

I. Introduction

1.1 Background

Los tacos son el platillo más famoso de México, existen una gran variedad de ellos, desde los que están cocinados con carne hasta los que lo están con pescado. Por otro lado, la Ciudad de México es una de las ciudades más grandes del mundo, con aproximadamente nueve millones de habitantes, además de ser un importante sitio turístico, pues cada año 14 millones de turistas visitan la ciudad. Por lo tanto, existe una gran demanda de tacos, lo que conlleva a un negocio en constante crecimiento, pues mexicanos y extranjeros buscan este platillo como primera opción para comer. Esto nos lleva a preguntarnos: ¿dónde podría ser el mejor lugar para poner una taquería dentro de la ciudad de México? Para responderla tenemos que ahondar en distintos temas como la seguridad, el nivel de desarrollo urbano del lugar y principalmente que sea un sitio céntrico sin un exceso de competencia en los alrededores.

1.2 Problem

Los datos que usemos serán utilizados para agrupar las colonias de la Ciudad de México y así poder seleccionar las que se parezcan entre ellas y cumplan con ser un sitio seguro, turístico y a la vez con menos concurrencia de taquerías en los alrededores.

1.3 Interest

El mayor interés está en establecer una taquería en un lugar donde pueda ser más visitada por mexicanos y extranjeros, y así tener mayores ganancias.

II. Data

2.1 Data sources

- I used a csv file provided by the Open Data Agency of Mexico City [1] with the geographic information of the neighborhoods in order to generate a .json file and be able to map the city.
- Utilicé un archivo csv con el registro de todos los crímenes cometidos desde el año 2016 hasta el 2020 en la Ciudad de México, proporcionado por la agencia de datos mencionada anteriormente [2].
- Para conocer el nivel de desarrollo urbano y justificar que sea una colonia turística, utilicé como única variable el porcentaje de personas viviendo en pobreza del lugar, para ello usé datos del coneval del 2015 [3]
- Por último utilicé la API de Foursquare para obtener los lugares más concurridos para cada barrio y también para conocer la densidad de taquerías en un radio de 1.5 km de cada barrio

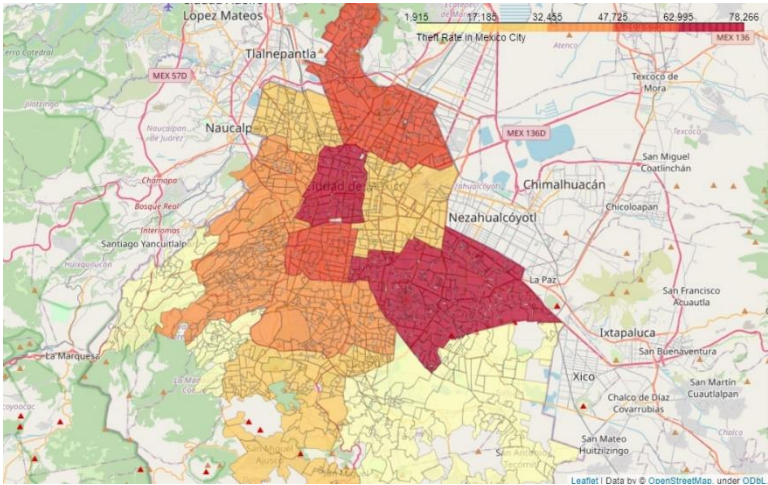
III. Methodology

3.1 Exploratory Data Analysis

With the dataframe corresponding to the violence that exists in the city, I explored the data in such a way that I only used those that were classified as robberies of any kind, because I thought that our business would be interested in that neither our clients nor we suffered any type of

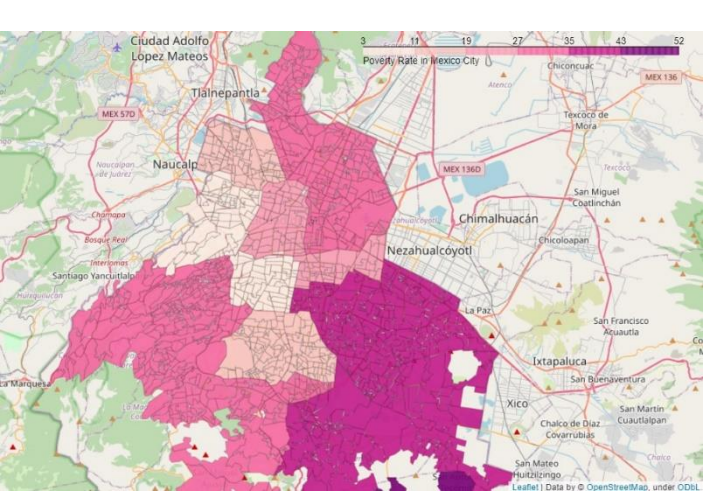
robbery, either with or without violence. To do this, I counted the number of thefts per Borough and gave the following result:

	Alcaldia	Count
0	IZTAPALAPA	78265
1	CUAUHTEMOC	76578
2	GUSTAVO A. MADERO	50105
3	BENITO JUAREZ	48763
4	MIGUEL HIDALGO	37803
5	COYOACAN	34431
6	ALVARO OBREGON	34355
7	VENUSTIANO CARRANZA	27669
8	AZCAPOTZALCO	27498
9	TLALPAN	27293
10	IZTACALCO	21542
11	XOCHIMILCO	13785
12	TLAHUAC	9605
13	CUAJIMALPA DE MORELOS	5579
14	LA MAGDALENA CONTRERAS	5372
15	MILPA ALTA	1915



As you can see, the downtown area is one of the most conflictive, which is curious since at the same time it is one of those with the greatest economic activity, the red parts correspond to Cuauhtémoc (center) and Iztapalapa (right). Hence the following with the most robberies are Gustavo A. Madero, Benito Juárez, Miguel Hidalgo, Coyoacán, Álvaro Obregón, although the difference in the number of robberies between the first five is enormous, because as an example, you can see how Cuauhtémoc doubles with ease the crimes of Miguel Hidalgo. Therefore, it is good to use the map display as a guide.

Then to justify that the downtown area of the city has greater human development and therefore in some way greater economic activity and tourism, I carried out a search within the data provided by CONEVAL, an organization that measures poverty in Mexico, and ordered from the lowest the higher the percentage of people living in poverty by mayor's office and I distributed it on a map.



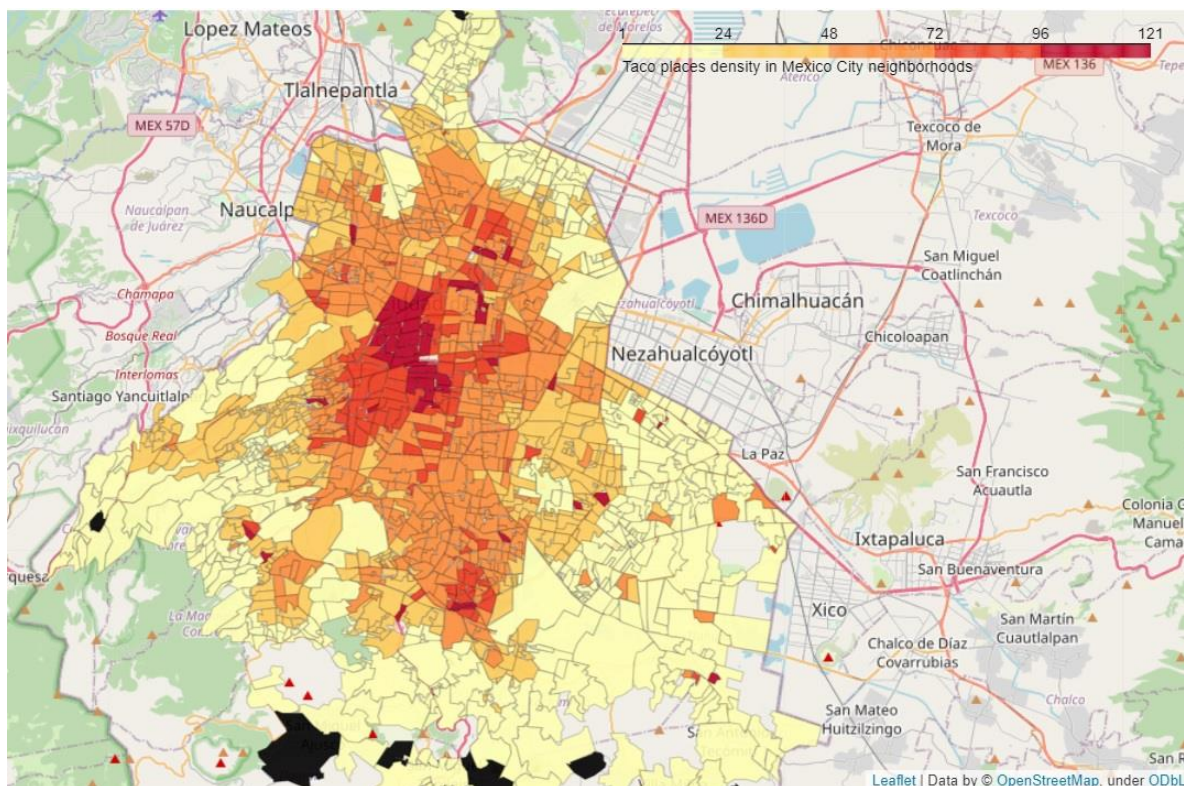
	Alcaldia	Ratio	Num_people_poverty
0	BENITO JUAREZ	3.2	10187
1	MIGUEL HIDALGO	10.2	33371
2	AZCAPOTZALCO	17.4	71888
3	COYOACAN	18.2	104101
4	CUAUHTEMOC	19.6	101795
5	IZTACALCO	25.9	102939
6	VENUSTIANO CARRANZA	27.7	123291
7	ALVARO OBREGON	27.8	208378
8	TLALPAN	29.1	186635
9	LA MAGDALENA CONTRERAS	30.8	82594
10	GUSTAVO A. MADERO	31.2	401347
11	CUAJIMALPA DE MORELOS	32.5	64249
12	XOCHIMILCO	36.1	147480
13	IZTAPALAPA	36.4	658543
14	TLAHUAC	42.5	166294
15	MILPA ALTA	51.3	74062

As we can see in the clear parts of the map, it is precisely the central area of Mexico City that has the lowest poverty rate, with the exception of Azcapotzalco (top-left) with 17.4% of its people living in poverty.

We can suggest but not assure that the foregoing may be the implication of less economic activity in these municipalities and therefore less tourism. To assert it would take much more analysis and take more variables, but we can have an idea of it.

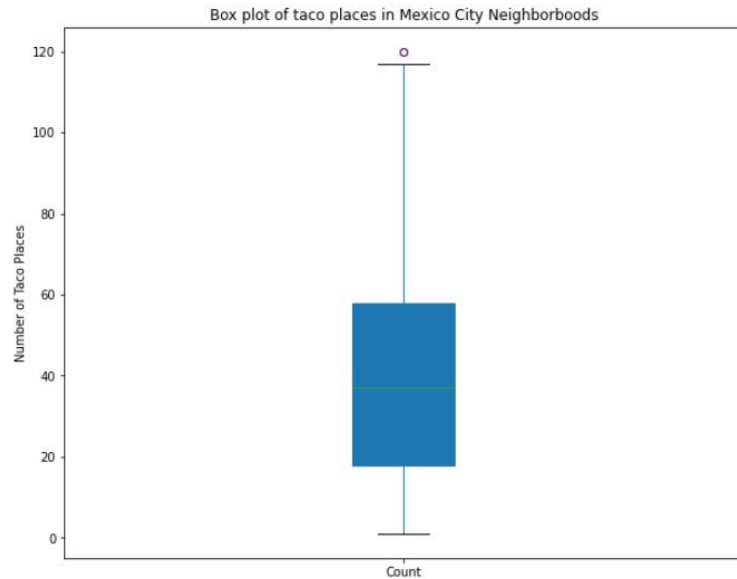
3.1.1 Density of taco places by zone

For this part I started making calls to the Foursquare API, thereby narrowing the search to taco places within a 1.5 km radius for each neighborhood. This distance was a bit long, but I only used it to visualize the grouping of taquerías in the zones, because with a smaller distance, the southern zones cannot be mapped as they are more separated from each other and not because of the fact that they are not have nearby tacos. From this, the following can be observed



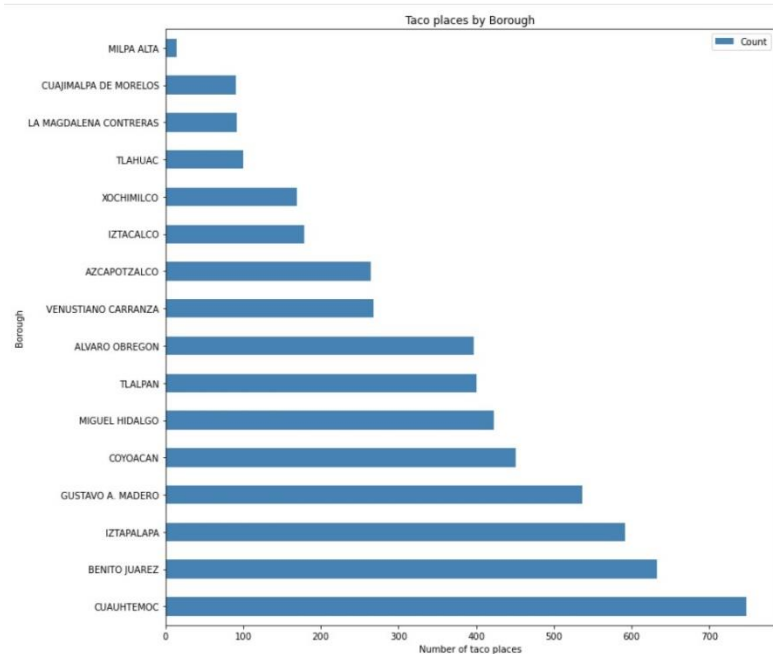
There is a high density of taquerías in the center of the city, but in the same way in other parts such as in certain areas of the south on the map such as Coyoacan or Alvaro Obregón, or in the east of the city as in Iztacalco. Here a table with the top 20 of the colonies with the most taco places and the other box plot indicates that the average number of taquerías per colonies is around 38, while the first quartial (25% of the data) are colonies. with less than 20 taco places, while 75% of the neighborhoods have a limit of 60 taquerías in the area, in addition to the other 25% being very disparate data.

	Neighborhood	Count
0	SAN BARTOLO EL CHICO	120
1	EL RODEO	120
2	EMILIANO ZAPATA (U HAB)	117
3	CENTRO II	114
4	VALLE GOMEZ	113
5	ANGEL ZIMBRON	112
6	LA JOYA	112
7	LA CRUZ	106
8	CENTRO I	101
9	MIGUEL ALEMAN	100
10	ROMA NORTE II	100
11	NARVARTE II	100
12	ROMA SUR I	100
13	ALAMOS II	100
14	HIPODROMO I	100
15	NARVARTE IV	100
16	NARVARTE VI	100
17	TABACALERA	100
18	ROMA NORTE III	100
19	ROMA NORTE I	100

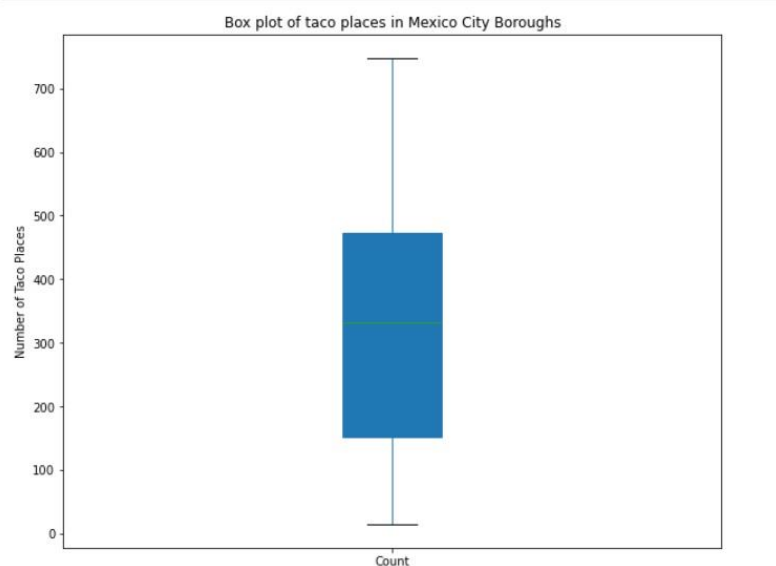


As I mentioned, the parameter of the radius around each colony when making the call to the Foursquare API is very important, so for greater precision I reduced the distance allowed for each site to only 600 meters, which helps us to know how many taquerías there are really by neighborhood and by city hall. This gave us the following results

	Borough	Count
0	CUAUHTEMOC	748
1	BENITO JUAREZ	633
2	IZTAPALAPA	591
3	GUSTAVO A. MADERO	536
4	COYOACAN	451
5	MIGUEL HIDALGO	423
6	TLALPAN	400
7	ALVARO OBREGON	397
8	VENUSTIANO CARRANZA	268
9	AZCAPOTZALCO	264
10	IZTACALCO	179
11	XOCHIMILCO	169
12	TLAHUAC	100
13	LA MAGDALENA CONTRERAS	92
14	CUAJIMALPA DE MORELOS	91
15	MILPA ALTA	15



Which means that effectively the density of tacos is the one we saw on the map, with the downtown area being the city, Cuauhtémoc and Benito Juárez, the ones with the largest number of taco places.



From this boxplot we note that the mean number of taquerías per municipality is around 320, with 25% of Boroughs with a range of 15 to 150 taco places and where 75% of the data has a limit of 450 tacos and a maximum in the borough of Cuahatemoc with 748. Note that for this the data is less triggered and is growing progressively.

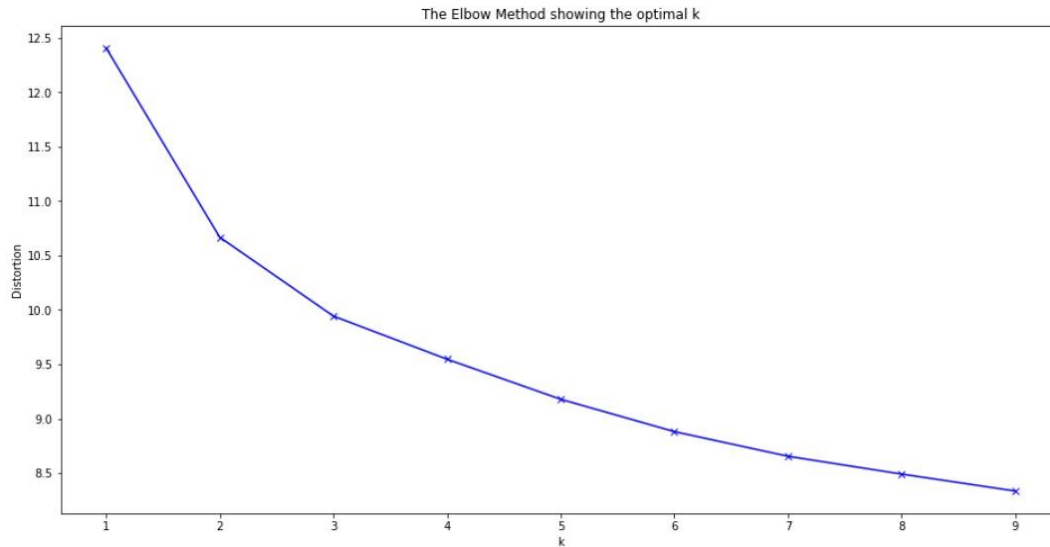
3.2 Selection of boroughs with possible optimal neighborhoods

After the previous analysis, we note that the ideal municipalities to work are Miguel Hidalgo, Coyoacán, Álvaro Obregón and Iztacalco, since the former are relatively central places, with various tourist sites and with a large economic activity, while Alvaro Obregón and Iztacalco are places where there is not as much density of taquerías and the level of robberies is not as great as in other parts of the city.

3.3 Machine Learning

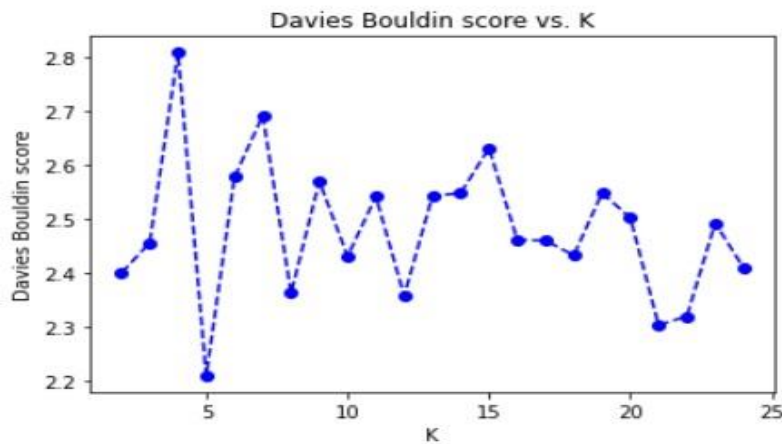
In this project, the K-means algorithm was used, which is an unsupervised machine learning algorithm that uses a clustering method, which aims to partition a set of n-observations into k groups in which each observation belongs to the group whose mean value is closest.

To use the algorithm we need to define the optimal k, for this we use the elbow method, which yielded the following result



As

can be seen, it is difficult to notice in the graph where the "elbow" is, we could imagine that it is between three and six, but to rectify we checked with another method called Davies – Bouldin index and it gave the following result



Therefore, the optimal value of k is in 5. It should be noted that to get to this, first calls were made to the Foursquare API to collect the information of all the neighborhoods of the city corresponding to the area that we defined above. As a parameter in each neighborhood, a search was made for venues within a radius of 700 meters.

3.4 Clustering

Through 5 clusters we group the neighborhoods of the four boroughs, taking into account their ten most common places.

Cluster 1:

Neighborhood	Borough	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
5 DE MAYO	MIGUEL HIDALGO	Taco Place	Mexican Restaurant	Restaurant	Coffee Shop	Burger Joint	Gym / Fitness Center	Bakery	Food Court	Park	Gym
SAN FRANCISCO CULHUACAN (PBLO)	COYOACAN	Mexican Restaurant	Taco Place	Seafood Restaurant	Bakery	Park	Flea Market	Pizza Place	Coffee Shop	Wings Joint	Music Venue
LA ASUNCION	IZTACALCO	Mexican Restaurant	Taco Place	Restaurant	Convenience Store	Seafood Restaurant	Bakery	Park	Dog Run	Brewery	Market
EX EJIDOS DE LA MAGDALENA MIXHUCA	IZTACALCO	Taco Place	Mexican Restaurant	Bar	Seafood Restaurant	Racetrack	Fried Chicken Joint	Burger Joint	Flea Market	Convenience Store	BBQ Joint
NUEVA STA ANITA	IZTACALCO	Mexican Restaurant	Taco Place	Restaurant	Argentinian Restaurant	Convenience Store	Bakery	Seafood Restaurant	Bar	Burger Joint	Gym
...
AGRICOLA ORIENTAL I	IZTACALCO	Taco Place	Mexican Restaurant	Gym / Fitness Center	Soccer Stadium	Food Truck	Department Store	Racetrack	Restaurant	Gym	Market
TLACOTAL RAMOS MILLAN	IZTACALCO	Mexican Restaurant	Taco Place	Seafood Restaurant	Snack Place	Burger Joint	Flea Market	Coffee Shop	Restaurant	Beer Garden	Dessert Shop
CAMPAMENTO 2 DE OCTUBRE II	IZTACALCO	Mexican Restaurant	Taco Place	Coffee Shop	Convenience Store	Playground	Restaurant	Park	Bakery	Seafood Restaurant	Gastropub
SANTA URSULA COAPA (PBLO)	COYOACAN	Taco Place	Mexican Restaurant	Food Truck	Bar	Soccer Field	Gym	Market	Coffee Shop	Diner	Office
TAXQUEA	COYOACAN	Mexican Restaurant	Taco Place	Ice Cream Shop	Restaurant	Bakery	Park	Coffee Shop	Convenience Store	Food Truck	Fast Food Restaurant

We note how these neighborhoods are places where Mexican restaurants and tacos are interspersed in the first place of the most frequent in the area.

Cluster 2:

Neighborhood	Borough	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
LOMAS DE CHAPULTEPEC	MIGUEL HIDALGO	Coffee Shop	Restaurant	Seafood Restaurant	Bakery	Taco Place	Spa	Café	Mexican Restaurant	Gourmet Shop	Music Venue
LOMAS DE REFORMA (LOMAS DE CHAPULTEPEC)	MIGUEL HIDALGO	Bookstore	Park	Scenic Lookout	Mexican Restaurant	Photography Lab	Dance Studio	Bakery	Mediterranean Restaurant	Japanese Restaurant	Pharmacy
DEL BOSQUE (POLANCO)	MIGUEL HIDALGO	Coffee Shop	Café	Taco Place	Mexican Restaurant	Ice Cream Shop	Bakery	Restaurant	Italian Restaurant	Seafood Restaurant	Gym
CAMPESTRE COYOACAN (FRACC)	COYOACAN	Mexican Restaurant	Taco Place	Convenience Store	Park	Coffee Shop	Restaurant	Food Truck	Burger Joint	Soccer Stadium	Seafood Restaurant
EMILIANO ZAPATA	COYOACAN	Restaurant	Mexican Restaurant	Taco Place	Park	Ice Cream Shop	Bakery	Museum	Spa	Coffee Shop	Breakfast Spot
...
ANAHUAC II	MIGUEL HIDALGO	Mexican Restaurant	Coffee Shop	Taco Place	Gym	Café	Burger Joint	Restaurant	Steakhouse	Convenience Store	Gym / Fitness Center
ALTILLO (COND ALTILLO UNIVERSIDAD)	COYOACAN	Coffee Shop	Pizza Place	Mexican Restaurant	Taco Place	Bookstore	Café	Clothing Store	Ice Cream Shop	Breakfast Spot	Cosmetics Shop
DEL NIO JESUS (BARR)	COYOACAN	Food Truck	Coffee Shop	Mexican Restaurant	Vegetarian / Vegan Restaurant	Italian Restaurant	Pizza Place	Café	Shopping Mall	Restaurant	Fast Food Restaurant
PEDREGAL DE SAN FRANCISCO (FRACC)	COYOACAN	Mexican Restaurant	Coffee Shop	Pizza Place	Restaurant	Food Truck	Italian Restaurant	Convenience Store	Burger Joint	National Park	Bakery
VILLA COYOACAN	COYOACAN	Mexican Restaurant	Ice Cream Shop	Coffee Shop	Café	Bar	Italian Restaurant	Food Truck	Plaza	Vegetarian / Vegan Restaurant	Art Gallery

Compared to the previous one, we noticed that this one has more venues other than taco places, so this may be the one. Which is confirmed by looking at the other three clusters.

Cluster 3:

Neighborhood	Borough	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
AJUSCO I	COYOACAN	Taco Place	Ice Cream Shop	Mexican Restaurant	Convenience Store	Café	Bakery	Brewery	Coffee Shop	Wings Joint	Soup Place
OLIVAR DEL CONDE 2DA SECCION I	ALVARO OBREGON	Taco Place	Food Truck	Pharmacy	Park	Sushi Restaurant	Gym	Diner	Athletics & Sports	Asian Restaurant	Mexican Restaurant
OLIVAR DEL CONDE 1RA SECCION II	ALVARO OBREGON	Taco Place	Mexican Restaurant	Burger Joint	Pizza Place	Asian Restaurant	Sushi Restaurant	Shoe Store	Drugstore	Park	Food Truck
1RA VICTORIA	ALVARO OBREGON	Taco Place	Mexican Restaurant	Park	Football Stadium	Bar	Garden Center	Soup Place	Seafood Restaurant	Housing Development	Restaurant
PUNTA DE CEHUAYO	ALVARO OBREGON	Taco Place	Convenience Store	Burger Joint	Gym	Park	Market	Dessert Shop	Bakery	Coffee Shop	BBQ Joint
POPOTLA I	MIQUEL HIDALGO	Taco Place	Gym	Convenience Store	Pizza Place	Shipping Store	Gymnastics Gym	Burger Joint	Mexican Restaurant	Historic Site	Restaurant
LA MEXICANA (AMPL)	ALVARO OBREGON	Mexican Restaurant	Taco Place	Burger Joint	Convenience Store	Gym	Gym / Fitness Center	Memorial Site	Park	Shopping Mall	Pharmacy
JOSE MARIA PINO SUAREZ	ALVARO OBREGON	Taco Place	Mexican Restaurant	Restaurant	Pharmacy	Coffee Shop	Gym / Fitness Center	Food Truck	Burger Joint	Seafood Restaurant	Furniture / Home Store
EL RUEDO	ALVARO OBREGON	Taco Place	Convenience Store	Park	Pharmacy	Basketball Court	Coffee Shop	Bakery	Athletics & Sports	Gym	Gym / Fitness Center
EX EJIDO SAN FRANCISCO CULHUACAN III	COYOACAN	Taco Place	Mexican Restaurant	Ice Cream Shop	Coffee Shop	Restaurant	Flea Market	Pizza Place	Juice Bar	Park	Food & Drink Shop

Cluster 4:

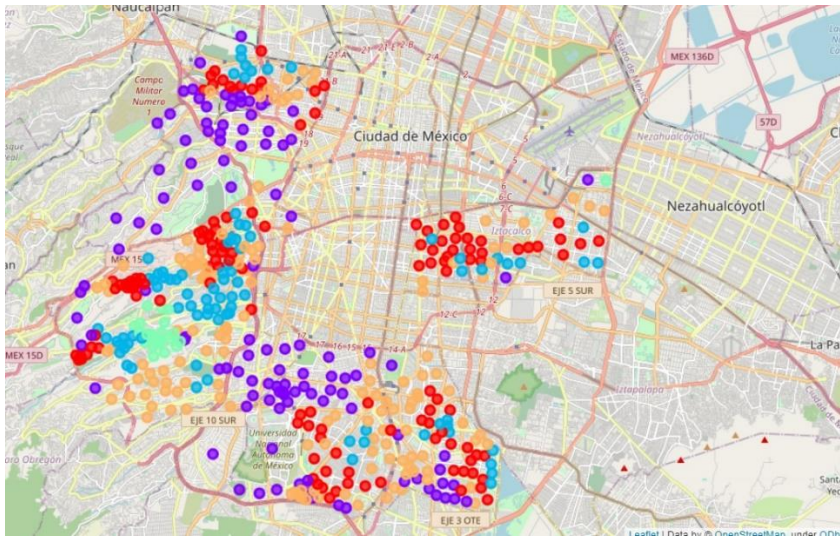
Neighborhood	Borough	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
PILOTO (ADOLFO LOPEZ MATEOS)	ALVARO OBREGON	Burger Joint	Mexican Restaurant	Taco Place	Pizza Place	Soccer Field	Market	Bar	BBQ Joint	Sushi Restaurant	Supermarket
LOMAS DE PUERTA GRANDE	ALVARO OBREGON	Taco Place	Pizza Place	Convenience Store	Gym	Electronics Store	Mexican Restaurant	Sushi Restaurant	Shopping Mall	Pharmacy	Athletics & Sports
GARCIMARRERO REACOMODO	ALVARO OBREGON	Taco Place	Burger Joint	Pizza Place	Mexican Restaurant	Park	Lounge	Sushi Restaurant	Market	Supermarket	Seafood Restaurant
GARCIMARRERO	ALVARO OBREGON	Taco Place	Mexican Restaurant	Burger Joint	Pizza Place	Lounge	Market	Theme Park	Bar	Supermarket	Bakery
LA MARTINICA	ALVARO OBREGON	Pizza Place	Taco Place	Pharmacy	Dog Run	Convenience Store	Park	Mexican Restaurant	Athletics & Sports	Electronics Store	Hobby Shop
ARCOS DE CENTENARIO	ALVARO OBREGON	Pizza Place	Mexican Restaurant	Burger Joint	Nature Preserve	Coffee Shop	Shopping Mall	River	Electronics Store	Street Art	Athletics & Sports
PROF JOSE ARTURO LOPEZ	ALVARO OBREGON	Mexican Restaurant	Dog Run	Pizza Place	Soccer Field	Pharmacy	Stationery Store	Taco Place	Nature Preserve	Basketball Court	Food Truck
VALENTIN GOMEZ FARIAS	ALVARO OBREGON	Taco Place	Pizza Place	Burger Joint	Convenience Store	Pharmacy	Basketball Court	Market	Fabric Shop	Scenic Lookout	Mexican Restaurant
PILOTO (ADOLFO LOPEZ MATEOS) (AMPL)	ALVARO OBREGON	Mexican Restaurant	Burger Joint	Taco Place	Gym	Pizza Place	Pub	BBQ Joint	Farmers Market	Farm	Shopping Mall
CANUTILLO PREDIO LA PRESA	ALVARO OBREGON	Pizza Place	Burger Joint	Mexican Restaurant	Taco Place	Market	Gym	Convenience Store	Electronics Store	Scenic Lookout	Seafood Restaurant
AVE REAL (AMPL)	ALVARO OBREGON	Taco Place	Pizza Place	Burger Joint	Mexican Restaurant	Argentinian Restaurant	Bakery	Lounge	Soccer Field	Market	Seafood Restaurant
HERON PROAL	ALVARO OBREGON	Taco Place	Pizza Place	Burger Joint	Pharmacy	Athletics & Sports	Park	Nature Preserve	Street Art	Mexican Restaurant	Stationery Store
PRIVADA CENTENARIO	ALVARO OBREGON	Pizza Place	Burger Joint	Taco Place	Mexican Restaurant	Gym	Market	Sushi Restaurant	Food Truck	Coffee Shop	Shopping Mall
PONCIANO ARRIAGA	ALVARO OBREGON	Mexican Restaurant	Taco Place	Pizza Place	Burger Joint	Convenience Store	Sushi Restaurant	Shopping Mall	Bakery	Restaurant	River
DE TARANGO (RCNDA)	ALVARO OBREGON	Mexican Restaurant	Dog Run	Pizza Place	Athletics & Sports	Gym	Food Truck	Diner	Shopping Mall	Taco Place	Nature Preserve
CANUTILLO (AGUASCALIENTES)	ALVARO OBREGON	Pizza Place	Taco Place	Burger Joint	Mexican Restaurant	Pharmacy	Gym / Fitness Center	Market	Bar	Sushi Restaurant	Gym

Cluster 5:

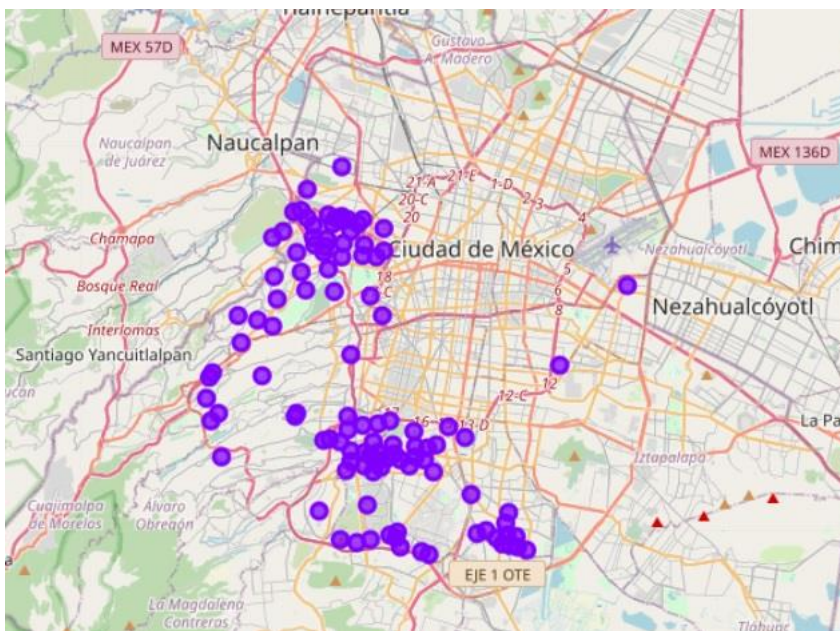
Neighborhood	Borough	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
PEDREGAL DE SANTA URSULA I	COYOACAN	Mexican Restaurant	Taco Place	Soccer Field	Bar	Seafood Restaurant	Market	Convenience Store	Snack Place	Bowling Alley	Flower Shop
VISTAS DEL MAUREL (U HAB)	COYOACAN	Mexican Restaurant	Taco Place	Ice Cream Shop	Gym	Clothing Store	Park	Concert Hall	Flea Market	Market	Furniture / Home Store
PLUTARCO ELIAS CALLES	MIQUEL HIDALGO	Mexican Restaurant	Taco Place	Convenience Store	Sushi Restaurant	Breakfast Spot	Restaurant	Athletics & Sports	Food Truck	Bar	BBQ Joint
CTM X CULHUACAN (U HAB)	COYOACAN	Mexican Restaurant	Convenience Store	Gym / Fitness Center	Taco Place	Pizza Place	Park	Seafood Restaurant	Coffee Shop	Restaurant	Burger Joint
PARQUE SAN ANDRES	COYOACAN	Taco Place	Mexican Restaurant	Café	Restaurant	Convenience Store	Food Truck	Pharmacy	Vegetarian / Vegan Restaurant	Furniture / Home Store	Indie Theater
10 DE ABRIL	MIQUEL HIDALGO	Mexican Restaurant	Restaurant	Taco Place	Park	Convenience Store	Pharmacy	Gym / Fitness Center	Café	Food Truck	Bakery
CAMPESTRE CHURUBUSCO	COYOACAN	Coffee Shop	Mexican Restaurant	Taco Place	Restaurant	Pharmacy	Café	Pizza Place	Burger Joint	Ice Cream Shop	Diner
CENTRO URBANO TALPAN (U HAB)	COYOACAN	Taco Place	Mexican Restaurant	Bakery	Restaurant	Pizza Place	Burger Joint	Pet Store	Coffee Shop	Park	Pharmacy
LOS OLIVOS (U HAB)	COYOACAN	Taco Place	Mexican Restaurant	Restaurant	Burger Joint	Coffee Shop	Gym / Fitness Center	Seafood Restaurant	Gym	Breakfast Spot	Ice Cream Shop
LA VIRGEN 1170 (U HAB)	COYOACAN	Taco Place	Mexican Restaurant	Food Truck	Flea Market	Gym / Fitness Center	Convenience Store	Park	Seafood Restaurant	Burger Joint	Athletics & Sports

We note how all except for the second cluster, have the most common place in the studs, therefore, we chose that cluster to explore it a little more.

So from the following image of clusters



, we are left with only these neighborhoods:



3.4 Information about cluster 2

1st Most Common Venue	Count	2nd Most Common Venue	Count	3rd Most Common Venue	Count
0 Mexican Restaurant	49	0 Coffee Shop	24	0 Taco Place	14
1 Coffee Shop	22	1 Mexican Restaurant	18	1 Ice Cream Shop	14
2 Taco Place	8	2 Clothing Store	8	2 Mexican Restaurant	11
3 Restaurant	4	3 Ice Cream Shop	8	3 Restaurant	7
4 Park	4	4 Taco Place	7	4 Park	6
5 Clothing Store	3	5 Restaurant	7	5 Coffee Shop	6
6 Athletics & Sports	2	6 Café	7	6 Bakery	5
7 Gym / Fitness Center	2	7 Park	6	7 Café	5
8 Boutique	2	8 Gym / Fitness Center	2	8 Pizza Place	4
9 Dog Run	1	9 Seafood Restaurant	2	9 Gym / Fitness Center	3

Borough	Count
0 COYOACAN	44
1 MIGUEL HIDALGO	42
2 ALVARO OBREGON	24
3 IZTACALCO	2

We note how these neighborhoods are mostly from the boroughs of Coyoacán and Miguel Hidalgo and tend to have more Mexican food restaurants and coffee shops, although some taquerías continue to prevail in them, for which we add an additional filter to the cluster in such a way that we Let's stay only with the colonies that do not have taquerías or in the first, second, third or fourth most common place.

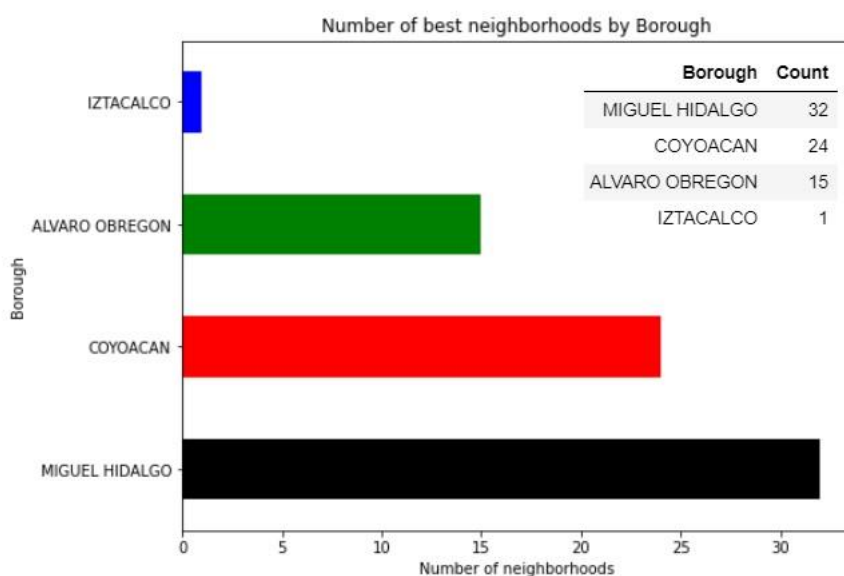
IV. Results

By adding this additional filter we are left with only 71 neighborhoods and we can check some

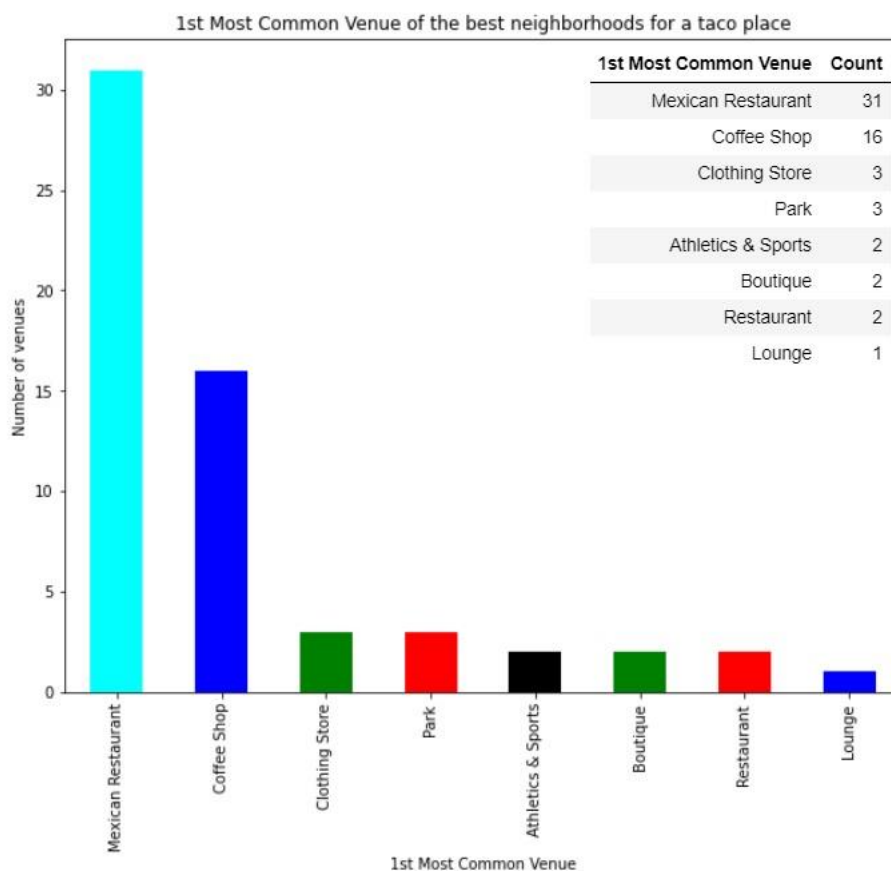
	Neighborhood	Borough	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	LOMAS DE CHAPULTEPEC	MIGUEL HIDALGO	19.4228411174	-99.2157935754	1	Coffee Shop	Restaurant	Seafood Restaurant	Bakery	Taco Place	Spa	Café	Mexican Restaurant	Gourmet Shop	Music Venue
1	LOMAS DE REFORMA (LOMAS DE CHAPULTEPEC)	MIGUEL HIDALGO	19.4106158914	-99.2262487268	1	Bookstore	Park	Scenic Lookout	Mexican Restaurant	Photography Lab	Dance Studio	Bakery	Mediterranean Restaurant	Japanese Restaurant	Pharmacy
2	CHAPULTEPEC MORALES (POLANCO)	MIGUEL HIDALGO	19.4343532798	-99.1866020156	1	Coffee Shop	Seafood Restaurant	Bakery	Pharmacy	Mexican Restaurant	Restaurant	Japanese Restaurant	Park	Breakfast Spot	Steakhouse
3	JARDINES DEL PEDREGAL	ALVARO OBREGON	19.3197415813	-99.2074193222	1	Boutique	Clothing Store	Ice Cream Shop	Jewelry Store	Mexican Restaurant	Cosmetics Shop	Shopping Mall	Coffee Shop	Movie Theater	Taco Place
4	METROPOLITANO (U HAB)	ALVARO OBREGON	19.3604002285	-99.2183068464	1	Mexican Restaurant	Soccer Field	Dog Run	Athletics & Sports	Nature Preserve	Food Truck	Food	Street Art	Coffee Shop	Shopping Mall
...
67	LOMAS DE SOTELO	MIGUEL HIDALGO	19.4492461991	-99.215268164	1	Mexican Restaurant	Clothing Store	Cosmetics Shop	Food Truck	Sporting Goods Shop	Taco Place	Gym / Fitness Center	Italian Restaurant	Movie Theater	Coffee Shop
68	PALMITAS (POLANCO)	MIGUEL HIDALGO	19.4309018729	-99.2048424103	1	Coffee Shop	Café	Jewelry Store	Mexican Restaurant	Restaurant	Seafood Restaurant	Ice Cream Shop	Bakery	Steakhouse	Mediterranean Restaurant
69	DEL NIO JESUS (BARR)	COYOACAN	19.3414112805	-99.1589499218	1	Food Truck	Coffee Shop	Mexican Restaurant	Vegetarian / Vegan Restaurant	Italian Restaurant	Pizza Place	Café	Shopping Mall	Restaurant	Fast Food Restaurant
70	PEDREGAL DE SAN FRANCISCO (FRACC)	COYOACAN	19.3388204534	-99.1661922139	1	Mexican Restaurant	Coffee Shop	Pizza Place	Restaurant	Food Truck	Italian Restaurant	Convenience Store	Burger Joint	National Park	Bakery
71	VILLA COYOACAN	COYOACAN	19.3473603624	-99.163099317	1	Mexican Restaurant	Ice Cream Shop	Coffee Shop	Café	Bar	Italian Restaurant	Food Truck	Plaza	Vegetarian / Vegan Restaurant	Art Gallery

We note that none of them have taco places as a common place, therefore there will be less competition in these places.

Some additional data for these 71 neighborhoods are:



Most of the borough Miguel Hidalgo and Coyoacán.



And its most common venues are Mexican food restaurants, cafes, clothing stores and parks. Which leads us to think that the next thing that could be convenient would be to add to the filter

that we made the one that its most common place is in the first or second place a Mexican food restaurant, because this way we make sure that in these neighborhoods despite not having so many taquerías continue to consume Mexican food and therefore there will be a demand for tacos if a taqueria is opened in those places.

Thus, the list narrows down to just 37 neighborhoods and they are as follows:

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[['METROPOLITANO (U HAB)', 'ALVARO OBREGON'],
 ['LORETO', 'ALVARO OBREGON'],
 ['CUAUHTEMOC PENSIL', 'MIGUEL HIDALGO'],
 ['PERIODISTA', 'MIGUEL HIDALGO'],
 ['CONCIENCIA PROLETARIA', 'ALVARO OBREGON'],
 ['FRANCISCO I MADERO', 'MIGUEL HIDALGO'],
 ['LOMAS DE BARRILACO (LOMAS DE CHAPULTEPEC)', 'MIGUEL HIDALGO'],
 ['LOMA HERMOSA (CONJ HAB)', 'MIGUEL HIDALGO'],
 ['CANTIL DEL PEDREGAL', 'COYOACAN'],
 ['LA CONCEPCION (BARR)', 'COYOACAN'],
 ['VILLA PANAMERICANA 3ERA. SECCIN (U HAB)', 'COYOACAN'],
 ['IRRIGACION', 'MIGUEL HIDALGO'],
 ['COPILCO UNIVERSIDAD', 'COYOACAN'],
 ['MORALES SECCION ALAMEDA (POLANCO)', 'MIGUEL HIDALGO'],
 ['CUADRANTE DE SAN FRANCISCO', 'COYOACAN'],
 ['FLORIDA', 'ALVARO OBREGON'],
 ['SAN GABRIEL', 'ALVARO OBREGON'],
 ['CHAPULTEPEC POLANCO (POLANCO)', 'MIGUEL HIDALGO'],
 ['LOS MORALES (POLANCO)', 'MIGUEL HIDALGO'],
 ['SAN DIEGO OCOYOACAC', 'MIGUEL HIDALGO'],
 ['HACIENDAS DE COYOACAN (FRACC)', 'COYOACAN'],
 ['GUADALUPE INN', 'ALVARO OBREGON'],
 ['OXTOPULCO UNIVERSIDAD', 'COYOACAN'],
 ['LOS GIRASOLES I', 'COYOACAN'],
 ['LOMAS DE SANTA FE II', 'ALVARO OBREGON'],
 ['HACIENDA DE GUADALUPE CHIMALISTAC', 'ALVARO OBREGON'],
 ['INTEGRACION LATINOAMERICANA (U HAB)', 'COYOACAN'],
 ['PENSIL SUR', 'MIGUEL HIDALGO'],
 ['19 DE MAYO', 'ALVARO OBREGON'],
 ['SANTA LUCIA (PBLO)', 'ALVARO OBREGON'],
 ['IMAN 580 (U HAB)', 'COYOACAN'],
 ['PANTITLAN I', 'IZTACALCO'],
 ['SAN ANGEL INN', 'ALVARO OBREGON'],
 ['SAN ANGEL', 'ALVARO OBREGON'],
 ['LOMAS DE SOTELO', 'MIGUEL HIDALGO'],
 ['PEDREGAL DE SAN FRANCISCO (FRACC)', 'COYOACAN'],
 ['VILLA COYOACAN', 'COYOACAN']]
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V. Discussion

Mexico City is very diverse and large, you have to be very careful with which variables to decide are key for a place to be successful. Less competition is not a guarantee of this, however, it helps to decide on the best place. Furthermore, places with greater purchasing power are not synonymous with greater food consumption, as this country suffers from high rates of obesity as a result of cheap street food and processed food. Very successful taco places can exist in poor, unsafe neighborhoods and even where there is great competition. So this work was only done so that whoever reads it has a better overview of the city and its distribution of tacos.

An important limitation is that, although the Foursquare API was key in the development of this project, it falls short of the reality of the number of tacos in the city, since it only manages to count around 5000, when in real life there are a little more than 10,000, that is, more than double. In

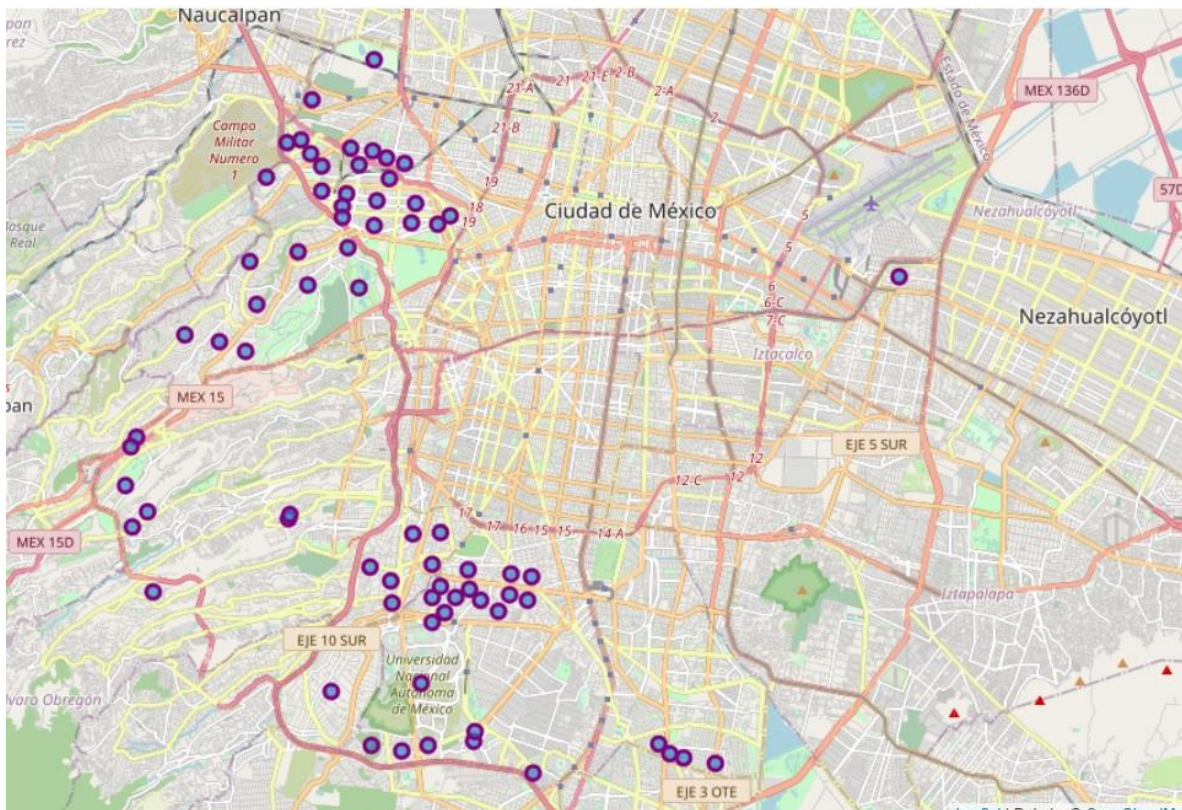
addition, you have to be very careful that sometimes the data is not duplicated as it is an important factor that occurs when using the API.

However, I consider that, although the results are not completely perfect, given the limitations of the data collected, they are a good approximation of reality. Well, I researched the zones and it matched my visualizations and modeling.

VI. Conclusion

Mexicans love tacos, foreigners, if they like Mexican food, they love tacos, finding a place with less competition from taquerías gives a lot of advantage if we want to open a taco place, because it is difficult to find places where there are none, although Be a taqueria as there is a lot of demand for this product. In addition, adding that the site we find is safe and touristy, puts us a little more ahead of the business, the following depends on the flavor and THE SALSA.

Finally, let's remember this map with the colonies with tastes for Mexican food but with not so many taco places:



VII. References:

- [1] <https://datos.cdmx.gob.mx/dataset/04a1900a-0c2f-41ed-94dc-3d2d5bad4065/resource/03368e1e-f05e-4bea-ac17-58fc650f6fee/download/coloniascdmx.csv>
- [2] <https://datos.cdmx.gob.mx/dataset/384c16c6-2208-4ba4-b360-90bed81c6fb5/resource/459e8343-60ce-4a36-9cfc-4aa8c9bcb47e/download/denuncias-victimas-pgj.csv>
- [3] https://www.coneval.org.mx/Informes/Pobreza/Datos_abiertos/pobreza_municipal/indicadores%20de%20pobreza%20municipal,%202010.csv
- [4] <https://developer.foursquare.com/>