

# Compare the Los Angeles and San Francisco City Cultures

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## 1. Introduction

Los Angeles and San Francisco are both world-renowned cultural, commercial and financial centers along the California Seashore. Many neighborhoods feature a mix of stores, restaurants, and boisterous businesses that cater to the locals' needs as well as serve visitors and tourists. Some of the neighborhoods are teeming with cafés and bars, while others may have exotic restaurants and antique stores.

As a person who has stayed in Los Angeles for almost ten years, and has visited San Francisco for three times, I am excited to draw big pictures of the two cities with data, and see what's the similarity and differences between their cultures.

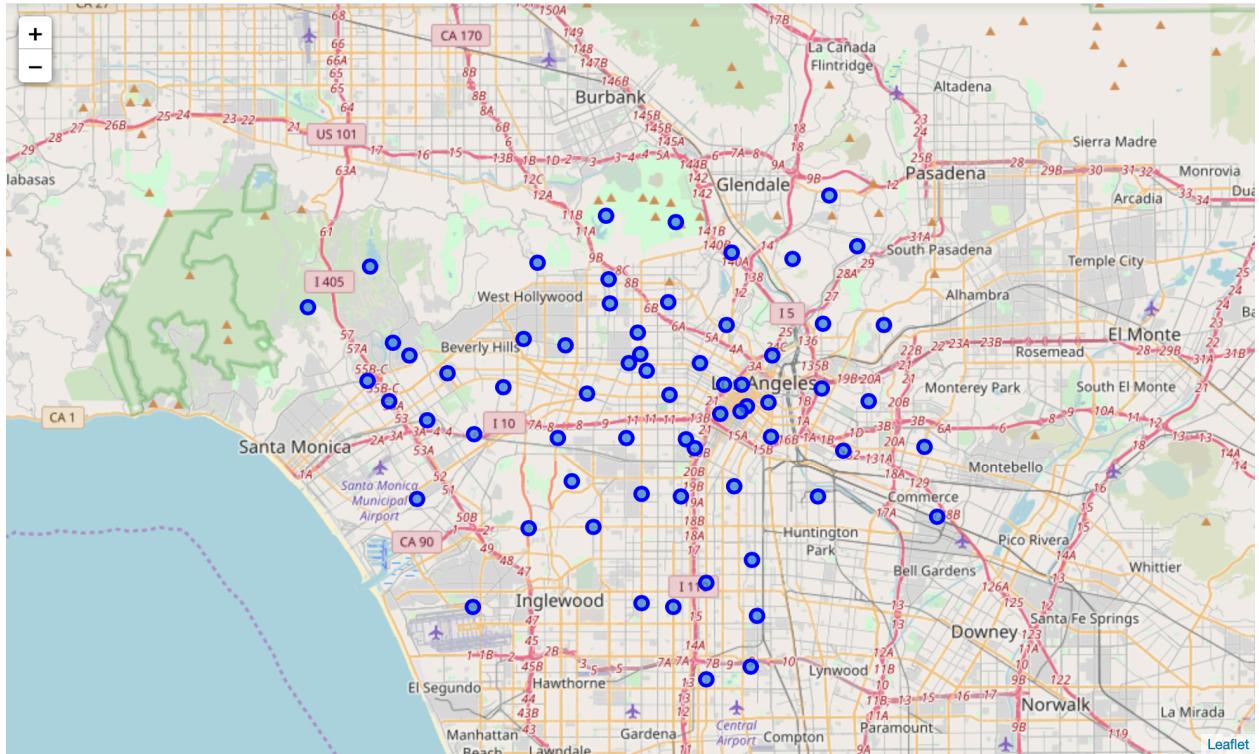


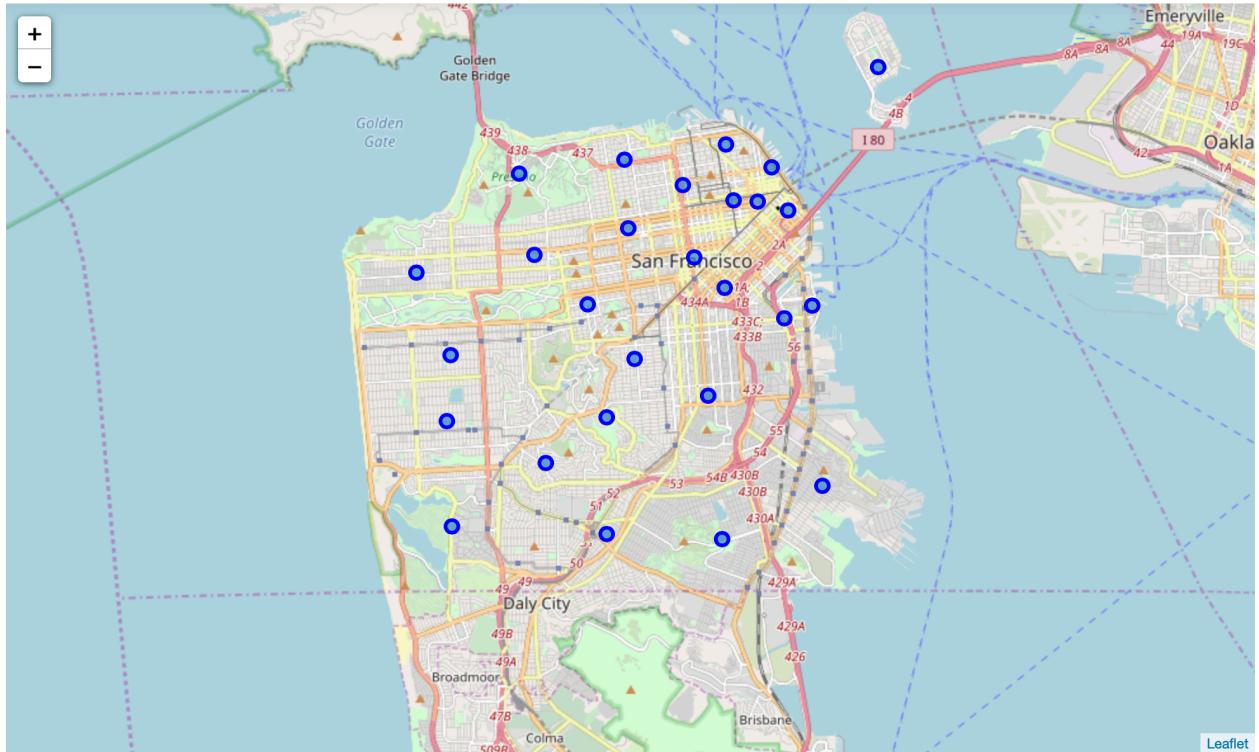
Los Angeles and San Francisco (Picture Sources: Wikipedia)

## 2. Data Description

The data I adopted came from two sources:

First, I downloaded the postcodes for each area in both cities from an online zip codes database Simplemaps (<https://simplemaps.com/data/us-zips>). The data set also includes the location coordinates, i.e. the longitude and latitude for each post code area. There are 65 post code areas in Los Angeles and 28 of them in San Francisco, as showed by the blue dots in the following two maps:





Second, I used Foursquare API (<https://foursquare.com>) to acquire the information on the venues in each post code area within both cities. Given the longitude and latitude for each area, I fetched the information about most trending venues within the radius of 500 meters and the limit of 100. The information includes these venues' names and categories. There are 1593 venues fetched in Los Angeles and 1604 venues in San Francisco.

### 3. Methodology

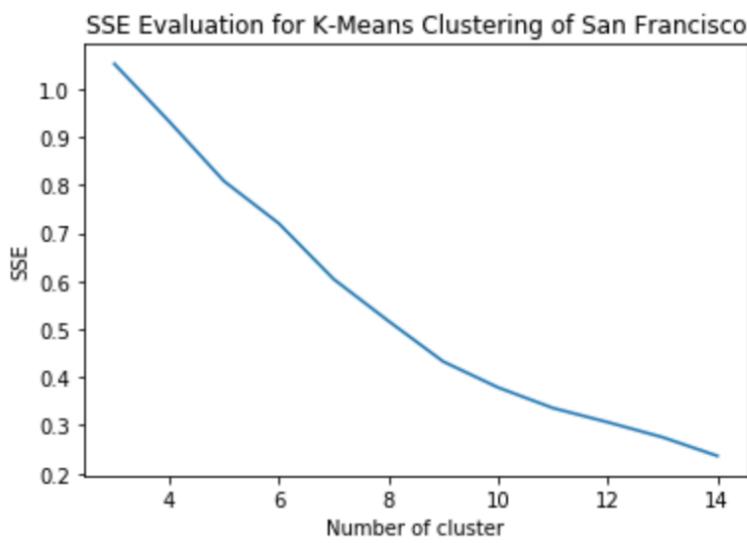
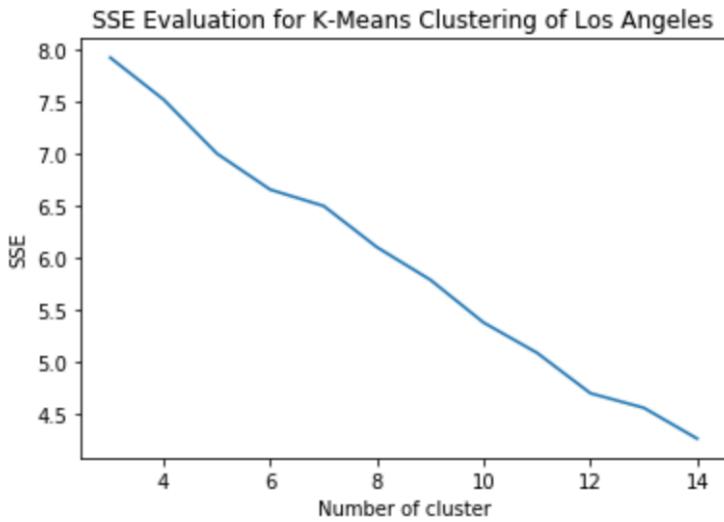
I used Miniconda as the platform to build my Jupyter Notebook. The programming language is Python along with some packages like Numpy, Pandas, Scikit-learn, etc. I also used folium library to draw the geographic maps.

To conduct this analysis, I followed several steps:

First, I calculated the frequencies of all venue types within each post code area. To do that, I transferred the venue category into dummies and then calculate the mean of each venue dummy for each post code. The mean is exactly the frequency of such venue in such post code area. I also printed out the top ten frequent venues for each code post area. Here is an example:

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	venue	freq
0	Park	0.5
1	Women's Store	0.5
2	Paper / Office Supplies Store	0.0
3	Music Store	0.0
4	Music Venue	0.0
5	Neighborhood	0.0
6	New American Restaurant	0.0
7	Nightclub	0.0
8	Non-Profit	0.0
9	Noodle House	0.0

Second, I used unsupervised learning K-means clustering algorithm to cluster the post code areas within both cities. The K-mean algorithm were iteratively run for each K in the range 3 to 15. The sum of squared error (SSE) are calculated and visualized in the following two graphs.

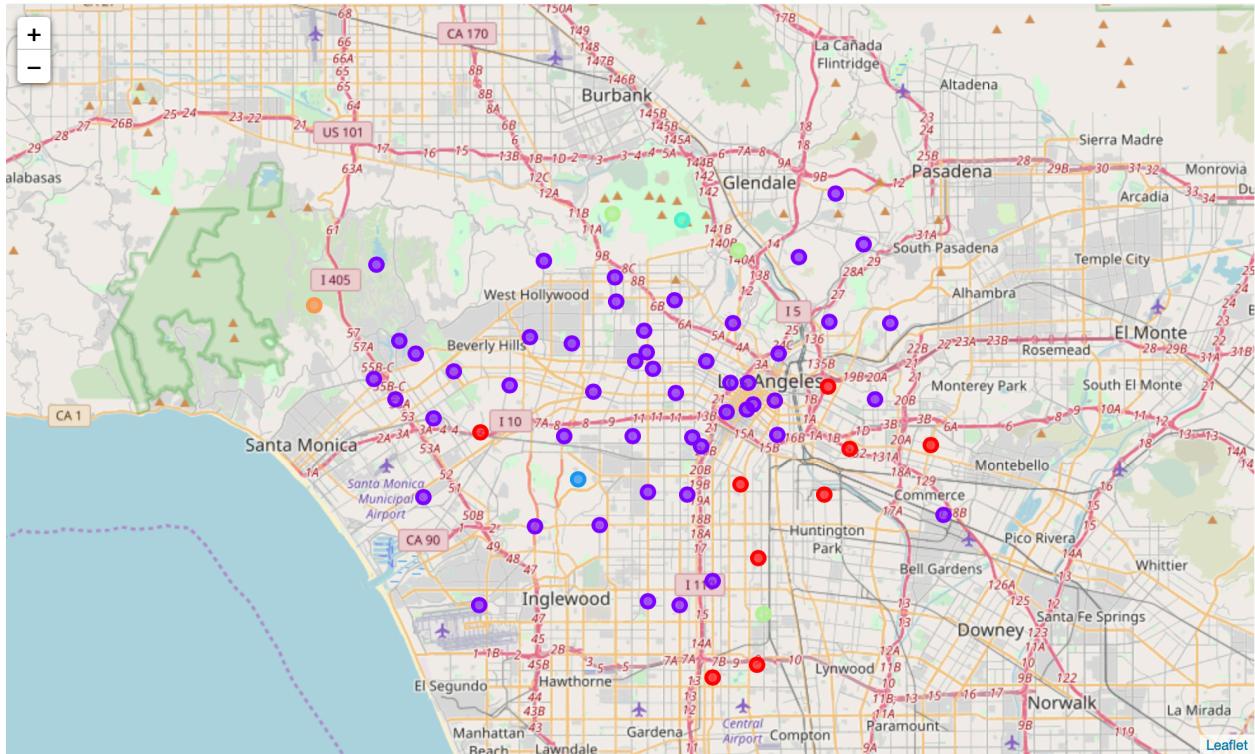


The elbows in the graphs are not obvious but still noticeable. I set the cluster number for Los Angeles as 6 and that for San Francisco as 8. With those numbers I run the K-mean clustering again for both cities.

Third, I analyzed the clusters I got from the last step. Calculated the frequency of all types of venues appearing as the trending venues, and then compared the clusters by their top frequent venues.

## 4. Results

Among the clusters for both cities, most of them are very small and only contain 1 to 3 post code areas. Those areas stands out because there are some rare features dominating other venues. Those rare features could be scenic lookout, park, or trail. Those small clusters always have peripheral locations: they are located at the edge of the cities. In despite of those small clusters, each city still have two major big clusters. Let's look at Los Angeles first:



The majority of Los Angeles post code areas are dotted either purple or red.

The purple areas are dominated by a mix of the white, Mexican, and Asian culture. Here is the sampled description:

Latitude	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
33.9641	Southern / Soul Food Restaurant	Taco Place	Bakery	Fast Food Restaurant	Yoga Studio	Fabric Shop	Food Truck	Food Stand	Food Court
34.0762	Korean Restaurant	Coffee Shop	Bar	Intersection	Seafood Restaurant	Japanese Restaurant	Cocktail Bar	Sandwich Place	Sushi Restaurant
34.0591	Korean Restaurant	Japanese Restaurant	Coffee Shop	Café	Yoga Studio	Beer Bar	Juice Bar	Gift Shop	Mexican Restaurant
34.0480	Donut Shop	Cosmetics Shop	Video Game Store	Grocery Store	Food Truck	Diner	Pizza Place	Sandwich Place	Bus Station
34.0281	Coffee Shop	Shipping Store	Yoga Studio	Food Truck	Caribbean Restaurant	College Residence Hall	Farmers Market	Food Court	Fraternity House
34.0621	Coffee Shop	Korean Restaurant	Japanese Restaurant	Pizza Place	Business Service	Sake Bar	Italian Restaurant	Asian Restaurant	Sandwich Place
34.0660	Chinese Restaurant	Bakery	Vietnamese Restaurant	Bar	Intersection	Diner	Recreation Center	Café	Monument / Landmark
34.0448	Japanese Restaurant	Sushi Restaurant	Ice Cream Shop	Bubble Tea Shop	Gift Shop	Cocktail Bar	Brewery	Bakery	Ramen Restaurant
34.0431	Bar	Coffee Shop	Music Venue	Theater	Italian Restaurant	Burger Joint	Hotel	Clothing Store	Lounge
34.0394	Coffee Shop	Mexican Restaurant	Bar	Food Truck	Sports Bar	American Restaurant	Basketball Court	Music Store	Cocktail Bar
34.0287	Dance Studio	Deli / Bodega	Check Cashing Service	Wine Bar	Fast Food Restaurant	Fried Chicken Joint	Mexican Restaurant	Latin American Restaurant	Sandwich Place

Here is the frequency of the top trending venues in this area:

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Coffee Shop	0.042
Café	0.036
Mexican Restaurant	0.032
Food Truck	0.030
Sandwich Place	0.028
Fast Food Restaurant	0.026
Burger Joint	0.024
Yoga Studio	0.024
Pizza Place	0.022
Food Court	0.022
Bakery	0.020
Food & Drink Shop	0.020
Chinese Restaurant	0.018
Grocery Store	0.018
Intersection	0.016
Italian Restaurant	0.016
Food Stand	0.016
Convenience Store	0.016
Fish Market	0.014
Bar	0.014
Clothing Store	0.014
Park	0.014
Hotel	0.014
Food	0.012
Filipino Restaurant	0.012
Japanese Restaurant	0.010
Flower Shop	0.010
Asian Restaurant	0.010
Farmers Market	0.010
Cocktail Bar	0.010
American Restaurant	0.010
Music Venue	0.010

The red area is dominated by a mix of Mexican and Asian culture. Here is the sampled description:

Latitude	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
33.9740	Mexican Restaurant	Shoe Store	Fruit & Vegetable Store	Fast Food Restaurant	Burger Joint	Pizza Place	Mobile Phone Shop	Donut Shop	Pharmacy	Sandwich Place
34.0071	Fast Food Restaurant	Mexican Restaurant	Ice Cream Shop	Fried Chicken Joint	Pizza Place	Discount Store	Food	Filipino Restaurant	Fish Market	Flea Market
34.0245	Mexican Restaurant	Shoe Store	Mobile Phone Shop	Convenience Store	Pizza Place	Bank	Donut Shop	Flower Shop	Filipino Restaurant	Fish Market
34.0228	Mexican Restaurant	Video Game Store	Fast Food Restaurant	Grocery Store	Sandwich Place	Discount Store	Seafood Restaurant	Department Store	Pizza Place	Food
34.0510	Mexican Restaurant	Pizza Place	American Restaurant	Thai Restaurant	Pharmacy	Sandwich Place	Seafood Restaurant	Fast Food Restaurant	Taco Place	Yoga Studio
34.0307	Pizza Place	Coffee Shop	Mexican Restaurant	Shipping Store	Sandwich Place	Grocery Store	Sushi Restaurant	Chinese Restaurant	Pharmacy	Snack Place
34.0024	Grocery Store	Sandwich Place	Yoga Studio	Food Truck	Food Stand	Food Court	Food & Drink Shop	Food	Flower Shop	Flea Market
33.9263	Mexican Restaurant	Burger Joint	Fish Market	Park	Gas Station	Video Store	Yoga Studio	Flower Shop	Filipino Restaurant	Flea Market
33.9204	Fast Food Restaurant	Convenience Store	Park	Yoga Studio	Fabric Shop	Football Stadium	Food Truck	Food Stand	Food Court	Food & Drink Shop

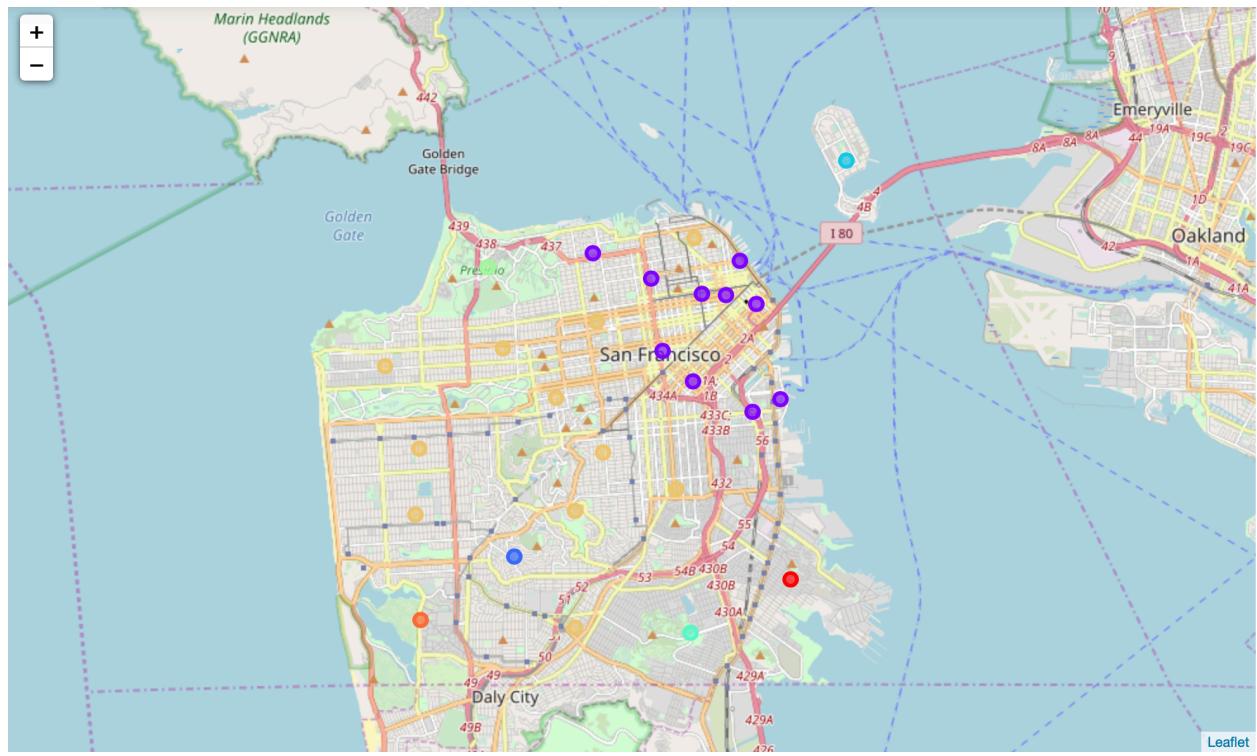
Here is the frequency of the top trending venues in this area:

Mexican Restaurant	0.077778
Pizza Place	0.066667
Sandwich Place	0.055556
Fast Food Restaurant	0.055556
Yoga Studio	0.044444
Food	0.033333
Filipino Restaurant	0.033333
Flower Shop	0.033333
Grocery Store	0.033333
Flea Market	0.033333
Fish Market	0.033333
Pharmacy	0.033333
Food Court	0.022222
Park	0.022222
Shoe Store	0.022222
Food Truck	0.022222
Food Stand	0.022222
Donut Shop	0.022222
Food & Drink Shop	0.022222
Burger Joint	0.022222
Seafood Restaurant	0.022222
Convenience Store	0.022222
Mobile Phone Shop	0.022222
Discount Store	0.022222
Video Store	0.011111
Fruit & Vegetable Store	0.011111
Department Store	0.011111
Football Stadium	0.011111
Sushi Restaurant	0.011111
Gas Station	0.011111
Chinese Restaurant	0.011111
Taco Place	0.011111
American Restaurant	0.011111

I can see that there are many more Mexican restaurants in the red area than the purple area.

On contrast, more Italian and American restaurants appear in the purple area.

The majority of San Francisco post code areas are dotted either yellow or purple.



The yellow area have multiple cultures but a relatively traditional lifestyle: There are many more restaurants than bars. Here is the sampled description:

Latitude	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
37.7500	Mexican Restaurant	Coffee Shop	Pizza Place	Grocery Store	Gym / Fitness Center	Cocktail Bar	Deli / Bodega	Latin American Restaurant	Art Gallery	Dessert Shop
37.7204	Pizza Place	Sandwich Place	Mexican Restaurant	Vietnamese Restaurant	Bus Station	Light Rail Station	Gas Station	Liquor Store	Steakhouse	Men's Store
37.7580	Gay Bar	Coffee Shop	Scenic Lookout	Clothing Store	Plaza	Playground	Pet Store	Intersection	Thai Restaurant	Deli / Bodega
37.7860	Cosmetics Shop	Spa	Bakery	Yoga Studio	Boutique	Ice Cream Shop	Café	Pizza Place	Park	New American Restaurant
37.7446	Chinese Restaurant	Café	Japanese Restaurant	Sandwich Place	Dance Studio	Dumpling Restaurant	Light Rail Station	Kids Store	Shoe Repair	Pizza Place
37.7697	Boutique	Clothing Store	Coffee Shop	Café	Thrift / Vintage Store	Shoe Store	Pizza Place	Gift Shop	Bookstore	Thai Restaurant
37.7801	Japanese Restaurant	Bakery	Sushi Restaurant	Thai Restaurant	Pizza Place	Vietnamese Restaurant	Massage Studio	Breakfast Spot	Burmese Restaurant	Korean Restaurant
37.7765	Café	Vietnamese Restaurant	Chinese Restaurant	Bus Station	Japanese Restaurant	Bakery	Sandwich Place	Bus Stop	Pizza Place	Dessert Shop
37.7588	Chinese Restaurant	Gym / Fitness Center	Bus Station	Light Rail Station	Shoe Store	Café	Coffee Shop	Gymnastics Gym	Playground	Pet Store
37.7455	Bus Station	Playground	Scenic Lookout	Theater	Park	Bus Line	Grocery Store	Salon / Barbershop	Shipping Store	Bus Stop

Here is the frequency of the top trending venues in this area:

Pizza Place	0.072727
Café	0.054545
Coffee Shop	0.045455
Bus Station	0.036364
Chinese Restaurant	0.036364
Bakery	0.036364
Sandwich Place	0.036364
Playground	0.027273
Light Rail Station	0.027273
Japanese Restaurant	0.027273
Park	0.027273
Thai Restaurant	0.027273
Vietnamese Restaurant	0.027273
Scenic Lookout	0.018182
Mexican Restaurant	0.018182
Shoe Store	0.018182
Bus Stop	0.018182
Clothing Store	0.018182
Dessert Shop	0.018182
Yoga Studio	0.018182
Grocery Store	0.018182
Boutique	0.018182
Deli / Bodega	0.018182
Gym / Fitness Center	0.018182
Pet Store	0.018182
Salon / Barbershop	0.009091
Gas Station	0.009091
Latin American Restaurant	0.009091
Art Gallery	0.009091
Liquor Store	0.009091
Intersection	0.009091
Burmese Restaurant	0.009091

We can see that the yellow area do not have many nightlife going on.

On the other hand, the purple area have a more active nightlife. Here is the sampled description:

Latitude	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
37.7797	Cocktail Bar	Café	Coffee Shop	French Restaurant	Beer Bar	Vietnamese Restaurant	Furniture / Home Store	Thai Restaurant	Theater	Perform Arts Ven
37.7732	Nightclub	Gay Bar	Cocktail Bar	Food Truck	Café	Coffee Shop	Thai Restaurant	Art Gallery	Bar	Motorcy Shop
37.7915	Coffee Shop	Sandwich Place	Gym	Café	Food Truck	Japanese Restaurant	Bar	Cocktail Bar	Seafood Restaurant	New America Restaur
37.7897	Coffee Shop	Sandwich Place	Café	Gym	American Restaurant	Seafood Restaurant	Vietnamese Restaurant	Vegetarian / Vegan Restaurant	Salad Place	Cocktail
37.7666	Café	Park	Coffee Shop	American Restaurant	French Restaurant	Mac & Cheese Joint	Sushi Restaurant	Mediterranean Restaurant	Bookstore	Bubble Shop
37.7920	Coffee Shop	Hotel	Spa	Café	Cocktail Bar	Gym	French Restaurant	Sushi Restaurant	Tea Room	Church
37.7952	Italian Restaurant	Deli / Bodega	Gym / Fitness Center	Spa	Wine Bar	Bar	Sushi Restaurant	Cosmetics Shop	French Restaurant	Massage Studio
37.7989	Food Truck	Japanese Restaurant	Café	Sandwich Place	Cosmetics Shop	Park	Bar	New American Restaurant	Street Food Gathering	Pier
37.8005	Italian Restaurant	French Restaurant	Wine Bar	Sushi Restaurant	Cosmetics Shop	Motel	Spa	American Restaurant	Salad Place	Gym / F Center
37.6221	Exhibit	Airport Lounge	Airport Service	Public Art	Café	Coffee Shop	Spa	Soup Place	Sandwich Place	Pizza Pl

Here is the frequency of the top trending venues in this area:

Café	0.072727
Coffee Shop	0.072727
French Restaurant	0.045455
Bar	0.045455
Cocktail Bar	0.045455
Food Truck	0.036364
Spa	0.036364
Sandwich Place	0.036364
Sushi Restaurant	0.036364
Cosmetics Shop	0.027273
American Restaurant	0.027273
Gym	0.027273
Park	0.027273
Vietnamese Restaurant	0.018182
Gym / Fitness Center	0.018182
Italian Restaurant	0.018182
Thai Restaurant	0.018182
Salad Place	0.018182
Japanese Restaurant	0.018182
New American Restaurant	0.018182
Mediterranean Restaurant	0.018182
Wine Bar	0.018182
Street Food Gathering	0.018182
Seafood Restaurant	0.018182
Vegetarian / Vegan Restaurant	0.009091
Beer Bar	0.009091
Pharmacy	0.009091
Nightclub	0.009091
Taco Place	0.009091
Exhibit	0.009091
Pier	0.009091
Mac & Cheese Joint	0.009091

We see that the night clubs, cocktail bars, wine bars, bear bars, and other bars in general appear very frequently.

## 5. Discussion

It has to be admitted that the culture in certain neighborhoods can not only be characterized by the catering business, like restaurants and bars, in that area. A more comprehensive analysis should also include the museum, art galleries, art studios, etc. Unfortunately, by their own natures those venues can hardly become trending on Foursquare. Therefore, other data collecting approach must to be developed.

## 6. Conclusion

From the analysis of this report, I concluded three main results:

First, both Los Angeles and San Francisco are melting pots in a the sense of cultures.

Second, the southern east part of Los Angeles are dominated by Mexican and Asian culture, and other parts features all type of cultures.

Third, the northern east seashore areas in San Francisco has very active nightlife, while the other part is more active in the daytime.