Introduction

Los Angeles, officially the City of Los Angeles and often abbreviated as L.A., is the largest city in California. It has an estimated population of nearly 4 million and is the second-largest city in the United States, after New York City, and the third-largest city in North America, after Mexico City and New York City. Los Angeles is known for its Mediterranean climate, ethnic and cultural diversity, Hollywood entertainment industry, and its sprawling metropolitan area. According to the 2010 Census, the racial makeup of Los Angeles included: 49.8% Whites, 9.6% African Americans, 0.7% Native Americans, 11.3% Asians, 0.1% Pacific Islanders, 23.8% from other races, and 4.6% from two or more races. Los Angeles is home to people from more than 140 countries speaking 224 different identified languages. Ethnic enclaves like Chinatown, Historic Filipinotown, Koreatown, Little Armenia, Little Ethiopia, Tehrangeles, Little Tokyo, Little Bangladesh, and Thai Town provide examples of the polyglot character of Los Angeles.

This project explores the most popular restaurants and its type of cuisine in different neighborhoods in central Los Angeles. Central L.A. has 26 neighborhoods and diverse racial makeup: 46.1% Latino, 26.4% White, 16.2% Asian, 8.2% Black and 3.1% Other. This results in a diverse makeup of cuisines in central L.A. and the analysis data can be used to decide what type of restaurant should you open if you plan to open a restaurant in this area. This project answers the questions "Which type of cuisine is the most popular one in each neighborhood in central L.A.?" and "What are the most similar neighborhoods in terms of types of cuisine?"

Data

To answer the above questions, I first use data from Los Angeles Times to identify different neighborhoods in central LA. LA Times also provides neighborhoods information in other areas in LA.

Geopy will be used to convert an address into latitude and longitude values so that we can further use FourSquare API.

All data related to locations and quality of different restaurants will be obtained via the FourSquare API utilized via the Request library in Python.

I then perform a K-means clustering on these neighborhoods and pick the cluster the most similar neighborhoods together.

Methodology

I first get the neighborhoods data from LA Times website. They've embedded the neighborhoods name in an interactive map, and I formatted these data in .json file and use json package in python to read them. Then I utilized the geopy API to obtain the geographical coordinates of the corresponding neighborhoods. Next step is to integrate venues data for each neighborhood by using Foursquare API. I choose to obtain at most 100 restaurants in each neighborhood. Next step is to do the one-hot encoding on the categorical cuisine type in order to cluster these neighborhoods based on popular cuisine types. Since we don't know the best k yet, I've plotted the elbow plot to do the visual check for picking best k. Then group each neighborhood and calculate the mean one-hot encoding value to the clustering using K-means. I've also tried using the sum value instead of mean value when quantifying each neighborhood, but the result is pretty similar to mean value, so I decided to stick with mean value.

Results

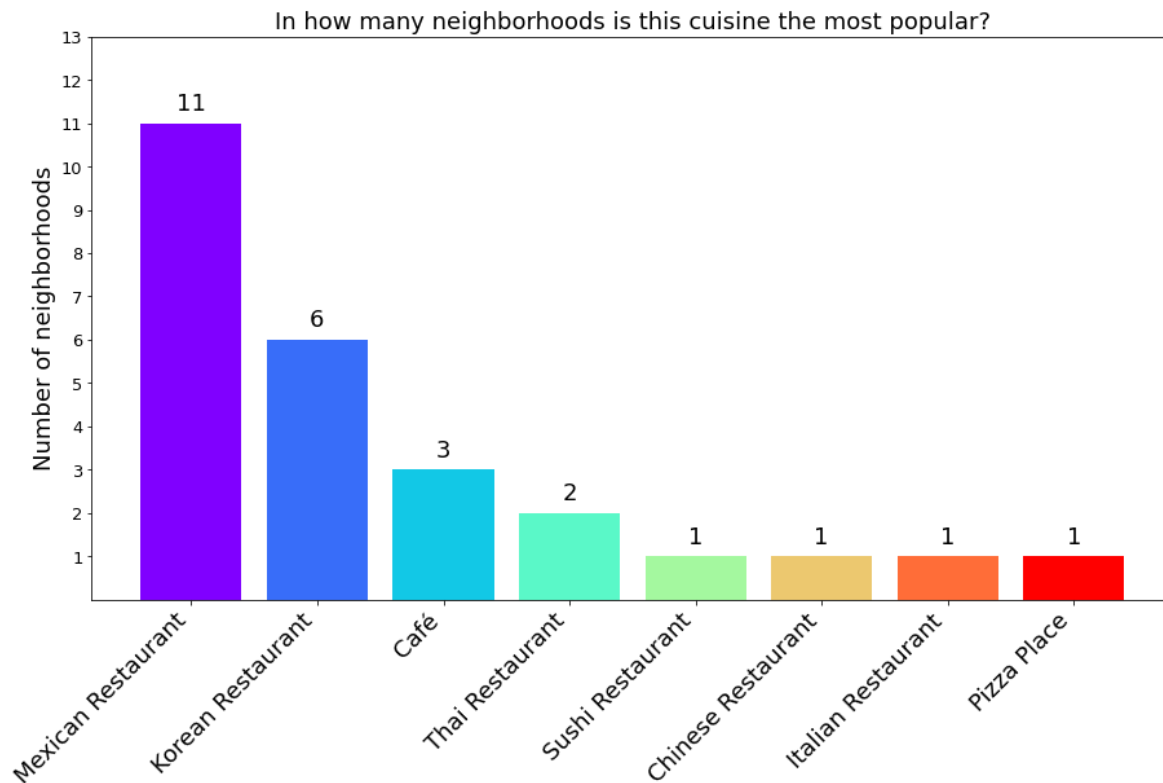Using the data I have after processing, I can finally answer the questions at the beginning.

"Which type of cuisine is the most popular one in each neighborhood in central L.A.?"

According to the dataframe variable "la_restaurants_sorted", each neighborhood has 5 most popular types of cuisine.
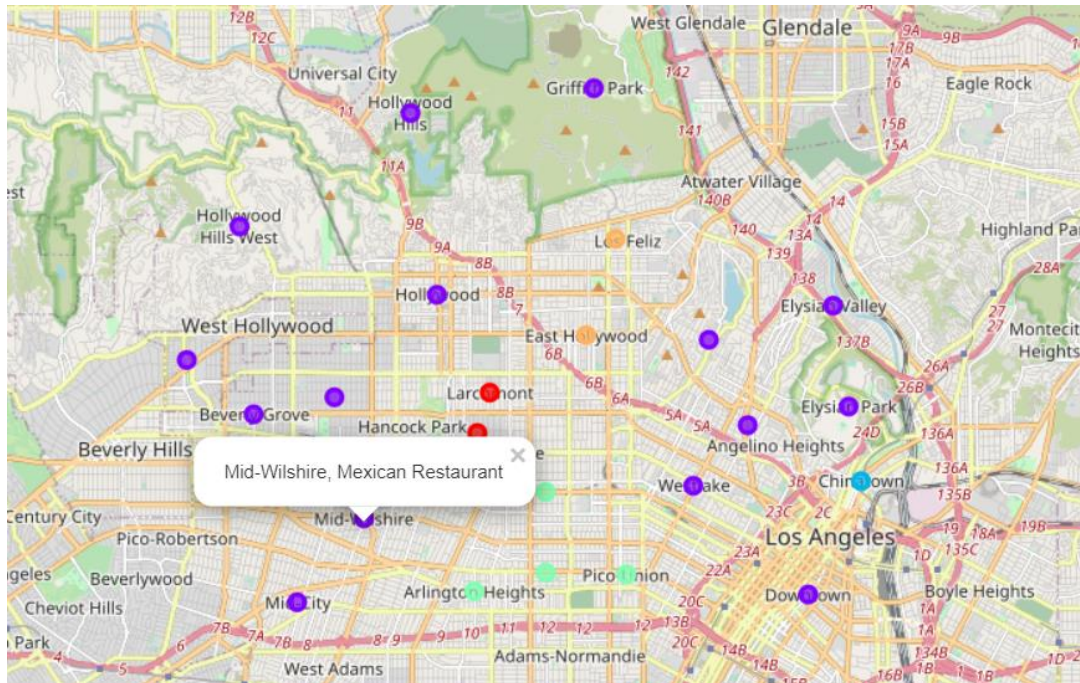
The dataframe looks like this:

	Neighborhood Name	No.1 Popular Cuisine	No.2 Popular Cuisine	No.3 Popular Cuisine	No.4 Popular Cuisine	No.5 Popular Cuisine
0	Arlington Heights	Korean Restaurant	Mexican Restaurant	Fast Food Restaurant	Sandwich Place	Chinese Restaurant
1	Beverly Grove	Café	Mexican Restaurant	Sushi Restaurant	Vegetarian / Vegan Restaurant	American Restaurant
2	Carthay	Sushi Restaurant	Ethiopian Restaurant	Café	Food Truck	Sandwich Place
3	Chinatown	Chinese Restaurant	Mexican Restaurant	Vietnamese Restaurant	Bakery	Sandwich Place
4	Downtown	Mexican Restaurant	Sushi Restaurant	Taco Place	Pizza Place	Gastropub
5	East Hollywood	Thai Restaurant	Asian Restaurant	Middle Eastern Restaurant	Pizza Place	Café
6	Echo Park	Mexican Restaurant	Café	Taco Place	Thai Restaurant	Pizza Place
7	Elysian Park	Mexican Restaurant	Taco Place	Bakery	Chinese Restaurant	Pizza Place
8	Elysian Valley	Mexican Restaurant	Café	Pizza Place	Food Truck	American Restaurant
9	Fairfax	Mexican Restaurant	Café	Italian Restaurant	Pizza Place	American Restaurant
10	Griffith Park	Café	American Restaurant	Sandwich Place	Cafeteria	Fast Food Restaurant
11	Hancock Park	Italian Restaurant	Mexican Restaurant	Korean Restaurant	Japanese Restaurant	Sandwich Place
12	Harvard Heights	Korean Restaurant	Café	Japanese Restaurant	Mexican Restaurant	Restaurant
13	Hollywood	Mexican Restaurant	Pizza Place	American Restaurant	Italian Restaurant	Café
14	Hollywood Hills	Café	Mexican Restaurant	American Restaurant	Food Truck	Italian Restaurant
15	Hollywood Hills West	Mexican Restaurant	American Restaurant	Sushi Restaurant	Italian Restaurant	Café
16	Koreatown	Korean Restaurant	Asian Restaurant	Café	Bakery	Restaurant
17	Larchmont	Korean Restaurant	Italian Restaurant	Thai Restaurant	Mexican Restaurant	Café
18	Los Feliz	Thai Restaurant	Italian Restaurant	Mexican Restaurant	Sandwich Place	Breakfast Spot
19	Mid-City	Mexican Restaurant	Sandwich Place	Ethiopian Restaurant	Fast Food Restaurant	Pizza Place
20	Mid-Wilshire	Mexican Restaurant	Sandwich Place	Bakery	Ethiopian Restaurant	Burger Joint
21	Pico-Union	Korean Restaurant	Mexican Restaurant	Latin American Restaurant	Pizza Place	Sandwich Place
22	Silver Lake	Mexican Restaurant	Café	Vegetarian / Vegan Restaurant	American Restaurant	Pizza Place
23	West Hollywood	Pizza Place	Sushi Restaurant	Italian Restaurant	American Restaurant	New American Restaurant
24	Westlake	Mexican Restaurant	Sandwich Place	Latin American Restaurant	Fast Food Restaurant	Chinese Restaurant
25	Windsor Square	Korean Restaurant	Café	Bakery	Japanese Restaurant	Mexican Restaurant

According to the bar plot shown below, Mexican restaurant is the most popular cuisine in central LA area. So if someone decides to open a restaurant in central LA, my recommendation will be a Mexican restaurant unless he/she decides to open in specific neighborhood where certain type of cuisine is much more popular than Mexican food such as Chinatown.
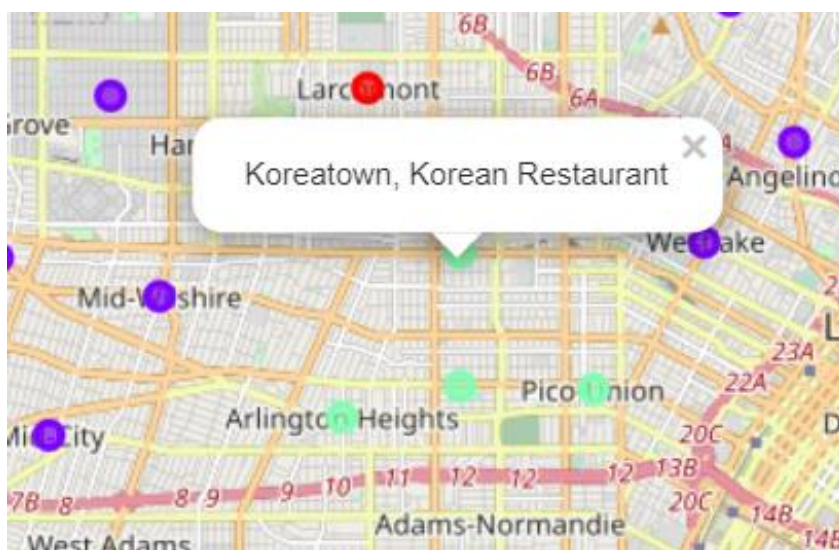
For the question "What are the most similar neighborhoods in terms of types of cuisine?"

Most neighborhoods with Mexican foods as their most popular cuisine are clustered together

Some other neighborhoods such as Koreantown and Harved Heights are clustered together because they share Korean restaurants as the popular cuisine.

Discussion

In some neighborhood, a certain type of cuisine is the dominating cuisine and surpass other types of cuisine by a lot. For example, neighborhood Chinatown has Chinese restaurants as the dominating cuisine and Koreantown has the Korean restaurants as the dominating cuisine. The observation makes sense because people lived in Chinatown or Koreantown are most likely to be Chinese or Korean who, reasonably, likes Chinese cuisine or Korean cuisine more. While some other neighborhoods such as Downtown, although likes Mexican foods more, does not have a dominating cuisine that surpass other types of cuisine by a lot. I think this is because the demographical makeup in downtown is more diverse than in Chinatown or Koreantown, so the cuisine types are more mixed together.

Conclusion

This project explores the types of cuisine in central LA area and analyze the popularity of cuisine in each neighborhood. The food preference in each neighborhood can somehow reflect the demographical makeup of races of people in each neighborhood.