Best Location for Mexican Restaurant in Kyiv. Madrid experience.

Introduction. There are many good and delicious Mexican restaurants in Madrid (Spain) due to different factors. Among these drivers, we can mention big Mexican diaspora living in Madrid, cultural diversity, food preferences of Spanish people, good purchasing power of city citizens. On the other hand, if we look at other European capital - Kyiv (Ukraine), we will not find huge verity of Mexican food restaurants in spite of many common factors that have Kyiv and Madrid:

- Both cities are European capitals.
- Cities population numbers are similar (more than 3 millions).
- Spain and Ukraine have almost the same dimension of the territory and quantities of countries' inhabitants.
- People in Madrid in Kyiv have good purchasing power. Income levels in the capitals of Spain and Ukraine are higher than in the rest of country.
- Mexican culture and food can be interesting for both cities' residents, especially for immigrants from Latin America.

The objective of this project is to find the best location for Mexican restaurant in Kyiv using the information regarding locations of Mexican restaurants in Madrid. People who want to begin this kind of business in Kyiv can be interested in this project.

Data. The main source of the data used in the project, is Foursquare geographical location information obtained from Foursquare developers

web-portal (https://api.foursquare.com/v2/venues). I used search API's to find all Mexican restaurants' locations in Madrid and Kyiv. Found geographical information was cleaned up and transformed in the Python data frames in order to be able to use obtained data in further calculations.

I found 41 Mexican restaurants in Madrid. Below is a part data frame of the found locations information.

	Name	Category	Address	City	Latitude	Longitude
0	Mexican Factory	Burrito Place	NaN	NaN	40.450129	-3.691512
1	Burro Delic Mexican Food	Mexican Restaurant	C.C. Parquesur	Leganés	40.339077	-3.733555
2	Mexican Factory Burrito Bar	Burrito Place	NaN	NaN	40.437485	-3.686225
3	MEXICando	Mexican Restaurant	NaN	Paracuellos de Jarama	40.503745	-3.531987
6	mexican factory	Mexican Restaurant	Calle Marie Cubrir 4	NaN	40.337768	-3.526724

Pic. 1. Locations of Mexican restaurants in Madrid. Head of Python data frame.

We can see these locations in Madrid on the Folium map:
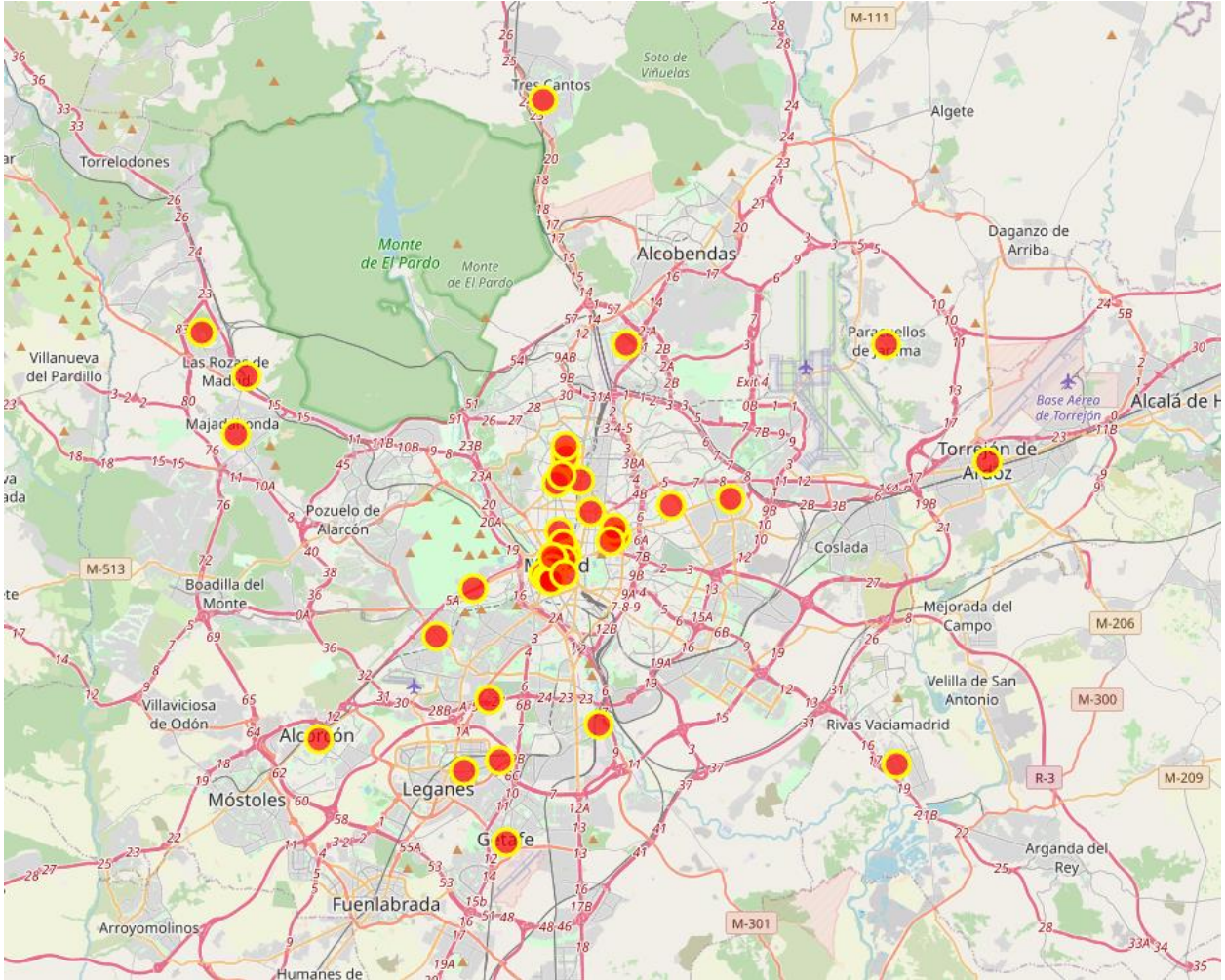
Pic. 2. Locations of Mexican restaurants in Madrid in Folium map.

In Kyiv only four Mexican restaurants were found. Results table (Pic. 3.) and locations marked on map(Pic. 4.) are below.

	Name	Category	Address	City	Latitude	Longitude
0	Rojo Ojo Mexican Food	Café	Окружная дорога, 22а	Київ	50.447757	30.357882
1	LosSantos Mexican food	Mexican Restaurant	ул. Изюмская 7	Київ	50.412937	30.520603
2	Dos Amigos	Mexican Restaurant	вул. Межигірська, 9	Київ	50.466785	30.515503
3	MexicanBar	Mexican Restaurant	Гната Юры	Киёв	50.430068	30.385957

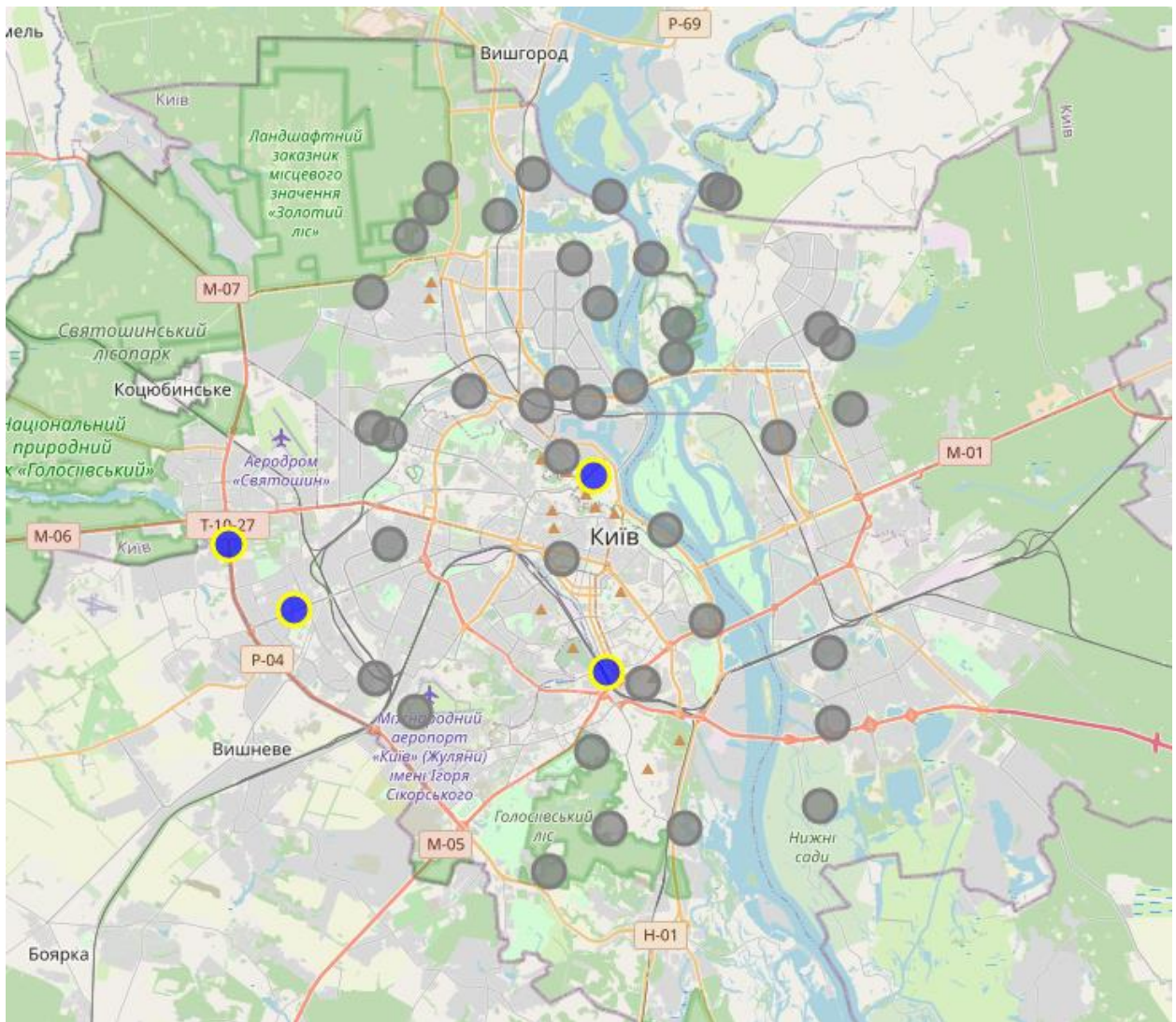Pic. 3. Locations of Mexican restaurants in Kyiv. Python data frame.
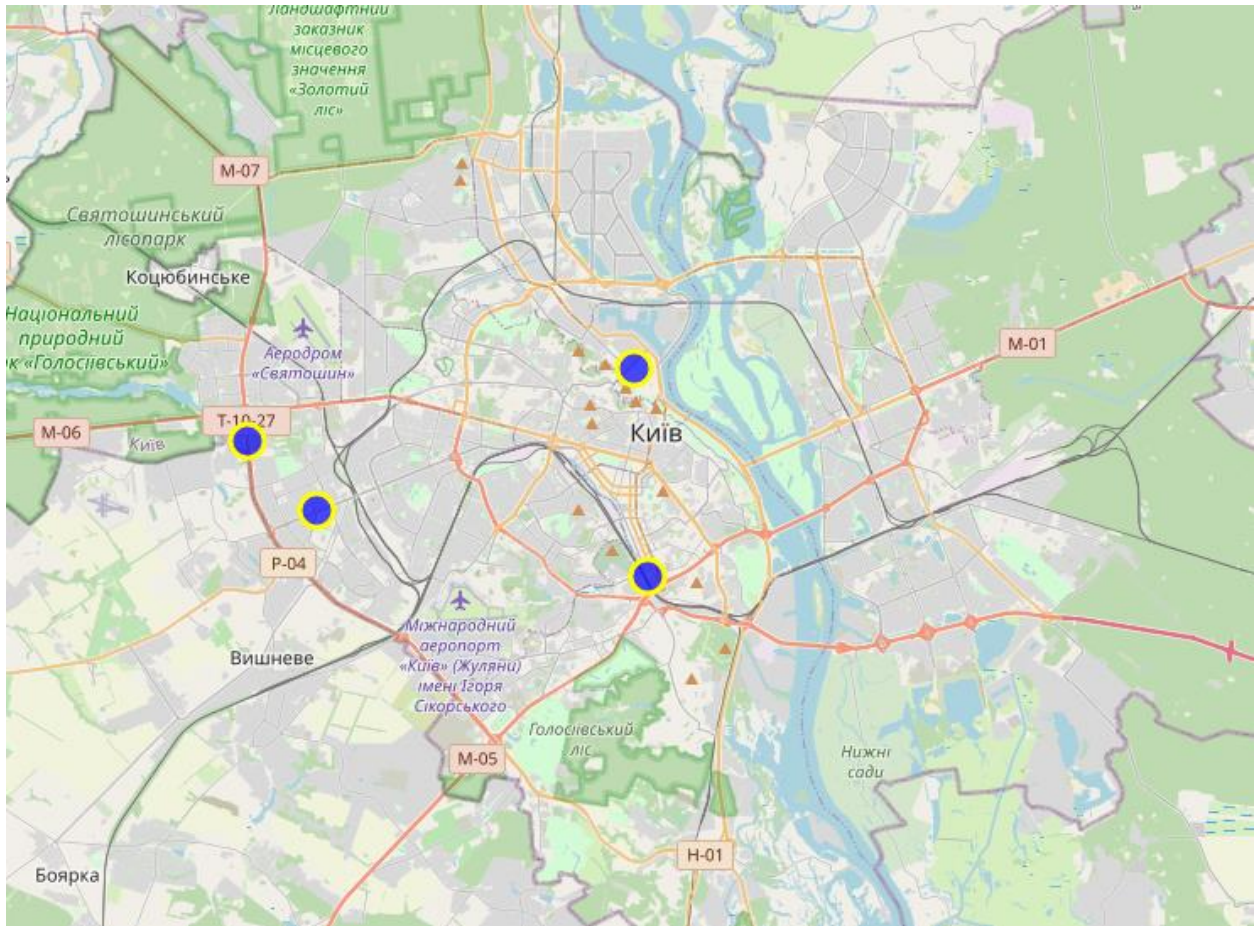
Pic. 4. Locations of Mexican restaurants in Kyiv in Folium map.

In addition, I prepared 40 random locations in Kyiv using Microsoft Excel and then loaded these locations in Python notebook. Below is a part of the list of these random locations (Pic. 5.). Their locations also are reflected in the Folium map (Pic. 6.).

	Name	Category	Address	City	Latitude	Longitude
0	Random1	Mexican Restaurant	Random1	Kyiv	50.538	30.4749
1	Random2	Mexican Restaurant	Random2	Kyiv	50.427	30.5640
2	Random3	Mexican Restaurant	Random3	Kyiv	50.448	30.4276
3	Random4	Mexican Restaurant	Random4	Kyiv	50.370	30.5222
4	Random5	Mexican Restaurant	Random5	Kyiv	50.508	30.5519

Pic. 5. Random locations generated in Excel and imported in Jupyter notebook as panda data frame.


Pic. 6. Random locations (grey) and existing Mexican restaurants (blue) in Kyiv.

From our point of view, k-means clustering method can be applied to the obtained data set (Madrid and Kyiv geographical coordinates) in order to find out:

- The best locations in Kyiv for opening new Mexican restaurant, considering the existing geographical locations of Mexican restaurants in Madrid. In this case some of random locations will belong to the best cluster (cluster with the biggest quantities of existing restaurants in Madrid city).
- Check if current locations of existing Mexican restaurants in Kyiv are good, looking at Madrid experience. Location is good if existing Kyiv restaurant location belongs to the best cluster (cluster with the biggest quantities of existing restaurants in Madrid city).

Methodology. All collected data frames (existing Mexican restaurants in Madrid, existing Mexican restaurants in Kyiv and randomly generated geographical locations in Kyiv) were combined in one data set. We performed cluster analysis of this data set using k-means clustering method. Analysis was done in Jypyter notebook with Foursquare APIs geographical data location information. We investigated all venues located in the radius of 500 meters within each restaurant. Data set was divided in 25 clusters basing on venues similarity near each restaurant: shop, park, river, Chinese restaurant, bar, bus stop, office etc. Results are reflected in folium maps of Madrid (Pic. 6.) and Kyiv (Pic. 7.). All information related to data and methods used can be found in the Jupyter notebook attached to this report.
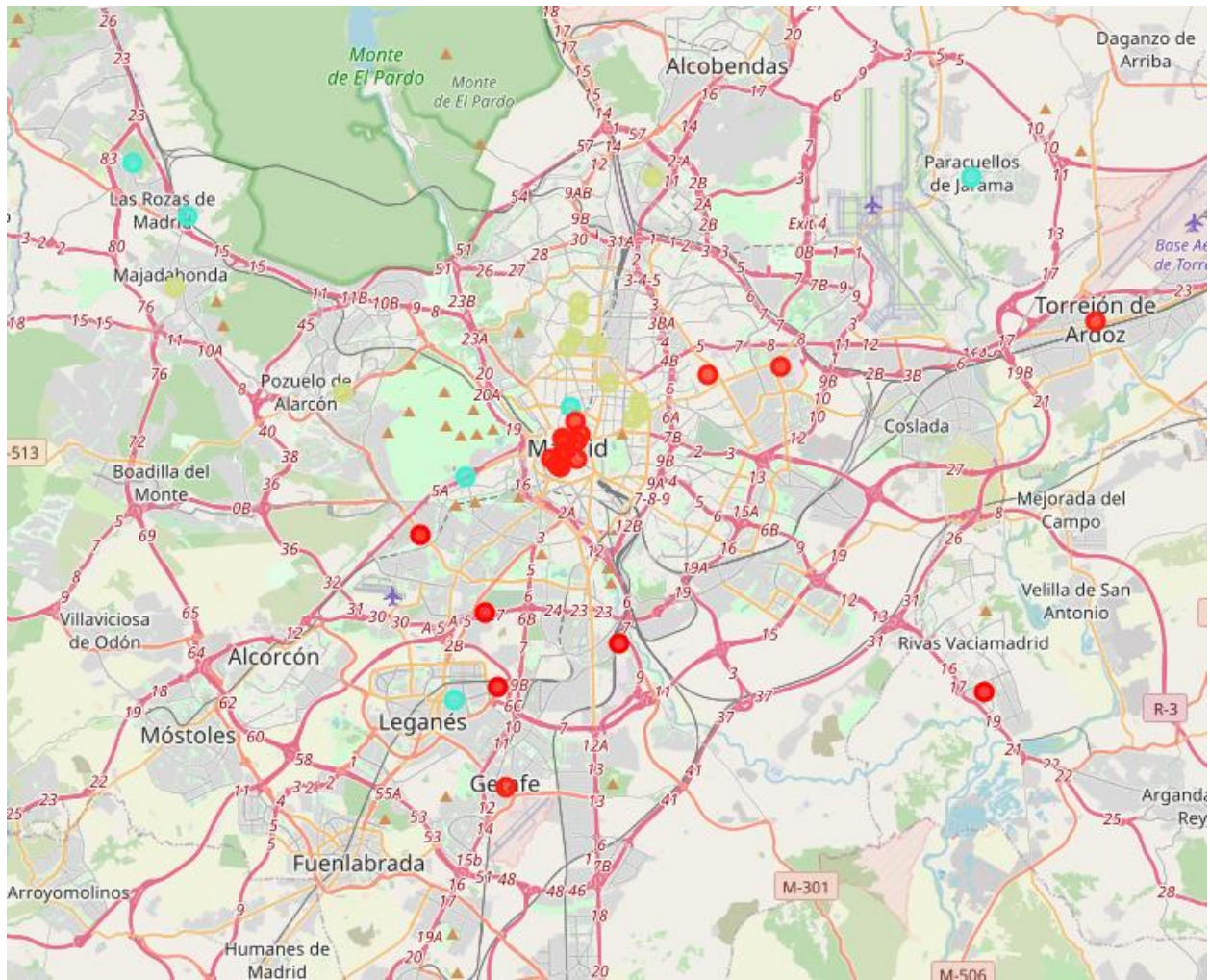
Pic. 6. Results of cluster analysis in Madrid.
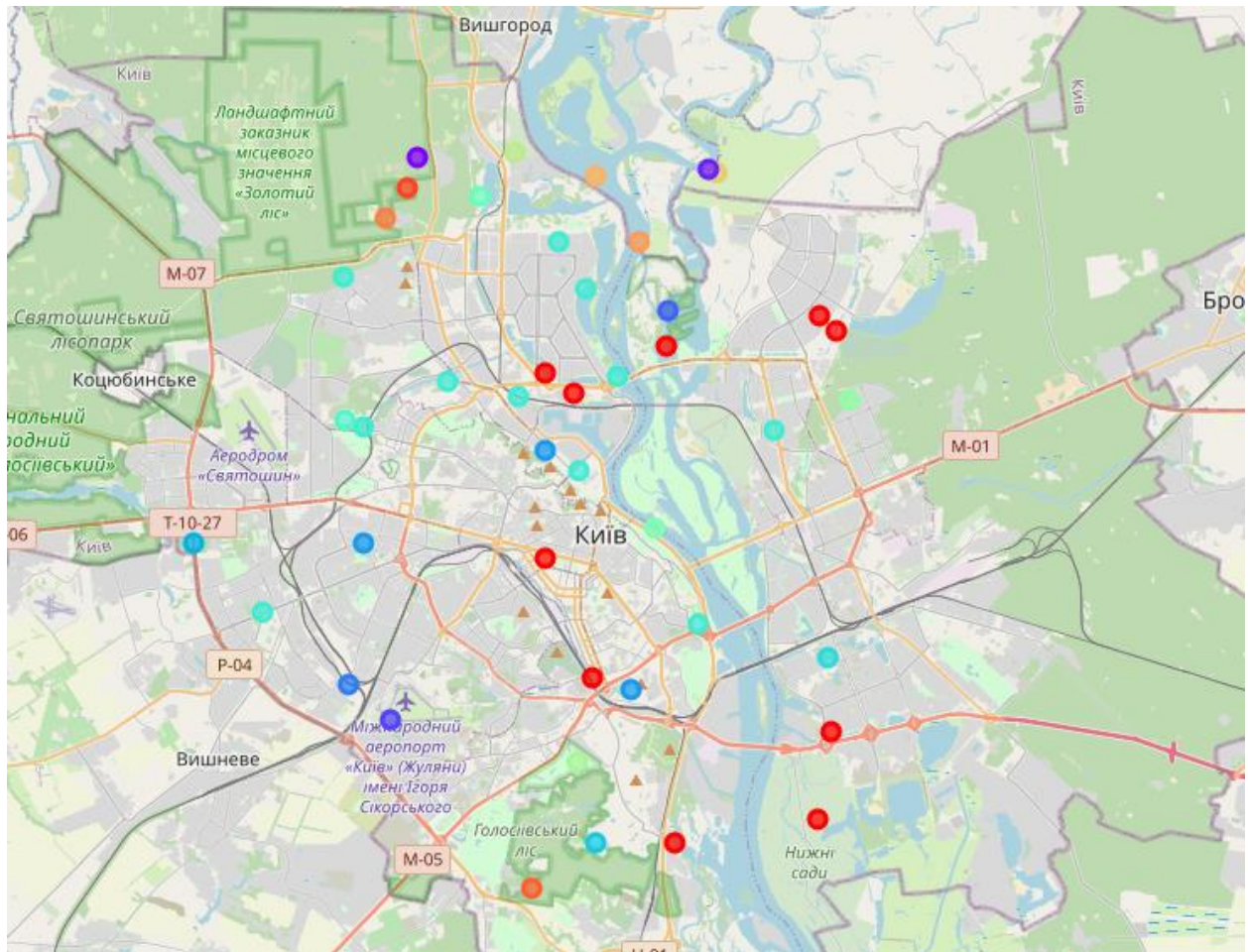
Pic. 7. Results of cluster analysis in Kyiv.

Results. Examining the clusters, we see that there are only two clusters with both Madrid and Kyiv geographical locations. On the other hand, we also noticed that Madrid venues generally are different in comparison with Kyiv locations. In cluster 2 we have only Madrid Mexican restaurants located mostly in the northern part of Madrid. Also in cluster 9 there are only Madrid locations, mainly city center. It means that these locations are very similar but in the same time, these locations differ from Kyiv. In addition, we see that in Kyiv there are many locations that are not similar to other locations in Kyiv. We have 21 cluster with only one, two or three Kyiv locations.

Let us investigate deeper clusters that have both Madrid and Kyiv locations (cluster 10 and cluster 20). These clusters are the most important in our analysis.

We can see cluster 10 coordinates in Pic. 7. (Madrid) and Pic. 8. (Kyiv).
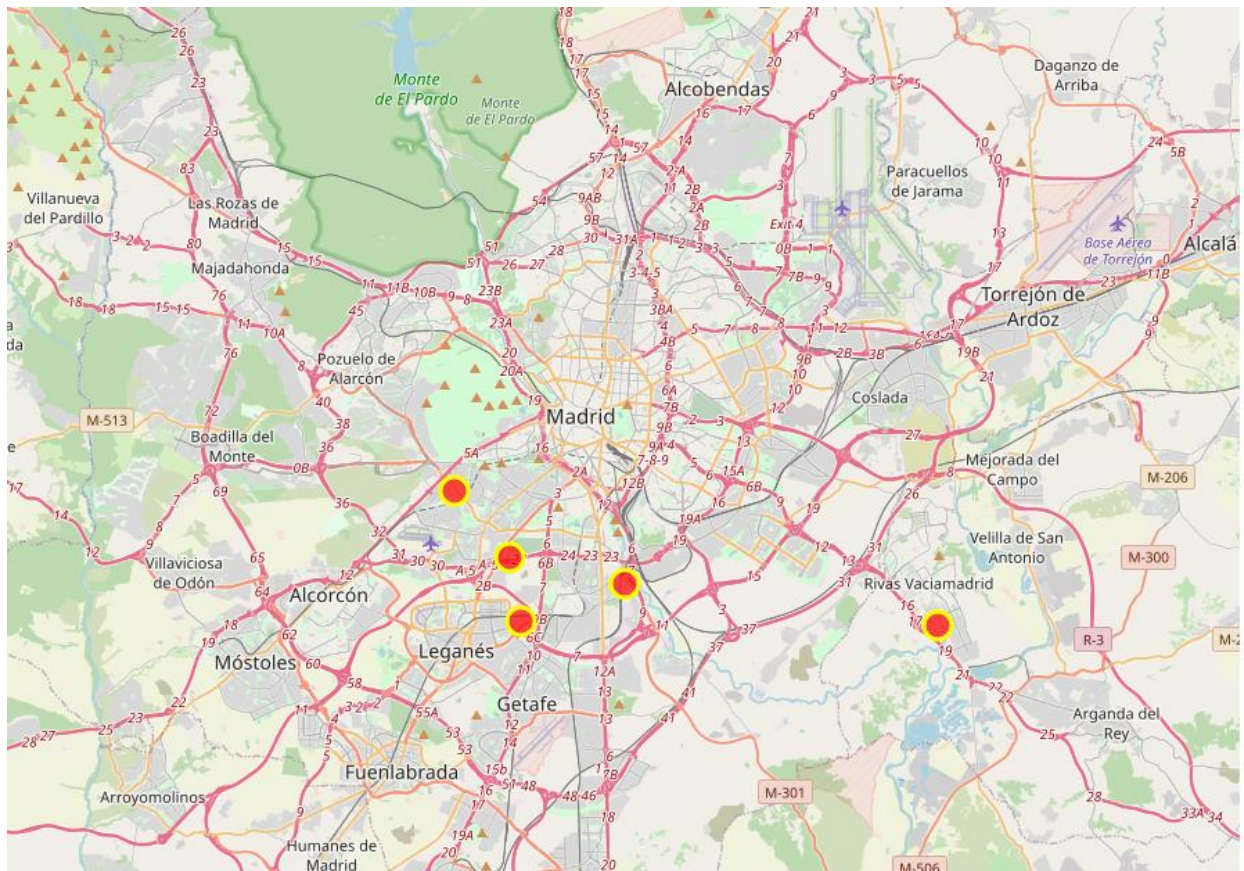
Pic. 7. Cluster 10 restaurants in Madrid.

Cluster 10 contains five Mexican restaurants located far from the city center and 10 locations situated in Kyiv mainly in center and in inhabited districts of Kyiv. In addition, I noticed that existing Mexican restaurant in Kyiv "Los Santos. Mexican food" belongs to this cluster. It means that this restaurant has logic location from the point of view of Madrid experience.
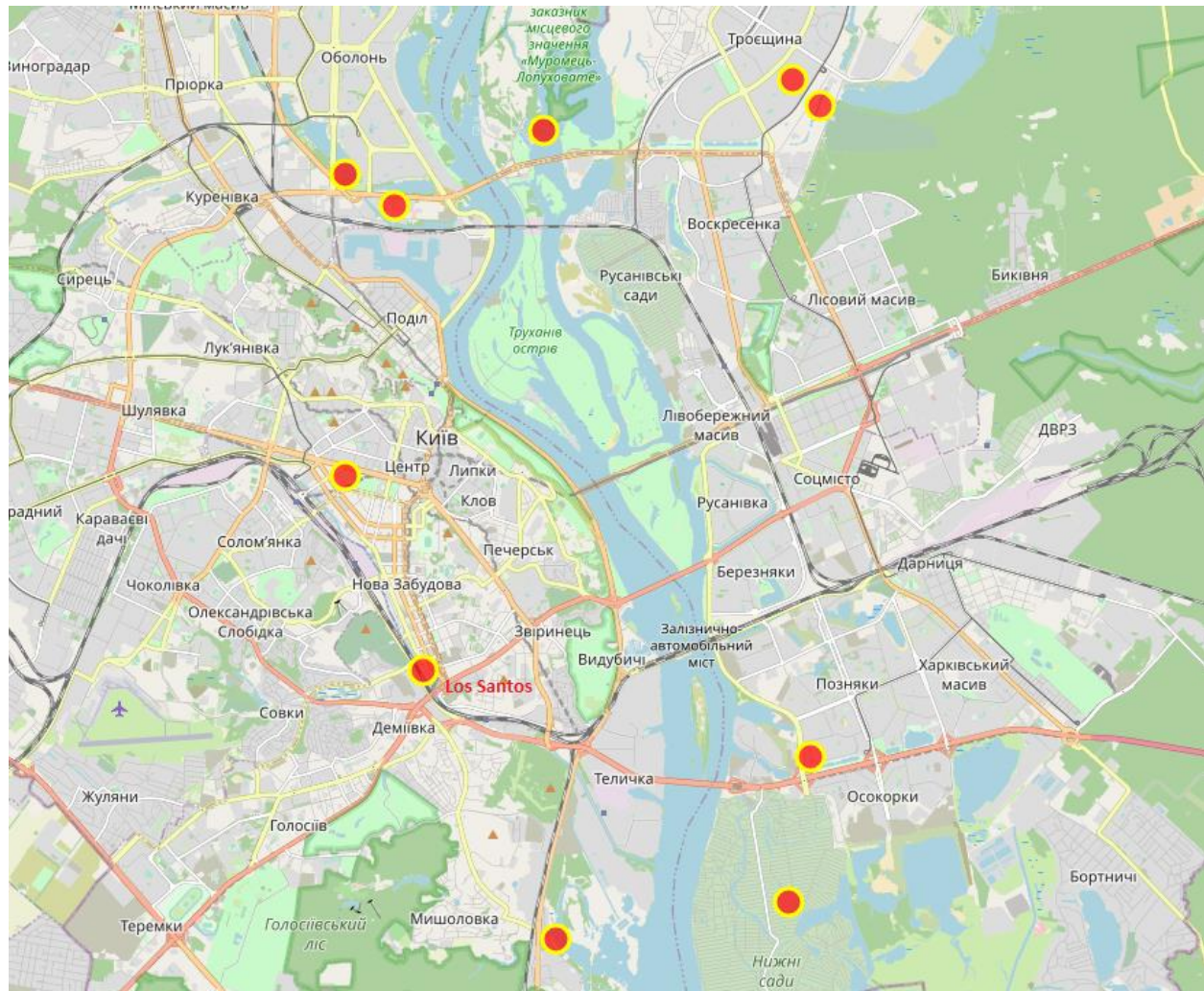
Pic. 8. Cluster 10 locations in Kyiv.

Cluster 20 is presented in Pic. 9. (Madrid) and Pic. 10. (Kyiv). In this cluster we see six Madrid Mexican restaurants located mostly far from city center, and eleven geographical locations in Kyiv. Two existing Mexican restaurants "Dos Amigos" and "Mexican Bar" are also in this cluster. Locations of these two restaurants correlate with locations of Mexican restaurants in Madrid.
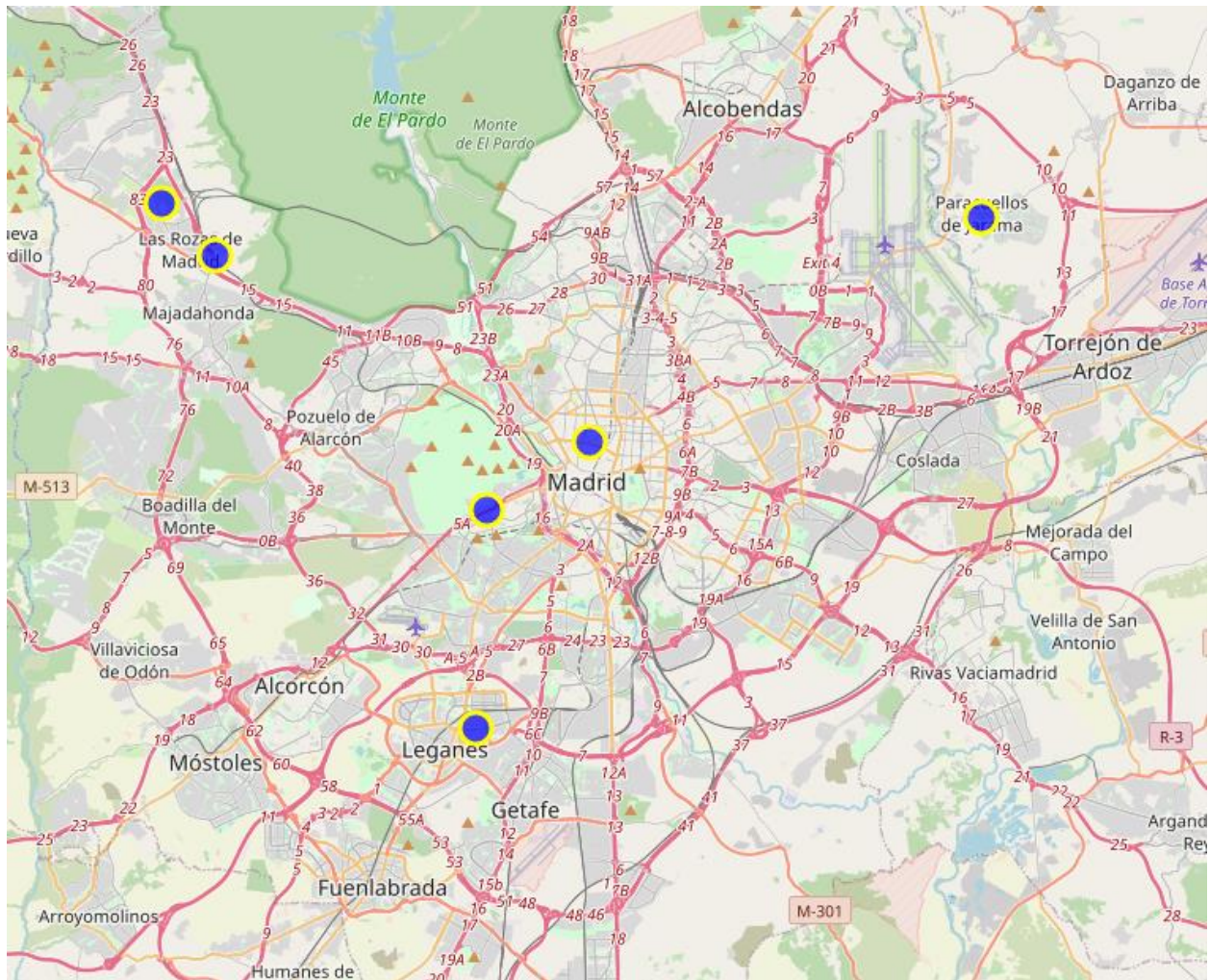
Pic. 9. Cluster 20 locations in Madrid.
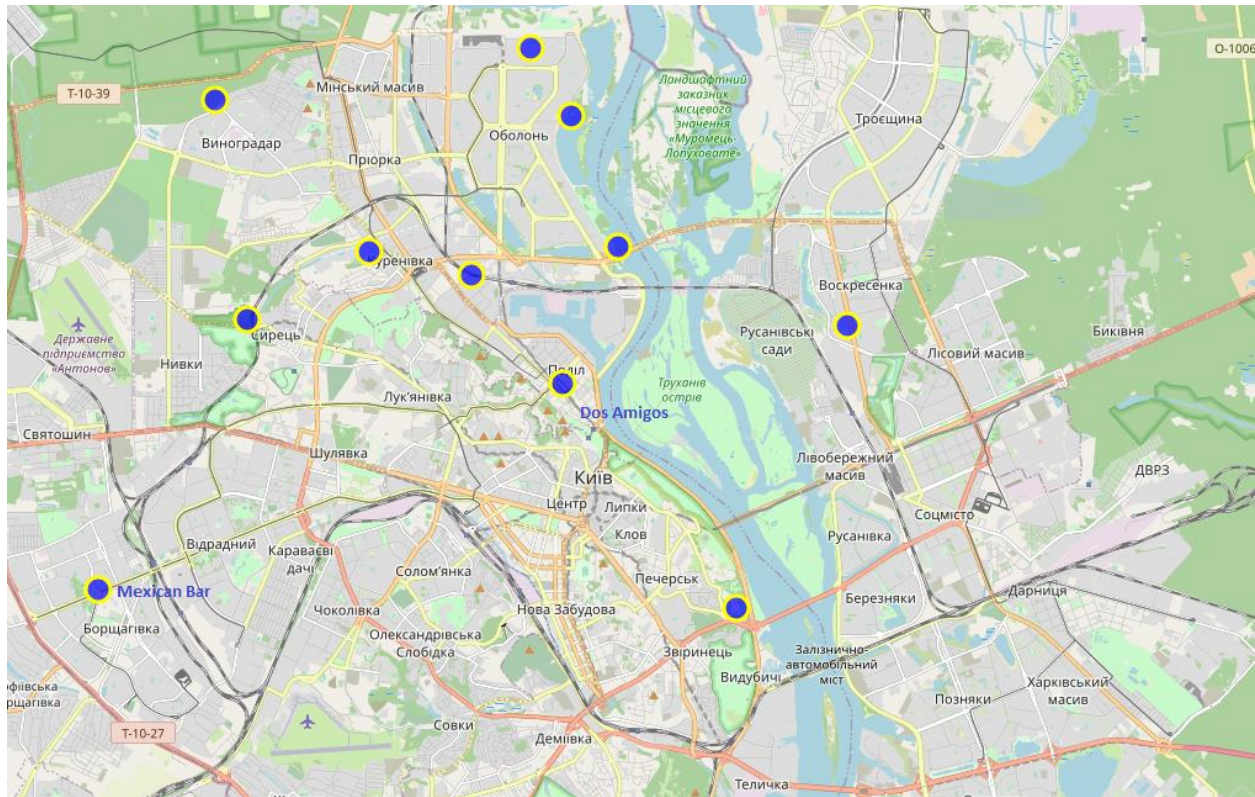
Pic. 10. Cluster 20 locations in Kyiv.

Also we found out that one existing Mexican restaurant in Kyiv "Rojo Ojo. Mexican Food" is in cluster 17 and this is unique location in this cluster. This restaurant has wrong location from the point of view of Madrid experience. This restaurant is situated very far from Kyiv city center.

Discussion. Taking into account the success Mexican restaurants have in Madrid, we can say that Kyiv locations belonging to cluster 10 and cluster 20 are good to open new Mexican restaurant in Kyiv. We can notice that these are city center locations and also places located in highly populated districts such as Obolon, Troieschyna, Holosiiv, Livoberezhna, Syrets, Borschagivka, Kurenivka and Vynogradar.

Conclusion. First conclusion is that locations of three exiting Mexican restaurants ("Los Santos", "Dos Amigos", "Mexican Bar") are good. Another

existing restaurant "Rojo Ojo" has geographical location that does not correlate with Madrid location of Mexican restaurants. Second conclusion is that we found good geographical coordinates to open new Mexican restaurant in Kyiv. See full list of possible places in the annexes (cluster 10 and cluster 20) and Pic. 8. & Pic. 10. These geographical locations are similar to the coordinates of existing Mexican restaurants in Madrid situated far from the city center.

This analysis based only on the similarity of the venues situated near existing or possible locations of Mexican restaurant. Other drivers, such as administrative permissions, competitors' activities, economic factors or cultural preferences are good objectives for further investigations.

ANNEXES

Cluster 10

	Category	City	Latitude	Longitude	Restaurant	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
2	Mexican Restaurant	Leganés	40.339077	-3.733555	Burro Delic Mexican Food Leganés C.C. Parquesur1	9	Clothing Store	Electronics Store	Coffee Shop	American Restaurant	Italian Restaurant
4	Mexican Restaurant	nan	40.337768	-3.526724	mexican factory nan Calle Marie Cubrir 4	9	Clothing Store	Fast Food Restaurant	Furniture / Home Store	Shopping Mall	Burger Joint
7	Mexican Restaurant	Madrid	40.363395	-3.738959	Mexican Factory Madrid C.C. Islazul	9	Clothing Store	Italian Restaurant	Sandwich Place	Fast Food Restaurant	Gym
32	Mexican Restaurant	Madrid	40.353380	-3.681617	Restaurante Café Mexicano Pupiseria Rio Grande...	9	Latin American Restaurant	Tapas Restaurant	Supermarket	Train Station	Snack Place
35	Mexican Restaurant	nan	40.388474	-3.766254	Mi ranchito mexicano nan nan	9	Italian Restaurant	Chinese Restaurant	Burger Joint	Tapas Restaurant	Bar
42	Mexican Restaurant	Київ	50.412937	30.520603	LosSantos Mexican food Київ ул. Изюмская 7	9	Clothing Store	Shoe Store	Boutique	Coffee Shop	Cosmetics Shop
51	Mexican Restaurant	Kyiv	50.399000	30.617900	Random7 Kyiv Random7	9	Wine Shop	Italian Restaurant	Gym	Caucasian Restaurant	Middle Eastern Restaurant
52	Mexican Restaurant	Kyiv	50.444000	30.501300	Random8 Kyiv Random8	9	Hotel	Pizza Place	Caucasian Restaurant	Health & Beauty Service	Coffee Shop
56	Mexican Restaurant	Kyiv	50.370000	30.554100	Random12 Kyiv Random12	9	Harbor / Marina	Tram Station	Bay	Snack Place	Buffet
58	Mexican Restaurant	Kyiv	50.376000	30.612400	Random14 Kyiv Random14	9	Garden	Gym / Fitness Center	Vineyard	Canal Lock	Pool
63	Mexican Restaurant	Kyiv	50.499000	30.550800	Random19 Kyiv Random19	9	Sports Club	Theme Park	Athletics & Sports	Board Shop	Beach
74	Mexican Restaurant	Kyiv	50.503000	30.620100	Random30 Kyiv Random30	9	Indie Movie Theater	Bus Stop	Office	Market	Music Store
77	Mexican Restaurant	Kyiv	50.487000	30.513400	Random33 Kyiv Random33	9	Sporting Goods Shop	Arcade	Motorcycle Shop	Clothing Store	Movie Theater
78	Mexican Restaurant	Kyiv	50.507000	30.613500	Random34 Kyiv Random34	9	Pizza Place	Indie Movie Theater	Cosmetics Shop	Bus Stop	Market
83	Mexican Restaurant	Kyiv	50.492000	30.501300	Random39 Kyiv Random39	9	Convenience Store	Pizza Place	Farmers Market	Bakery	Grocery Store

Cluster 20

	Category	City	Latitude	Longitude	Restaurant	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6tl
3	Mexican Restaurant	Paracuellos de Jarama	40.503745	-3.531987	MEXICando Paracuellos de Jarama nan	19	Diner	Coffee Shop	Café	Pharmacy	Pizza Place	
15	Café	Madrid	40.429898	-3.702722	Cafés La Mexicana Madrid C. Fuencarral	19	Plaza	Coffee Shop	Bar	Pizza Place	Ice Cream Shop	
31	Market	Madrid	40.407400	-3.747072	La Mexicana Madrid Calle de el Greco, 27	19	Theme Park Ride / Attraction	Pizza Place	Falafel Restaurant	Park	Bar	
34	Mexican Restaurant	Leganés	40.508535	-3.888245	Burro Delic Mexican Food Leganés C.C. Parquesur	19	Park	Grocery Store	Tapas Restaurant	General Entertainment	Bar	
36	Café	Leganés	40.334804	-3.751703	Cafés La Mexicana Leganés Avenida Rey Juan Car...	19	Park	Coffee Shop	Rock Club	Plaza	Diner	
39	Mexican Restaurant	Las Rozas	40.491098	-3.865076	El Rinconcito Mexicano Las Rozas nan	19	Park	Italian Restaurant	Spanish Restaurant	Coffee Shop	Mexican Restaurant	
43	Mexican Restaurant	Київ	50.466785	30.515503	Dos Amigos Київ вул. Межигірська, 9	19	Coffee Shop	Bar	Café	Cocktail Bar	Park	
44	Mexican Restaurant	Київ	50.430068	30.385957	MexicanBar Київ Гната Юры	19	Pizza Place	Park	Coffee Shop	Soccer Field	Gym / Fitness Center	
46	Mexican Restaurant	Kyiv	50.427000	30.564000	Random2 Kyiv Random2	19	History Museum	Park	Furniture / Home Store	Gas Station	Outdoor Sculpture	
53	Mexican Restaurant	Kyiv	50.478000	30.427600	Random9 Kyiv Random9	19	Park	Yoga Studio	Lake	Music Venue	Botanical Garden	E
61	Mexican Restaurant	Kyiv	50.490000	30.461700	Random17 Kyiv Random17	19	Bus Stop	Coffee Shop	Clothing Store	Spa	Bistro	
66	Mexican Restaurant	Kyiv	50.491000	30.531000	Random22 Kyiv Random22	19	Coffee Shop	Scenic Lookout	Yoga Studio	Health & Beauty Service	Playground	
67	Mexican Restaurant	Kyiv	50.486000	30.490300	Random23 Kyiv Random23	19	Electronics Store	Bookstore	Coffee Shop	Bakery	Comic Shop	
71	Mexican Restaurant	Kyiv	50.517000	30.418800	Random27 Kyiv Random27	19	Eastern European Restaurant	Forest	Park	Café	Rock Climbing Spot	
72	Mexican Restaurant	Kyiv	50.477000	30.594800	Random28 Kyiv Random28	19	Convenience Store	Pharmacy	Garden Center	Pool	Coffee Shop	
76	Mexican Restaurant	Kyiv	50.526000	30.506800	Random32 Kyiv Random32	19	Gym	Pub	Pharmacy	Gym / Fitness Center	Bike Rental / Bike Share	
81	Mexican Restaurant	Kyiv	50.514000	30.517800	Random37 Kyiv Random37	19	Bay	Harbor / Marina	Gym	Coffee Shop	Beach	

Cluster 17

	Category	City	Latitude	Longitude	Restaurant	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	Co
41	Café	Київ	50.447757	30.357882	Rojo Ojo Mexican Food Київ Окружная дорога, 22a	16	Forest	Convenience Store	Automotive Shop	Flower Shop	Motorcycle Shop	

Cluster 2

	Category	City	Latitude	Longitude	Restaurant	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	
0	Burrito Place	nan	40.450129	-3.691512	Mexican Factory nan nan	1	Spanish Restaurant	Coffee Shop	Burger Joint	Italian Restaurant	Pizza Place	
1	Burrito Place	nan	40.437485	-3.686225	Mexican Factory Burrito Bar nan nan	1	Spanish Restaurant	Coffee Shop	Hotel	Mediterranean Restaurant	Japanese Restaurant	T
5	None	Madrid	40.428010	-3.672238	Giorgione's Mexican Terrace Madrid Antonio Ari...	1	Spanish Restaurant	Tapas Restaurant	Plaza	Supermarket	Burger Joint	
6	Cocktail Bar	nan	40.431097	-3.673894	Mexican's Besta Chef at Salamanca nan nan	1	Spanish Restaurant	Bar	Burger Joint	Mediterranean Restaurant	Asian Restaurant	Ir
11	Food Truck	nan	40.503773	-3.667536	Reataurante Mexicano De Diego nan nan	1	Spanish Restaurant	Pizza Place	Burger Joint	Pharmacy	Café	
13	Café	Madrid	40.425800	-3.675587	Cafès La Mexicana Madrid C. Conde de Peñalver, 11	1	Spanish Restaurant	Bakery	Tapas Restaurant	Ice Cream Shop	Café	
14	Mexican Restaurant	Tetúan	40.463544	-3.699099	El Tio Taco, comida mexicana en Madrid a domic...	1	Spanish Restaurant	Grocery Store	Chinese Restaurant	Brewery	Coffee Shop	
16	Café	Madrid	40.459642	-3.699063	Cafès La Mexicana Madrid Pensamiento 1	1	Spanish Restaurant	Brazilian Restaurant	Grocery Store	Chinese Restaurant	Supermarket	
17	Food & Drink Shop	Madrid	40.449249	-3.703666	La Mexicana Madrid Calle Bravo Murillo 123	1	Spanish Restaurant	Bakery	Bar	Seafood Restaurant	Tapas Restaurant	
22	Mexican Restaurant	Madrid	40.452105	-3.701187	Nano el Mexicano Madrid Calle de Lérida 8	1	Spanish Restaurant	Coffee Shop	Seafood Restaurant	Bakery	Electronics Store	
33	Café	nan	40.600379	-3.710453	Cafès La Mexicana nan nan	1	Spanish Restaurant	Supermarket	Breakfast Spot	Movie Theater	Gym / Fitness Center	
38	Mexican Restaurant	Pozuelo de Alarcón	40.434248	-3.799191	Central Mexicana Pozuelo de Alarcón C. Atenas, 2	1	Spanish Restaurant	Mexican Restaurant	Bar	Sushi Restaurant	Tapas Restaurant	
40	Mexican Restaurant	nan	40.468274	-3.870867	Cantina Mexicana nan nan	1	Coffee Shop	Gastropub	Spanish Restaurant	Movie Theater	Tapas Restaurant	

Cluster 9

	Category	City	Latitude	Longitude	Restaurant	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	
8	None	nan	40.415130	-3.705240	Tekila Mexican Food nan nan	8	Plaza	Spanish Restaurant	Hostel	Hotel	Tapas Restaurant	
9	None	Madrid	40.442913	-3.613423	El Mexicano Madrid Santa tecla 35	8	Plaza	Flower Shop	Spanish Restaurant	Pool	Breakfast Spot	
10	Breakfast Spot	nan	40.457561	-3.479202	Café La Mexicana nan nan	8	Pizza Place	Hotel	Plaza	Bar	General Entertainment	
12	Breakfast Spot	Madrid	40.440407	-3.643753	Cafés La Mexicana Madrid C. Jose del Hierro, 52	8	Bar	Tapas Restaurant	Brewery	Hotel	Salon / Barbershop	
18	Gourmet Shop	Madrid	40.418647	-3.705061	Cafés La Mexicana Madrid C. Preciados, 24	8	Hotel	Tapas Restaurant	Plaza	Clothing Store	Bookstore	
19	Mexican Restaurant	Madrid	40.418822	-3.699612	Santita Carbón Mexicano Madrid Virgen de los P...	8	Plaza	Hotel	Café	Tapas Restaurant	Clothing Store	
20	Mexican Restaurant	Madrid	40.424949	-3.700450	El Milagro Mexicano Madrid Centro Comercial Pu...	8	Café	Spanish Restaurant	Tapas Restaurant	Hotel	Cosmetics Shop	
21	Mexican Restaurant	Madrid	40.420855	-3.698141	Cafe Mexicano Madrid Calle de Augusto Figueroa...	8	Café	Plaza	Hotel	Tapas Restaurant	Bookstore	
23	Mexican Restaurant	Madrid	40.415117	-3.705925	Típico Mexicano Madrid calle del león, 16	8	Plaza	Tapas Restaurant	Spanish Restaurant	Hostel	Hotel	
24	Mexican Restaurant	Madrid	40.411608	-3.708542	Comida Mexicana Madrid San Marcos	8	Tapas Restaurant	Spanish Restaurant	Plaza	Bar	Hotel	
25	Mexican Restaurant	Madrid	40.413147	-3.710597	La Esquina Mexicana Madrid nan	8	Tapas Restaurant	Spanish Restaurant	Plaza	Bar	Church	
26	Ice Cream Shop	Madrid	40.410481	-3.706657	Tulup Paletas Mexicanas Madrid C. Embajadores, 6	8	Tapas Restaurant	Spanish Restaurant	Bar	Hotel	Plaza	
27	Mexican Restaurant	Madrid	40.419703	-3.705512	Central Mexicana Madrid Pl. del Callao, 2	8	Tapas Restaurant	Hotel	Café	Hostel	Bookstore	S
28	Mexican Restaurant	nan	40.410320	-3.707380	El Rinconcito Mexicano nan nan	8	Tapas Restaurant	Hotel	Bar	Spanish Restaurant	Plaza	
29	Mexican Restaurant	Getafe	40.306818	-3.730170	La Venganza de Malinche Urban Mexican Getafe C...	8	Café	Plaza	Supermarket	Breakfast Spot	Cocktail Bar	
30	Mexican Restaurant	Madrid	40.412836	-3.699351	DF Bar Torteria Mexicana Madrid C. Leon, 31	8	Spanish Restaurant	Hotel	Bar	Café	Theater	
37	Mexican Restaurant	nan	40.683609	-3.612255	El Rincon Mexicano nan nan	8	Spanish Restaurant	Pizza Place	Mexican Restaurant	Tapas Restaurant	Theater	