

# **Capstone Project - The Battle of Neighborhoods**

## **Introduction:**

Los Angeles County is one of the most populated countys in the United States. Due to it's good weather, beaches and important events such as music festivals or the Oscars, and places like the Walk of Fame, the Chinese Theatre or Santa Monica boulevard, it receives thousands of tourists from all around the world. It seems to be a good place to open a restaurant or a shop.

This project will help people to choose the most appropriate location where a shop or a restaurant can be opened and which type of place it should be.

## **Problem**

To find the answers to the following questions:

- 1) Is Los Angeles a suitable place to open a store or restaurant?
- 2) Find the most recommended type of shop or restaurant.
- 3) Which is the best place to open a store or restaurant?
- 4) Which is the least attractive area to open a new restaurant or store?

## **Required information**

Database with demographic information of all the cities in the United States. Coordinates are necessary too. Economical data about citizens is helpful. Foursquare API will provide information about relevant places.

Demographic information:

- Population: Low population or low density usually means low number of clients.
- Ethnic groups: In case of opening a restaurant, it is useful to know who to hire. If someone wants to open an spanish restaurant, it is usually better to hire a person that is spanish, because knows more about spanish cuisine.

Economical data:

- Cost of living and household income: It is not a good idea to sell expensive products in places where salaries are low and the cost of living is too high.

Foursquare API:

- It can find thousands of places (possible competitors) and provide information such as rating, number of visitors, price, categorie or location.

Population, density and coordinates: <https://simplemaps.com/data/us-cities>

Los Angeles ethnical groups: <https://data.lacounty.gov/resource/ai64-dnh8.json>

Cost of living: <https://worldpopulationreview.com/state-rankings/cost-of-living-index-by-state>

## **Methodology**

We begin studying United States population. The probability of finding clients is greater if the population is high and the density of population is high. Figure 1 shows us Los Angeles is the second city in the United States with greater number of citizens.

|   | city        | county_name | state_name | population | density | lat     | lng       |
|---|-------------|-------------|------------|------------|---------|---------|-----------|
| 0 | New York    | New York    | New York   | 18713220.0 | 10715.0 | 40.6943 | -73.9249  |
| 1 | Los Angeles | Los Angeles | California | 12750807.0 | 3276.0  | 34.1139 | -118.4068 |
| 2 | Chicago     | Cook        | Illinois   | 8604203.0  | 4574.0  | 41.8373 | -87.6862  |
| 3 | Miami       | Miami-Dade  | Florida    | 6445545.0  | 5019.0  | 25.7839 | -80.2102  |
| 4 | Dallas      | Dallas      | Texas      | 5743938.0  | 1526.0  | 32.7936 | -96.7662  |

Figure 1 – Most populated cities in the United States.

Two of the most important parameters are the cost index and the household income. The ratio between this two parameters has been calculated. California is one of the expensive states in the US. The price of the products offered in the store or the restaurant must be considered. If the cost is too high, the number of customers will be reduced.

|   | State         | Cost_Index | Household_Income | Ratio      |
|---|---------------|------------|------------------|------------|
| 0 | Hawaii        | 192.9      | 78084            | 404.790047 |
| 1 | Oregon        | 134.2      | 59393            | 442.570790 |
| 2 | California    | 151.7      | 71228            | 469.531971 |
| 3 | New York      | 139.1      | 65323            | 469.611790 |
| 4 | Maine         | 117.5      | 55425            | 471.702128 |
| 5 | Montana       | 106.9      | 52559            | 491.665108 |
| 6 | West Virginia | 91.1       | 44921            | 493.095499 |
| 7 | Mississippi   | 86.1       | 43567            | 506.004646 |
| 8 | Louisiana     | 93.9       | 47942            | 510.564430 |
| 9 | Vermont       | 114.5      | 60076            | 524.681223 |

Figure 2 – Cost of Living Ranking

Ethnical groups studying is important. It can help us to understand people's preferences. For example, if the number of latíno citizens is high, it might be a good idea to open a mexican, colombian or cuban restaurant. In case of opening a mexican restaurant, it is easier to hire people who knows mexican cuisine.

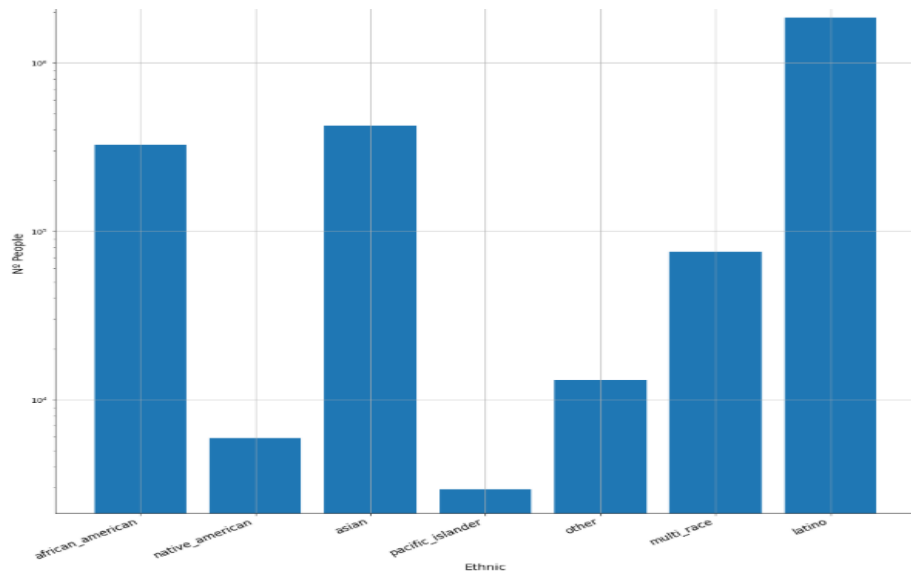


Figure 3 – Los Angeles Diverse Population

Once the population and economical data are collected, it is time to find the most suitable place where a shop or a restaurant can be opened. Figure 4 shows a map with all the cities in Los Angeles County.

There are 141 cities in Los Angeles County. It is a huge number of cities. Some of this cities will be ignored due to its low population or density.

The average population and the average density are calculated. This figure will help us to filter and reduce the number of cities.

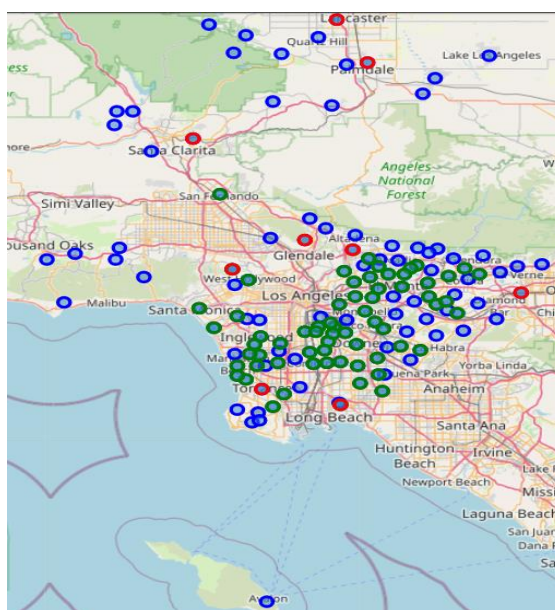


Figure 4 – Cities of Los Angeles County

- 1- Red circle: Cities which population and density are above the average.
- 2- Green circle: Cities which population is below the average and density over the average.
- 3- Blue circle: Cities which population and density are below the average.

To reduce the number of cities, the distance between cities has been calculated. Cities which population or density is below the average and its distance to the most populated cities is greater than 500 meters are ignored.

- 1- Green: Most populated cities.
- 2- Blue: Adjacent cities.

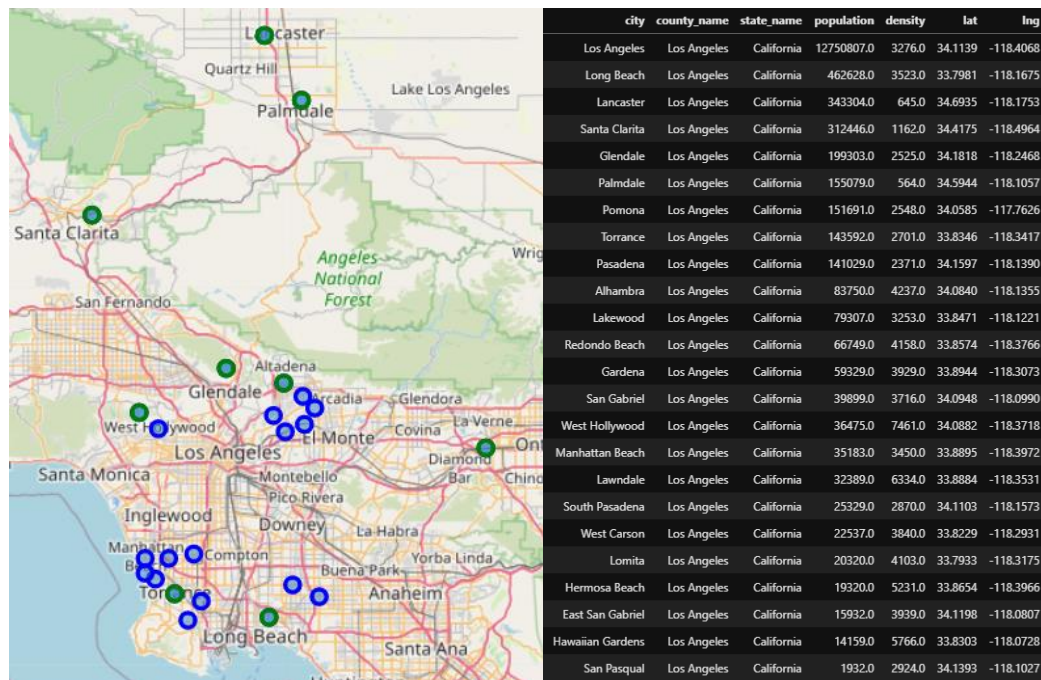


Figure 5 – Most populated cities and adjacent cities

We use API Foursquare to find venues. The API needs the the user credentials and the coordinates of the cities. The function *nearbyVenues(...)* returns a dataframe with information about different venues, such as the location, the ID number, the name and the category. It is possible to calculate the number of venues per category. The number of categories is closer to 300, but we only pay attention to the 15 categories with greater number of venues.

Coffee shops, mexican restaurants and pizza places seem to be the most popular venues. We studied Los Angeles ethnical groups before. The huge number of latinos makes easier to find a chef with mexican cuisine knowledge.

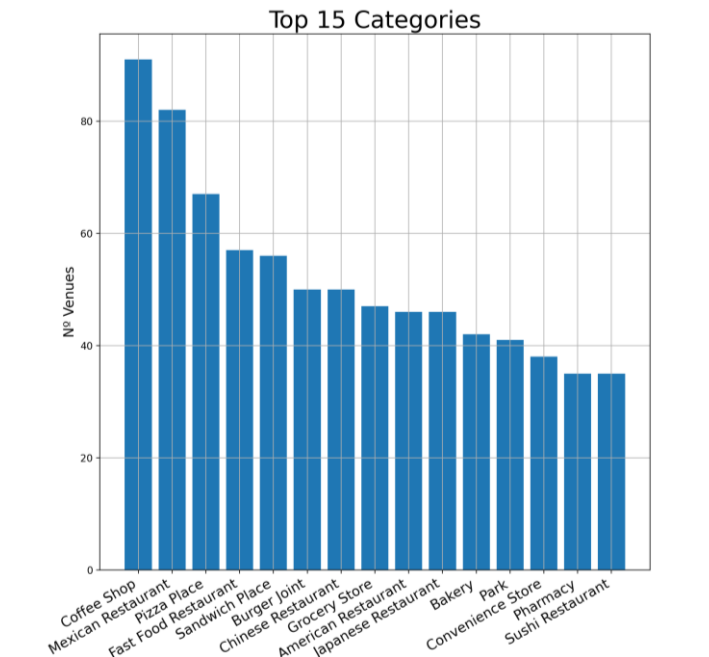


Figure 6 – Categories Ranking

We have to decide the best location for the mexican restaurant. Our decision will be based on the number of restaurants in each city and customer experience. The number of restaurants in Hermosa Beach and Ponomia is quite big. This means that there are lots of rivals. A new restaurant in this cities must offer better products with competitive prices. It is easier to find clients in places where the number of mexican restaurants is low.

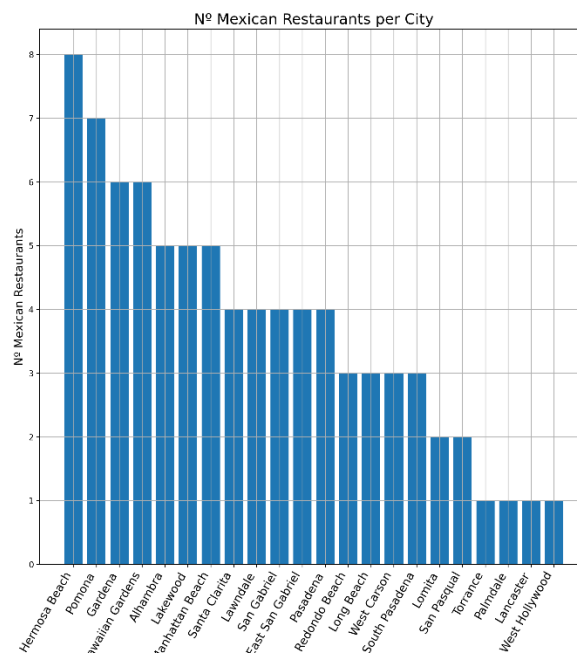


Figure 7 – Mexican Restaurants in each city

Figure 8 shows the average rating of mexican restaurant in each city. West Hollywood, Redondo Beach and Torrance got the best score. It might be difficult to beat mexican restaurants in this cities.

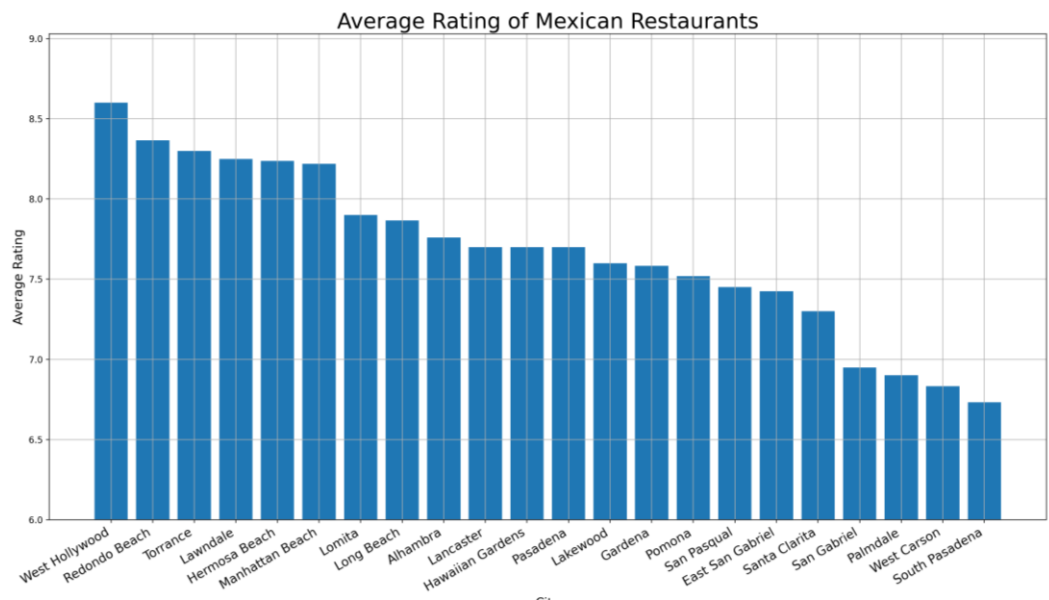


Figure 8 – Average rating of mexican restaurants in each city.

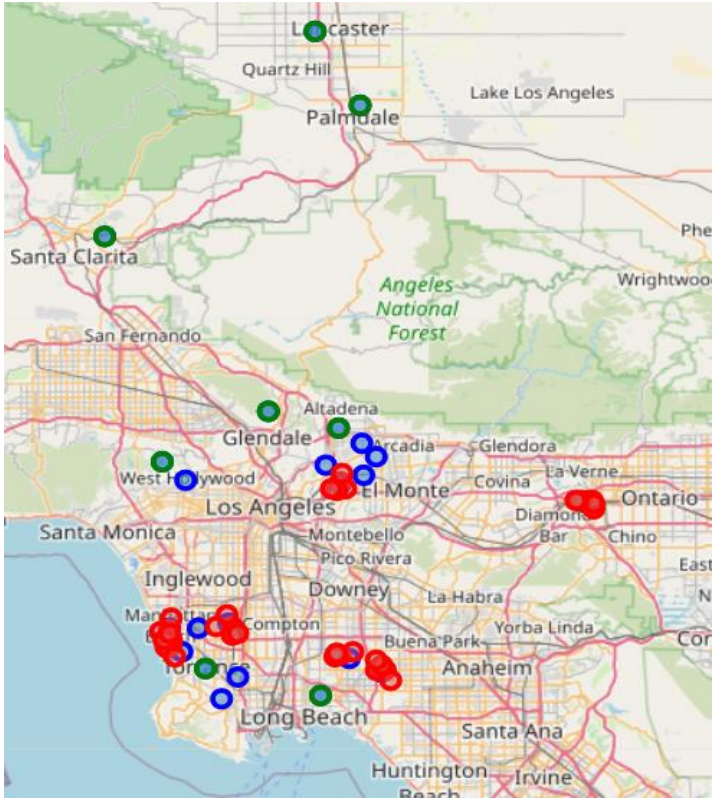


Figure 9 – Los Angeles County Map

- 1- Red circle: Restaurant
- 2- Green circle: Cities which population and density are above the average.
- 3- Blue circle: Other cities.

### **Conclusions**

Considering all the information collected, we can get to the next conclusions:

- 1) Is Los Angeles a suitable place to open a store or restaurant?  
Yes. Tourism, universities, and the enormous number of citizens means the probability of success can be high if we choose the type of store or restaurant carefully.
- 2) Find the most recommended type of shop or restaurant.  
The most popular restaurants are coffee shops, mexican restaurants and pizza places. The 3 of them are good choices.
- 3) Which is the best place to open a store or restaurant?  
Although the average rating in West Hollywood is the highest, there is only one mexican restaurant (according to Foursquare's database). Lomita and West Carson are 2 interesting options.
- 4) Which is the least attractive area to open a new restaurant or store?  
The number of restaurants in Santa Clarita, Lancaster and Palmdale is quite low. The ratings are also low. It is easy to think that a new restaurant in this cities will find many clients, but it can be a bit difficult. It's still a good choice.  
There are 3 places which are not recommended because of the number of restaurants.
  - 1- South-West of Los Angeles (Redondo Beach, Manhattan Beach and Hermosa Beach)
  - 2- Pomona
  - 3- Hawaiian Gardens

### **Future Work**

Foursquare API provides information about prices and menus. This 2 parameters can help us to decide where to open the restaurant, the menu (based on favourite meals in other restaurants) and its cost.

The jupyter notebook can be used to study other types of restaurants or stores.