

The Battle of Neighborhoods

Introduction

Toluca Valley is just west of the Valley of Mexico near to Mexico City, is compound by Toluca city and Metepec city forming a metropolitan area. This valley is an important place for business, commerce, manufacturing, tourism and farming.

Toluca Valley is a populated place and have important activity of local commerce and business near to downtowns of the cities that forms. Every city consist in different socioeconomic levels, since traditional and old neighborhoods to luxury residences, all near to small downtowns, without forget the closeness of the capital of Mexico with people that travel everyday from one city to other.

Every neighborhood is different one each other, with different types of commerces and business, from local to national or transnational representative corporations, have different types of people with different consumer habits and personal interests.

Today at the beginning of the year 2021 investors and entrepreneurs search reactivate the economy caused by coronavirus disease. Search new opportunities with local commerce and loyal competence. This is the importance of explore the most important neighborhoods of downtown area and analyzes the preferences of the people. How to start a new business and not lost capital in the try. This analysis not consider other bills and pays used for stablished a business in determinate place, its only a suggestion.

Data

For this project I select the follow neighborhoods:

Toluca City	Metepec City
Centro	Fortanet
Santa Clara	Las Jaras
El Cóporo	Luisa Isabel Campos de Jiménez Cantú
La Retama	Villas Alteza
Alcaltunco	Jesús Jiménez Gallardo
San Bernardino	Purísima
Morelos 1a Sección	La Providencia
Américas	Rincón de San Gabriel
Paseo Tollocan INFONAVIT	Virreyes Residencial

Toluca City	Metepec City
*	Hípico
*	El Rodeo

Table 1.- Neighborhoods of downtown area of Toluca and Metepec city.

It selection is based in the popular neighborhoods in the downtown of Toluca and Metepec city (CANACO-SERVYTUR, 2021).

For get more information like geographical coordinates and postal codes I used the website: <https://www.worldpostalcode.org> . And the libraries Geopy and Geocode for python environment. In the case of places and commerces I used the API of Foursquare.

Methodology

For this project I build a database with the popular neighborhoods in the downtown of Toluca and Metepec city. (Check the Github link in the section “Appendix”). This databases as show in the tables 2 and 3.

Neighborhood	Postalcode	Latitude	Longitude
Centro	50000	19.28916	-99.655750
Santa Clara	50090	19.29187	-99.649360
El Cópore	50050	19.29568	-99.659140
La Retama	50040	19.29394	-99.661080
Alcaltunco	50290	19.28567	-99.652810
San Bernardino	50080	19.28901	-99.668520
Morelos 1a Sección	50120	19.28338	-99.668880
Américas	50130	19.28196	-99.645300
Paseo Tollocan INFONAVIT	50123	19.27294	-99.659891

Table 2.- Neighborhoods of downtown area of Toluca city.

Using python Folium library I can show this neighborhoods in a map to correlate the location in the downtown cities. View figure 1 and 2.

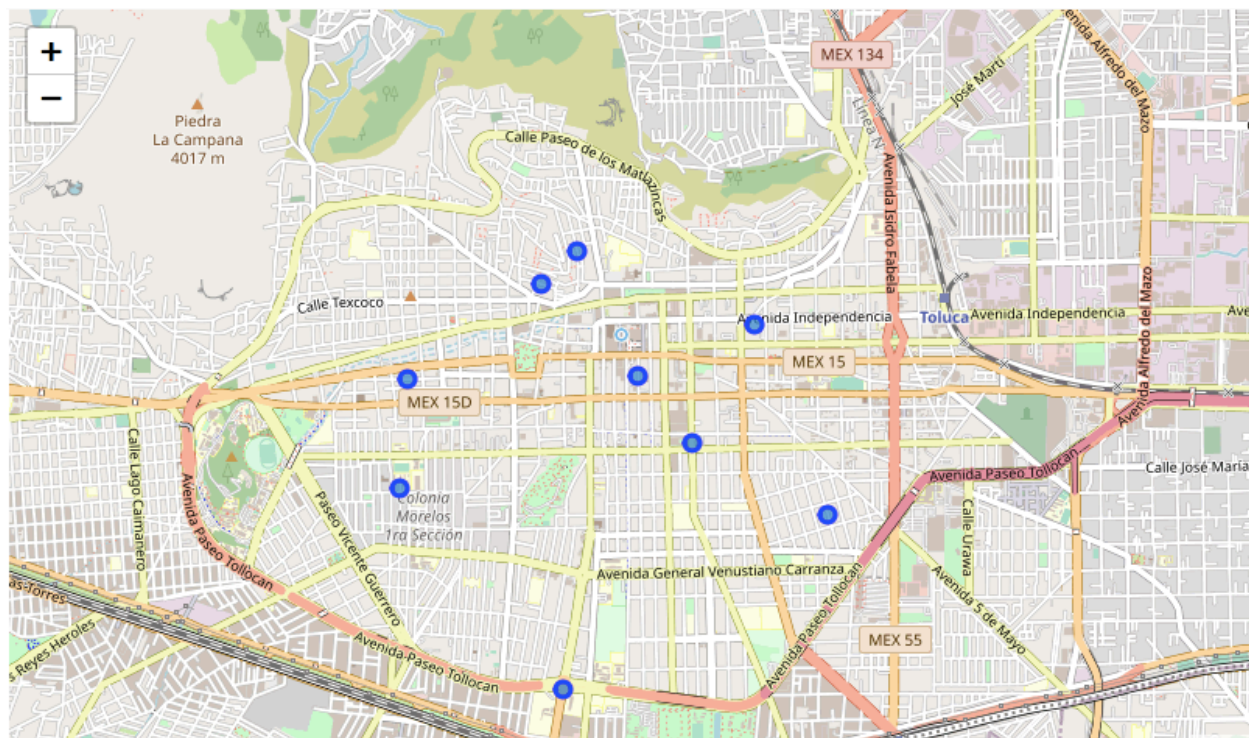


Figure 1.- Map of Toluca downtown. The blue point mark the location of popular neighborhoods.

Neighborhood	Postalcode	Latitude	Longitude
Fortanet	52159	19.26218	-99.61466
Las Jaras	52160	19.25438	-99.62942
Luisa Isabel Campos de Jiménez Cantú	52166	19.25204	-99.63385
Villas Alteza	52168	19.25733	-99.63929
Jesús Jiménez Gallardo	52167	19.25795	-99.63389
Purísima	52169	19.26197	-99.62808
La Providencia	52177	19.27093	-99.60437
Rincón de San Gabriel	52158	19.27258	-99.62310
Virreyes Residencial	52155	19.26888	-99.63082
Hípico	52156	19.26689	-99.63202
El Rodeo	52157	19.26708	-99.63629

Table 3.- Neighborhoods of downtown area of Metepec city.

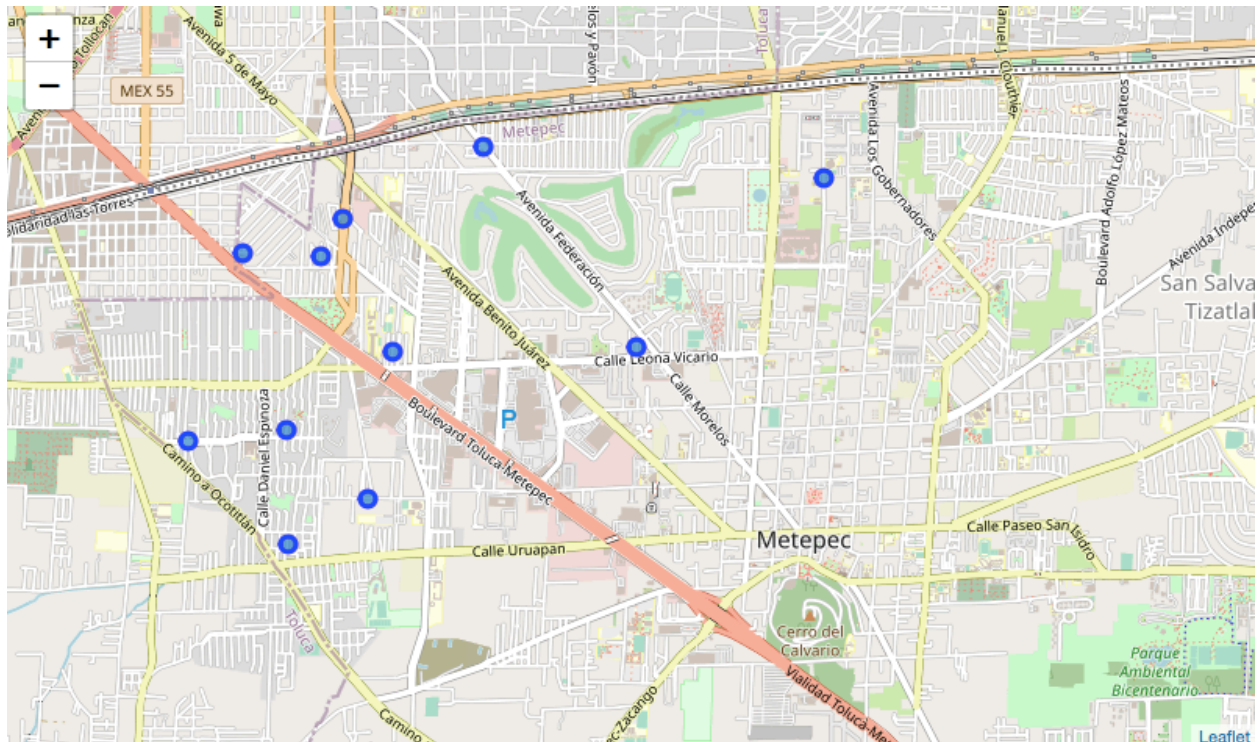


Figure 2.- Map of Metepec downtown. The blue point mark the location of popular neighborhoods.

Exploring the neighborhoods.

I utilized the Foursquare API to explore the neighborhoods and segment them. I designed the limit of 500 meter of radius for each neighborhood from their given latitude and longitude informations. Here is a head of the list Venues name, category, latitude and longitude informations from Forsquare API. (Check table 4 for Toluca city and 5 for Metepec city).

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Centro	19.28916	-99.65575	Bistró Mecha Centro Histórico	19.290751	-99.654963	Bistro
Centro	19.28916	-99.65575	Fantasias Miguel	19.290071	-99.655655	Shopping Mall
Centro	19.28916	-99.65575	The Green Factory	19.289671	-99.657675	Salad Place
Centro	19.28916	-99.65575	Centro Historico	19.289986	-99.655161	Plaza
Centro	19.28916	-99.65575	Café Catalán	19.289049	-99.656387	Café

Table 4.- Venues head table information of Toluca neighborhoods from Foursquare API.

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Fortanet	19.26218	-99.61466	Cielito Querido Café	19.261164	-99.613279	Café
Fortanet	19.26218	-99.61466	Sports World	19.260901	-99.613814	Gym / Fitness Center
Fortanet	19.26218	-99.61466	Starbucks	19.261204	-99.617083	Coffee Shop
Fortanet	19.26218	-99.61466	Unidad Deportiva (Hortaliza)	19.265195	-99.613503	Park
Fortanet	19.26218	-99.61466	Mimis	19.261639	-99.611945	Theme Restaurant

Table 5.- Venues head table information of Metepec neighborhoods from Foursquare API.

This search shows that in Toluca are 72 different types of venues and in Metepec 65 different types.

In the section of results I show to the reader more specific information about the venues arranged by neighborhood.

Results

The result of this work consist in two parts, first I show to you information for every neighborhood, the top 5 of business and I show in a map the most popular neighborhoods in accordance with the top 5.

I have some common venue categories in neighborhoods. In this reason I used unsupervised learning K-means algorithm to cluster the neighborhoods. K-Means algorithm is one of the most common cluster method of unsupervised learning.

Top 5 in every neighborhood

The table 6 and 7 shows the top 5 of business in every neighborhood for each city, the type of business is important information for investors and entrepreneurs because shows the most popular business for start a commerce or try a different business far to popular business, may be an innovation in the area.

Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
Centro	Breakfast Spot	Ice Cream Shop	Plaza	Restaurant	Sandwich Place
Santa Clara	Seafood Restaurant	Vegetarian / Vegan Restaurant	BBQ Joint	Taco Place	Coffee Shop
El C6poro	Art Museum	Coffee Shop	Italian Restaurant	Mexican Restaurant	Sandwich Place
La Retama	Art Museum	Mexican Restaurant	Taco Place	Coffee Shop	Sandwich Place
Alcaltunco	Ice Cream Shop	Mexican Restaurant	Taco Place	Caf6	Seafood Restaurant
San Bernardino	Mexican Restaurant	Seafood Restaurant	Taco Place	Hot Dog Joint	Karaoke Bar
Morelos 1a Secci6n	Mexican Restaurant	Taco Place	Seafood Restaurant	Convenience Store	Restaurant
Am6ricas	Mexican Restaurant	Convenience Store	Gym	Taco Place	Salad Place
Paseo Tollocan INFONAVIT	Coffee Shop	Caf6	Taco Place	Pharmacy	Dog Run

Table 6.- Top 5 of business in every neighborhood in downtown of Toluca city.

Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
Fortanet	Gym / Fitness Center	Ice Cream Shop	Seafood Restaurant	BBQ Joint	Café
Las Jaras	Gym	Taco Place	Steakhouse	Coffee Shop	Café
Luisa Isabel Campos de Jiménez Cantú	Convenience Store	Seafood Restaurant	Taco Place	Burger Joint	Mexican Restaurant
Villas Alteza	Mexican Restaurant	Seafood Restaurant	Gym / Fitness Center	Burger Joint	Ice Cream Shop
Jesús Jiménez Gallardo	Mexican Restaurant	Taco Place	Seafood Restaurant	Burger Joint	Ice Cream Shop
Purísima	Mexican Restaurant	Coffee Shop	Taco Place	Pet Store	Pizza Place
La Providencia	Coffee Shop	Supermarket	Movie Theater	Burger Joint	Breakfast Spot
Rincón de San Gabriel	Taco Place	Market	Golf Course	Bar	Moving Target
Virreyes Residencial	Taco Place	Mexican Restaurant	Seafood Restaurant	Bubble Tea Shop	Food & Drink Shop
Hípico	Mexican Restaurant	Seafood Restaurant	Taco Place	Convenience Store	Ice Cream Shop
El Rodeo	Mexican Restaurant	Taco Place	Bakery	Pharmacy	Restaurant

Table 7.- Top 5 of business in every neighborhood in downtown of Metepec city.

The most popular neighborhoods in downtown

Using python Folium library I can show this neighborhoods in a map (view figure 3 and 4).

Toluca

In the map of Toluca downtown I grouped the neighborhoods by frequency and result graphically in 5 color groups, the table 8 array by more popular to less popular neighborhood.

Red (more popular)	Purple	Blue	Green	Orange (less popular)
Centro	Américas	Alcaltunco	Morelos 1a Sección	Santa Clara
El Cópore	San Bernardino	La Retama	*	*
*	Paseo Toluca INFONAVIT	*	*	*

Table 8.- More popular to less popular neighborhoods in Toluca downtown.

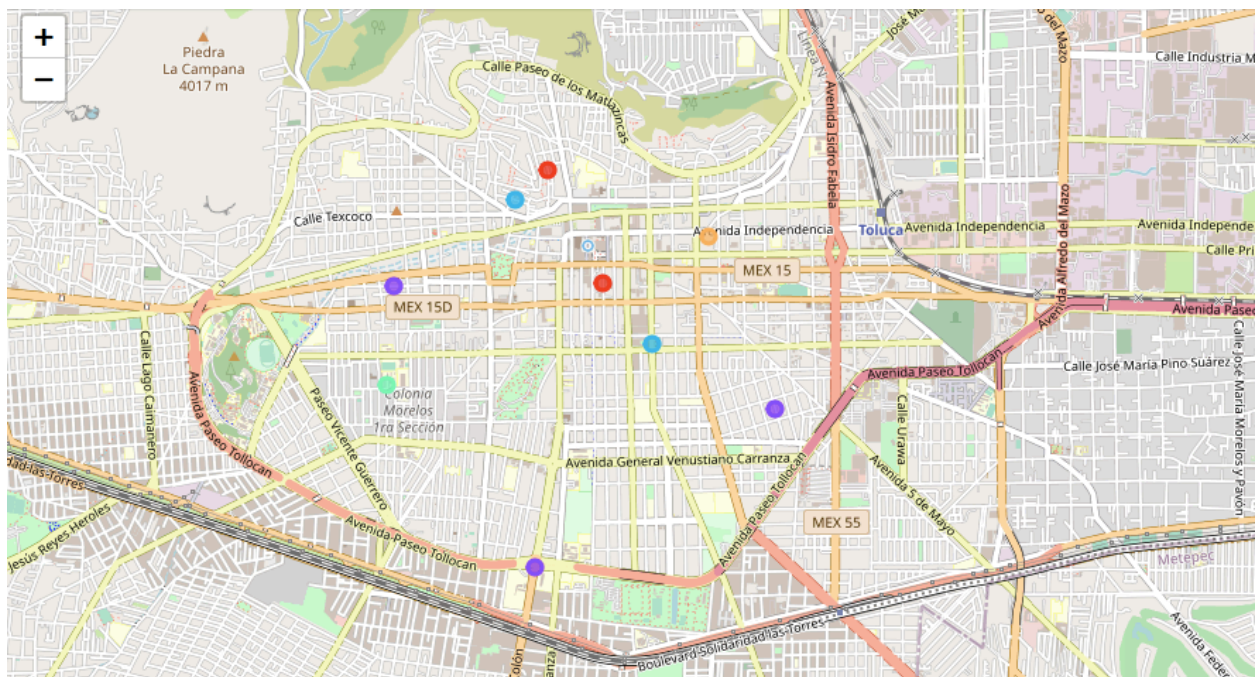


Figure 3.- Map of more popular to less popular neighborhoods in Toluca downtown.

Metepec

In the map of Metepec downtown I grouped the neighborhoods by frequency and result graphically in 5 color groups, the table 9 array by more popular to less popular neighborhood.

Red (more popular)	Purple	Blue	Green	Orange (less popular)
Fortanet	Purísima	Rincón de San Gabriel	Virreyes Residencial	La Providencia
Luisa Isabel Campos de Jiménez Cantú	*	Las Jaras	*	*

Red (more popular)	Purple	Blue	Green	Orange (less popular)
Villas Alteza	*	Jesús Jiménez Gallardo	*	*
Hípico	*	*	*	*
El Rodeo	*	*	*	*

Table 9.- More popular to less popular neighborhoods in Metepec downtown.

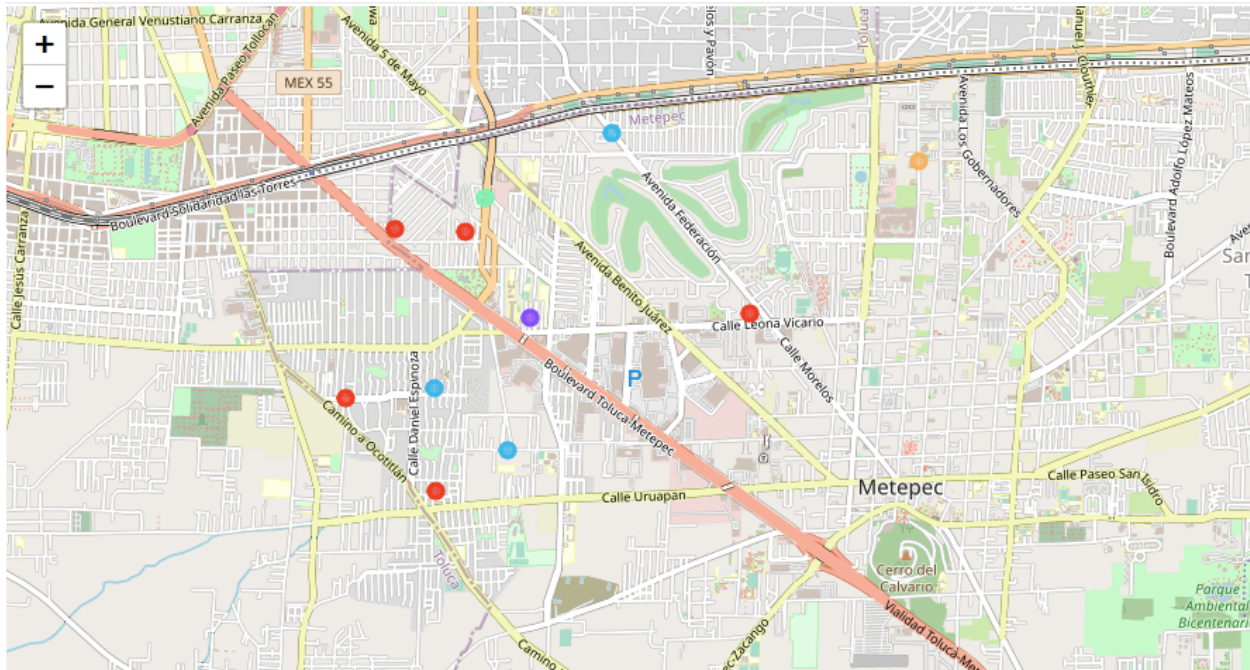


Figure 4.- Map of more popular to less popular neighborhoods in Metepec downtown.

Discussion

As I mentioned before, Toluca and Metepec are a important cities for commerce and business. As there is such a complexity, very different approaches can be tried in clustering and classification studies. This study its only descriptive and can have variability day per day if we consider the dynamics economy caused by coronavirus disease in the cities and entire world.

I ended the study by visualizing the data and clustering information on Toluca and Metepec maps. In future studies, web or telephone applications can be carried out to direct investors.

Conclusion

As a result Metepec is most popular city and have more popular venues. Every neighborhood is different and some one have a coffee shop, could be a standard commerce!. I hope that this study could help investors an entrepreneurs to establish a new commerce and help the local competence.

Study realized by: Emmanuel Pichardo Quintana
If you like my work send me an email: epq9406@gmail.com

References

CANACO-SERVYTUR. Web site: <http://www.canacotoluca.org/quienes-somos/> Visited: 2 January 2021.

Appendix

Github repository and code resources for this project:

[https://github.com/epichardoq/datasciencecoursera/blob/master/The % 2 0 B a t t l e % 2 0 o f % 2 0 N e i g h b o r h o o d s / W e e k 5 / The_Battle_of_Neighborhoods_Code.ipynb](https://github.com/epichardoq/datasciencecoursera/blob/master/The%20Battle%20of%20Neighborhoods/Week5/The_Battle_of_Neighborhoods_Code.ipynb)