



# Applied Capstone: Battle of the Neighbourhoods Barcelona and Madrid

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# Introduction

- Two of the biggest culturally vibrant and popular cities in Spain are Madrid and Barcelona.
- There are many distinction between Madrid(Spanish Capital) and Barcelona (Catalonian Capital)
- Both Barcelona and Madrid are quite popular tourist attraction and vacation destination for people all around the world.
- They are both diverse and multicultural cities that offer a lot of unique experiences that is widely sought after.

# Business Problem

- Goal to help tourists choose their destinations depending on the unique experiences that each city has to offer and the neighbourhoods where that can be experienced
- Compare and Contrast what makes Barcelona and Madrid alike and different at the same time

# Data

## Neighbourhoods:

- Data on the neighbourhood names and districts in Barcelona are provided by the Barcelona Government (Open Data BCN) via csv file
- Data on the neighbourhood names and districts in Madrid are provided by the Madrid Government (Datos de Madrid) via csv file

## Geo Coding:

- We used the Geocoder and ArcGIS API to get geo locations of all of the neighbourhood by coordinates. The inputs are names of neighbourhood and the district name/code to get the coordinates (Latitude and Longitude) as outputs

# Data

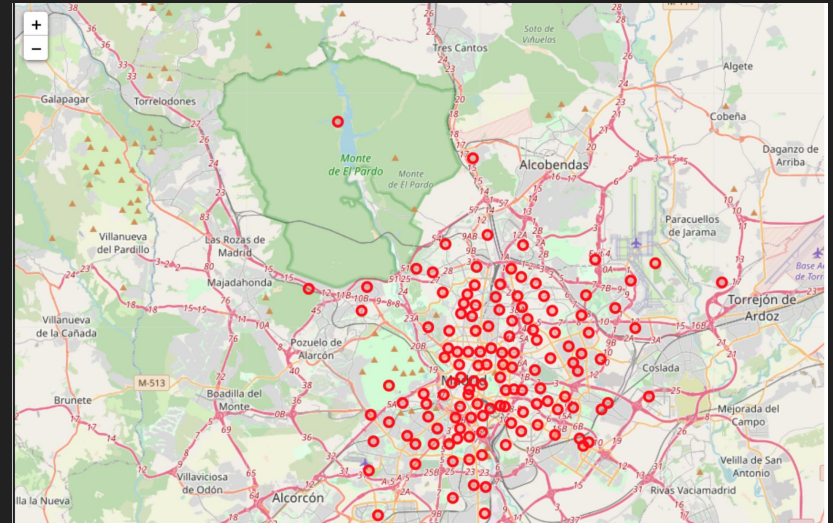
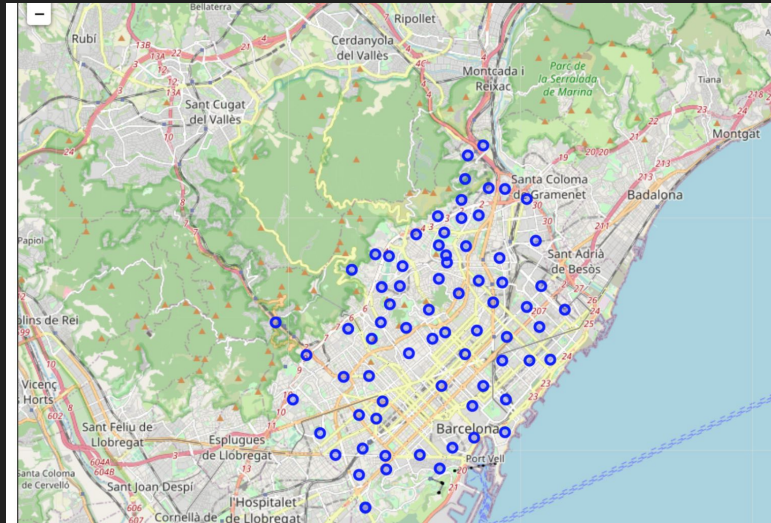
## Venue Data

- Based on the Data that we collected and modified (added coordinates), we used the FourSquare API, to get all of the venues in each neighbourhood and merged them with previous data into a new data frame

# Methodology

Folium:

- We used Folium python package to use the data that was collected to generate maps with the neighbourhood below



# Methodology

## One Hot Encoding:

- In order to use and apply the K Means clustering Machine Learning algorithm we need to encode the categorical variables into numeric form. In this case we used One Hot Encoding method to convert all unique items under Neighbourhood venue category

## Top 10 Venue categories:

- Since there are many different types of venues, in both cities we decided to take only the top 10 common types of venues for K-Means Clustering

# Methodology

## K-Means Clustering:

- We used the K Means clustering technique to divide the neighbourhoods in 5 clusters based similarities on the common top venues.

### Cluster 5

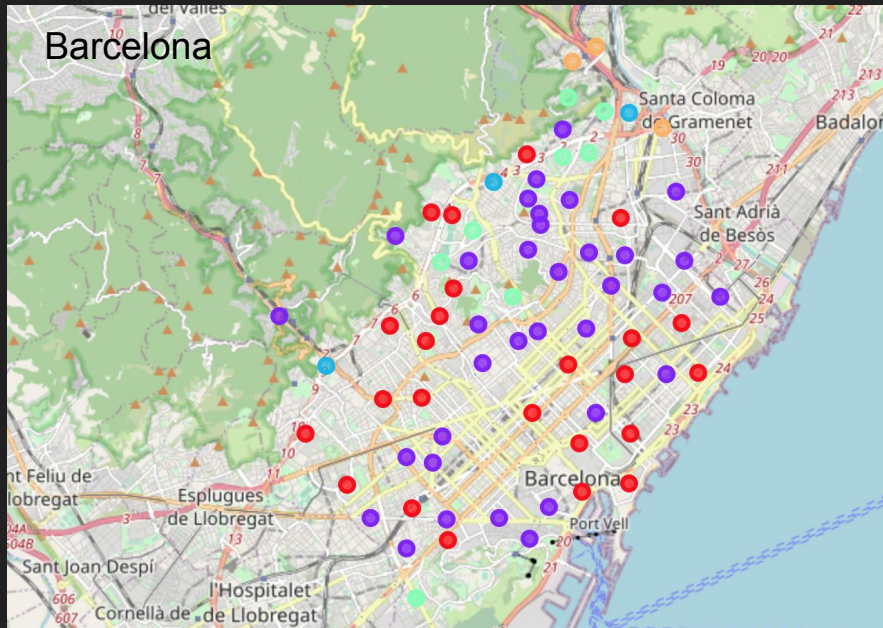
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]: barcelona_merged.loc[barcelona_merged['Cluster Labels'] == 4, barcelona_merged.columns[[1] + list(range(5, barcelona_merg  
.]:
```

	NOM_DISTRICTE	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 Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
54	Nou Barris	2.17722	4	Metro Station	Park	Plaza	Grocery Store	Train Station	Donut Shop	Flea Market	Fast Food Restaurant	Farmers Market	Farm
55	Nou Barris	2.18313	4	Plaza	Train Station	Grocery Store	Park	Dog Run	Flea Market	Fast Food Restaurant	Farmers Market	Farm	Falafel Restaurant
57	Sant Andreu	2.19963	4	Plaza	Metro Station	Café	Park	Electronics Store	Flower Shop	Flea Market	Fast Food Restaurant	Farmers Market	Farm



# Results

- The neighbourhoods in both cities are divided into 5 different clusters, and mapped to the map below, each cluster has its own unique color.



# Discussion

- Madrid is a bustling capital on arid plains in the heart of Spain it is bigger and has about 132 neighbourhoods to explore.
- Barcelona is more of an Mediterranean city and offers a lot more natural, and picturesque natural scenery with 73 neighbourhoods to explore.
- Both have historical sites and museums although Barcelona has more extraordinary art and architecture on the street to enjoy like the Gothic quarter
- Madrid is a cosmopolitan city, and offers a lot more possibilities in terms of entertainment and Spanish atmosphere.

# Discussion

- In terms of cuisines both Barcelona and Madrid offer wide variety of international cuisines. Barcelona offers more Catalan cuisine and is more vegetarian and vegan friendly, while Madrid offers more traditional Spanish, and a gourmet experience.
- Both have really good street markets to offer like Barcelona's La Ramblas and Madrid's Rastro.

# Conclusion

- If you are looking for more cosmopolitan and bustling city with lots of entertainment like experience Madrid will be the choice.
- If you are looking for more combination of city and beach/nature with architecture and art on the street then Barcelona will be the choice.
- Both cities seem to offer a nice vacation stay with a lot of places to explore, and variety of unique activities to do.

# Image sources:

<https://boomersdaily.files.wordpress.com/2020/08/barcelona-travel-video-august-19-2020.jpg>

[https://cdn.contexttravel.com/image/upload/c\\_fill,q\\_60,w\\_2600/v1555940004/production/city/hero\\_image\\_16\\_1555940004.jpg](https://cdn.contexttravel.com/image/upload/c_fill,q_60,w_2600/v1555940004/production/city/hero_image_16_1555940004.jpg)