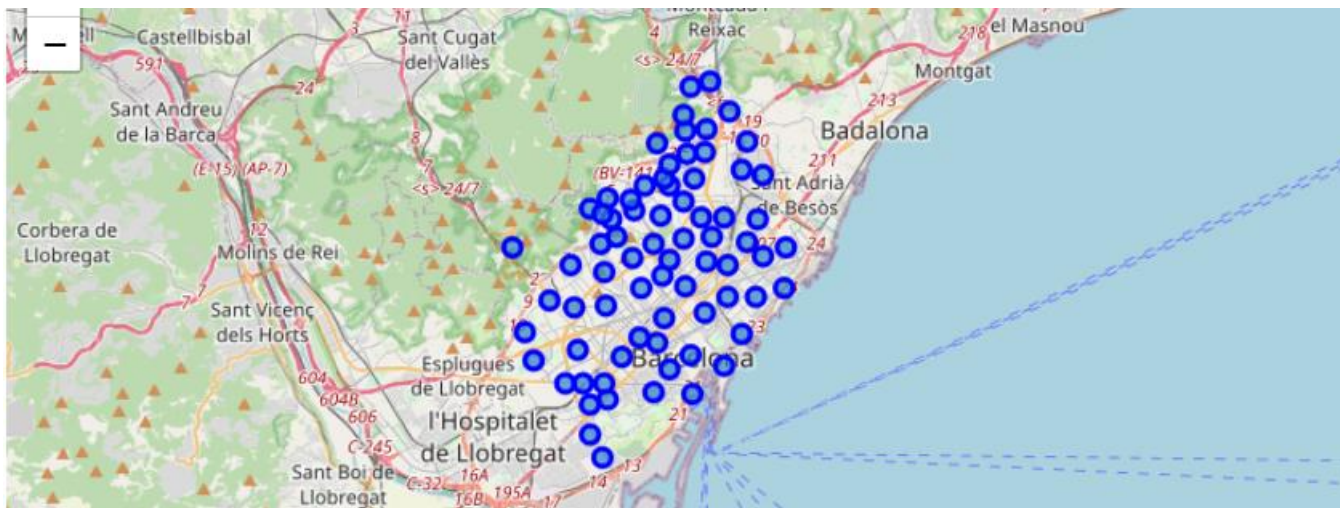
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Introduction

- ▶ Barcelona has become the 5th most visited city in Europe and 20th in the World. It has 519 hotels (March 2016) including 35 five stars hotels and a developed tourist infrastructure also with a high density of international restaurants, bars, pubs, bakeries or coffee shops.
- ▶ One of the critical aspects for the success of a restaurant in a city like Barcelona is where to place it.
- ▶ This project aims to predict **where a new Italian restaurant in Barcelona should be placed** in order to have more probabilities to success.

Data import and geocoordinates generation

- ▶ We have obtained the necessary data of Barcelona neighborhoods from the government official website that includes **districts, population, territory and density**.
- ▶ After this, using **geopy** function we obtain the **geographical coordinates** for **each neighborhood** in the city of Barcelona. Some adjustments were implemented in the neighborhoods data in order to make it work properly (name convention alignment).



Analysis of Barcelona population and density

- Our approach is then to **identify which are the 5 most populated and 5 most dense neighborhoods** in the city of Barcelona as these would be potentially the ideal areas to open a restaurant.

	District		Neighborhood	Population	Area (ha)	Density
8	Eixample	la Nova Esquerra de l'Eixample		58032	134.1	433
59	Sant Andreu		Sant Andreu	57843	186.7	310
5	Eixample	la Sagrada Família		51385	104.2	493
30	Gràcia		la Vila de Gràcia	50102	132.1	379
25	Sarrià-Sant Gervasi		Sant Gervasi - Galvany	47588	166.9	285

	District		Neighborhood	Population	Area (ha)	Density
16	Sants-Montjuïc		Sants - Badal	24312	41.5	586
31	Gràcia	el Camp d'en Grassot i Gràcia Nova		34911	65.1	537
50	Nou Barris		Verdun	12531	23.7	528
62	Sant Andreu		Navas	22176	42.4	523
63	Sant Martí		el Camp de l'Arpa del Clot	38663	74.1	522

Explore neighborhood categories

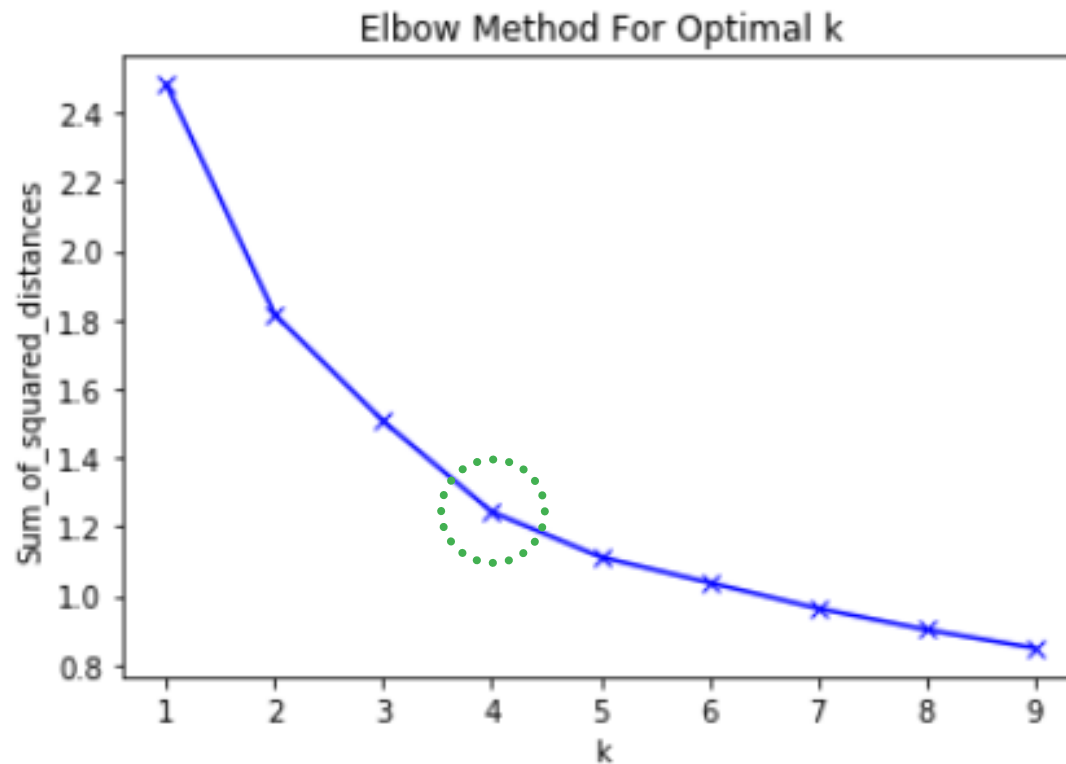
- ▶ We've used **Foursquare API** to find **100 venues** in a radius of 1000 meters from the coordinates of **each neighborhood**.
- ▶ Obtained a list of **5851 different venues** distributed in **288 unique categories**
- ▶ We have reviewed the list of categories and group some of them by one single category to have a more accurate clustering, reducing 288 categories to **26 categories**.

Foursquare category	Grouped category
Mexican Restaurant	Latin American restaurants
Argentinian Restaurant	Latin American restaurants
Latin American Restaurant	Latin American restaurants
Taco Place	Latin American restaurants
Peruvian Restaurant	Latin American restaurants
Empanada Restaurant	Latin American restaurants
South American Restaurant	Latin American restaurants
Venezuelan Restaurant	Latin American restaurants
Brazilian Restaurant	Latin American restaurants
Caribbean Restaurant	Latin American restaurants

Example of grouped category

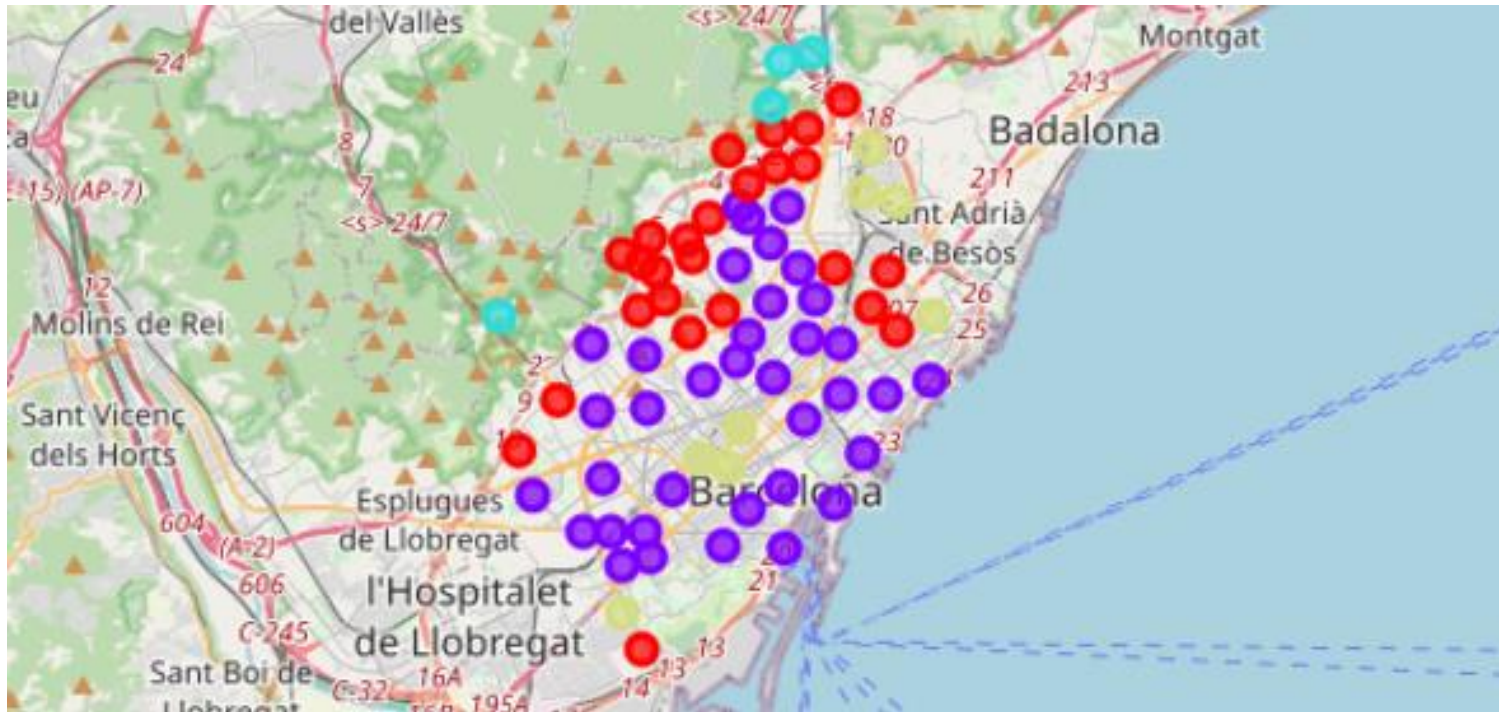
Clustering (I)

- ▶ We have selected the top 10 grouped venue categories for each neighborhood and performed an **Elbow Method** analysis to find the **optimal number of clusters**:



Clustering (II)

- Plot of 4 clusters in a map of Barcelona to see how the different neighborhoods have been grouped:



Outcome and conclusions

Italian restaurants	
Cluster Labels	
0	54
1	207
2	0
3	23

- ▶ Cluster 1 is the one with more Italian restaurants
- ▶ and from there the Neighborhood with lowest density of Italian Restaurant is *La Nova Esquerra de l'Eixample*:

	District	Neighborhood	Population	Area (ha)	Density	latitude	longitude	Italian restaurants	Cluster Labels	Italian_density
6	Eixample	la Nova Esquerra de l'Eixample	58032	134.1	433	41.382816	2.149966	3	1	0.000052
0	Ciutat Vella	el Raval	47353	110.0	430	41.379518	2.168368	3	1	0.000063
19	Gràcia	la Vila de Gràcia	50102	132.1	379	41.403178	2.157166	4	1	0.000080
4	Eixample	el Fort Pienc	32349	92.9	348	41.395925	2.182325	4	1	0.000124
13	Les Corts	les Corts	46274	141.0	328	41.385244	2.132863	6	1	0.000130

- ▶ The conclusion is that the best neighborhood to place an Italian restaurant based on the analysis is *La Nova Esquerra de l'Eixample*.