

IBM Data Science Captstone Project

# Opening a new restaurant in Barcelona



# How's food in BCN?

- In Barcelona, food is a lifestyle
- Mediterranean cuisine and eating out is both a social need and a custom deeply rooted in local culture
- Counts with locals, expats and with uncountable tourists all year round

# Objective of this project

- Study the food market by zones → is globalization affecting the restaurants?
- See by zones what is more popular
- Is the food affected by the income
- Is the food affected by the nationality of its residents?

# Data sets from the Open Data BCN portal, the Ajuntament de Barcelona's open data service

- population.csv containing

Year	District.Code	District.Name	Neighborhood.Code	Neighborhood.Name	Gender	Age	Number
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- nationalitynsex.csv containing

Year	District.Code	District.Name	Neighborhood.Code	Neighborhood.Name	Gender	Nationality	Age	Number
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- 2017\_rendatributariamitjanaunitatconsum.csv

Year	District.Code	District.Name	Neighborhood.Code	Neighborhood.Name	Section	Income
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**FOURSQUARE**

# Foursquare calls only by food

- Developed an URL for Forsquare that only calls food venues and upgradeable to other types of venues

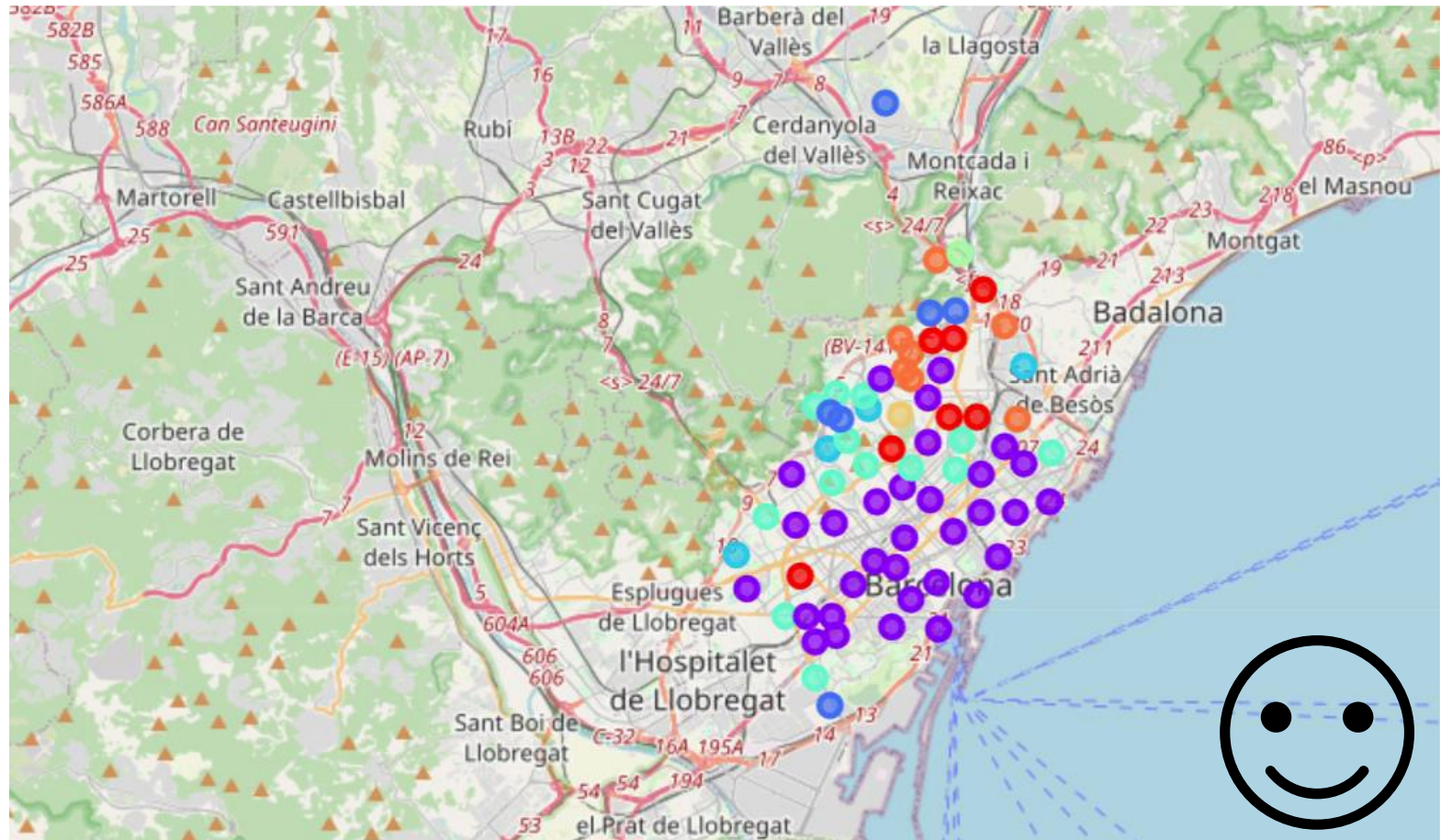
```
def getNearbyVenues(names, latitudes, longitudes, radius=500):  
  
    venues_list=[]  
    for name, lat, lng in zip(names, latitudes, longitudes):  
        print(name)  
        categoryId = ["4d4b7105d754a06374d81259"]  
        # create the API request URL  
        url = 'https://api.foursquare.com/v2/venues/explore?&client_id={}&client_secret={}&v={}&ll={},{}&radius={}&limit={}&categoryId={}'.format(  
            CLIENT_ID,  
            CLIENT_SECRET,  
            VERSION,  
            lat,  
            lng,  
            radius,  
            LIMIT,  
            ",".join(categoryId))
```

Food Category ID



# Kmeans Cluster Analysis

- Found that 8 clusters would be the optimal by Silhouette rating and Elbow method
- The resulting map is:





# Differences between cluster food tastes

```
[ ] bcn_merged.loc[bcn_merged['Cluster Labels'] == 1, bcn_merged.columns[[1] + list(range(5, bcn_merged.shape[1]))]]
```



	Neighborhood.Name	latitude	longitude	altitude	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	el Raval	41.379518	2.168368	0.0	1	Spanish Restaurant	Tapas Restaurant	Mediterranean Restaurant	Café	Pizza Place	Seafood Restaurant
1	el Barri Gòtic	41.383395	2.176912	0.0	1	Tapas Restaurant	Spanish Restaurant	Mediterranean Restaurant	Italian Restaurant	Café	Vegetarian / Vegan Restaurant
2	la Barceloneta	41.380653	2.189927	0.0	1	Tapas Restaurant	Mediterranean Restaurant	Paella Restaurant	Spanish Restaurant	Seafood Restaurant	Burger Joint
3	Sant Pere, Santa Caterina i la Ribera	41.372251	2.177532	0.0	1	Mediterranean Restaurant	Restaurant	Chinese Restaurant	Food Truck	Bistro	Diner
4	el Fort Pienc	41.395925	2.182325	0.0	1	Café	Sandwich Place	Chinese Restaurant	Spanish Restaurant	Mediterranean Restaurant	Bakery

```
bcn_merged.loc[bcn_merged['Cluster Labels'] == 3, bcn_merged.columns[[1] + list(range(5, bcn_merged.shape[1]))]]
```



	Neighborhood.Name	latitude	longitude	altitude	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
20	Pedralbes	41.390140	2.112218	0.0	3	Café	Mediterranean Restaurant	Hot Dog Joint	Restaurant	Spanish Restaurant	Pizza Place
27	Vallcarca i els Penitents	41.415712	2.141469	0.0	3	Café	Snack Place	Bakery	Restaurant	Burger Joint	Pizza Place
36	el Carmel	41.425591	2.154959	0.0	3	Restaurant	Café	Bakery	Food Court	Wings Joint	Fish & Chips Shop
58	el Bon Pastor	41.436110	2.204807	0.0	3	Café	Restaurant	Tapas Restaurant	Italian Restaurant	Bakery	Mediterranean Restaurant

Cluster 2

Team Tapas



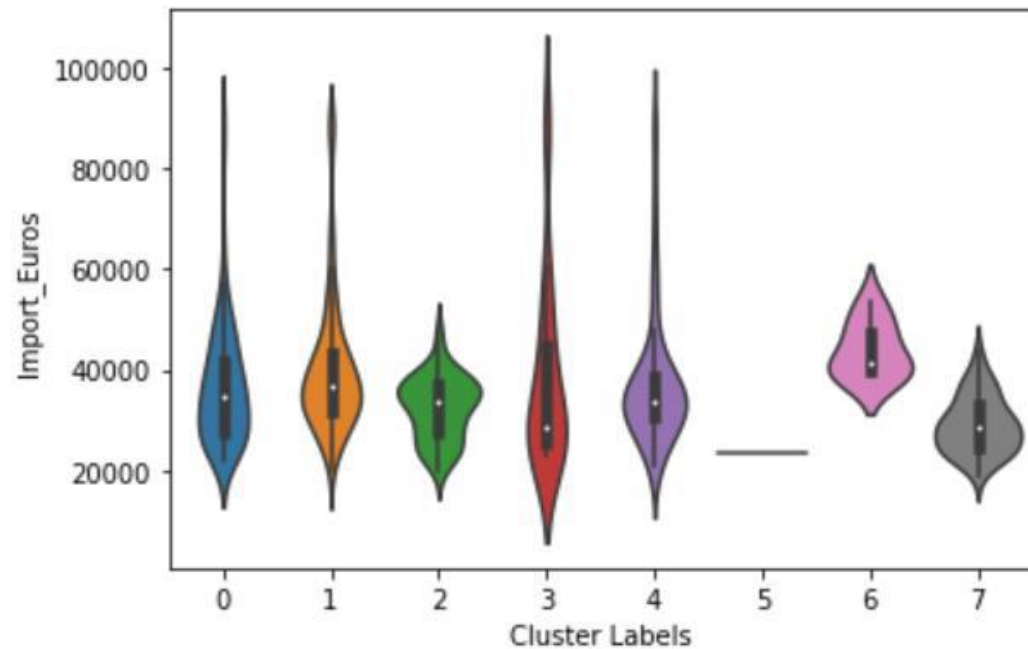
Cluster 4

Team Coffee

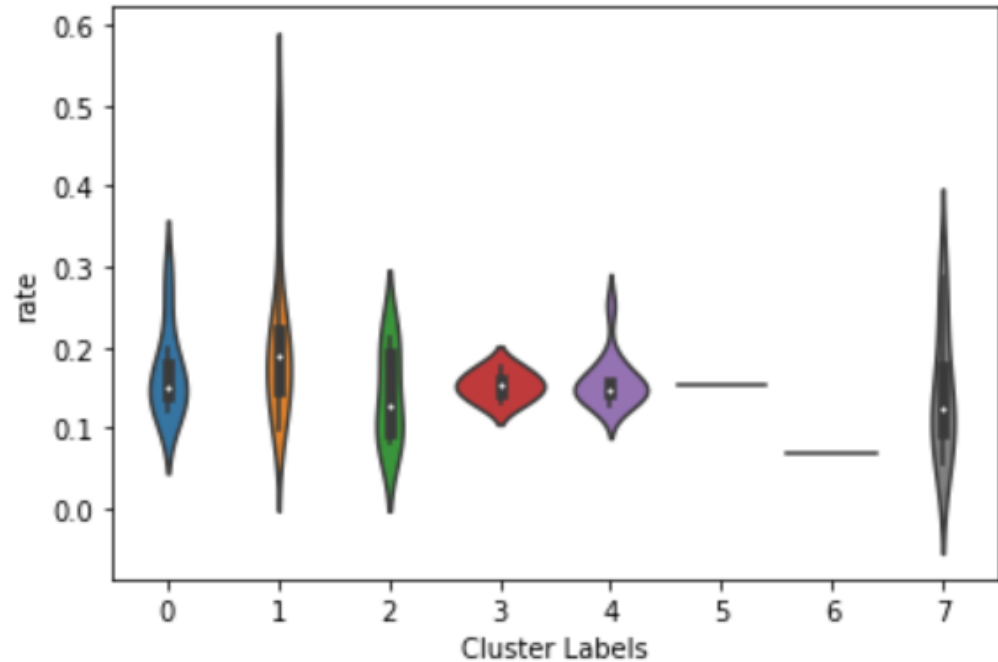


# Influence of income and nationality

- Food tastes organized by clusters compared to the household income and the amount of non-Spanish residents rate



Average household income by clusters labels



non-Spanish residents rate by clusters labels



# Conclusion

- Despite the strong influence on global food trends the main part of Barcelona is still relying on Spanish food such as Tapas, Spanish and Mediterranean Restaurants
- Residential zones have popular cafes and bakeries
- The income of the population doesn't influence strongly the type of food
- The nationality of the residents doesn't affect the popularity of the local food