

# **Characterizing the neighborhoods of Sant Martí, Barcelona**

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# **1. Introduction**

## **1.1. Background**

Sant Martí is one of the Barcelona's boroughs, and Barcelona is one of the most popular cities in the world and the second in Spain. How are its neighborhoods and how are they distributed are important factors that determine the possible objectives that can have the people to go to them. Each type of neighborhood can bring a different value to the people. Thus, it is necessary to know this information. For example, this information can be used to make a better decision-making to go on holidays, or to move to.

## **1.2. Problem**

Data that might contribute to determining what characterizes each neighborhood include its location (latitude and longitude), its venue categories and its venue categories density. This project aims to know how many types of neighborhoods exist in Sant Martí and what characterizes each type based on these data.

## **1.3. Interest**

One type of people interested in these data are the tourists, others would be people who live in other boroughs of Barcelona, people who live in one of those neighborhoods but don't know the rest, people who are thinking about moving to the city or specifically to this borough, or people who are thinking about creating a new company in this borough but don't know what kind of neighborhoods are there.

## **2. Data acquisition and cleaning**

### **2.1. Data sources**

The borough and neighborhood's names can be found from [https://en.wikipedia.org/wiki/Districts\\_of\\_Barcelona](https://en.wikipedia.org/wiki/Districts_of_Barcelona), and the rest of data (latitude, longitude and venue features) from Foursquare API, venue features through personal credentials. Those datasets are permanently updating.

### **2.2. Data cleaning**

Data downloaded or scraped from those sources were combined into one data frame. Since combining only the necessary variables, no further cleaning is required.

## **3. Exploratory Data Analysis**

### **3.1. Calculation of the target variables**

Now we have the venue categories in the same feature, to calculate the density distribution for each one, we divide this feature in a new data frame and we obtain 796 samples (one for each venue) with 169 features (one for each type of venue), then, we calculate their density distribution grouped by neighborhood and include it in a new data frame.

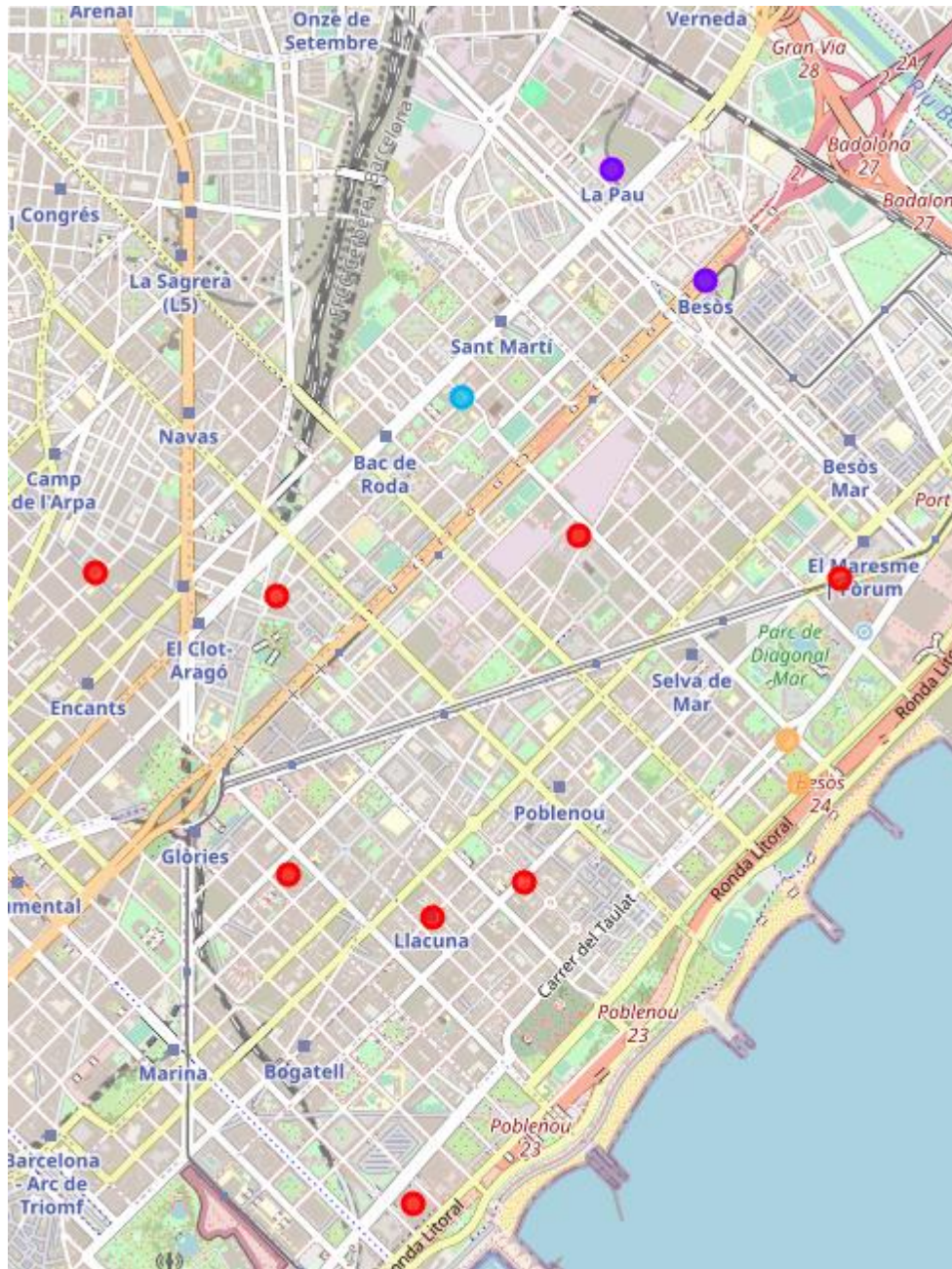
With this, now we have 14 samples (one for each neighborhood) with 169 features (one for each density distribution of venue category).

### **3.2. Cluster the neighborhoods**

Finally, we can create the clusters to group each neighborhood with its similar.

One possible good way, our selection, is clustering by 5.

## 4.- Analyze each cluster



## 4.1. By geographical location

- 3 clusters (2, 3 and 4) are in the north
- 1 cluster (1) is in west, center, east and south
- 1 cluster (5) is in south-east

## 4.2. By venues

Neighborhood	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
el Maresme	Café	Hotel	Italian Restaurant	Diner	Restaurant	Burger Joint	Ice Cream Shop	Cafeteria	Big Box Store	Cocktail Bar
el Clot	Spanish Restaurant	Tapas Restaurant	Mediterranean Restaurant	Café	Coffee Shop	Hotel	Restaurant	Supermarket	Plaza	Park
El Camp de l'Arpa del Clot	Bakery	Grocery Store	Hotel	Pizza Place	Café	Restaurant	Spanish Restaurant	Italian Restaurant	Mediterranean Restaurant	Burger Joint
el Parc	Hotel	Bar	Restaurant	Clothing Store	Spanish Restaurant	Mediterranean Restaurant	Tapas Restaurant	Coffee Shop	Music Venue	Sandwich Place
la Llacuna del Poblenou	Spanish Restaurant	Mediterranean Restaurant	Bakery	Italian Restaurant	Gastropub	Coffee Shop	Pizza Place	Restaurant	Empanada Restaurant	Cocktail Bar
Poblenou	Spanish Restaurant	Mediterranean Restaurant	Bakery	Italian Restaurant	Restaurant	Pizza Place	Indian Restaurant	Gastropub	Café	Tapas Restaurant
Provençals del Poblenou	Spanish Restaurant	Asian Restaurant	Pedestrian Plaza	Pizza Place	Mediterranean Restaurant	Bistro	Liquor Store	Soccer Field	Café	Recreation Center
la Vila Olímpica del Poblenou	Restaurant	Mediterranean Restaurant	Café	Italian Restaurant	Hookah Bar	Nightclub	Paella Restaurant	Spanish Restaurant	Lounge	Bar

- First cluster, includes "el Maresme", "el Clot", "El Camp de l'Arpa del Clot", "el Parc", "la Llacuna del Poblenou", "Poblenou", "Provençals del Poblenou" and "la Vila Olímpica del Poblenou", in west, east and south of Sant Martí, and it is characterized by having places for crowded eating and some tourism (many types of Restaurants, Hotels, Café, Pizza, Ice Cream, etc).

Neighborhood	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
El Besòs	Tapas Restaurant	Tram Station	Metro Station	Café	Breakfast Spot	Pedestrian Plaza	Vegetarian / Vegan Restaurant	Restaurant	Plaza	Market
la Pau	Café	Supermarket	Tapas Restaurant	Fast Food Restaurant	Bar	Plaza	Pharmacy	Coffee Shop	Hardware Store	Falafel Restaurant

- Second cluster, includes "el Besòs" and "la Pau", in north of the Sant Martí, and it is characterized by having chill eating places or to buy food and some transport stations (Café, Tapas, Supermarket, Bar, Breakfast, Tram Station, Metro Station).

Neighborhood	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
Sant Martí de Provençals	Spanish Restaurant	Supermarket	Coffee Shop	Soccer Field	Grocery Store	Pizza Place	Bakery	Pedestrian Plaza	Pawn Shop	Park

- Third cluster, includes "Sant Martí de Provençals", in north of the Sant Martí, and it is characterized by having a variety of food places (Restaurants, Supermarket, Coffe, Pizza).

Neighborhood	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
La Verneda	Food	Coffee Shop	Fast Food Restaurant	Soccer Field	Metro Station	Athletics & Sports	Smoke Shop	Empanada Restaurant	Flea Market	Farmers Market

- Fourth cluster, includes "La Verneda", in north of the Sant Martí, and it is characterized by having places for sports and food (Food, Athletics & Sports, Soccer Field, Restaurants).

Neighborhood	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
Diagonal Mar	Mediterranean Restaurant	Restaurant	Hotel	Beach	Italian Restaurant	Beach Bar	Park	Café	Cafeteria	Fast Food Restaurant
el Front Marítim del Poblenou	Mediterranean Restaurant	Restaurant	Beach Bar	Beach	Café	Athletics & Sports	Hotel	Park	Cocktail Bar	Fast Food Restaurant

- Fifth cluster, includes "Diagonal Mar" and "el Front Marítim del Poblenou", in south-east of Sant Martí, and it is characterized by having beach places where you can eat (Beach, Beach Bars, Restaurants).



## **5. Conclusions**

In this study, I created data frames to analyze the density distribution of each type of venue for each neighborhood, clustered them by similar density distribution, and analyzed what characterize each cluster. These data frames can be useful to help many kinds of people. For example, if someone wants to move to a specific kind of neighborhood.