# C9_Wk3,4Assgn_ Combo2,1-Final1

June 19, 2020

Learning FourSquare API with Python

# 1 C9_WK4,5_ASSIGNMENT_RD

Table of Contents

## 1.1 1) INTRODUCTION

### 1.1.1 1.1) BACKGROUND AND BUSINESS PROBLEM

As people relocate between cities for work or otherwise, they often start out in the new location by renting.

As you move to a new city, how would one choose the area of the new city in which to live?

This would depend a lot on the individuals personal choices and lifestyle.

Using rental data that is available online, I would like to explore the use of the Four Square API app to see if the combination can be used to get a better understanding of neighborhoods in a target ciy and if, based on user input and preference, any neighborhoods in a city are of greater interest to rent in as compared to others.

The city that I will be exploring will be Los Angeles, CA.

### 1.1.2 1.2) DATA

The average rental rates for different neighborhoods in the city of Los Angeles are available at:

https://www.rentcafe.com/average-rent-market-trends/us/ca/los-angeles/

This neighborhood and rental data will be extracted to csv and then into a dataframe and cleaned.

I will try to pair this data, with information on the different LA neighbourhoods, obtained through the Four Square API app. I will use this rental data and the API app to explore different venues in the LA neighborhoods to try get an idea of what are the high traffic offerings in the various neighborhoods.

I will use one hot encoding to try to find the ten most frequently occurring venues in the different neighborhoods.

I will then apply K-Means Clustering Machine Learning algorithm on the acquired neighborhood-venue data to cluster the data into five clusters.

The Neighborhood cluster will then be plotted on a map of LA city using Folium.

I will then filter the Neighborhood-Venue frequency data set, using venues of my choice and look for neighborhoods where these venues are among the top three most frequent venues.

Using the FourSquare API, I will then search any two of these neighborhoods further, with five venues of my choice and try to determine the frequency of occurrance of these venues, within a distance of 2000m of their neighborhood coordinates.

Once I have all this information, I will try to put all this information together to look for similarities/differences in the two neighborhoods and see if any one neighborhood is more preferred to rent in than the other.

The final goal is to see whether this data can be used to differentiate between the neighborhoods and be used by people to make a better decisions on choice of city neighborhood to rent in.

### 1.1.3 1.3) Import necessary Libraries

[1]:
```
import requests # library to handle requests
import pandas as pd # library for data analsysis
import numpy as np # library to handle data in a vectorized manner
import random # library for random number generation

#!conda install -c conda-forge geopy --yes  #<- Uncheck is not installed
from geopy.geocoders import Nominatim # module to convert an address into␣
 ↪latitude and longitude values

# libraries for displaying images
from IPython.display import Image
from IPython.core.display import HTML

# tranforming json file into a pandas dataframe library
from pandas.io.json import json_normalize

# Matplotlib and associated plotting modules
import matplotlib.cm as cm
import matplotlib.colors as colors
import matplotlib.pyplot as plt
import seaborn as sns

# import k-means from clustering stage
from sklearn.cluster import KMeans

#!conda install -c conda-forge folium=0.5.0 --yes #<- Uncheck is not installed
import folium # plotting library

print('Folium installed')
print('Libraries imported.')
```

```
Folium installed
Libraries imported.
```

[2]:
```
pip install lxml
```

```
Requirement already satisfied: lxml in
/home/jupyterlab/conda/envs/python/lib/python3.6/site-packages (4.5.1)
Note: you may need to restart the kernel to use updated packages.
```

[3]:
```
pip install beautifulsoup4
```

```
Requirement already satisfied: beautifulsoup4 in
/home/jupyterlab/conda/envs/python/lib/python3.6/site-packages (4.9.1)
Requirement already satisfied: soupsieve>1.2 in
/home/jupyterlab/conda/envs/python/lib/python3.6/site-packages (from
beautifulsoup4) (2.0.1)
Note: you may need to restart the kernel to use updated packages.
```

### 1.1.4 1.4) Define Foursquare Credentials and Version

**Make sure that you have created a Foursquare developer account and have your credentials handy**

[4]:
```
CLIENT_ID = 'ND4XM0TEO203FMDF5YICGXO14O1R0YXG1Z3EE051BCUY4QBM' # your␣
 ↪Foursquare ID.
CLIENT_SECRET = 'B5GTDFPKINBOZJIRQZ4C2D0QXPYKN0PTNUXXQT5BPKHARRKO' # your␣
 ↪Foursquare Secret.
VERSION = '20180604'
#LIMIT = 5
print('Your credentails:')
print('CLIENT_ID: ' + CLIENT_ID)
print('CLIENT_SECRET:' + CLIENT_SECRET)
```

```
Your credentails:
CLIENT_ID: ND4XM0TEO203FMDF5YICGXO14O1R0YXG1Z3EE051BCUY4QBM
CLIENT_SECRET:B5GTDFPKINBOZJIRQZ4C2D0QXPYKN0PTNUXXQT5BPKHARRKO
```

## 1.2 2) DATA

### 1.2.1 2.1)LOAD AND CLEAN THE DATA

[5]:

```
#Get LA rental information from website
#https://www.rentcafe.com/average-rent-market-trends/us/ca/los-angeles/
# Website table was not directly accessible through pandas, so I copied and␣
↪saved it as a .csv

#read in .csv
la_rent1 = pd.read_csv("LA_RentByNEighbourhood_mod2.csv")

#rename column
la_rent1.rename(columns = {'Average Monthly Rent (USD)':
↪'AverageMonthlyRent_USD'}, inplace = True)
la_rent1.rename(columns = {'Neighborhood':'LA_Neighborhood'}, inplace = True)

# remove the $sign
la_rent1['AverageMonthlyRent_USD'] = la_rent1.AverageMonthlyRent_USD.str.
↪replace('$', '')

# remove the comma
la_rent1['AverageMonthlyRent_USD'] = la_rent1.AverageMonthlyRent_USD.str.
↪replace(',', '')

#add string 'CA, USA' to LA_Neighborhood
la_rent1['LA_Neighborhood'] = la_rent1['LA_Neighborhood'].astype(str) + ', CA,␣
↪USA'

#drop extra column
#la_rent.drop(['AverageMonthlyRent'],axis=1,inplace=True)
la_rent1.head()

la_rent=la_rent1
la_rent.head()
```

[5]:

```
          LA_Neighborhood AverageMonthlyRent_USD
0  Jefferson Park, CA, USA                   1355
1       El Sereno, CA, USA                   1396
2   Vermont Vista, CA, USA                   1445
3  Vermont Knolls, CA, USA                   1445
4       Hyde Park, CA, USA                   1484
```

[6]:

```
#Get datatypes in dataframe
la_rent.dtypes
```

```
[6]: LA_Neighborhood           object
     AverageMonthlyRent_USD    object
     dtype: object
```

```
[7]: # Convert Column Average Monthly Rent to float data type

     la_rent.AverageMonthlyRent_USD =la_rent.AverageMonthlyRent_USD.astype(float)
     la_rent.dtypes
```

```
[7]: LA_Neighborhood            object
     AverageMonthlyRent_USD    float64
     dtype: object
```

```
[8]: #Check the dataframe
     la_rent.head()
```

```
[8]:            LA_Neighborhood  AverageMonthlyRent_USD
     0  Jefferson Park, CA, USA                  1355.0
     1       El Sereno, CA, USA                  1396.0
     2   Vermont Vista, CA, USA                  1445.0
     3  Vermont Knolls, CA, USA                  1445.0
     4       Hyde Park, CA, USA                  1484.0
```

```
[9]: la_rent.shape
```

```
[9]: (98, 2)
```

Now we need to add latitude and longitude data to the Neighborhood information

```
[10]: # Convert column Neighborhood to list
      LA_Neighborhood_list = la_rent['LA_Neighborhood'].tolist()
      LA_Neighborhood_list
```

```
[10]: ['Jefferson Park, CA, USA',
       'El Sereno, CA, USA',
       'Vermont Vista, CA, USA',
       'Vermont Knolls, CA, USA',
       'Hyde Park, CA, USA',
       'Glassell Park, CA, USA',
       'Cypress Park, CA, USA',
       'Winnetka, CA, USA',
       'Sunland, CA, USA',
       'Leimert Park, CA, USA',
       'Panorama City, CA, USA',
       'Sun Valley, CA, USA',
       'Arlington Heights, CA, USA',
       'Shadow Hills, CA, USA',
       'Harvard Heights, CA, USA',
       'North Hills, CA, USA',
       'Pacoima, CA, USA',
       'Arleta, CA, USA',
       'Vermont - Slauson, CA, USA',
       'Reseda, CA, USA',
       'Tarzana, CA, USA',
       'Manchester Square, CA, USA',
       'Harvard Park, CA, USA',
       'Gramercy Park, CA, USA',
       'Chesterfield Square, CA, USA',
       'Van Nuys, CA, USA',
       'Baldwin Hills - Crenshaw, CA, USA',
       'Lake View Terrace, CA, USA',
       'West Hills, CA, USA',
       'Valley Glen, CA, USA',
       'Lake Balboa, CA, USA',
       'Sylmar, CA, USA',
       'West Adams, CA, USA',
       'Boyle Heights, CA, USA',
       'Vermont Square, CA, USA',
       'Northridge, CA, USA',
       'Highland Park, CA, USA',
       'Chatsworth, CA, USA',
       'Canoga Park, CA, USA',
       'Granada Hills, CA, USA',
       'Eagle Rock, CA, USA',
       'Koreatown, CA, USA',
       'Encino, CA, USA',
       'Windsor Square, CA, USA',
       'Lincoln Heights, CA, USA',
       'North Hollywood, CA, USA',
       'Porter Ranch, CA, USA',
       'Los Feliz, CA, USA',
       'Sherman Oaks, CA, USA',
       'East Hollywood, CA, USA',
       'Elysian Valley, CA, USA',
       'Westlake, CA, USA',
       'Atwater Village, CA, USA',
       'Larchmont, CA, USA',
       'Griffith Park, CA, USA',
       'Mid-City, CA, USA',
       'Silver Lake, CA, USA',
       'Pico - Robertson, CA, USA',
       'Woodland Hills, CA, USA',
       'Echo Park, CA, USA',
       'Studio City, CA, USA',
       'Hollywood Hills, CA, USA',
       'Valley Village, CA, USA',
       'Beverlywood, CA, USA',
       'Palms, CA, USA',
       'Hollywood, CA, USA',
       'Elysian Park, CA, USA',
       'Hancock Park, CA, USA',
       'Hollywood Hills West, CA, USA',
       'Fox Hills, CA, USA',
       'Rancho Park, CA, USA',
       'Cheviot Hills, CA, USA',
       'Downtown Los Angeles, CA, USA',
       'Mid-Wilshire, CA, USA',
       'Playa del Rey, CA, USA',
       'Westchester, CA, USA',
       'Mar Vista, CA, USA',
       'Jefferson, CA, USA',
       'Blair Hills, CA, USA',
       'West Los Angeles, CA, USA',
       'Sawtelle, CA, USA',
       'Pico - Union, CA, USA',
       'Bel Air, CA, USA',
       'Washington Culver, CA, USA',
       'Culver City, CA, USA',
       'Playa Vista, CA, USA',
       'Westwood, CA, USA',
       'Venice, CA, USA',
       'Exposition Park, CA, USA',
       'Ocean Park, CA, USA',
       'Adams - Normandie, CA, USA',
       'Century City, CA, USA',
       'Pacific Palisades, CA, USA',
       'Beverly Grove, CA, USA',
       'Historic South-Central, CA, USA',
       'University Park, CA, USA',
       'Pico, CA, USA',
       'Santa Monica, CA, USA']
```

[11]:

```python
#Create empty dataframe for input of latitude and logitude data

## define the dataframe columns
column_names = ['LA_Neighborhood', 'Latitude', 'Longitude']

## instantiate the dataframe
LA_lat_long = pd.DataFrame(columns=column_names)
LA_lat_long.head()
```

[11]:
```
Empty DataFrame
Columns: [LA_Neighborhood, Latitude, Longitude]
Index: []
```

[12]:
```
##Gets the coordinates for LA Neighborhoods  and append to list
LA_address_list = []
LA_lat_list = []
LA_long_list = []

#Gets the coordinates for listed LA Neighborhoods
for Neighborhood in LA_Neighborhood_list:
    address =  Neighborhood

    geolocator = Nominatim(user_agent= "foursquare_agent")
    location = geolocator.geocode(address)
    latitude = location.latitude
    longitude = location.longitude
    #LA_lat_long_list.append [(Neighborhood, Latitude, Longitude )]
    LA_address_list.append (Neighborhood)
    LA_lat_list.append(latitude)
    LA_long_list.append(longitude)
    #print(address, latitude, longitude)
```

[13]:
```
# Create dataframe from the lists
LA_lat_long['LA_Neighborhood'] = LA_address_list
LA_lat_long['Latitude'] = LA_lat_list
LA_lat_long['Longitude'] = LA_long_list
LA_lat_long
```

[13]:
```
                    LA_Neighborhood   Latitude   Longitude
0           Jefferson Park, CA, USA  34.027234 -118.317576
1                El Sereno, CA, USA  34.081121 -118.177849
2            Vermont Vista, CA, USA  33.941947 -118.285814
3           Vermont Knolls, CA, USA  33.966819 -118.291670
4                Hyde Park, CA, USA  33.980569 -118.330631
..                              …          …           …
93           Beverly Grove, CA, USA  34.076034 -118.369972
94  Historic South-Central, CA, USA  34.016230 -118.267308
95         University Park, CA, USA  34.027449 -118.283949
96                    Pico, CA, USA  34.040672 -118.266192
97            Santa Monica, CA, USA  34.025072 -118.496513

[98 rows x 3 columns]
```

[14]:
```
LA_lat_long.shape
```

[14]:
```
(98, 3)
```

Add the rent information to the dataframe

[15]:
```
#Full outer join of la_rent and LA_lat_long dataframes
la_data = pd.merge(left=la_rent, right=LA_lat_long, how='outer',␣
 ↪left_on='LA_Neighborhood', right_on='LA_Neighborhood')
la_data.head()
```

[15]:
```
           LA_Neighborhood  AverageMonthlyRent_USD   Latitude   Longitude
0  Jefferson Park, CA, USA                  1355.0  34.027234 -118.317576
1       El Sereno, CA, USA                  1396.0  34.081121 -118.177849
2   Vermont Vista, CA, USA                  1445.0  33.941947 -118.285814
3  Vermont Knolls, CA, USA                  1445.0  33.966819 -118.291670
4       Hyde Park, CA, USA                  1484.0  33.980569 -118.330631
```

[16]:
```
#rename column
la_data.rename(columns = {'LA_Neighborhood':'Neighborhood'}, inplace = True)
la_data.head()
```

[16]:
```
              Neighborhood  AverageMonthlyRent_USD   Latitude   Longitude
0  Jefferson Park, CA, USA                  1355.0  34.027234 -118.317576
1       El Sereno, CA, USA                  1396.0  34.081121 -118.177849
2   Vermont Vista, CA, USA                  1445.0  33.941947 -118.285814
3  Vermont Knolls, CA, USA                  1445.0  33.966819 -118.291670
4       Hyde Park, CA, USA                  1484.0  33.980569 -118.330631
```

[17]:
```
la_data.dtypes
```

[17]:
```
Neighborhood               object
AverageMonthlyRent_USD    float64
Latitude                  float64
Longitude                 float64
dtype: object
```

### 1.3 2.2 VIEW NEIGHBORHOODS ON FOLIUM

[18]:
```
# View these neighborhoos on a map using Folium
# Use geopy library to get coordinated og Los Angeles city.

address = 'Los Angeles, CA'

geolocator = Nominatim(user_agent="la_explorer")
location = geolocator.geocode(address)
la_latitude = location.latitude
la_longitude = location.longitude
```

```
print('The geographical coordinate of Los Angeles City are {}, {}.'.
 ↪format(latitude, longitude))
```

```
The geographical coordinate of Los Angeles City are 34.0250724, -118.4965129.
```

[19]:

```
#Create a map of Los Angeles with neighborhoods superimposed on top!
map_la = folium.Map(location=[la_latitude, la_longitude], zoom_start=10)

# add markers to map
for lat, lng, LA_Neighborhood in zip(la_data['Latitude'], la_data['Longitude'],␣
 ↪la_data['Neighborhood']):
        label = '{}'.format(LA_Neighborhood)
        label = folium.Popup(label, parse_html=True)
        folium.features.CircleMarker(
        [lat, lng],
        radius=3,
        color='blue',
        popup=label,
        fill = True,
        fill_color='blue',
        fill_opacity=0.6).add_to(map_la)

map_la
```

[19]:

```
<folium.folium.Map at 0x7f4cdff92240>
```

# 2 3) BATTLE OF LA NEIGHBORHOODS - METHODOLOGY: EXPLORE VENUES

## 2.1 3.1) EXPLORE VENUES of high traffic in the listed LA neighborhoods.

[20]:

```
# Pull up neighborhoods dataframe
la_data.head()
```

[20]:

```
              Neighborhood  AverageMonthlyRent_USD   Latitude   Longitude
0  Jefferson Park, CA, USA                  1355.0  34.027234 -118.317576
1       El Sereno, CA, USA                  1396.0  34.081121 -118.177849
2   Vermont Vista, CA, USA                  1445.0  33.941947 -118.285814
3  Vermont Knolls, CA, USA                  1445.0  33.966819 -118.291670
4       Hyde Park, CA, USA                  1484.0  33.980569 -118.330631
```

[21]:

```
# Use geopy library to get coordinates of listed LA neighborhoods

#search_query = [Location1, Location2, Location3, Location4, Location5]

# Choose you radius (meters) and the number of hits returned(Limit)
```

```
radius = 500
LIMIT=5

def getNearbyVenues(names, latitudes, longitudes, radius=500, LIMIT=5):

    venues_list=[]
    for name, lat, lng in zip(names, latitudes, longitudes):
        print(name)

        # create the API request URL
        url = 'https://api.foursquare.com/v2/venues/explore?
 ↪&client_id={}&client_secret={}&v={}&ll={},{}&radius={}&limit={}'.format(
            CLIENT_ID,
            CLIENT_SECRET,
            VERSION,
            lat,
            lng,
            radius,
            LIMIT)

        # make the GET request
        results = requests.get(url).json()["response"]['groups'][0]['items']

        # return only relevant information for each nearby venue
        venues_list.append([(
            name,
            lat,
            lng,
            v['venue']['name'],
            v['venue']['location']['lat'],
            v['venue']['location']['lng'],
            v['venue']['categories'][0]['name']) for v in results])

    nearby_venues = pd.DataFrame([item for venue_list in venues_list for item␣
 ↪in venue_list])
    nearby_venues.columns = ['Neighborhood',
                  'Neighborhood Latitude',
                  'Neighborhood Longitude',
                  'Venue',
                  'Venue Latitude',
                  'Venue Longitude',
                  'Venue Category']

    return(nearby_venues)
```

[22]:

```
#write the code to run the above function on each neighborhood and create a new␣
 ↪dataframe called la_venues.
```

```python
#If there is an error, rerun the cell.

la_venues = getNearbyVenues(names=la_data['Neighborhood'],
                                   latitudes=la_data['Latitude'],
                                   longitudes=la_data['Longitude']
                                   )
```

```
Jefferson Park, CA, USA
El Sereno, CA, USA
Vermont Vista, CA, USA
Vermont Knolls, CA, USA
Hyde Park, CA, USA
Glassell Park, CA, USA
Cypress Park, CA, USA
Winnetka, CA, USA
Sunland, CA, USA
Leimert Park, CA, USA
Panorama City, CA, USA
Sun Valley, CA, USA
Arlington Heights, CA, USA
Shadow Hills, CA, USA
Harvard Heights, CA, USA
North Hills, CA, USA
Pacoima, CA, USA
Arleta, CA, USA
Vermont - Slauson, CA, USA
Reseda, CA, USA
Tarzana, CA, USA
Manchester Square, CA, USA
Harvard Park, CA, USA
Gramercy Park, CA, USA
Chesterfield Square, CA, USA
Van Nuys, CA, USA
Baldwin Hills - Crenshaw, CA, USA
Lake View Terrace, CA, USA
West Hills, CA, USA
Valley Glen, CA, USA
Lake Balboa, CA, USA
Sylmar, CA, USA
West Adams, CA, USA
Boyle Heights, CA, USA
Vermont Square, CA, USA
Northridge, CA, USA
Highland Park, CA, USA
Chatsworth, CA, USA
Canoga Park, CA, USA
Granada Hills, CA, USA
```

```
Eagle Rock, CA, USA
Koreatown, CA, USA
Encino, CA, USA
Windsor Square, CA, USA
Lincoln Heights, CA, USA
North Hollywood, CA, USA
Porter Ranch, CA, USA
Los Feliz, CA, USA
Sherman Oaks, CA, USA
East Hollywood, CA, USA
Elysian Valley, CA, USA
Westlake, CA, USA
Atwater Village, CA, USA
Larchmont, CA, USA
Griffith Park, CA, USA
Mid-City, CA, USA
Silver Lake, CA, USA
Pico - Robertson, CA, USA
Woodland Hills, CA, USA
Echo Park, CA, USA
Studio City, CA, USA
Hollywood Hills, CA, USA
Valley Village, CA, USA
Beverlywood, CA, USA
Palms, CA, USA
Hollywood, CA, USA
Elysian Park, CA, USA
Hancock Park, CA, USA
Hollywood Hills West, CA, USA
Fox Hills, CA, USA
Rancho Park, CA, USA
Cheviot Hills, CA, USA
Downtown Los Angeles, CA, USA
Mid-Wilshire, CA, USA
Playa del Rey, CA, USA
Westchester, CA, USA
Mar Vista, CA, USA
Jefferson, CA, USA
Blair Hills, CA, USA
West Los Angeles, CA, USA
Sawtelle, CA, USA
Pico - Union, CA, USA
Bel Air, CA, USA
Washington Culver, CA, USA
Culver City, CA, USA
Playa Vista, CA, USA
Westwood, CA, USA
Venice, CA, USA
```

```
Exposition Park, CA, USA
Ocean Park, CA, USA
Adams - Normandie, CA, USA
Century City, CA, USA
Pacific Palisades, CA, USA
Beverly Grove, CA, USA
Historic South-Central, CA, USA
University Park, CA, USA
Pico, CA, USA
Santa Monica, CA, USA
```

[23]:

```
print(la_venues.shape)
la_venues.head()
```

```
(443, 7)
```

[23]:

```
                Neighborhood  Neighborhood Latitude  Neighborhood Longitude  \
0  Jefferson Park, CA, USA              34.027234             -118.317576
1  Jefferson Park, CA, USA              34.027234             -118.317576
2  Jefferson Park, CA, USA              34.027234             -118.317576
3  Jefferson Park, CA, USA              34.027234             -118.317576
4  Jefferson Park, CA, USA              34.027234             -118.317576

                                              Venue  Venue Latitude  \
0                                            Subway       34.025798
1                                     Burger Palace       34.025680
2  Louisiana Fried Chicken, Chinese Food & Donuts       34.025931
3                                    Jefferson Park       34.024528
4                                 El Valle Oaxaqueno       34.025366

   Venue Longitude       Venue Category
0      -118.321471       Sandwich Place
1      -118.317412         Burger Joint
2      -118.317901  Fried Chicken Joint
3      -118.319029         Neighborhood
4      -118.320779   Mexican Restaurant
```

[24]:

```
#Check how many venues were returned for each neighborhood
la_venues.groupby('Neighborhood').count()
```

[24]:

```
                                    Neighborhood Latitude  \
Neighborhood
Adams - Normandie, CA, USA                              5
Arleta, CA, USA                                         3
Arlington Heights, CA, USA                              5
Atwater Village, CA, USA                                5
Baldwin Hills - Crenshaw, CA, USA                       3
…                                                    …
```

```
Westlake, CA, USA                                      5
Westwood, CA, USA                                      5
Windsor Square, CA, USA                                5
Winnetka, CA, USA                                      5
Woodland Hills, CA, USA                                5

                                   Neighborhood Longitude  Venue  \
Neighborhood
Adams - Normandie, CA, USA                              5      5
Arleta, CA, USA                                         3      3
Arlington Heights, CA, USA                              5      5
Atwater Village, CA, USA                                5      5
Baldwin Hills - Crenshaw, CA, USA                       3      3
…                                                    …    …
Westlake, CA, USA                                       5      5
Westwood, CA, USA                                       5      5
Windsor Square, CA, USA                                 5      5
Winnetka, CA, USA                                       5      5
Woodland Hills, CA, USA                                 5      5

                                   Venue Latitude  Venue Longitude  \
Neighborhood
Adams - Normandie, CA, USA                      5                5
Arleta, CA, USA                                 3                3
Arlington Heights, CA, USA                      5                5
Atwater Village, CA, USA                        5                5
Baldwin Hills - Crenshaw, CA, USA               3                3
…                                           …              …
Westlake, CA, USA                               5                5
Westwood, CA, USA                               5                5
Windsor Square, CA, USA                         5                5
Winnetka, CA, USA                               5                5
Woodland Hills, CA, USA                         5                5

                                   Venue Category
Neighborhood
Adams - Normandie, CA, USA                      5
Arleta, CA, USA                                 3
Arlington Heights, CA, USA                      5
Atwater Village, CA, USA                        5
Baldwin Hills - Crenshaw, CA, USA               3
…                                           …
Westlake, CA, USA                               5
Westwood, CA, USA                               5
Windsor Square, CA, USA                         5
Winnetka, CA, USA                               5
Woodland Hills, CA, USA                         5
```

```
[97 rows x 6 columns]
```

[25]:

```
#Find out how many unique categories can be curated from all the returned venues
print('There are {} uniques categories.'.format(len(la_venues['Venue Category'].
 ↪unique())))
```

```
There are 144 uniques categories.
```

## 2.2 3.2) Analyze Each Neighborhood

[26]:

```
# one hot encoding
la_onehot = pd.get_dummies(la_venues[['Venue Category']], prefix="",␣
 ↪prefix_sep="")

# add neighborhood column back to dataframe
la_onehot['Neighborhood'] = la_venues['Neighborhood']

# move neighborhood column to the first column
fixed_columns = [la_onehot.columns[-1]] + list(la_onehot.columns[:-1])
la_onehot = la_onehot[fixed_columns]

la_onehot.head()
```

[26]:

```
   Yoga Studio  ATM  American Restaurant  Arcade  Art Gallery  \
0            0    0                    0       0            0
1            0    0                    0       0            0
2            0    0                    0       0            0
3            0    0                    0       0            0
4            0    0                    0       0            0

   Arts & Crafts Store  Asian Restaurant  Auto Garage  BBQ Joint  Bagel Shop  \
0                    0                 0            0          0           0
1                    0                 0            0          0           0
2                    0                 0            0          0           0
3                    0                 0            0          0           0
4                    0                 0            0          0           0

   …  Thai Restaurant  Theater  Thrift / Vintage Store  Tiki Bar  Trail  \
0  …                0        0                       0         0      0
1  …                0        0                       0         0      0
2  …                0        0                       0         0      0
3  …                0        0                       0         0      0
4  …                0        0                       0         0      0

   Vegetarian / Vegan Restaurant  Vietnamese Restaurant  Wine Bar  Wine Shop  \
0                              0                      0         0          0
```

```
1                              0                      0         0          0
2                              0                      0         0          0
3                              0                      0         0          0
4                              0                      0         0          0

   Wings Joint
0            0
1            0
2            0
3            0
4            0

[5 rows x 144 columns]
```

[27]:

```
la_onehot.shape
```

[27]:

```
(443, 144)
```

[28]:

```
#Group rows by neighborhood and by taking the mean of the frequency of␣
 ↪occurrence of each category
la_grouped = la_onehot.groupby('Neighborhood').mean().reset_index()
la_grouped
```

[28]:

```
                         Neighborhood  Yoga Studio  ATM  American Restaurant  \
0          Adams - Normandie, CA, USA          0.0  0.0                  0.0
1                     Arleta, CA, USA          0.0  0.0                  0.0
2          Arlington Heights, CA, USA          0.0  0.0                  0.0
3            Atwater Village, CA, USA          0.0  0.0                  0.0
4   Baldwin Hills - Crenshaw, CA, USA          0.0  0.0                  0.0
..                                …          …  …                  …
92                  Westlake, CA, USA          0.0  0.0                  0.0
93                  Westwood, CA, USA          0.0  0.0                  0.0
94            Windsor Square, CA, USA          0.0  0.0                  0.0
95                  Winnetka, CA, USA          0.0  0.0                  0.0
96            Woodland Hills, CA, USA          0.0  0.0                  0.0

    Arcade  Art Gallery  Arts & Crafts Store  Asian Restaurant  Auto Garage  \
0      0.0          0.0                  0.0               0.0          0.0
1      0.0          0.0                  0.0               0.0          0.0
2      0.0          0.2                  0.0               0.0          0.0
3      0.0          0.0                  0.0               0.0          0.0
4      0.0          0.0                  0.0               0.0          0.0
..     …          …                  …               …          …
92     0.0          0.0                  0.0               0.0          0.0
93     0.0          0.0                  0.0               0.0          0.0
94     0.0          0.0                  0.0               0.0          0.0
95     0.0          0.0                  0.0               0.0          0.0
```

```
96     0.0          0.0                  0.0               0.0          0.0

    BBQ Joint  …  Thai Restaurant  Theater  Thrift / Vintage Store  \
0          0.0  …              0.0      0.0                     0.0
1          0.0  …              0.0      0.0                     0.0
2          0.0  …              0.0      0.0                     0.0
3          0.0  …              0.0      0.0                     0.0
4          0.0  …              0.0      0.0                     0.0
..        …  …              …      …                     …
92         0.0  …              0.2      0.0                     0.0
93         0.0  …              0.0      0.0                     0.0
94         0.0  …              0.0      0.0                     0.0
95         0.0  …              0.0      0.0                     0.0
96         0.0  …              0.0      0.0                     0.0

    Tiki Bar     Trail  Vegetarian / Vegan Restaurant  Vietnamese Restaurant  \
0        0.0  0.000000                            0.0                    0.0
1        0.0  0.000000                            0.0                    0.0
2        0.0  0.000000                            0.0                    0.0
3        0.0  0.000000                            0.0                    0.0
4        0.0  0.333333                            0.0                    0.0
..       …       …                            …                    …
92       0.0  0.000000                            0.0                    0.0
93       0.0  0.200000                            0.0                    0.0
94       0.0  0.000000                            0.0                    0.0
95       0.0  0.000000                            0.0                    0.0
96       0.0  0.000000                            0.0                    0.0

    Wine Bar  Wine Shop  Wings Joint
0        0.0        0.0          0.0
1        0.0        0.0          0.0
2        0.0        0.0          0.0
3        0.0        0.0          0.0
4        0.0        0.0          0.0
..       …        …          …
92       0.0        0.0          0.0
93       0.0        0.0          0.0
94       0.0        0.0          0.0
95       0.0        0.0          0.0
96       0.0        0.0          0.0

[97 rows x 144 columns]
```

```
[29]: la_grouped.shape
```

```
[29]: (97, 144)
```

```
[30]: #Print each neighborhood along with the top 5 most common venues
num_top_venues = 5

for hood in la_grouped['Neighborhood']:
    print("----"+hood+"----")
    temp = la_grouped[la_grouped['Neighborhood'] == hood].T.reset_index()
    temp.columns = ['venue','freq']
    temp = temp.iloc[1:]
    temp['freq'] = temp['freq'].astype(float)
    temp = temp.round({'freq': 2})
    print(temp.sort_values('freq', ascending=False).reset_index(drop=True).
 ↪head(num_top_venues))
    print('\n')
```

```
----Adams - Normandie, CA, USA----
               venue  freq
0   Sushi Restaurant   0.6
1        Gas Station   0.2
2         Taco Place   0.2
3        Yoga Studio   0.0
4  Mobile Phone Shop   0.0


----Arleta, CA, USA----
           venue  freq
0  Movie Theater  0.67
1  Historic Site  0.33
2           Park  0.00
3      Multiplex  0.00
4         Museum  0.00


----Arlington Heights, CA, USA----
                       venue  freq
0          Convenience Store   0.2
1                 Restaurant   0.2
2                Art Gallery   0.2
3  Latin American Restaurant   0.2
4                       Café   0.2


----Atwater Village, CA, USA----
                venue  freq
0  Italian Restaurant   0.2
1         Pizza Place   0.2
2  Mexican Restaurant   0.2
3              Bakery   0.2
```

```
4      Farmers Market   0.2


----Baldwin Hills - Crenshaw, CA, USA----
         venue  freq
0         Park  0.33
1  Music Venue  0.33
2        Trail  0.33
3  Yoga Studio  0.00
4    Multiplex  0.00


----Bel Air, CA, USA----
         venue  freq
0   Restaurant   0.2
1    Hotel Bar   0.2
2        Hotel   0.2
3         Café   0.2
4  Golf Course   0.2


----Beverly Grove, CA, USA----
                           venue  freq
0                 Breakfast Spot   0.2
1  Vegetarian / Vegan Restaurant   0.2
2                           Café   0.2
3                    Coffee Shop   0.2
4                            Spa   0.2


----Beverlywood, CA, USA----
         venue  freq
0         Park   1.0
1  Yoga Studio   0.0
2    Multiplex   0.0
3       Museum   0.0
4  Music Venue   0.0


----Blair Hills, CA, USA----
                    venue  freq
0                    Park   0.6
1          Scenic Lookout   0.2
2  Furniture / Home Store   0.2
3             Pizza Place   0.0
4                Pharmacy   0.0
```

```
----Boyle Heights, CA, USA----
                 venue  freq
0  Japanese Restaurant   0.2
1               Bakery   0.2
2   Mexican Restaurant   0.2
3                 Café   0.2
4             Pharmacy   0.2


----Canoga Park, CA, USA----
                       venue  freq
0  South American Restaurant   0.2
1                   Pharmacy   0.2
2           Asian Restaurant   0.2
3                  Pet Store   0.2
4                       Café   0.2


----Century City, CA, USA----
                 venue  freq
0   Chinese Restaurant   0.2
1  Japanese Restaurant   0.2
2           Steakhouse   0.2
3          Art Gallery   0.2
4         Food Service   0.2


----Chatsworth, CA, USA----
                       venue  freq
0      Vietnamese Restaurant   0.2
1         Mexican Restaurant   0.2
2                  Rock Club   0.2
3  Cajun / Creole Restaurant   0.2
4                        Spa   0.2


----Chesterfield Square, CA, USA----
                      venue  freq
0        Mexican Restaurant   0.2
1  Mediterranean Restaurant   0.2
2      Marijuana Dispensary   0.2
3            Hardware Store   0.2
4              Burger Joint   0.2


----Cheviot Hills, CA, USA----
          venue  freq
0  Tennis Court   1.0
```

```
1   Yoga Studio   0.0
2         Motel   0.0
3     Multiplex   0.0
4        Museum   0.0


----Culver City, CA, USA----
         venue  freq
0  Yoga Studio   0.2
1  Coffee Shop   0.2
2         Café   0.2
3    City Hall   0.2
4      Theater   0.2


----Cypress Park, CA, USA----
                venue  freq
0  Mexican Restaurant   0.4
1              Bakery   0.2
2      Discount Store   0.2
3                Park   0.2
4         Yoga Studio   0.0


----Downtown Los Angeles, CA, USA----
                 venue  freq
0            Speakeasy   0.2
1           Restaurant   0.2
2  Arts & Crafts Store   0.2
3          Flower Shop   0.2
4                  Bar   0.2


----Eagle Rock, CA, USA----
                 venue  freq
0   Italian Restaurant   0.2
1               Bakery   0.2
2        Deli / Bodega   0.2
3     Ramen Restaurant   0.2
4  American Restaurant   0.2


----East Hollywood, CA, USA----
                       venue  freq
0          Convenience Store   0.2
1  Middle Eastern Restaurant   0.2
2                Pizza Place   0.2
3                 Donut Shop   0.2
```

```
4            Thai Restaurant   0.2


----Echo Park, CA, USA----
                           venue  freq
0            American Restaurant   0.2
1                      Bookstore   0.2
2                     Food Truck   0.2
3  Vegetarian / Vegan Restaurant   0.2
4                    Coffee Shop   0.2


----El Sereno, CA, USA----
                    venue  freq
0              Restaurant   0.2
1             Pizza Place   0.2
2      Mexican Restaurant   0.2
3  Thrift / Vintage Store   0.2
4            Liquor Store   0.2


----Elysian Park, CA, USA----
              venue  freq
0  Baseball Stadium   0.4
1            Museum   0.2
2    Baseball Field   0.2
3        Sports Bar   0.2
4       Yoga Studio   0.0


----Elysian Valley, CA, USA----
                 venue  freq
0  Rental Car Location   0.2
1       Rental Service   0.2
2        Burrito Place   0.2
3                Trail   0.2
4                 Park   0.2


----Encino, CA, USA----
                 venue  freq
0                 Park   0.2
1  American Restaurant   0.2
2        Hot Dog Joint   0.2
3           Donut Shop   0.2
4                  Gym   0.2
```

```
----Exposition Park, CA, USA----
                    venue  freq
0          Science Museum   0.4
1  College Football Field   0.2
2                    Park   0.2
3           Movie Theater   0.2
4        Pedestrian Plaza   0.0


----Fox Hills, CA, USA----
            venue  freq
0   Grocery Store   0.4
1      Steakhouse   0.2
2  Lingerie Store   0.2
3    Liquor Store   0.2
4     Yoga Studio   0.0


----Glassell Park, CA, USA----
            venue  freq
0  Shipping Store   0.2
1            Pool   0.2
2        Pharmacy   0.2
3            Café   0.2
4          Bakery   0.2


----Gramercy Park, CA, USA----
                        venue  freq
0  Construction & Landscaping   0.2
1                        Pool   0.2
2              Discount Store   0.2
3                    Pharmacy   0.2
4           Convenience Store   0.2


----Granada Hills, CA, USA----
                       venue  freq
0                 Food Truck   0.2
1                 Restaurant   0.2
2                Pizza Place   0.2
3  Middle Eastern Restaurant   0.2
4                       Café   0.2


----Griffith Park, CA, USA----
            venue  freq
0            Park  0.50
```

```
1        Tea Room  0.25
2  Scenic Lookout  0.25
3          Office  0.00
4       Multiplex  0.00


----Hancock Park, CA, USA----
               venue  freq
0       Concert Hall   1.0
1  Recreation Center   0.0
2          Multiplex   0.0
3             Museum   0.0
4        Music Venue   0.0


----Harvard Heights, CA, USA----
                  venue  freq
0     Korean Restaurant   0.4
1   Japanese Restaurant   0.2
2    Mexican Restaurant   0.2
3  Fast Food Restaurant   0.2
4                  Park   0.0


----Harvard Park, CA, USA----
               venue  freq
0               Park   0.5
1           Bus Stop   0.5
2  Recreation Center   0.0
3          Multiplex   0.0
4             Museum   0.0


----Highland Park, CA, USA----
                venue  freq
0       Bowling Alley   0.2
1        Concert Hall   0.2
2         Coffee Shop   0.2
3                Café   0.2
4  Mexican Restaurant   0.2


----Historic South-Central, CA, USA----
                  venue  freq
0  Fast Food Restaurant   0.2
1         Shopping Mall   0.2
2    Mexican Restaurant   0.2
3         Grocery Store   0.2
```

```
4           Donut Shop   0.2


----Hollywood Hills West, CA, USA----
                   venue  freq
0            Yoga Studio  0.25
1                   Café  0.25
2          Grocery Store  0.25
3     Italian Restaurant  0.25
4  Vietnamese Restaurant  0.00


----Hollywood Hills, CA, USA----
         venue  freq
0        Trail   1.0
1  Yoga Studio   0.0
2         Park   0.0
3    Multiplex   0.0
4       Museum   0.0


----Hollywood, CA, USA----
                venue  freq
0       Movie Theater   0.2
1      Farmers Market   0.2
2         Coffee Shop   0.2
3  Salon / Barbershop   0.2
4           Multiplex   0.2


----Hyde Park, CA, USA----
         venue  freq
0  Pizza Place   0.4
1   Taco Place   0.2
2   Donut Shop   0.2
3        Motel   0.2
4  Yoga Studio   0.0


----Jefferson Park, CA, USA----
                 venue  freq
0  Fried Chicken Joint   0.2
1       Sandwich Place   0.2
2   Mexican Restaurant   0.2
3         Burger Joint   0.2
4          Pizza Place   0.0
```

```
----Jefferson, CA, USA----
                  venue  freq
0  Fast Food Restaurant   0.2
1        Rental Service   0.2
2         Shopping Mall   0.2
3    Mexican Restaurant   0.2
4            Donut Shop   0.2


----Koreatown, CA, USA----
                venue  freq
0          Steakhouse   0.2
1   Korean Restaurant   0.2
2          Restaurant   0.2
3  Mexican Restaurant   0.2
4           BBQ Joint   0.2


----Lake Balboa, CA, USA----
                 venue  freq
0                 Park   0.2
1  American Restaurant   0.2
2           Playground   0.2
3          Golf Course   0.2
4       Baseball Field   0.2


----Lake View Terrace, CA, USA----
           venue  freq
0         Garden   0.5
1          Trail   0.5
2    Yoga Studio   0.0
3         Office   0.0
4  Movie Theater   0.0


----Larchmont, CA, USA----
                 venue  freq
0                 Park   0.2
1  American Restaurant   0.2
2  Indie Movie Theater   0.2
3    Korean Restaurant   0.2
4        Movie Theater   0.2


----Leimert Park, CA, USA----
                   venue  freq
0  Performing Arts Venue   0.2
```

```
1                   Park   0.2
2             Donut Shop   0.2
3            Auto Garage   0.2
4   Caribbean Restaurant   0.2


----Lincoln Heights, CA, USA----
            venue  freq
0  Scenic Lookout   0.2
1           Trail   0.2
2          Lawyer   0.2
3          Office   0.2
4    Liquor Store   0.2


----Los Feliz, CA, USA----
                venue  freq
0         Coffee Shop   0.4
1      Ice Cream Shop   0.2
2  Mexican Restaurant   0.2
3                Café   0.2
4         Yoga Studio   0.0


----Manchester Square, CA, USA----
                venue  freq
0            Wine Bar   0.2
1         Music Venue   0.2
2                Food   0.2
3           BBQ Joint   0.2
4  Seafood Restaurant   0.2


----Mar Vista, CA, USA----
                    venue  freq
0  Furniture / Home Store   0.2
1             Coffee Shop   0.2
2          Shipping Store   0.2
3              Taco Place   0.2
4         Thai Restaurant   0.2


----Mid-City, CA, USA----
                  venue  freq
0         Indie Theater   0.2
1          Liquor Store   0.2
2  Gym / Fitness Center   0.2
3               Theater   0.2
```

```
4            Food Truck   0.2


----Mid-Wilshire, CA, USA----
                 venue  freq
0  Japanese Restaurant   0.2
1       Sandwich Place   0.2
2   Mexican Restaurant   0.2
3           Taco Place   0.2
4           Food Truck   0.2


----North Hills, CA, USA----
              venue  freq
0  Sculpture Garden  0.25
1            Garden  0.25
2  Business Service  0.25
3              Farm  0.25
4              Park  0.00


----North Hollywood, CA, USA----
                       venue  freq
0             Hardware Store   0.2
1  Middle Eastern Restaurant   0.2
2         Mexican Restaurant   0.2
3                   Dive Bar   0.2
4               Burger Joint   0.2


----Northridge, CA, USA----
                 venue  freq
0  American Restaurant   0.4
1          Wings Joint   0.2
2          Coffee Shop   0.2
3        Hot Dog Joint   0.2
4     Pedestrian Plaza   0.0


----Ocean Park, CA, USA----
                 venue  freq
0       Farmers Market   0.2
1  Japanese Restaurant   0.2
2                 Café   0.2
3           Shoe Store   0.2
4     Tapas Restaurant   0.2
```

```
----Pacific Palisades, CA, USA----
                venue  freq
0              Bakery   0.2
1  Italian Restaurant   0.2
2                Café   0.2
3         Coffee Shop   0.2
4      Farmers Market   0.2


----Pacoima, CA, USA----
                       venue  freq
0       Fast Food Restaurant   0.2
1               Burger Joint   0.2
2  Middle Eastern Restaurant   0.2
3         Mexican Restaurant   0.2
4                 Taco Place   0.2


----Palms, CA, USA----
                 venue  freq
0   Italian Restaurant   0.2
1  Japanese Restaurant   0.2
2                 Café   0.2
3     Asian Restaurant   0.2
4           Taco Place   0.2


----Panorama City, CA, USA----
              venue  freq
0    Breakfast Spot   0.2
1    Discount Store   0.2
2    Sandwich Place   0.2
3  Asian Restaurant   0.2
4              Bank   0.2


----Pico - Robertson, CA, USA----
               venue  freq
0      Jewelry Store   0.2
1  Kosher Restaurant   0.2
2         Food Truck   0.2
3  French Restaurant   0.2
4             Arcade   0.2


----Pico - Union, CA, USA----
                       venue  freq
0  South American Restaurant   0.2
```

```
1           Cuban Restaurant   0.2
2             Ice Cream Shop   0.2
3         Mexican Restaurant   0.2
4                 Taco Place   0.2


----Pico, CA, USA----
                venue  freq
0          Sports Bar   0.2
1                Café   0.2
2  Basketball Stadium   0.2
3    Basketball Court   0.2
4          Shoe Store   0.2


----Playa Vista, CA, USA----
               venue  freq
0  Recreation Center   0.2
1      Movie Theater   0.2
2      Shopping Mall   0.2
3      Grocery Store   0.2
4     Farmers Market   0.2


----Playa del Rey, CA, USA----
            venue  freq
0    Liquor Store   0.2
1            Park   0.2
2     Pizza Place   0.2
3  Sandwich Place   0.2
4      Donut Shop   0.2


----Porter Ranch, CA, USA----
              venue  freq
0  Business Service   0.5
1               Gym   0.5
2       Yoga Studio   0.0
3     Movie Theater   0.0
4            Museum   0.0


----Rancho Park, CA, USA----
                venue  freq
0    Pedestrian Plaza   0.2
1    Business Service   0.2
2           Nightclub   0.2
3  Light Rail Station   0.2
```

```
4              Lounge   0.2


----Reseda, CA, USA----
                   venue  freq
0  Vietnamese Restaurant   0.6
1    Arts & Crafts Store   0.2
2       Greek Restaurant   0.2
3            Yoga Studio   0.0
4                   Park   0.0


----Santa Monica, CA, USA----
                venue  freq
0  Seafood Restaurant   0.2
1                Café   0.2
2  Mexican Restaurant   0.2
3         Coffee Shop   0.2
4      Sandwich Place   0.2


----Sawtelle, CA, USA----
                  venue  freq
0           Yoga Studio   0.2
1         Grocery Store   0.2
2           Supermarket   0.2
3            Taco Place   0.2
4  Gym / Fitness Center   0.2


----Sherman Oaks, CA, USA----
                  venue  freq
0           Yoga Studio   0.2
1    Italian Restaurant   0.2
2  Fast Food Restaurant   0.2
3           Pizza Place   0.2
4   Japanese Restaurant   0.2


----Silver Lake, CA, USA----
                 venue  freq
0   Italian Restaurant   0.2
1  American Restaurant   0.2
2       Ice Cream Shop   0.2
3          Coffee Shop   0.2
4   Seafood Restaurant   0.2
```

```
----Studio City, CA, USA----
                 venue  freq
0        Deli / Bodega   0.2
1  Arts & Crafts Store   0.2
2       Ice Cream Shop   0.2
3          Coffee Shop   0.2
4       Farmers Market   0.2


----Sun Valley, CA, USA----
              venue  freq
0    Breakfast Spot   0.2
1              Bank   0.2
2    Ice Cream Shop   0.2
3  Sushi Restaurant   0.2
4        Taco Place   0.2


----Sunland, CA, USA----
         venue  freq
0        Trail   1.0
1  Yoga Studio   0.0
2         Park   0.0
3    Multiplex   0.0
4       Museum   0.0


----Sylmar, CA, USA----
                venue  freq
0         Pizza Place   0.4
1          Food Truck   0.2
2                Food   0.2
3  Mexican Restaurant   0.2
4              Office   0.0


----Tarzana, CA, USA----
                 venue  freq
0  Japanese Restaurant   0.2
1          Pizza Place   0.2
2            Locksmith   0.2
3       Breakfast Spot   0.2
4            Wine Shop   0.2


----University Park, CA, USA----
                      venue  freq
0    College Residence Hall   0.2
```

```
1               Coffee Shop   0.2
2            Shipping Store   0.2
3  Mediterranean Restaurant   0.2
4             Grocery Store   0.2


----Valley Glen, CA, USA----
                       venue  freq
0                     Bakery   0.2
1  Middle Eastern Restaurant   0.2
2  Cajun / Creole Restaurant   0.2
3                 Taco Place   0.2
4                   Tiki Bar   0.2


----Valley Village, CA, USA----
                 venue  freq
0   Chinese Restaurant   0.2
1  Fried Chicken Joint   0.2
2     Sushi Restaurant   0.2
3          Music Venue   0.2
4       Cosmetics Shop   0.2


----Van Nuys, CA, USA----
                       venue  freq
0          Mobile Phone Shop   0.2
1  Latin American Restaurant   0.2
2         Mexican Restaurant   0.2
3        Filipino Restaurant   0.2
4               Burger Joint   0.2


----Venice, CA, USA----
                           venue  freq
0                    Coffee Shop   0.4
1                 Cosmetics Shop   0.2
2                 Ice Cream Shop   0.2
3  Vegetarian / Vegan Restaurant   0.2
4                    Yoga Studio   0.0


----Vermont - Slauson, CA, USA----
                   venue  freq
0  Check Cashing Service   0.2
1      Mobile Phone Shop   0.2
2                   Food   0.2
3         Sandwich Place   0.2
```

```
4           Burger Joint   0.2


----Vermont Knolls, CA, USA----
            venue  freq
0             ATM  0.25
1  Sandwich Place  0.25
2   Grocery Store  0.25
3    Burger Joint  0.25
4     Yoga Studio  0.00


----Vermont Square, CA, USA----
                venue  freq
0        Liquor Store   0.2
1                Park   0.2
2  Mexican Restaurant   0.2
3      Shop & Service   0.2
4        Burger Joint   0.2


----Vermont Vista, CA, USA----
           venue  freq
0   Burger Joint   0.5
1         Market   0.5
2  Movie Theater   0.0
3      Multiplex   0.0
4         Museum   0.0


----Washington Culver, CA, USA----
                  venue  freq
0     Convenience Store   0.2
1           Art Gallery   0.2
2  Gym / Fitness Center   0.2
3             BBQ Joint   0.2
4          Climbing Gym   0.2


----West Adams, CA, USA----
                   venue  freq
0  Check Cashing Service   0.2
1               Wine Bar   0.2
2          Deli / Bodega   0.2
3         Sandwich Place   0.2
4    Fried Chicken Joint   0.2
```

```
----West Hills, CA, USA----
               venue  freq
0               Park   0.5
1   Business Service   0.5
2  Recreation Center   0.0
3          Multiplex   0.0
4             Museum   0.0


----West Los Angeles, CA, USA----
                     venue  freq
0         Ramen Restaurant   0.2
1                      Gym   0.2
2  North Indian Restaurant   0.2
3      Japanese Restaurant   0.2
4      Indie Movie Theater   0.2


----Westchester, CA, USA----
                    venue  freq
0     Japanese Restaurant   0.2
1           Grocery Store   0.2
2          Clothing Store   0.2
3              Bagel Shop   0.2
4  Furniture / Home Store   0.2


----Westlake, CA, USA----
             venue  freq
0   Clothing Store   0.4
1      Music Venue   0.2
2      Coffee Shop   0.2
3  Thai Restaurant   0.2
4      Yoga Studio   0.0


----Westwood, CA, USA----
                  venue  freq
0    Italian Restaurant   0.2
1  Fast Food Restaurant   0.2
2          Dance Studio   0.2
3           Coffee Shop   0.2
4                 Trail   0.2


----Windsor Square, CA, USA----
            venue  freq
0       Bookstore   0.2
```

```
1  Ice Cream Shop   0.2
2     Pizza Place   0.2
3     Coffee Shop   0.2
4      Bagel Shop   0.2


----Winnetka, CA, USA----
                       venue  freq
0          Convenience Store   0.2
1  Latin American Restaurant   0.2
2         Mexican Restaurant   0.2
3        Filipino Restaurant   0.2
4                        Bar   0.2


----Woodland Hills, CA, USA----
                     venue  freq
0                 Tea Room   0.2
1              Gas Station   0.2
2               Steakhouse   0.2
3              Coffee Shop   0.2
4  Health & Beauty Service   0.2
```

[ ]:

```python
# Put that into a pandas dataframe
#Write a function to sort the venues in descending order.

def return_most_common_venues(row, num_top_venues):
    row_categories = row.iloc[1:]
    row_categories_sorted = row_categories.sort_values(ascending=False)

    return row_categories_sorted.index.values[0:num_top_venues]
```

[32]:

```python
#Create the new dataframe and display the top 10 venues for each neighborhood.
num_top_venues = 10

indicators = ['st', 'nd', 'rd']

# create columns according to number of top venues
columns = ['Neighborhood']
for ind in np.arange(num_top_venues):
    try:
        columns.append('{}{} Most Common Venue'.format(ind+1, indicators[ind]))
    except:
        columns.append('{}th Most Common Venue'.format(ind+1))
```

```
# create a new dataframe
neighborhoods_venues_sorted = pd.DataFrame(columns=columns)
neighborhoods_venues_sorted['Neighborhood'] = la_grouped['Neighborhood']

for ind in np.arange(la_grouped.shape[0]):
    neighborhoods_venues_sorted.iloc[ind, 1:] =␣
 ↪return_most_common_venues(la_grouped.iloc[ind, :], num_top_venues)

neighborhoods_venues_sorted.head(10)
```

[32]:

```
                        Neighborhood 1st Most Common Venue  \
0         Adams - Normandie, CA, USA      Sushi Restaurant
1                    Arleta, CA, USA         Movie Theater
2         Arlington Heights, CA, USA     Convenience Store
3           Atwater Village, CA, USA    Mexican Restaurant
4  Baldwin Hills - Crenshaw, CA, USA                 Trail
5                   Bel Air, CA, USA           Golf Course
6             Beverly Grove, CA, USA                   Spa
7               Beverlywood, CA, USA                  Park
8               Blair Hills, CA, USA                  Park
9             Boyle Heights, CA, USA    Mexican Restaurant

    2nd Most Common Venue 3rd Most Common Venue  \
0              Taco Place           Gas Station
1           Historic Site           Wings Joint
2             Art Gallery            Restaurant
3                  Bakery           Pizza Place
4                    Park           Music Venue
5               Hotel Bar                 Hotel
6          Breakfast Spot           Coffee Shop
7             Wings Joint            Donut Shop
8  Furniture / Home Store        Scenic Lookout
9                  Bakery              Pharmacy

           4th Most Common Venue      5th Most Common Venue  \
0                    Wings Joint               Food Service
1                     Donut Shop                Flower Shop
2                           Café  Latin American Restaurant
3             Italian Restaurant             Farmers Market
4                    Wings Joint                 Donut Shop
5                     Restaurant                       Café
6  Vegetarian / Vegan Restaurant                       Café
7                           Food                Flower Shop
8                    Wings Joint                   Dive Bar
9            Japanese Restaurant                       Café

  6th Most Common Venue 7th Most Common Venue 8th Most Common Venue  \
0           Flower Shop   Filipino Restaurant  Fast Food Restaurant
1   Filipino Restaurant  Fast Food Restaurant        Farmers Market
2            Donut Shop           Flower Shop   Filipino Restaurant
3          Food Service                  Food           Flower Shop
4           Flower Shop   Filipino Restaurant  Fast Food Restaurant
5           Wings Joint   Filipino Restaurant  Fast Food Restaurant
6                  Farm           Flower Shop   Filipino Restaurant
7   Filipino Restaurant  Fast Food Restaurant        Farmers Market
8   Filipino Restaurant  Fast Food Restaurant        Farmers Market
9          Food Service                  Food           Flower Shop

  9th Most Common Venue 10th Most Common Venue
0        Farmers Market                   Farm
1                  Farm               Dive Bar
2  Fast Food Restaurant         Farmers Market
3   Filipino Restaurant   Fast Food Restaurant
4        Farmers Market                   Farm
5        Farmers Market                   Farm
6  Fast Food Restaurant         Farmers Market
7                  Farm               Dive Bar
8                  Farm             Donut Shop
9   Filipino Restaurant   Fast Food Restaurant
```

# 3 4) BATTLE OF LA NEIGHBORHOODS - METHODOLOGY: CLUSTER VENUES

## 3.1 4.1) Run k-means to cluster the neighborhood into 5 clusters.

[33]:

```
# import k-means from clustering stage
from sklearn.cluster import KMeans
```

[34]:

```
# set number of clusters
kclusters = 5

la_grouped_clustering = la_grouped.drop('Neighborhood', 1)

# run k-means clustering
kmeans = KMeans(n_clusters=kclusters, random_state=0).fit(la_grouped_clustering)

# check cluster labels generated for each row in the dataframe
kmeans.labels_[0:10]
```

[34]:

```
array([0, 0, 0, 2, 0, 0, 0, 1, 1, 2], dtype=int32)
```

## 3.2 4.2) Let's create a new dataframe that includes the cluster as well as the top 10 venues for each neighborhood.

[35]:

```
# add clustering labels
neighborhoods_venues_sorted.insert(0, 'Cluster Labels', kmeans.labels_)

la_merged = la_data

# merge la_grouped with la_data to add latitude/longitude for each neighborhood
la_merged = la_merged.join(neighborhoods_venues_sorted.
 ↪set_index('Neighborhood'), on='Neighborhood')

la_merged.head()
# check the last columns!
```

[35]:

```
              Neighborhood  AverageMonthlyRent_USD   Latitude   Longitude  \
0  Jefferson Park, CA, USA                  1355.0  34.027234 -118.317576
1       El Sereno, CA, USA                  1396.0  34.081121 -118.177849
2   Vermont Vista, CA, USA                  1445.0  33.941947 -118.285814
3  Vermont Knolls, CA, USA                  1445.0  33.966819 -118.291670
4       Hyde Park, CA, USA                  1484.0  33.980569 -118.330631

   Cluster Labels 1st Most Common Venue 2nd Most Common Venue  \
0             2.0          Burger Joint    Mexican Restaurant
1             2.0           Pizza Place            Restaurant
2             0.0          Burger Joint                Market
3             0.0        Sandwich Place         Grocery Store
4             0.0           Pizza Place            Donut Shop

    3rd Most Common Venue 4th Most Common Venue 5th Most Common Venue  \
0     Fried Chicken Joint        Sandwich Place            Donut Shop
1  Thrift / Vintage Store          Liquor Store    Mexican Restaurant
2             Wings Joint            Food Truck                  Food
3            Burger Joint                   ATM        Cosmetics Shop
4                   Motel            Taco Place           Wings Joint

  6th Most Common Venue 7th Most Common Venue 8th Most Common Venue  \
0           Flower Shop   Filipino Restaurant  Fast Food Restaurant
1            Donut Shop           Flower Shop   Filipino Restaurant
2           Flower Shop   Filipino Restaurant  Fast Food Restaurant
3      Cuban Restaurant          Dance Studio         Deli / Bodega
4           Flower Shop   Filipino Restaurant  Fast Food Restaurant

  9th Most Common Venue 10th Most Common Venue
0        Farmers Market                   Farm
1  Fast Food Restaurant         Farmers Market
2        Farmers Market                   Farm
```

```
3        Discount Store                Dive Bar
4        Farmers Market                    Farm
```

[36]:

```
# Remove null objects in dataframe
la_merged.isnull() #to check for null values
la_merged = la_merged.fillna(0)
la_merged['Cluster Labels'] =la_merged['Cluster Labels'].astype(int)
```

## 3.3 4,2) VIEW CLUSTERS ON FOLIUM MAP

[37]:

```
### Finally, let's visualize the resulting clusters
# create map
map_clusters = folium.Map(location=[latitude, longitude], zoom_start=10)

# set color scheme for the clusters
x = np.arange(kclusters)
ys = [i + x + (i*x)**2 for i in range(kclusters)]
colors_array = cm.rainbow(np.linspace(0, 1, len(ys)))
rainbow = [colors.rgb2hex(i) for i in colors_array]

# add markers to the map
markers_colors = []
for lat, lon, poi, cluster in zip(la_merged['Latitude'],␣
 ↪la_merged['Longitude'], la_merged['Neighborhood'], la_merged['Cluster␣
 ↪Labels']):
    label = folium.Popup(str(poi) + ' Cluster ' + str(cluster), parse_html=True)
    folium.CircleMarker(
        [lat, lon],
        radius=5,
        popup=label,
        color=rainbow[cluster-5],
        fill=True,
        fill_color=rainbow[cluster-5],
        fill_opacity=0.7).add_to(map_clusters)

map_clusters
```

[37]:

```
<folium.folium.Map at 0x7f4cd8fd8780>
```

[38]:

```
la_merged
```

[38]:

```
                     Neighborhood  AverageMonthlyRent_USD   Latitude  \
0         Jefferson Park, CA, USA                  1355.0  34.027234
1              El Sereno, CA, USA                  1396.0  34.081121
2          Vermont Vista, CA, USA                  1445.0  33.941947
3         Vermont Knolls, CA, USA                  1445.0  33.966819
```

```
4                Hyde Park, CA, USA                  1484.0  33.980569
..                              …                      …        …
93           Beverly Grove, CA, USA                  3804.0  34.076034
94  Historic South-Central, CA, USA                  3844.0  34.016230
95        University Park, CA, USA                   3890.0  34.027449
96                   Pico, CA, USA                   3939.0  34.040672
97           Santa Monica, CA, USA                   4234.0  34.025072

     Longitude  Cluster Labels   1st Most Common Venue 2nd Most Common Venue  \
0  -118.317576               2            Burger Joint    Mexican Restaurant
1  -118.177849               2             Pizza Place            Restaurant
2  -118.285814               0            Burger Joint                Market
3  -118.291670               0          Sandwich Place         Grocery Store
4  -118.330631               0             Pizza Place            Donut Shop
..         …             …                     …                   …
93 -118.369972               0                     Spa        Breakfast Spot
94 -118.267308               2           Grocery Store            Donut Shop
95 -118.283949               0  College Residence Hall        Shipping Store
96 -118.266192               0      Basketball Stadium            Sports Bar
97 -118.496513               2          Sandwich Place                  Café

       3rd Most Common Venue          4th Most Common Venue  \
0        Fried Chicken Joint                 Sandwich Place
1     Thrift / Vintage Store                   Liquor Store
2                Wings Joint                     Food Truck
3               Burger Joint                            ATM
4                      Motel                     Taco Place
..                       …                            …
93               Coffee Shop  Vegetarian / Vegan Restaurant
94        Mexican Restaurant                  Shopping Mall
95  Mediterranean Restaurant                  Grocery Store
96          Basketball Court                     Shoe Store
97        Seafood Restaurant             Mexican Restaurant

   5th Most Common Venue 6th Most Common Venue 7th Most Common Venue  \
0             Donut Shop           Flower Shop   Filipino Restaurant
1     Mexican Restaurant            Donut Shop           Flower Shop
2                   Food           Flower Shop   Filipino Restaurant
3         Cosmetics Shop      Cuban Restaurant          Dance Studio
4            Wings Joint           Flower Shop   Filipino Restaurant
..                   …                   …                   …
93                  Café                  Farm           Flower Shop
94  Fast Food Restaurant           Flower Shop   Filipino Restaurant
95           Coffee Shop        Cosmetics Shop      Cuban Restaurant
96                  Café           Wings Joint          Food Service
97           Coffee Shop      Cuban Restaurant          Dance Studio
```

```
  8th Most Common Venue 9th Most Common Venue 10th Most Common Venue
0  Fast Food Restaurant        Farmers Market                   Farm
1   Filipino Restaurant  Fast Food Restaurant         Farmers Market
2  Fast Food Restaurant        Farmers Market                   Farm
3         Deli / Bodega        Discount Store               Dive Bar
4  Fast Food Restaurant        Farmers Market                   Farm
..                  …                     …                      …
93  Filipino Restaurant  Fast Food Restaurant         Farmers Market
94       Farmers Market                  Farm            Wings Joint
95         Dance Studio         Deli / Bodega         Discount Store
96          Flower Shop   Filipino Restaurant   Fast Food Restaurant
97        Deli / Bodega        Discount Store               Dive Bar

[98 rows x 15 columns]
```

## 3.4 4.3) Examine Clusters

**Cluster 1**

[39]:
```
# Cluster 1
la_merged.loc[la_merged['Cluster Labels'] == 0, la_merged.columns[[0,1] +␣
↪list(range(5, la_merged.shape[1]))]]
```

[39]:
```
                 Neighborhood  AverageMonthlyRent_USD  \
2        Vermont Vista, CA, USA                  1445.0
3       Vermont Knolls, CA, USA                  1445.0
4            Hyde Park, CA, USA                  1484.0
5        Glassell Park, CA, USA                  1485.0
9         Leimert Park, CA, USA                  1575.0
..                          …                      …
91        Century City, CA, USA                  3683.0
92  Pacific Palisades, CA, USA                  3765.0
93       Beverly Grove, CA, USA                  3804.0
95     University Park, CA, USA                  3890.0
96                Pico, CA, USA                  3939.0

      1st Most Common Venue  2nd Most Common Venue     3rd Most Common Venue  \
2              Burger Joint                 Market               Wings Joint
3            Sandwich Place          Grocery Store              Burger Joint
4               Pizza Place             Donut Shop                     Motel
5                      Pool               Pharmacy            Shipping Store
9      Caribbean Restaurant  Performing Arts Venue                      Park
..                      …                      …                       …
91             Food Service    Japanese Restaurant               Art Gallery
92                   Bakery     Italian Restaurant               Coffee Shop
93                      Spa         Breakfast Spot               Coffee Shop
95  College Residence Hall         Shipping Store  Mediterranean Restaurant
96        Basketball Stadium             Sports Bar           Basketball Court
```

```
            4th Most Common Venue 5th Most Common Venue 6th Most Common Venue  \
2                      Food Truck                  Food           Flower Shop
3                             ATM        Cosmetics Shop      Cuban Restaurant
4                      Taco Place           Wings Joint           Flower Shop
5                            Café                Bakery            Donut Shop
9                     Auto Garage            Donut Shop           Wings Joint
..                            ...                   ...                   ...
91                     Steakhouse    Chinese Restaurant                  Farm
92                           Café        Farmers Market           Wings Joint
93  Vegetarian / Vegan Restaurant                  Café                  Farm
95                  Grocery Store           Coffee Shop        Cosmetics Shop
96                     Shoe Store                  Café           Wings Joint

   7th Most Common Venue 8th Most Common Venue 9th Most Common Venue  \
2    Filipino Restaurant  Fast Food Restaurant        Farmers Market
3           Dance Studio         Deli / Bodega        Discount Store
4    Filipino Restaurant  Fast Food Restaurant        Farmers Market
5    Filipino Restaurant  Fast Food Restaurant        Farmers Market
9            Flower Shop   Filipino Restaurant  Fast Food Restaurant
..                   ...                   ...                   ...
91                  Food           Flower Shop   Filipino Restaurant
92                  Food           Flower Shop   Filipino Restaurant
93           Flower Shop   Filipino Restaurant  Fast Food Restaurant
95      Cuban Restaurant          Dance Studio         Deli / Bodega
96          Food Service           Flower Shop   Filipino Restaurant

   10th Most Common Venue
2                    Farm
3                Dive Bar
4                    Farm
5                    Farm
9          Farmers Market
..                    ...
91   Fast Food Restaurant
92   Fast Food Restaurant
93         Farmers Market
95         Discount Store
96   Fast Food Restaurant

[67 rows x 12 columns]
```

**Cluster 2**

[40]:
```
#Cluster2
la_merged.loc[la_merged['Cluster Labels'] == 1, la_merged.columns[[0,1] + list(range(5, la_merged.shape[1]))]]
```

[40]:

```
              Neighborhood  AverageMonthlyRent_USD 1st Most Common Venue  \
22   Harvard Park, CA, USA                  1738.0              Bus Stop
28     West Hills, CA, USA                  1806.0      Business Service
54  Griffith Park, CA, USA                  2180.0                  Park
63    Beverlywood, CA, USA                  2400.0                  Park
78    Blair Hills, CA, USA                  2830.0                  Park

     2nd Most Common Venue 3rd Most Common Venue 4th Most Common Venue  \
22                    Park           Wings Joint                  Farm
28                    Park           Wings Joint                  Farm
54          Scenic Lookout              Tea Room              Dive Bar
63             Wings Joint            Donut Shop                  Food
78  Furniture / Home Store        Scenic Lookout           Wings Joint

   5th Most Common Venue 6th Most Common Venue 7th Most Common Venue  \
22                  Food           Flower Shop   Filipino Restaurant
28                  Food           Flower Shop   Filipino Restaurant
54           Flower Shop   Filipino Restaurant  Fast Food Restaurant
63           Flower Shop   Filipino Restaurant  Fast Food Restaurant
78              Dive Bar   Filipino Restaurant  Fast Food Restaurant

   8th Most Common Venue 9th Most Common Venue 10th Most Common Venue
22  Fast Food Restaurant        Farmers Market             Donut Shop
28  Fast Food Restaurant        Farmers Market             Donut Shop
54        Farmers Market                  Farm             Donut Shop
63        Farmers Market                  Farm               Dive Bar
78        Farmers Market                  Farm             Donut Shop
```

### Cluster 3

[41]:

```
#Cluster 3
la_merged.loc[la_merged['Cluster Labels'] == 2, la_merged.columns[[0,1] +␣
↪list(range(5, la_merged.shape[1]))]]
```

[41]:

```
                       Neighborhood  AverageMonthlyRent_USD  \
0           Jefferson Park, CA, USA                  1355.0
1                El Sereno, CA, USA                  1396.0
6             Cypress Park, CA, USA                  1485.0
7                 Winnetka, CA, USA                  1526.0
14         Harvard Heights, CA, USA                  1607.0
16                 Pacoima, CA, USA                  1629.0
24     Chesterfield Square, CA, USA                  1738.0
25                Van Nuys, CA, USA                  1757.0
31                  Sylmar, CA, USA                  1825.0
33           Boyle Heights, CA, USA                  1847.0
34          Vermont Square, CA, USA                  1877.0
36           Highland Park, CA, USA                  1906.0
```

```
37              Chatsworth, CA, USA                  1907.0
41               Koreatown, CA, USA                  1970.0
45         North Hollywood, CA, USA                  2024.0
47               Los Feliz, CA, USA                  2060.0
52         Atwater Village, CA, USA                  2138.0
73            Mid-Wilshire, CA, USA                  2681.0
77               Jefferson, CA, USA                  2830.0
81            Pico - Union, CA, USA                  2904.0
94  Historic South-Central, CA, USA                  3844.0
97            Santa Monica, CA, USA                  4234.0

        1st Most Common Venue      2nd Most Common Venue  \
0                Burger Joint         Mexican Restaurant
1                 Pizza Place                 Restaurant
6          Mexican Restaurant             Discount Store
7          Mexican Restaurant  Latin American Restaurant
14          Korean Restaurant         Mexican Restaurant
16  Middle Eastern Restaurant               Burger Joint
24         Mexican Restaurant             Hardware Store
25         Mexican Restaurant  Latin American Restaurant
31                Pizza Place                 Food Truck
33         Mexican Restaurant                     Bakery
34         Mexican Restaurant               Burger Joint
36               Concert Hall         Mexican Restaurant
37                        Spa  Cajun / Creole Restaurant
41         Mexican Restaurant                 Steakhouse
45  Middle Eastern Restaurant         Mexican Restaurant
47                Coffee Shop             Ice Cream Shop
52         Mexican Restaurant                     Bakery
73                 Food Truck        Japanese Restaurant
77         Mexican Restaurant                 Donut Shop
81         Mexican Restaurant             Ice Cream Shop
94              Grocery Store                 Donut Shop
97             Sandwich Place                       Café

       3rd Most Common Venue 4th Most Common Venue      5th Most Common Venue  \
0        Fried Chicken Joint        Sandwich Place                 Donut Shop
1     Thrift / Vintage Store          Liquor Store         Mexican Restaurant
6                       Park                Bakery                       Farm
7        Filipino Restaurant                   Bar          Convenience Store
14       Japanese Restaurant  Fast Food Restaurant                       Farm
16                Taco Place  Fast Food Restaurant         Mexican Restaurant
24  Mediterranean Restaurant  Marijuana Dispensary               Burger Joint
25              Burger Joint   Filipino Restaurant          Mobile Phone Shop
31                      Food    Mexican Restaurant             Cosmetics Shop
33                  Pharmacy   Japanese Restaurant                       Café
34            Shop & Service                  Park               Liquor Store
```

```
36               Coffee Shop                  Café              Bowling Alley
37     Vietnamese Restaurant             Rock Club         Mexican Restaurant
41         Korean Restaurant            Restaurant                  BBQ Joint
45              Burger Joint        Hardware Store                   Dive Bar
47        Mexican Restaurant                  Café                       Farm
52               Pizza Place    Italian Restaurant             Farmers Market
73                Taco Place        Sandwich Place         Mexican Restaurant
77             Shopping Mall        Rental Service       Fast Food Restaurant
81          Cuban Restaurant            Taco Place  South American Restaurant
94        Mexican Restaurant         Shopping Mall       Fast Food Restaurant
97        Seafood Restaurant    Mexican Restaurant                Coffee Shop

      6th Most Common Venue 7th Most Common Venue 8th Most Common Venue  \
0               Flower Shop   Filipino Restaurant  Fast Food Restaurant
1                Donut Shop           Flower Shop   Filipino Restaurant
6                      Food           Flower Shop   Filipino Restaurant
7   Health & Beauty Service          Food Service        Cosmetics Shop
14             Food Service                  Food           Flower Shop
16           Farmers Market          Food Service                  Food
24            Deli / Bodega          Dance Studio        Discount Store
25            Deli / Bodega        Discount Store              Dive Bar
31         Cuban Restaurant          Dance Studio         Deli / Bodega
33             Food Service                  Food           Flower Shop
34                     Farm           Flower Shop   Filipino Restaurant
36     Fast Food Restaurant          Food Service                  Food
37              Flower Shop   Filipino Restaurant  Fast Food Restaurant
41               Donut Shop                  Food           Flower Shop
45           Farmers Market                  Food           Flower Shop
47                     Food           Flower Shop   Filipino Restaurant
52             Food Service                  Food           Flower Shop
73         Cuban Restaurant          Dance Studio         Deli / Bodega
77              Flower Shop   Filipino Restaurant        Farmers Market
81                     Farm                  Food           Flower Shop
94              Flower Shop   Filipino Restaurant        Farmers Market
97         Cuban Restaurant          Dance Studio         Deli / Bodega

   9th Most Common Venue 10th Most Common Venue
0         Farmers Market                   Farm
1   Fast Food Restaurant         Farmers Market
6   Fast Food Restaurant         Farmers Market
7       Cuban Restaurant           Dance Studio
14   Filipino Restaurant         Farmers Market
16           Flower Shop    Filipino Restaurant
24              Dive Bar             Donut Shop
25          Dance Studio             Food Truck
31        Discount Store           Food Service
33   Filipino Restaurant   Fast Food Restaurant
```

```
34  Fast Food Restaurant         Farmers Market
36           Flower Shop    Filipino Restaurant
37        Farmers Market                   Farm
41   Filipino Restaurant   Fast Food Restaurant
45   Filipino Restaurant   Fast Food Restaurant
47  Fast Food Restaurant         Farmers Market
52   Filipino Restaurant   Fast Food Restaurant
73        Discount Store         Cosmetics Shop
77                  Farm               Dive Bar
81   Filipino Restaurant   Fast Food Restaurant
94                  Farm            Wings Joint
97        Discount Store               Dive Bar
```

### Cluster 4

```
[42]: #Cluster 4
      la_merged.loc[la_merged['Cluster Labels'] == 3, la_merged.columns[[1] +␣
       ↪list(range(5, la_merged.shape[1]))]]
```

```
[42]:     AverageMonthlyRent_USD 1st Most Common Venue 2nd Most Common Venue  \
      8                   1571.0                 Trail           Wings Joint
      27                  1793.0                Garden                 Trail
      61                  2380.0                 Trail           Wings Joint

         3rd Most Common Venue 4th Most Common Venue 5th Most Common Venue  \
      8             Donut Shop                  Food           Flower Shop
      27           Wings Joint            Donut Shop                  Food
      61            Donut Shop                  Food           Flower Shop

         6th Most Common Venue 7th Most Common Venue 8th Most Common Venue  \
      8    Filipino Restaurant  Fast Food Restaurant        Farmers Market
      27           Flower Shop   Filipino Restaurant  Fast Food Restaurant
      61   Filipino Restaurant  Fast Food Restaurant        Farmers Market

         9th Most Common Venue 10th Most Common Venue
      8                   Farm               Dive Bar
      27        Farmers Market                   Farm
      61                  Farm               Dive Bar
```

### Cluster 5

```
[43]: #Cluster 5
      la_merged.loc[la_merged['Cluster Labels'] == 4, la_merged.columns[[0,1] +␣
       ↪list(range(5, la_merged.shape[1]))]]
```

```
[43]:               Neighborhood  AverageMonthlyRent_USD 1st Most Common Venue  \
      71  Cheviot Hills, CA, USA                  2605.0          Tennis Court
```

```
   2nd Most Common Venue 3rd Most Common Venue 4th Most Common Venue  \
71           Wings Joint            Food Truck                  Food

   5th Most Common Venue 6th Most Common Venue 7th Most Common Venue  \
71           Flower Shop   Filipino Restaurant  Fast Food Restaurant

   8th Most Common Venue 9th Most Common Venue 10th Most Common Venue
71        Farmers Market                  Farm             Donut Shop
```

# 4 5) BATTLE OF LA NEIGHBORHOODS - METHODOLOGY: EVALUATE THESE NEIGHBORHOODS FURTHER, LOOKING FOR SPECIFIC VENUES OF INTEREST

## 4.1 5.1.1) Method1 - Make your three selections for 1st Most Common Venue

[44]:
```
Common1a = 'Theater'
Common1b = 'Theater'
Common1c = 'Theater'
df_first=la_merged[(la_merged['1st Most Common Venue'].str.contains(Common1a))␣
 ↪| (la_merged['1st Most Common Venue'].str.contains(Common1b)) |␣
 ↪(la_merged['1st Most Common Venue'].str.contains(Common1c))].reset_index␣
 ↪(drop=True)
df_first.head(7)
```

[44]:
```
         Neighborhood  AverageMonthlyRent_USD   Latitude   Longitude  \
0     Arleta, CA, USA                  1634.0  34.241327 -118.432205
1  Larchmont, CA, USA                  2140.0  34.079837 -118.317870
2   Mid-City, CA, USA                  2188.0  34.041527 -118.360370

   Cluster Labels 1st Most Common Venue 2nd Most Common Venue  \
0               0         Movie Theater         Historic Site
1               0   Indie Movie Theater     Korean Restaurant
2               0         Indie Theater  Gym / Fitness Center

  3rd Most Common Venue 4th Most Common Venue 5th Most Common Venue  \
0           Wings Joint            Donut Shop           Flower Shop
1         Movie Theater                  Park   American Restaurant
2          Liquor Store               Theater            Food Truck

  6th Most Common Venue 7th Most Common Venue 8th Most Common Venue  \
0   Filipino Restaurant  Fast Food Restaurant        Farmers Market
1      Cuban Restaurant          Dance Studio         Deli / Bodega
2          Dance Studio         Deli / Bodega      Cuban Restaurant

  9th Most Common Venue 10th Most Common Venue
0                  Farm               Dive Bar
```

```
1        Discount Store           Food Service
2        Cosmetics Shop         Discount Store
```

[45]:
```
df_first.shape
```

[45]:
```
(3, 15)
```

## 4.2 5.1.2) Method2 - Make your three selections for first, second and third most common venues.

[46]:
```
# 'AND' search of all the LA Neighborhoods using chosen venues.
Common1 = 'Theater'
Common2 = 'Theater'
Common3 = 'Theater'

df_and=la_merged[(la_merged['1st Most Common Venue'].str.contains(Common1)) &␣
 ↪(la_merged['2nd Most Common Venue'].str.contains(Common2)) & (la_merged['3rd␣
 ↪Most Common Venue'].str.contains(Common3))].reset_index (drop=True)
df_and.head()
```

[46]:
```
Empty DataFrame
Columns: [Neighborhood, AverageMonthlyRent_USD, 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]
Index: []
```

[47]:
```
df_and.shape
```

[47]:
```
(0, 15)
```

[48]:
```
# 'OR' search search of all the LA Neighborhoods using chosen venues.
df_or=la_merged[(la_merged['1st Most Common Venue'].str.contains(Common1)) |␣
 ↪(la_merged['2nd Most Common Venue'].str.contains(Common2)) | (la_merged['3rd␣
 ↪Most Common Venue'].str.contains(Common3))].reset_index (drop=True)

print ('Scan these neighborhood venues and select one to explore further')
df_or.head()
```

```
Scan these neighborhood venues and select one to explore further
```

[48]:
```
               Neighborhood  AverageMonthlyRent_USD   Latitude   Longitude  \
0         Arleta, CA, USA                  1634.0  34.241327 -118.432205
1      Larchmont, CA, USA                  2140.0  34.079837 -118.317870
2       Mid-City, CA, USA                  2188.0  34.041527 -118.360370
3      Hollywood, CA, USA                  2485.0  34.098003 -118.329523
4  Exposition Park, CA, USA               3522.0  34.013654 -118.287211
```

```
   Cluster Labels 1st Most Common Venue   2nd Most Common Venue  \
0               0         Movie Theater           Historic Site
1               0   Indie Movie Theater       Korean Restaurant
2               0         Indie Theater    Gym / Fitness Center
3               0           Coffee Shop           Movie Theater
4               0        Science Museum  College Football Field

  3rd Most Common Venue 4th Most Common Venue 5th Most Common Venue  \
0           Wings Joint            Donut Shop           Flower Shop
1         Movie Theater                  Park   American Restaurant
2          Liquor Store               Theater            Food Truck
3             Multiplex    Salon / Barbershop        Farmers Market
4         Movie Theater                  Park           Wings Joint

  6th Most Common Venue 7th Most Common Venue 8th Most Common Venue  \
0   Filipino Restaurant  Fast Food Restaurant        Farmers Market
1      Cuban Restaurant          Dance Studio         Deli / Bodega
2          Dance Studio         Deli / Bodega      Cuban Restaurant
3           Wings Joint            Donut Shop   Filipino Restaurant
4   Filipino Restaurant  Fast Food Restaurant        Farmers Market

  9th Most Common Venue 10th Most Common Venue
0                  Farm               Dive Bar
1        Discount Store           Food Service
2        Cosmetics Shop         Discount Store
3  Fast Food Restaurant                   Farm
4                  Farm             Donut Shop
```

[49]:

```
df_or.shape
```

[49]:

```
(5, 15)
```

USE NEIGHBORHOODS IN DATAFRAME df_or TO SEARCH FURTHER.

[50]:

```
# List neighborhoods resulting from the 'OR' search.
df_or.head(10)
```

[50]:

```
               Neighborhood  AverageMonthlyRent_USD   Latitude   Longitude  \
0           Arleta, CA, USA                  1634.0  34.241327 -118.432205
1        Larchmont, CA, USA                  2140.0  34.079837 -118.317870
2         Mid-City, CA, USA                  2188.0  34.041527 -118.360370
3        Hollywood, CA, USA                  2485.0  34.098003 -118.329523
4  Exposition Park, CA, USA                  3522.0  34.013654 -118.287211

   Cluster Labels 1st Most Common Venue   2nd Most Common Venue  \
0               0         Movie Theater           Historic Site
```

```
1               0   Indie Movie Theater       Korean Restaurant
2               0         Indie Theater    Gym / Fitness Center
3               0           Coffee Shop           Movie Theater
4               0        Science Museum  College Football Field

  3rd Most Common Venue 4th Most Common Venue 5th Most Common Venue  \
0           Wings Joint            Donut Shop           Flower Shop
1         Movie Theater                  Park   American Restaurant
2          Liquor Store               Theater            Food Truck
3             Multiplex    Salon / Barbershop        Farmers Market
4         Movie Theater                  Park           Wings Joint

  6th Most Common Venue 7th Most Common Venue 8th Most Common Venue  \
0   Filipino Restaurant  Fast Food Restaurant        Farmers Market
1      Cuban Restaurant          Dance Studio         Deli / Bodega
2          Dance Studio         Deli / Bodega      Cuban Restaurant
3           Wings Joint            Donut Shop   Filipino Restaurant
4   Filipino Restaurant  Fast Food Restaurant        Farmers Market

  9th Most Common Venue 10th Most Common Venue
0                  Farm               Dive Bar
1        Discount Store           Food Service
2        Cosmetics Shop         Discount Store
3  Fast Food Restaurant                   Farm
4                  Farm             Donut Shop
```

### 4.3 5.2) Select your neighborhood and choose five venues/locations, whose presence in your selected neighborhood, you would like to explore further.

[51]:

```
#Choose your target Neighborhood from df_or to analyze further.
y=4 #y is the row index in df_or. Changing this  changes your neighborhood selection.

#Choose your five locations to explore in your target neighborhood selected above
Location1 = 'Pharmacy'
Location2 = 'Market'
Location3 = 'Library'
Location4 = 'Theater'
Location5 = 'Restaurant'

LIMIT = 5
radius = 2000

range = len(df_first.index)
```

```
df_select = pd.DataFrame()
latitude = df_or.iloc[y,2]
longitude = df_or.iloc[y,3]
Neighborhood = df_or.iloc[y,0]
AverageMonthlyRent = df_or.iloc[y,1]
#print(range)
#print(latitude)
#print(longitude)
#print(Neighborhood)
#print(AverageMonthlyRent, '$')

search_query = [Location1, Location2, Location3, Location4, Location5]
for search_query in search_query:
    #print (search_query)
    #print (latitude)
    #print (longitude)
    #print (Neighborhood)
    #print(AverageMonthlyRent, '$')

    url = 'https://api.foursquare.com/v2/venues/search?
 ↪client_id={}&client_secret={}&ll={},{}&v={}&query={}&radius={}&limit={}'.
 ↪format(
        CLIENT_ID,
        CLIENT_SECRET,
        latitude,
        longitude,
        VERSION,
        search_query,
        radius,
        LIMIT)

    results = requests.get(url).json()
    results
    #print(results)
    venues = results['response']['venues']
    #dataframe = json_normalize(venues)
    dataframe1=pd.json_normalize(venues)
    #dataframe.head()
    ##df=dataframe[['name','location.address', 'location.lat', 'location.lng']].
 ↪copy()
    #dataframe.append(dataframe[['name','location.address', 'location.lat',␣
 ↪'location.lng']])
    df_select = df_select.append(dataframe1)
    search_query=search_query[+1:+1]
    #dataframe.head()
    #df_select.head()
    df_select.reset_index(drop=False)
df_select.reset_index(drop=False)

print ('Neighborhood chosen:', Neighborhood)
#print(Neighborhood_sel)
print('Average Monthly Rent:', AverageMonthlyRent, '$')
print ('Latitude:',latitude)
print ('Longitude:', longitude)
```

```
Neighborhood chosen: Exposition Park, CA, USA
Average Monthly Rent: 3522.0 $
Latitude: 34.01365405
Longitude: -118.28721058194556
```

```
[52]: df_select.shape
```

```
[52]: (25, 18)
```

### 4.3.1 5.2.1) Filter dataframe to see if your chosen locations/category are present in the selected neighborhood

[53]:

```
# keep only columns that include venue name, and anything that is associated␣
↪with location
filtered_columns = ['name', 'categories'] + [col for col in df_select.columns␣
↪if col.startswith('location.')] + ['id']
df_sel_filtered = df_select.loc[:, filtered_columns]

# function that extracts the category of the venue
def get_category_type(row):
    try:
        categories_list = row['categories']
    except:
        categories_list = row['venue.categories']

    if len(categories_list) == 0:
        return None
    else:
        return categories_list[0]['name']

# filter the category for each row
df_sel_filtered['categories'] = df_sel_filtered.apply(get_category_type, axis=1)

# clean column names by keeping only last term
df_sel_filtered.columns = [column.split('.')[-1] for column in df_sel_filtered.
↪columns]

df_sel_filtered
df_sel_filtered.reset_index(drop=True)
```

[53]:

```
                                          name            categories  \
0        University Park Campus Pharmacy (STU)              Pharmacy
1                                 CVS pharmacy              Pharmacy
2                                 CVS pharmacy              Pharmacy
3                                 USC Pharmacy        Student Center
4                   USC Health Center Pharmacy              Pharmacy
5                               AJ Mini Market     Convenience Store
6                                  Luis Market               Butcher
7                         All Seas Fish Market  Fast Food Restaurant
8                           USC Farmers Market        Farmers Market
9                            C&C Liquor Market     Convenience Store
10               Doheny Memorial Library (DML)       College Library
11           Hoose Library of Philosophy (MHP)       College Library
12              Crocker Business Library (HOH)       College Library
13                           Law Library (LAW)       College Library
14  Seaver Science & Engineering Library (SSL)       College Library
15                                IMAX Theater         Movie Theater
16                 Norris Cinema Theater (NCT)     College Classroom
17                                     Theater             Multiplex
```

```
18         The Rosen Family Screening Theater      College Theater
19               theater near Huntington Park            Multiplex
20                  Parkside Restaurant (IRC)    College Cafeteria
21         Moreton Fig Restaurant and Lounge    College Cafeteria
22                          Gozalo Restaurant   Mexican Restaurant
23                       La Fogata Restaurant   Mexican Restaurant
24                    Restaurant La Bendicion                 Food

                         address                     crossStreet  \
0             3601 Trousdale Pkwy  University of Southern California
1               3335 S Figueroa St                        by 32nd St
2               4030 S Western Ave    at W Martin Luther King Jr Blvd
3                              NaN                               NaN
4                              NaN                               NaN
5                              NaN                               NaN
6               4253 S Vermont Ave                               NaN
7               4320 S Vermont Ave                               NaN
8                   University Ave     btw W Jefferson Blvd & 32nd St
9                   4606 S Broadway                 46th & Broadway
10            3550 Trousdale Pkwy  University of Southern California
11            3709 Trousdale Pkwy  University of Southern California
12             701 Exposition Blvd                               USC
13             699 Exposition Blvd  University of Southern California
14                  910 Bloom Walk  University of Southern California
15       700 Exposition Park Drive                      at Figueroa
16            3507 Trousdale Pkwy  University of Southern California
17                             NaN                               NaN
18                             NaN        Ronald Tutor Campus Center
19                             NaN                               NaN
20            3771 McClintock Ave  University of Southern California
21            3607 Trousdale Pkwy                               NaN
22  245 W Martin Luther King Jr Blvd                             NaN
23              4431 S Vermont Ave                   45th and Vermont
24              4181 S Figueroa St                               NaN

          lat         lng                                    labeledLatLngs  \
0   34.020300 -118.285422  [{'label': 'display', 'lat': 34.02029965714512…
1   34.023473 -118.279362  [{'label': 'display', 'lat': 34.02347304225484…
2   34.010146 -118.308294  [{'label': 'display', 'lat': 34.0101460845838,…
3   34.024655 -118.283978  [{'label': 'display', 'lat': 34.02465479249049…
4   34.025229 -118.287238  [{'label': 'display', 'lat': 34.02522901341101…
5   34.009812 -118.290948  [{'label': 'display', 'lat': 34.00981224699274…
6   34.006140 -118.292059  [{'label': 'display', 'lat': 34.00614, 'lng': …
7   34.004900 -118.291323  [{'label': 'display', 'lat': 34.0049, 'lng': -…
8   34.023907 -118.283701  [{'label': 'display', 'lat': 34.02390722951203…
9   34.001785 -118.278160  [{'label': 'display', 'lat': 34.00178481347217…
10  34.019941 -118.283646  [{'label': 'display', 'lat': 34.01994062885611…
```

```
11  34.018666 -118.286581  [{'label': 'display', 'lat': 34.0186663692096,…
12  34.018746 -118.285261  [{'label': 'display', 'lat': 34.01874617200168…
13  34.018909 -118.284694  [{'label': 'display', 'lat': 34.01890907004856…
14  34.019519 -118.288888  [{'label': 'display', 'lat': 34.01951920612859…
15  34.015504 -118.286117  [{'label': 'display', 'lat': 34.01550416089791…
16  34.021979 -118.285169  [{'label': 'display', 'lat': 34.02197871603587…
17  34.019838 -118.267511  [{'label': 'display', 'lat': 34.01983813216623…
18  34.020377 -118.285959  [{'label': 'display', 'lat': 34.020377, 'lng':…
19  34.019787 -118.267489  [{'label': 'display', 'lat': 34.01978683487930…
20  34.018761 -118.291090  [{'label': 'display', 'lat': 34.01876109148158…
21  34.019741 -118.285767  [{'label': 'display', 'lat': 34.01974105834961…
22  34.011336 -118.277784  [{'label': 'display', 'lat': 34.011336, 'lng':…
23  34.002913 -118.291797  [{'label': 'display', 'lat': 34.002913, 'lng':…
24  34.007252 -118.283028  [{'label': 'display', 'lat': 34.00725173950195…

    distance postalCode  cc         city state        country  \
0        757      90089  US  Los Angeles    CA  United States
1       1311      90007  US  Los Angeles    CA  United States
2       1984      90062  US  Los Angeles    CA  United States
3       1260      90007  US  Los Angeles    CA  United States
4       1288      90007  US  Los Angeles    CA  United States
5        549        NaN  US  Los Angeles    CA  United States
6        948      90037  US  Los Angeles    CA  United States
7       1045      90037  US  Los Angeles    CA  United States
8       1186      90007  US  Los Angeles    CA  United States
9       1563      90037  US  Los Angeles    CA  United States
10       773      90089  US  Los Angeles    CA  United States
11       560      90089  US  Los Angeles    CA  United States
12       594      90089  US  Los Angeles    CA  United States
13       629      90089  US  Los Angeles    CA  United States
14       670      90089  US  Los Angeles    CA  United States
15       229      90037  US  Los Angeles    CA  United States
16       945      90089  US  Los Angeles    CA  United States
17      1943      90011  US   South Gate    CA  United States
18       757        NaN  US  Los Angeles    CA  United States
19      1943      90011  US  Los Angeles    CA  United States
20       671      90089  US  Los Angeles    CA  United States
21       690      90089  US  Los Angeles    CA  United States
22       907      90037  US  Los Angeles    CA  United States
23      1268      90037  US  Los Angeles    CA  United States
24       810      90037  US  Los Angeles    CA  United States

                                     formattedAddress  \
0   [3601 Trousdale Pkwy (University of Southern C…
1   [3335 S Figueroa St (by 32nd St), Los Angeles,…
2   [4030 S Western Ave (at W Martin Luther King J…
3              [Los Angeles, CA 90007, United States]
```

```
4              [Los Angeles, CA 90007, United States]
5                    [Los Angeles, CA, United States]
6   [4253 S Vermont Ave, Los Angeles, CA 90037, Un…
7   [4320 S Vermont Ave, Los Angeles, CA 90037, Un…
8   [University Ave (btw W Jefferson Blvd & 32nd S…
9   [4606 S Broadway (46th & Broadway), Los Angele…
10  [3550 Trousdale Pkwy (University of Southern C…
11  [3709 Trousdale Pkwy (University of Southern C…
12  [701 Exposition Blvd (USC), Los Angeles, CA 90…
13  [699 Exposition Blvd (University of Southern C…
14  [910 Bloom Walk (University of Southern Califo…
15  [700 Exposition Park Drive (at Figueroa), Los …
16  [3507 Trousdale Pkwy (University of Southern C…
17              [South Gate, CA 90011, United States]
18  [Ronald Tutor Campus Center, Los Angeles, CA, …
19             [Los Angeles, CA 90011, United States]
20  [3771 McClintock Ave (University of Southern C…
21  [3607 Trousdale Pkwy, Los Angeles, CA 90089, U…
22  [245 W Martin Luther King Jr Blvd, Los Angeles…
23  [4431 S Vermont Ave (45th and Vermont), Los An…
24  [4181 S Figueroa St, Los Angeles, CA 90037, Un…

                          id
0   4c758f5fb474a1cd4ba2b9bf
1   4d3cf2ef84d46ea85da2025d
2   5320ec9011d2644cf9c6f385
3   502c10f4e4b03fdb3d1e1349
4   51116dfde4b0c342adb9e3b4
5   4e32e7bab0fb3bf8109f317f
6   4eaef09782315d0ca63ab07e
7   50787f1be4b00760ca61d88d
8   4c740d2bdb52b1f704f874dc
9   50dfe649e4b0a6d1c7534384
10  4ac94884f964a52087bf20e3
11  4cdae773adcc2c0ff0e6ad79
12  4bd62d9e5631c9b65686a530
13  4c9a88e4eaa5a143781ccde4
14  4c7d696ad6543704c34cc0a2
15  4bda06ac63c5c9b64f532268
16  4a6d1129f964a52075d21fe3
17  50e60859e4b0650b9d44a3aa
18  4d6485c83384a093e21f9d3c
19  5070ff59e4b0cff8620502dd
20  4b21b9b7f964a520ad4024e3
21  50523ae3e4b0bdd5e9088bd7
22  4f6df6e9e4b0dca2e0ddc8fc
23  4f40488ce4b08a9e0a4d0297
```

```
24   4f327f1319836c91c7dd7ee9
```

```
[54]: df_sel_filtered.shape
```

```
[54]: (25, 15)
```

### 4.3.2 5.2.2) Let's visualize venue categories identified using Folium maps.

```
[55]: # Visualize names
      df_sel_filtered.name
```

```
[55]: 0         University Park Campus Pharmacy (STU)
      1                                  CVS pharmacy
      2                                  CVS pharmacy
      3                                  USC Pharmacy
      4                    USC Health Center Pharmacy
      0                                AJ Mini Market
      1                                   Luis Market
      2                          All Seas Fish Market
      3                            USC Farmers Market
      4                             C&C Liquor Market
      0                 Doheny Memorial Library (DML)
      1             Hoose Library of Philosophy (MHP)
      2                Crocker Business Library (HOH)
      3                             Law Library (LAW)
      4    Seaver Science & Engineering Library (SSL)
      0                                  IMAX Theater
      1                   Norris Cinema Theater (NCT)
      2                                       Theater
      3            The Rosen Family Screening Theater
      4                  theater near Huntington Park
      0                     Parkside Restaurant (IRC)
      1             Moreton Fig Restaurant and Lounge
      2                             Gozalo Restaurant
      3                          La Fogata Restaurant
      4                       Restaurant La Bendicion
      Name: name, dtype: object
```

### 4.3.3 5.2.3) Segregate Venue categories further by Venue and create dataframes for each category

```
[56]: # create a new dataframe for Location1 category
      df_Location1=df_sel_filtered[(df_sel_filtered['name'].str.contains(Location1))␣
       ↪| (df_sel_filtered['categories'].str.contains(Location1))].reset_index␣
       ↪(drop=True)
      #df_Location1
```

```
##If hit are zero try replacing Location variable with actual criteria string␣
 ↪searhed for.
#df_Location1=dataframe_filtered[dataframe_filtered.name.str.contains('string')␣
 ↪| dataframe_filtered.categories.str.contains('string') ].reset_index␣
 ↪(drop=True) #<- Unhash to run, replace ('string') with Location1 'string'
#df_Location1  #<- Unhash to run.

# count the number of Location1 categories found
#count_Loc1=df_Location1.count( axis=1, level=None, numeric_only=False)
count_Loc1=len(df_Location1.index)
count_Loc1


print (count_Loc1, Location1, 'were found within', radius, 'meters of␣
 ↪neighborhood:', Neighborhood)
print ('Average monthly rent in ', Neighborhood, 'is $', AverageMonthlyRent)
df_Location1
```

```
5 Pharmacy were found within 2000 meters of neighborhood: Exposition Park, CA,
USA
Average monthly rent in  Exposition Park, CA, USA is $ 3522.0
```

[56]:

```
                                  name      categories            address  \
0  University Park Campus Pharmacy (STU)       Pharmacy  3601 Trousdale Pkwy
1                         CVS pharmacy       Pharmacy   3335 S Figueroa St
2                         CVS pharmacy       Pharmacy   4030 S Western Ave
3                       USC Pharmacy  Student Center                 NaN
4             USC Health Center Pharmacy       Pharmacy                 NaN

                     crossStreet        lat         lng  \
0  University of Southern California  34.020300 -118.285422
1                         by 32nd St  34.023473 -118.279362
2    at W Martin Luther King Jr Blvd  34.010146 -118.308294
3                                NaN  34.024655 -118.283978
4                                NaN  34.025229 -118.287238

                                    labeledLatLngs  distance postalCode  cc  \
0  [{'label': 'display', 'lat': 34.02029965714512…       757      90089  US
1  [{'label': 'display', 'lat': 34.02347304225484…      1311      90007  US
2  [{'label': 'display', 'lat': 34.0101460845838,…      1984      90062  US
3  [{'label': 'display', 'lat': 34.02465479249049…      1260      90007  US
4  [{'label': 'display', 'lat': 34.02522901341101…      1288      90007  US

          city state        country  \
0  Los Angeles    CA  United States
1  Los Angeles    CA  United States
2  Los Angeles    CA  United States
```

```
3  Los Angeles    CA  United States
4  Los Angeles    CA  United States

                                     formattedAddress                        id
0  [3601 Trousdale Pkwy (University of Southern C…  4c758f5fb474a1cd4ba2b9bf
1  [3335 S Figueroa St (by 32nd St), Los Angeles,…  4d3cf2ef84d46ea85da2025d
2  [4030 S Western Ave (at W Martin Luther King J…  5320ec9011d2644cf9c6f385
3             [Los Angeles, CA 90007, United States]  502c10f4e4b03fdb3d1e1349
4             [Los Angeles, CA 90007, United States]  51116dfde4b0c342adb9e3b4
```

[57]:
```
# create a new dataframe for Location2 category
df_Location2=df_sel_filtered[(df_sel_filtered['name'].str.contains(Location2))␣
 ↪| (df_sel_filtered['categories'].str.contains(Location2))].reset_index␣
 ↪(drop=True)
#df_Location2
##If hit are zero try replacing Location variable with actual criteria string␣
 ↪searhed for.
#df_Location1=dataframe_filtered[dataframe_filtered.name.str.contains('string')␣
 ↪| dataframe_filtered.categories.str.contains('string') ].reset_index␣
 ↪(drop=True) #<- Unhash to run, replace ('string') with Location1 'string'
#df_Location2  #<- Unhash to run.

# count the number of Location1 categories found
#count_Loc1=df_Location1.count( axis=1, level=None, numeric_only=False)
count_Loc2=len(df_Location2.index)
count_Loc2



print (count_Loc2, Location2, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood)
print ('Average monthly rent in ', Neighborhood, 'is $', AverageMonthlyRent)
df_Location2
```

```
5 Market were found within 2000 meters of input neighborhood: Exposition Park,
CA, USA
Average monthly rent in  Exposition Park, CA, USA is $ 3522.0
```

[57]:
```
                  name             categories            address  \
0       AJ Mini Market      Convenience Store                NaN
1          Luis Market                Butcher  4253 S Vermont Ave
2  All Seas Fish Market  Fast Food Restaurant  4320 S Vermont Ave
3    USC Farmers Market         Farmers Market     University Ave
4      C&C Liquor Market      Convenience Store     4606 S Broadway

                 crossStreet        lat         lng  \
0                        NaN  34.009812 -118.290948
```

```
1                            NaN  34.006140 -118.292059
2                            NaN  34.004900 -118.291323
3  btw W Jefferson Blvd & 32nd St  34.023907 -118.283701
4                46th & Broadway  34.001785 -118.278160

                                      labeledLatLngs  distance postalCode  cc  \
0  [{'label': 'display', 'lat': 34.00981224699274…       549        NaN  US
1  [{'label': 'display', 'lat': 34.00614, 'lng': …       948      90037  US
2  [{'label': 'display', 'lat': 34.0049, 'lng': -…      1045      90037  US
3  [{'label': 'display', 'lat': 34.02390722951203…      1186      90007  US
4  [{'label': 'display', 'lat': 34.00178481347217…      1563      90037  US

          city state        country  \
0  Los Angeles    CA  United States
1  Los Angeles    CA  United States
2  Los Angeles    CA  United States
3  Los Angeles    CA  United States
4  Los Angeles    CA  United States

                                    formattedAddress                        id
0                  [Los Angeles, CA, United States]  4e32e7bab0fb3bf8109f317f
1  [4253 S Vermont Ave, Los Angeles, CA 90037, Un…  4eaef09782315d0ca63ab07e
2  [4320 S Vermont Ave, Los Angeles, CA 90037, Un…  50787f1be4b00760ca61d88d
3  [University Ave (btw W Jefferson Blvd & 32nd S…  4c740d2bdb52b1f704f874dc
4  [4606 S Broadway (46th & Broadway), Los Angele…  50dfe649e4b0a6d1c7534384
```

[58]:

```
# create a new dataframe for Location3 category
df_Location3=df_sel_filtered[(df_sel_filtered['name'].str.contains(Location3))␣
 ↪| (df_sel_filtered['categories'].str.contains(Location3))].reset_index␣
 ↪(drop=True)

##If hit are zero try replacing Location variable with actual criteria string␣
 ↪searhed for.
#df_Location1=dataframe_filtered[dataframe_filtered.name.str.contains('string')␣
 ↪| dataframe_filtered.categories.str.contains('string') ].reset_index␣
 ↪(drop=True) #<- Unhash to run, replace ('string') with Location1 'string'
#df_Location1  #<- Unhash to run.



# count the number of Location1 categories found
#count_Loc1=df_Location1.count( axis=1, level=None, numeric_only=False)
count_Loc3=len(df_Location3.index)
count_Loc3



print (count_Loc3, Location3, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood)
```

```
print ('Average monthly rent in ', Neighborhood, 'is $', AverageMonthlyRent)
df_Location3
```

```
5 Library were found within 2000 meters of input neighborhood: Exposition Park,
CA, USA
Average monthly rent in  Exposition Park, CA, USA is $ 3522.0
```

[58]:

```
                                          name       categories  \
0               Doheny Memorial Library (DML)  College Library
1           Hoose Library of Philosophy (MHP)  College Library
2              Crocker Business Library (HOH)  College Library
3                           Law Library (LAW)  College Library
4  Seaver Science & Engineering Library (SSL)  College Library

                address                       crossStreet        lat  \
0  3550 Trousdale Pkwy  University of Southern California  34.019941
1  3709 Trousdale Pkwy  University of Southern California  34.018666
2  701 Exposition Blvd                                USC  34.018746
3  699 Exposition Blvd  University of Southern California  34.018909
4       910 Bloom Walk  University of Southern California  34.019519

          lng                                    labeledLatLngs  distance  \
0 -118.283646  [{'label': 'display', 'lat': 34.01994062885611…       773
1 -118.286581  [{'label': 'display', 'lat': 34.0186663692096,…       560
2 -118.285261  [{'label': 'display', 'lat': 34.01874617200168…       594
3 -118.284694  [{'label': 'display', 'lat': 34.01890907004856…       629
4 -118.288888  [{'label': 'display', 'lat': 34.01951920612859…       670

  postalCode  cc         city state         country  \
0      90089  US  Los Angeles    CA  United States
1      90089  US  Los Angeles    CA  United States
2      90089  US  Los Angeles    CA  United States
3      90089  US  Los Angeles    CA  United States
4      90089  US  Los Angeles    CA  United States

                                    formattedAddress                        id
0  [3550 Trousdale Pkwy (University of Southern C…  4ac94884f964a52087bf20e3
1  [3709 Trousdale Pkwy (University of Southern C…  4cdae773adcc2c0ff0e6ad79
2  [701 Exposition Blvd (USC), Los Angeles, CA 90…  4bd62d9e5631c9b65686a530
3  [699 Exposition Blvd (University of Southern C…  4c9a88e4eaa5a143781ccde4
4  [910 Bloom Walk (University of Southern Califo…  4c7d696ad6543704c34cc0a2
```

[59]:

```
# create a new dataframe for Location4 category
df_Location4=df_sel_filtered[(df_sel_filtered['name'].str.contains(Location4))␣
 ↪| (df_sel_filtered['categories'].str.contains(Location4))].reset_index␣
 ↪(drop=True)
```

```
##If hit are zero try replacing Location variable with actual criteria string␣
↪searhed for.
#df_Location1=dataframe_filtered[dataframe_filtered.name.str.contains('string')␣
↪| dataframe_filtered.categories.str.contains('string') ].reset_index␣
↪(drop=True) #<- Unhash to run, replace ('string') with Location1 'string'
#df_Location1  #<- Unhash to run.


# count the number of Location1 categories found
#count_Loc1=df_Location1.count( axis=1, level=None, numeric_only=False)
count_Loc4=len(df_Location4.index)
count_Loc4


print (count_Loc4, Location4, 'were found within', radius, 'meters of input␣
↪neighborhood:', Neighborhood)
print ('Average monthly rent in ', Neighborhood, 'is $', AverageMonthlyRent)
df_Location4
```

```
4 Theater were found within 2000 meters of input neighborhood: Exposition Park,
CA, USA
Average monthly rent in  Exposition Park, CA, USA is $ 3522.0
```

[59]:

```
                                 name         categories  \
0                        IMAX Theater      Movie Theater
1          Norris Cinema Theater (NCT)  College Classroom
2                             Theater          Multiplex
3  The Rosen Family Screening Theater    College Theater

                     address                        crossStreet        lat  \
0  700 Exposition Park Drive                        at Figueroa  34.015504
1        3507 Trousdale Pkwy  University of Southern California  34.021979
2                        NaN                                NaN  34.019838
3                        NaN         Ronald Tutor Campus Center  34.020377

          lng                                    labeledLatLngs  distance  \
0 -118.286117  [{'label': 'display', 'lat': 34.01550416089791…       229
1 -118.285169  [{'label': 'display', 'lat': 34.02197871603587…       945
2 -118.267511  [{'label': 'display', 'lat': 34.01983813216623…      1943
3 -118.285959  [{'label': 'display', 'lat': 34.020377, 'lng':…       757

  postalCode  cc         city state        country  \
0      90037  US  Los Angeles    CA  United States
1      90089  US  Los Angeles    CA  United States
2      90011  US   South Gate    CA  United States
3        NaN  US  Los Angeles    CA  United States
```

```
                                     formattedAddress                        id
0  [700 Exposition Park Drive (at Figueroa), Los …  4bda06ac63c5c9b64f532268
1  [3507 Trousdale Pkwy (University of Southern C…  4a6d1129f964a52075d21fe3
2              [South Gate, CA 90011, United States]  50e60859e4b0650b9d44a3aa
3  [Ronald Tutor Campus Center, Los Angeles, CA, …  4d6485c83384a093e21f9d3c
```

[60]:

```
# create a new dataframe for Location4 category
df_Location5=df_sel_filtered[(df_sel_filtered['name'].str.contains(Location5))␣
 ↪| (df_sel_filtered['categories'].str.contains(Location5))].reset_index␣
 ↪(drop=True)

##If hit are zero try replacing Location variable with actual criteria string␣
 ↪searhed for.
#df_Location1=dataframe_filtered[dataframe_filtered.name.str.contains('string')␣
 ↪| dataframe_filtered.categories.str.contains('string') ].reset_index␣
 ↪(drop=True) #<- Unhash to run, replace ('string') with Location1 'string'
#df_Location1  #<- Unhash to run.


# count the number of Location1 categories found
#count_Loc1=df_Location1.count( axis=1, level=None, numeric_only=False)
count_Loc5=len(df_Location5.index)
count_Loc5



print (count_Loc5, Location5, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood)
print ('Average monthly rent in ', Neighborhood, 'is $', AverageMonthlyRent)
df_Location5
```

```
6 Restaurant were found within 2000 meters of input neighborhood: Exposition
Park, CA, USA
Average monthly rent in  Exposition Park, CA, USA is $ 3522.0
```

[60]:

```
                                name           categories  \
0               All Seas Fish Market  Fast Food Restaurant
1            Parkside Restaurant (IRC)     College Cafeteria
2  Moreton Fig Restaurant and Lounge     College Cafeteria
3                  Gozalo Restaurant    Mexican Restaurant
4                La Fogata Restaurant    Mexican Restaurant
5            Restaurant La Bendicion                  Food

                            address                          crossStreet  \
0                   4320 S Vermont Ave                                  NaN
1                 3771 McClintock Ave  University of Southern California
2                 3607 Trousdale Pkwy                                  NaN
```

```
3  245 W Martin Luther King Jr Blvd                                NaN
4                4431 S Vermont Ave                   45th and Vermont
5                4181 S Figueroa St                                NaN

         lat         lng                                labeledLatLngs  \
0  34.004900 -118.291323  [{'label': 'display', 'lat': 34.0049, 'lng': -…
1  34.018761 -118.291090  [{'label': 'display', 'lat': 34.01876109148158…
2  34.019741 -118.285767  [{'label': 'display', 'lat': 34.01974105834961…
3  34.011336 -118.277784  [{'label': 'display', 'lat': 34.011336, 'lng':…
4  34.002913 -118.291797  [{'label': 'display', 'lat': 34.002913, 'lng':…
5  34.007252 -118.283028  [{'label': 'display', 'lat': 34.00725173950195…

   distance postalCode  cc         city state        country  \
0      1045      90037  US  Los Angeles    CA  United States
1       671      90089  US  Los Angeles    CA  United States
2       690      90089  US  Los Angeles    CA  United States
3       907      90037  US  Los Angeles    CA  United States
4      1268      90037  US  Los Angeles    CA  United States
5       810      90037  US  Los Angeles    CA  United States

                                    formattedAddress                        id
0  [4320 S Vermont Ave, Los Angeles, CA 90037, Un…  50787f1be4b00760ca61d88d
1  [3771 McClintock Ave (University of Southern C…  4b21b9b7f964a520ad4024e3
2  [3607 Trousdale Pkwy, Los Angeles, CA 90089, U…  50523ae3e4b0bdd5e9088bd7
3  [245 W Martin Luther King Jr Blvd, Los Angeles…  4f6df6e9e4b0dca2e0ddc8fc
4  [4431 S Vermont Ave (45th and Vermont), Los An…  4f40488ce4b08a9e0a4d0297
5  [4181 S Figueroa St, Los Angeles, CA 90037, Un…  4f327f1319836c91c7dd7ee9
```

### 4.3.4 5.2.4) Plot venues on a Folium Map

[61]:

```
# create map with Parmacies and MArkets in different colors
venues_map1 = folium.Map(location=[latitude, longitude], zoom_start=13) #␣
 ↪generate map centred around the chosen LA Neighborhood

# add a red circle marker to represent the chosen LA Neighborhood
folium.features.CircleMarker(
    [latitude, longitude],
    radius=6,
    color='red',
    popup= Neighborhood,
    fill = True,
    fill_color = 'red',
    fill_opacity = 0.6
).add_to(venues_map1)

# add  Location1 as blue circle markers
```

```
for lat, lng, label in zip(df_Location1.lat, df_Location1.lng, df_Location1.
 ↪categories):
    folium.features.CircleMarker(
        [lat, lng],
        radius=4,
        color='blue',
        popup=label,
        fill = True,
        fill_color='blue',
        fill_opacity=0.6
    ).add_to(venues_map1)

 # add the Location2 as green circle markers
for lat, lng, label in zip(df_Location2.lat, df_Location2.lng, df_Location2.
 ↪categories):
    folium.features.CircleMarker(
        [lat, lng],
        radius=4,
        color='green',
        popup=label,
        fill = True,
        fill_color='green',
        fill_opacity=0.6
    ).add_to(venues_map1)

# add the Location3 as cyan circle markers
for lat, lng, label in zip(df_Location3.lat, df_Location3.lng, df_Location3.
 ↪categories):
    folium.features.CircleMarker(
        [lat, lng],
        radius=4,
        color='cyan',
        popup=label,
        fill = True,
        fill_color='cyan',
        fill_opacity=0.6
    ).add_to(venues_map1)

# add the Location4 as magenta circle markers
for lat, lng, label in zip(df_Location4.lat, df_Location4.lng, df_Location4.
 ↪categories):
    folium.features.CircleMarker(
        [lat, lng],
        radius=4,
        color='magenta',
        popup=label,
        fill = True,
        fill_color='magenta',
        fill_opacity=0.6
    ).add_to(venues_map1)

# add the Location5 as orange circle markers
for lat, lng, label in zip(df_Location5.lat, df_Location5.lng, df_Location5.
 ↪categories):
    folium.features.CircleMarker(
        [lat, lng],
        radius=4,
        color='orange',
        popup=label,
        fill = True,
        fill_color='blue',
        fill_opacity=0.6
    ).add_to(venues_map1)


#Add Pop Up labels

# Color Legend
import sys
from termcolor import colored, cprint
print ('Map legend color is:')
cprint('Home', 'red')
cprint( Location1, 'blue')
cprint(Location2, 'green')
cprint(Location3, 'cyan')
cprint(Location4, 'magenta')
cprint(Location5, 'yellow')

# display map
venues_map1
```

```
Map legend color is:
Home
Pharmacy
Market
Library
Theater
Restaurant
```

```
[61]: <folium.folium.Map at 0x7f4cbc500208>
```

## 5.2.5) Calculate the median distance of each Venue type from target Neighborhood coordinates.

[62]:
```
# Find average distance to Location1


#define a procedure
lat1=df_Location1['lat'].median()
lon1= df_Location1['lng'].median()
lat0 = latitude
lon0 = longitude

from math import radians, cos, sin, asin, sqrt
def haversine(lon0, lat0, lon1, lat1):

    #Calculate the great circle distance between two points on the earth (specified in decimal degrees)

    # convert decimal degrees to radians
    lon0, lat0, lon1, lat1 = map(radians, [lon0, lat0, lon1, lat1])
    # haversine formula
    dlon = lon1 - lon0
    dlat = lat1 - lat0
    a = sin(dlat/2)**2 + cos(lat0) * cos(lat1) * sin(dlon/2)**2
    c = 2 * asin(sqrt(a))
    # Radius of earth in kilometers is 6371
    km = 6371* c
    print (count_Loc1, Location1, 'were found within', radius, 'meters of input neighborhood:', Neighborhood)
    print ('The median distance to a', Location1,'from input address-', Neighborhood, 'is:',round (km,2), 'km')
    return km

km1 = haversine(lon0, lat0, lon1, lat1)
print(km1)
```

```
5 Pharmacy were found within 2000 meters of input neighborhood: Exposition Park,
CA, USA
The median distance to a Pharmacy from input address- Exposition Park, CA, USA
is: 1.1 km
1.1041929193989808
```

[63]:
```
# Find average distance  to Location2


#define a procedure
lat2=df_Location2['lat'].median()
lon2= df_Location2['lng'].median()
lat0 = latitude
lon0 = longitude
```

```python
from math import radians, cos, sin, asin, sqrt
def haversine(lon0, lat0, lon2, lat2):

    #Calculate the great circle distance between two points on the earth␣
 ↪(specified in decimal degrees)

    # convert decimal degrees to radians
    lon0, lat0, lon2, lat2 = map(radians, [lon0, lat0, lon2, lat2])
    # haversine formula
    dlon = lon2 - lon0
    dlat = lat2 - lat0
    a = sin(dlat/2)**2 + cos(lat0) * cos(lat2) * sin(dlon/2)**2
    c = 2 * asin(sqrt(a))
    # Radius of earth in kilometers is 6371
    km = 6371* c
    print (count_Loc2, Location2, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood)
    print ('The median distance to a', Location2,'from input address-',␣
 ↪Neighborhood, 'is:',round (km,2), 'km')
    return km

km2 = haversine(lon0, lat0, lon2, lat2)
print(km2)
```

```
5 Market were found within 2000 meters of input neighborhood: Exposition Park,
CA, USA
The median distance to a Market from input address- Exposition Park, CA, USA is:
0.9 km
0.9037545977334124
```

[64]:

```python
# Find average distance  to Location3


#define a procedure
lat3=df_Location3['lat'].median()
lon3= df_Location3['lng'].median()
lat0 = latitude
lon0 = longitude

from math import radians, cos, sin, asin, sqrt
def haversine(lon0, lat0, lon3, lat3):

    #Calculate the great circle distance between two points on the earth␣
 ↪(specified in decimal degrees)

    # convert decimal degrees to radians
    lon0, lat0, lon3, lat3 = map(radians, [lon0, lat0, lon3, lat3])
    # haversine formula
    dlon = lon3 - lon0
    dlat = lat3 - lat0
    a = sin(dlat/2)**2 + cos(lat0) * cos(lat3) * sin(dlon/2)**2
    c = 2 * asin(sqrt(a))
    # Radius of earth in kilometers is 6371
    km = 6371* c
    print (count_Loc3, Location3, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood)
    print ('The median distance to a', Location3,'from input address-',␣
 ↪Neighborhood, 'is:',round (km,2), 'km')
    return km

km3=haversine(lon0, lat0, lon3, lat3)
print (km3)
```

```
5 Library were found within 2000 meters of input neighborhood: Exposition Park,
CA, USA
The median distance to a Library from input address- Exposition Park, CA, USA
is: 0.61 km
0.611333384483036
```

[65]:

```
# Find average distance  to Location4



#define a procedure
lat4=df_Location4['lat'].median()
lon4= df_Location4['lng'].median()
lat0 = latitude
lon0 = longitude

from math import radians, cos, sin, asin, sqrt
def haversine(lon0, lat0, lon4, lat4):

    #Calculate the great circle distance between two points on the earth␣
 ↪(specified in decimal degrees)

    # convert decimal degrees to radians
    lon0, lat0, lon4, lat4 = map(radians, [lon0, lat0, lon4, lat4])
    # haversine formula
    dlon = lon4 - lon0
    dlat = lat4 - lat0
    a = sin(dlat/2)**2 + cos(lat0) * cos(lat4) * sin(dlon/2)**2
    c = 2 * asin(sqrt(a))
    # Radius of earth in kilometers is 6371
    km = 6371* c
    print (count_Loc4, Location4, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood)
    print ('The median distance to a', Location4,'from input address-',␣
 ↪Neighborhood, 'is:',round (km,2), 'km')
    return km

km4=haversine(lon0, lat0, lon4, lat4)
print (km4)
```

```
4 Theater were found within 2000 meters of input neighborhood: Exposition Park,
CA, USA
The median distance to a Theater from input address- Exposition Park, CA, USA
is: 0.73 km
0.7334699010100676
```

[66]:

```
# Find average distance  to Location5



#define a procedure
lat5=df_Location5['lat'].median()
lon5= df_Location5['lng'].median()
lat0 = latitude
lon0 = longitude

from math import radians, cos, sin, asin, sqrt
def haversine(lon0, lat0, lon5, lat5):

    #Calculate the great circle distance between two points on the earth␣
 ↪(specified in decimal degrees)

    # convert decimal degrees to radians
    lon0, lat0, lon5, lat5 = map(radians, [lon0, lat0, lon5, lat5])
    # haversine formula
    dlon = lon5 - lon0
    dlat = lat5 - lat0
    a = sin(dlat/2)**2 + cos(lat0) * cos(lat5) * sin(dlon/2)**2
    c = 2 * asin(sqrt(a))
    # Radius of earth in kilometers is 6371
    km = 6371* c
    print (count_Loc5, Location5, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood)
    print ('The median distance to a', Location5,'from input address-',␣
 ↪Neighborhood, 'is:',round (km,2), 'km')
    return km

km5=haversine(lon0, lat0, lon5, lat5)
print (km5)
```

```
6 Restaurant were found within 2000 meters of input neighborhood: Exposition
Park, CA, USA
The median distance to a Restaurant from input address- Exposition Park, CA, USA
is: 0.5 km
0.4976484168224165
```

## 4.4 5.2.6) CHOSEN NEIGHBORHOOD SUMMARY

[67]:
```
#Report, using dictionaries
summary1_dict={'LA_Neighborhood':[Neighborhood, Neighborhood, Neighborhood,␣
 ↪Neighborhood, Neighborhood],
'Average_Monthly_Rent_USD':[AverageMonthlyRent, AverageMonthlyRent,␣
 ↪AverageMonthlyRent, AverageMonthlyRent, AverageMonthlyRent],
'Radius (m)': [radius, radius, radius, radius, radius],
'Location': [Location1, Location2, Location3, Location4, Location5],
'Found' : [count_Loc1, count_Loc2, count_Loc3, count_Loc4, count_Loc5],
'Median Distance (km)' :[km1, km2, km3, km4, km5]}

RD_SUMMARY1=pd.DataFrame(summary1_dict)
#RD_SUMMARY= report.set_index(["Algorithm"])

#round decimals
decimals = 2
RD_SUMMARY1['Median Distance (km)'] = RD_SUMMARY1['Median Distance (km)'].
 ↪apply(lambda x: round(x, decimals))

print (Neighborhood, 'Latitude:', latitude, 'Longitude:', longitude,␣
 ↪",''SUMMARY1 by RD :')
RD_SUMMARY1
```

```
Exposition Park, CA, USA Latitude: 34.01365405 Longitude: -118.28721058194556
,SUMMARY1 by RD :
```

[67]:
```
             LA_Neighborhood  Average_Monthly_Rent_USD  Radius (m)    Location  \
0  Exposition Park, CA, USA                    3522.0        2000    Pharmacy
1  Exposition Park, CA, USA                    3522.0        2000      Market
2  Exposition Park, CA, USA                    3522.0        2000     Library
3  Exposition Park, CA, USA                    3522.0        2000     Theater
4  Exposition Park, CA, USA                    3522.0        2000  Restaurant

   Found  Median Distance (km)
0      5                  1.10
1      5                  0.90
2      5                  0.61
3      4                  0.73
4      6                  0.50
```

[68]:
```
# Color Legend
import sys
from termcolor import colored, cprint
print ('Map legend color is:')
cprint('Home', 'red')
cprint( Location1, 'blue')
cprint(Location2, 'green')
cprint(Location3, 'cyan')
cprint(Location4, 'magenta')
cprint(Location5, 'yellow')

venues_map1
```

```
Map legend color is:
Home
Pharmacy
Market
Library
Theater
Restaurant
```

[68]:
```
<folium.folium.Map at 0x7f4cbc500208>
```

## 4.5 5.3 Select another neighborhood and use the same five venues/locations, whoose presence in your selected neighborhood, you would like to explore further.

[69]:
```
# List neighborhood resulting from the 'OR' search
df_or.head(7)
```

[69]:
```
               Neighborhood  AverageMonthlyRent_USD   Latitude   Longitude  \
0           Arleta, CA, USA                  1634.0  34.241327 -118.432205
1        Larchmont, CA, USA                  2140.0  34.079837 -118.317870
2         Mid-City, CA, USA                  2188.0  34.041527 -118.360370
3        Hollywood, CA, USA                  2485.0  34.098003 -118.329523
4  Exposition Park, CA, USA                  3522.0  34.013654 -118.287211

   Cluster Labels 1st Most Common Venue    2nd Most Common Venue  \
0               0         Movie Theater           Historic Site
1               0   Indie Movie Theater       Korean Restaurant
2               0         Indie Theater    Gym / Fitness Center
3               0           Coffee Shop           Movie Theater
4               0        Science Museum  College Football Field

  3rd Most Common Venue 4th Most Common Venue 5th Most Common Venue  \
0           Wings Joint            Donut Shop           Flower Shop
1         Movie Theater                  Park   American Restaurant
```

```
2          Liquor Store                Theater             Food Truck
3             Multiplex     Salon / Barbershop         Farmers Market
4         Movie Theater                   Park            Wings Joint

  6th Most Common Venue 7th Most Common Venue 8th Most Common Venue  \
0   Filipino Restaurant  Fast Food Restaurant        Farmers Market
1      Cuban Restaurant          Dance Studio         Deli / Bodega
2          Dance Studio         Deli / Bodega      Cuban Restaurant
3           Wings Joint            Donut Shop   Filipino Restaurant
4   Filipino Restaurant  Fast Food Restaurant        Farmers Market

  9th Most Common Venue 10th Most Common Venue
0                  Farm               Dive Bar
1        Discount Store           Food Service
2        Cosmetics Shop         Discount Store
3  Fast Food Restaurant                   Farm
4                  Farm             Donut Shop
```

[70]:

```
#Choose your target Neighborhood from df_or to analyze further.
z=0 #y is the row index in df_or. Changing this  changes your selection.

#Choose your five locations to explore in your target neighborhood selected␣
 ↪above
Location1 = 'Pharmacy'
Location2 = 'Market'
Location3 = 'Library'
Location4 = 'Theater'
Location5 = 'Restaurant'

LIMIT = 5
radius = 2000

range = len(df_first.index)

df_select2 = pd.DataFrame()
latitude2 = df_or.iloc[z,2]
longitude2 = df_or.iloc[z,3]
Neighborhood2 = df_or.iloc[z,0]
AverageMonthlyRent2 = df_or.iloc[z,1]
#print(range)
#print(latitude)
#print(longitude)
#print(Neighborhood)
#print(AverageMonthlyRent, '$')

search_query = [Location1, Location2, Location3, Location4, Location5]
for search_query in search_query:
    #print (search_query)
    #print (latitude)
    #print (longitude)
    #print (Neighborhood)
    #print(AverageMonthlyRent, '$')

    url = 'https://api.foursquare.com/v2/venues/search?
 ↪client_id={}&client_secret={}&ll={},{}&v={}&query={}&radius={}&limit={}'.
 ↪format(
        CLIENT_ID,
        CLIENT_SECRET,
        latitude2,
        longitude2,
        VERSION,
        search_query,
        radius,
        LIMIT)

    results = requests.get(url).json()
    results
    #print(results)
    venues = results['response']['venues']
    #dataframe = json_normalize(venues)
    dataframe1=pd.json_normalize(venues)
    #dataframe.head()
    ##df=dataframe[['name','location.address', 'location.lat', 'location.lng']].
 ↪copy()
    #dataframe.append(dataframe[['name','location.address', 'location.lat',␣
 ↪'location.lng']])
    df_select2 = df_select2.append(dataframe1)
    search_query=search_query[+1:+1]
    #dataframe.head()
    #df_select.head()
    df_select2.reset_index(drop=False)
df_select2.reset_index(drop=False)

print ('Neighborhood chosen:', Neighborhood2)
#print(Neighborhood_sel)
print('Average Monthly Rent:', AverageMonthlyRent2, '$')
print ('Latitude:',latitude2)
print ('Longitude:', longitude2)
```

```
Neighborhood chosen: Arleta, CA, USA
Average Monthly Rent: 1634.0 $
Latitude: 34.2413266
Longitude: -118.4322047
```

[71]:

```
df_select2.shape
```

[71]:

```
(19, 23)
```

### 4.5.1 5.3.1) Filter dataframe to see if your chosen locations/category are present in the selected neighborhood

[72]:

```
# keep only columns that include venue name, and anything that is associated␣
↪with location
filtered_columns = ['name', 'categories'] + [col for col in df_select.columns␣
↪if col.startswith('location.')] + ['id']
df_sel_filtered = df_select2.loc[:, filtered_columns]

# function that extracts the category of the venue
def get_category_type(row):
    try:
        categories_list = row['categories']
    except:
        categories_list = row['venue.categories']

    if len(categories_list) == 0:
        return None
    else:
        return categories_list[0]['name']

# filter the category for each row
df_sel_filtered['categories'] = df_sel_filtered.apply(get_category_type, axis=1)

# clean column names by keeping only last term
df_sel_filtered.columns = [column.split('.')[-1] for column in df_sel_filtered.
↪columns]

df_sel_filtered
df_sel_filtered.reset_index(drop=True)
```

[72]:

```
                                          name  \
0                                CVS pharmacy
1                                    Pharmacy
2                            Walmart Pharmacy
3                            Walmart Pharmacy
4                             Laurel Pharmacy
5                  Four Star Liquor And Market
6                  Walmart Neighborhood Market
7                               arleta market
8                                Video Market
9                          Metro Market Liquor
```

```
10        Los Angeles Public Library - Panorama City
11              Los Angeles Public Library - Pacoima
12  Friends of the Library Bookstore - Panorama LAPL
13                Movie Theater @ Panorama City Park
14                        Laura's Mexican Restaurant
15                               Vim Thai Restaurant
16                            La Sirenita Restaurant
17                          Coco's Bakery Restaurant
18                           El suchitlan Restaurant

                   categories                  address  \
0                    Pharmacy         9089 Woodman Ave
1                    Pharmacy            inside Target
2                    Pharmacy       8333 Van Nuys Blvd
3                    Pharmacy        14530 Nordhoff St
4                    Pharmacy   10376-10398 Rincon Ave
5                Liquor Store        13922 Nordhoff St
6               Grocery Store        14530 Nordhoff St
7                        None         13439 Osborne St
8                 Video Store                      NaN
9                Liquor Store                      NaN
10                    Library        14345 Roscoe Blvd
11                    Library      13605 Van Nuys Blvd
12                       None              Roscoe Blvd
13                  Multiplex       8600 Hazeltine Ave
14         Mexican Restaurant         9057 Woodman Ave
15            Thai Restaurant     9071 1/2 Woodman Ave
16         Seafood Restaurant       9116 Van Nuys Blvd
17                     Bakery        13733 Roscoe Blvd
18  Latin American Restaurant      13679 Van Nuys Blvd

                crossStreet        lat         lng  \
0            at Nordhoff St  34.235033 -118.440789
1   9725 Laurel Canyon Blvd.  34.245382 -118.419171
2                       NaN  34.222614 -118.449585
3                       NaN  34.235408 -118.448883
4                       NaN  34.259403 -118.430888
5                       NaN  34.234967 -118.436465
6                       NaN  34.234695 -118.448864
7                    Arleta  34.236588 -118.426599
8                       NaN  34.233712 -118.438895
9                       NaN  34.251344 -118.437876
10                      NaN  34.221873 -118.446506
11                      NaN  34.261154 -118.429071
12                      NaN  34.223892 -118.451136
13                Chase st.  34.227531 -118.441048
14                      NaN  34.234196 -118.440353
```

```
15                     NaN  34.234513 -118.440462
16                 Nordoff  34.235959 -118.450014
17                     NaN  34.221898 -118.431888
18        laurel canyon Blvd  34.259695 -118.431297

                                       labeledLatLngs  distance postalCode  \
0   [{'label': 'display', 'lat': 34.23503342345255…      1055      91331   
1   [{'label': 'display', 'lat': 34.24538229045852…      1281      91331   
2   [{'label': 'entrance', 'lat': 34.222461, 'lng'…      2626      91402   
3   [{'label': 'display', 'lat': 34.2354083333333,…      1670      91402   
4   [{'label': 'display', 'lat': 34.25940254104697…      2015      91331   
5   [{'label': 'display', 'lat': 34.234967, 'lng':…       809      91331   
6   [{'label': 'display', 'lat': 34.23469549709577…      1701      91402   
7   [{'label': 'display', 'lat': 34.23658846253168…       737      91331   
8   [{'label': 'display', 'lat': 34.233712, 'lng':…      1047        NaN   
9   [{'label': 'display', 'lat': 34.25134393355293…      1231        NaN   
10  [{'label': 'display', 'lat': 34.22187329599463…      2534      91402   
11  [{'label': 'display', 'lat': 34.26115419770338…      2225      91331   
12  [{'label': 'display', 'lat': 34.2238916, 'lng'…      2608      91402   
13  [{'label': 'display', 'lat': 34.22753143310547…      1737      91402   
14  [{'label': 'display', 'lat': 34.23419600000000…      1091      91331   
15  [{'label': 'display', 'lat': 34.23451292038614…      1073      91331   
16  [{'label': 'display', 'lat': 34.23595862067454…      1744      91402   
17  [{'label': 'display', 'lat': 34.22189848375367…      2162      91402   
18  [{'label': 'display', 'lat': 34.259695, 'lng':…      2046      91331   

    cc                 city       state        country  \
0   US               Arleta          CA  United States   
1   US              Pacoima          CA  United States   
2   US        Panorama City          CA  United States   
3   US        Panorama City          CA  United States   
4   US  San Fernando Valley          CA  United States   
5   US               Arleta          CA  United States   
6   US        Panorama City          CA  United States   
7   US               Arleta          CA  United States   
8   US                  NaN  California  United States   
9   US          Los Angeles          CA  United States   
10  US        Panorama City          CA  United States   
11  US              Pacoima          CA  United States   
12  US        Panorama City          CA  United States   
13  US        Panorama City          CA  United States   
14  US               Arleta          CA  United States   
15  US               Arleta          CA  United States   
16  US        Panorama City          CA  United States   
17  US             Van Nuys          CA  United States   
18  US  San Fernando Valley          CA  United States   
```

```
                                     formattedAddress  \
0   [9089 Woodman Ave (at Nordhoff St), Arleta, CA…
1   [inside Target (9725 Laurel Canyon Blvd.), Pac…
2   [8333 Van Nuys Blvd, Panorama City, CA 91402, …
3   [14530 Nordhoff St, Panorama City, CA 91402, U…
4   [10376-10398 Rincon Ave, San Fernando Valley, …
5   [13922 Nordhoff St, Arleta, CA 91331, United S…
6   [14530 Nordhoff St, Panorama City, CA 91402, U…
7   [13439 Osborne St (Arleta), Arleta, CA 91331, …
8                         [California, United States]
9                    [Los Angeles, CA, United States]
10  [14345 Roscoe Blvd, Panorama City, CA 91402, U…
11  [13605 Van Nuys Blvd, Pacoima, CA 91331, Unite…
12  [Roscoe Blvd, Panorama City, CA 91402, United …
13  [8600 Hazeltine Ave (Chase st.), Panorama City…
14  [9057 Woodman Ave, Arleta, CA 91331, United St…
15  [9071 1/2 Woodman Ave, Arleta, CA 91331, Unite…
16  [9116 Van Nuys Blvd (Nordoff), Panorama City, …
17  [13733 Roscoe Blvd, Van Nuys, CA 91402, United…
18  [13679 Van Nuys Blvd (laurel canyon Blvd), San…

                          id
0   4b6a6ba4f964a520f8d42be3
1   5000c867e4b05ceffbdf7ca8
2   551c1117498e6d8696182a3f
3   551c111a498e6d8696188a8f
4   4c7308fa57b6a143d036c7cc
5   4c39373f2c8020a1d5678c00
6   50462a37e4b0a6a6518cf7fc
7   4d27c44edbc160fc0e3242b6
8   4b96d4a4f964a52070e734e3
9   530a9d27498e9b5bf04a3fb3
10  527c6834498e434d57f8cc5a
11  4a807501f964a5204ff51fe3
12  4e39ced014959f8577ad9c19
13  4c538c7c479fc9287eb8a391
14  4b6399bdf964a5201a862ae3
15  4d290c7b8292236a92681fbb
16  4c8be54555fba0930d795aab
17  4baace48f964a520ae873ae3
18  4c743000c219224b48249f28
```

[73]:
```
df_sel_filtered.shape
```

[73]:
```
(19, 15)
```

### 4.5.2 5.3.2) Let’s visualize venue categories identified using Folium maps.

[74]:
```
# Visualize names
df_sel_filtered.name
```

[74]:
```
0                                        CVS pharmacy
1                                            Pharmacy
2                                    Walmart Pharmacy
3                                    Walmart Pharmacy
4                                     Laurel Pharmacy
0                         Four Star Liquor And Market
1                         Walmart Neighborhood Market
2                                       arleta market
3                                        Video Market
4                                 Metro Market Liquor
0          Los Angeles Public Library - Panorama City
1                Los Angeles Public Library - Pacoima
2    Friends of the Library Bookstore - Panorama LAPL
0                  Movie Theater @ Panorama City Park
0                          Laura's Mexican Restaurant
1                                 Vim Thai Restaurant
2                              La Sirenita Restaurant
3                            Coco's Bakery Restaurant
4                             El suchitlan Restaurant
Name: name, dtype: object
```

### 4.5.3 5.3.3) Segregate Venue categories further by Venue and create dataframes for each category

[75]:
```
# create a new dataframe for Location1 category
df_Location1=df_sel_filtered[(df_sel_filtered['name'].str.contains(Location1))␣
 ↪| (df_sel_filtered['categories'].str.contains(Location1))].reset_index␣
 ↪(drop=True)
#df_Location1
##If hit are zero try replacing Location variable with actual criteria string␣
 ↪searhed for.
#df_Location1=dataframe_filtered[dataframe_filtered.name.str.contains('string')␣
 ↪| dataframe_filtered.categories.str.contains('string') ].reset_index␣
 ↪(drop=True) #<- Unhash to run, replace ('string') with Location1 'string'
#df_Location1  #<- Unhash to run.

# count the number of Location1 categories found
#count_Loc1=df_Location1.count( axis=1, level=None, numeric_only=False)
count_Loc1=len(df_Location1.index)
count_Loc1
```

```
print (count_Loc1, Location1, 'were found within', radius, 'meters of␣
↪neighborhood:', Neighborhood2)
print ('Average monthly rent in ', Neighborhood2, 'is $', AverageMonthlyRent2)
df_Location1
```

```
5 Pharmacy were found within 2000 meters of neighborhood: Arleta, CA, USA
Average monthly rent in  Arleta, CA, USA is $ 1634.0
```

[75]:

```
               name categories                 address  \
0      CVS pharmacy   Pharmacy         9089 Woodman Ave
1          Pharmacy   Pharmacy            inside Target
2  Walmart Pharmacy   Pharmacy       8333 Van Nuys Blvd
3  Walmart Pharmacy   Pharmacy        14530 Nordhoff St
4   Laurel Pharmacy   Pharmacy  10376-10398 Rincon Ave

                crossStreet        lat         lng  \
0           at Nordhoff St  34.235033 -118.440789
1  9725 Laurel Canyon Blvd.  34.245382 -118.419171
2                      NaN  34.222614 -118.449585
3                      NaN  34.235408 -118.448883
4                      NaN  34.259403 -118.430888

                                       labeledLatLngs  distance postalCode  cc  \
0  [{'label': 'display', 'lat': 34.23503342345255…      1055      91331  US
1  [{'label': 'display', 'lat': 34.24538229045852…      1281      91331  US
2  [{'label': 'entrance', 'lat': 34.222461, 'lng'…      2626      91402  US
3  [{'label': 'display', 'lat': 34.2354083333333,…      1670      91402  US
4  [{'label': 'display', 'lat': 34.25940254104697…      2015      91331  US

                  city state        country  \
0               Arleta    CA  United States
1              Pacoima    CA  United States
2        Panorama City    CA  United States
3        Panorama City    CA  United States
4  San Fernando Valley    CA  United States

                                    formattedAddress                        id
0  [9089 Woodman Ave (at Nordhoff St), Arleta, CA…  4b6a6ba4f964a520f8d42be3
1  [inside Target (9725 Laurel Canyon Blvd.), Pac…  5000c867e4b05ceffbdf7ca8
2  [8333 Van Nuys Blvd, Panorama City, CA 91402, …  551c1117498e6d8696182a3f
3  [14530 Nordhoff St, Panorama City, CA 91402, U…  551c111a498e6d8696188a8f
4  [10376-10398 Rincon Ave, San Fernando Valley, …  4c7308fa57b6a143d036c7cc
```

[76]:

```
# create a new dataframe for Location2 category
df_Location2=df_sel_filtered[(df_sel_filtered['name'].str.contains(Location2))␣
↪| (df_sel_filtered['categories'].str.contains(Location2))].reset_index␣
↪(drop=True)
```

```
#df_Location2
##If hit are zero try replacing Location variable with actual criteria string␣
 ↪searhed for.
#df_Location1=dataframe_filtered[dataframe_filtered.name.str.contains('string')␣
 ↪| dataframe_filtered.categories.str.contains('string') ].reset_index␣
 ↪(drop=True) #<- Unhash to run, replace ('string') with Location1 'string'
#df_Location2  #<- Unhash to run.

# count the number of Location1 categories found
#count_Loc1=df_Location1.count( axis=1, level=None, numeric_only=False)
count_Loc2=len(df_Location2.index)
count_Loc2


print (count_Loc2, Location2, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood2)
print ('Average monthly rent in ', Neighborhood2, 'is $', AverageMonthlyRent2)
df_Location2
```

```
4 Market were found within 2000 meters of input neighborhood: Arleta, CA, USA
Average monthly rent in  Arleta, CA, USA is $ 1634.0
```

[76]:

```
                          name     categories           address crossStreet  \
0  Four Star Liquor And Market   Liquor Store  13922 Nordhoff St         NaN
1  Walmart Neighborhood Market  Grocery Store  14530 Nordhoff St         NaN
2                 Video Market    Video Store               NaN         NaN
3          Metro Market Liquor   Liquor Store               NaN         NaN

         lat         lng                                      labeledLatLngs  \
0  34.234967 -118.436465  [{'label': 'display', 'lat': 34.234967, 'lng':…
1  34.234695 -118.448864  [{'label': 'display', 'lat': 34.23469549709577…
2  34.233712 -118.438895  [{'label': 'display', 'lat': 34.233712, 'lng':…
3  34.251344 -118.437876  [{'label': 'display', 'lat': 34.25134393355293…

   distance postalCode  cc           city       state        country  \
0       809      91331  US         Arleta          CA  United States
1      1701      91402  US  Panorama City          CA  United States
2      1047        NaN  US            NaN  California  United States
3      1231        NaN  US    Los Angeles          CA  United States

                                    formattedAddress                        id
0  [13922 Nordhoff St, Arleta, CA 91331, United S…  4c39373f2c8020a1d5678c00
1  [14530 Nordhoff St, Panorama City, CA 91402, U…  50462a37e4b0a6a6518cf7fc
2                        [California, United States]  4b96d4a4f964a52070e734e3
3              [Los Angeles, CA, United States]  530a9d27498e9b5bf04a3fb3
```

[77]:

```
# create a new dataframe for Location3 category
df_Location3=df_sel_filtered[(df_sel_filtered['name'].str.contains(Location3))␣
 ↪| (df_sel_filtered['categories'].str.contains(Location3))].reset_index␣
 ↪(drop=True)

##If hit are zero try replacing Location variable with actual criteria string␣
 ↪searhed for.
#df_Location1=dataframe_filtered[dataframe_filtered.name.str.contains('string')␣
 ↪| dataframe_filtered.categories.str.contains('string') ].reset_index␣
 ↪(drop=True) #<- Unhash to run, replace ('string') with Location1 'string'
#df_Location1  #<- Unhash to run.


# count the number of Location1 categories found
#count_Loc1=df_Location1.count( axis=1, level=None, numeric_only=False)
count_Loc3=len(df_Location3.index)
count_Loc3


print (count_Loc3, Location3, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood2)
print ('Average monthly rent in ', Neighborhood2, 'is $', AverageMonthlyRent2)
df_Location3
```

```
3 Library were found within 2000 meters of input neighborhood: Arleta, CA, USA
Average monthly rent in  Arleta, CA, USA is $ 1634.0
```

[77]:

```
                                               name categories  \
0        Los Angeles Public Library - Panorama City    Library
1              Los Angeles Public Library - Pacoima    Library
2  Friends of the Library Bookstore - Panorama LAPL       None

              address crossStreet        lat         lng  \
0    14345 Roscoe Blvd         NaN  34.221873 -118.446506
1  13605 Van Nuys Blvd         NaN  34.261154 -118.429071
2          Roscoe Blvd         NaN  34.223892 -118.451136

                                    labeledLatLngs  distance postalCode  cc  \
0  [{'label': 'display', 'lat': 34.22187329599463…      2534      91402  US
1  [{'label': 'display', 'lat': 34.26115419770338…      2225      91331  US
2  [{'label': 'display', 'lat': 34.2238916, 'lng'…      2608      91402  US

            city state        country  \
0  Panorama City    CA  United States
1        Pacoima    CA  United States
2  Panorama City    CA  United States
```

```
                                         formattedAddress                        id
0  [14345 Roscoe Blvd, Panorama City, CA 91402, U…  527c6834498e434d57f8cc5a
1  [13605 Van Nuys Blvd, Pacoima, CA 91331, Unite…  4a807501f964a5204ff51fe3
2  [Roscoe Blvd, Panorama City, CA 91402, United …  4e39ced014959f8577ad9c19
```

[78]:

```
# create a new dataframe for Location4 category
df_Location4=df_sel_filtered[(df_sel_filtered['name'].str.contains(Location4))␣
 ↪| (df_sel_filtered['categories'].str.contains(Location4))].reset_index␣
 ↪(drop=True)

##If hit are zero try replacing Location variable with actual criteria string␣
 ↪searhed for.
#df_Location1=dataframe_filtered[dataframe_filtered.name.str.contains('string')␣
 ↪| dataframe_filtered.categories.str.contains('string') ].reset_index␣
 ↪(drop=True) #<- Unhash to run, replace ('string') with Location1 'string'
#df_Location1  #<- Unhash to run.


# count the number of Location1 categories found
#count_Loc1=df_Location1.count( axis=1, level=None, numeric_only=False)
count_Loc4=len(df_Location4.index)
count_Loc4

print (count_Loc4, Location4, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood2)
print ('Average monthly rent in ', Neighborhood2, 'is $', AverageMonthlyRent2)
df_Location4
```

```
1 Theater were found within 2000 meters of input neighborhood: Arleta, CA, USA
Average monthly rent in  Arleta, CA, USA is $ 1634.0
```

[78]:

```
                                  name categories             address  \
0  Movie Theater @ Panorama City Park  Multiplex  8600 Hazeltine Ave

  crossStreet        lat         lng  \
0   Chase st.  34.227531 -118.441048

                                       labeledLatLngs  distance postalCode  cc  \
0  [{'label': 'display', 'lat': 34.22753143310547…      1737      91402  US

            city state        country  \
0  Panorama City    CA  United States

                                         formattedAddress                        id
0  [8600 Hazeltine Ave (Chase st.), Panorama City…  4c538c7c479fc9287eb8a391
```

```
[79]: # create a new dataframe for Location4 category
      df_Location5=df_sel_filtered[(df_sel_filtered['name'].str.contains(Location5))␣
       ↪| (df_sel_filtered['categories'].str.contains(Location5))].reset_index␣
       ↪(drop=True)

      ##If hit are zero try replacing Location variable with actual criteria string␣
       ↪searhed for.
      #df_Location1=dataframe_filtered[dataframe_filtered.name.str.contains('string')␣
       ↪| dataframe_filtered.categories.str.contains('string') ].reset_index␣
       ↪(drop=True) #<- Unhash to run, replace ('string') with Location1 'string'
      #df_Location1  #<- Unhash to run.


      # count the number of Location1 categories found
      #count_Loc1=df_Location1.count( axis=1, level=None, numeric_only=False)
      count_Loc5=len(df_Location5.index)
      count_Loc5


      print (count_Loc5, Location5, 'were found within', radius, 'meters of input␣
       ↪neighborhood:', Neighborhood2)
      print ('Average monthly rent in ', Neighborhood2, 'is $', AverageMonthlyRent2)
      df_Location5
```

```
5 Restaurant were found within 2000 meters of input neighborhood: Arleta, CA,
USA
Average monthly rent in  Arleta, CA, USA is $ 1634.0
```

```
[79]:                         name                  categories  \
      0  Laura's Mexican Restaurant          Mexican Restaurant
      1         Vim Thai Restaurant             Thai Restaurant
      2      La Sirenita Restaurant          Seafood Restaurant
      3     Coco's Bakery Restaurant                      Bakery
      4     El suchitlan Restaurant  Latin American Restaurant

                      address         crossStreet        lat         lng  \
      0      9057 Woodman Ave                 NaN  34.234196 -118.440353
      1  9071 1/2 Woodman Ave                 NaN  34.234513 -118.440462
      2    9116 Van Nuys Blvd             Nordoff  34.235959 -118.450014
      3     13733 Roscoe Blvd                 NaN  34.221898 -118.431888
      4   13679 Van Nuys Blvd  laurel canyon Blvd  34.259695 -118.431297

                                           labeledLatLngs  distance postalCode  cc  \
      0  [{'label': 'display', 'lat': 34.23419600000000…      1091      91331  US
      1  [{'label': 'display', 'lat': 34.23451292038614…      1073      91331  US
      2  [{'label': 'display', 'lat': 34.23595862067454…      1744      91402  US
      3  [{'label': 'display', 'lat': 34.22189848375367…      2162      91402  US
```

```
4  [{'label': 'display', 'lat': 34.259695, 'lng':…      2046      91331  US

                 city state        country  \
0              Arleta    CA  United States
1              Arleta    CA  United States
2       Panorama City    CA  United States
3           Van Nuys    CA  United States
4  San Fernando Valley    CA  United States

                                    formattedAddress                        id
0  [9057 Woodman Ave, Arleta, CA 91331, United St…  4b6399bdf964a5201a862ae3
1  [9071 1/2 Woodman Ave, Arleta, CA 91331, Unite…  4d290c7b8292236a92681fbb
2  [9116 Van Nuys Blvd (Nordoff), Panorama City, …  4c8be54555fba0930d795aab
3  [13733 Roscoe Blvd, Van Nuys, CA 91402, United…  4baace48f964a520ae873ae3
4  [13679 Van Nuys Blvd (laurel canyon Blvd), San…  4c743000c219224b48249f28
```

### 4.5.4 5.3.4) Plot venues on a Folium Map

[80]:

```
# create map with Parmacies and MArkets in different colors
venues_map2 = folium.Map(location=[latitude2, longitude2], zoom_start=13) #␣
↪generate map centred around the chosen LA Neighborhood

# add a red circle marker to represent the chosen LA Neighborhood
folium.features.CircleMarker(
    [latitude2, longitude2],
    radius=6,
    color='red',
    popup= Neighborhood2,
    fill = True,
    fill_color = 'red',
    fill_opacity = 0.6
).add_to(venues_map2)

# add  Location1 as blue circle markers
for lat21, lng21, label21 in zip(df_Location1.lat, df_Location1.lng,␣
↪df_Location1.categories):
    folium.features.CircleMarker(
        [lat21, lng21],
        radius=4,
        color='blue',
        popup=label21,
        fill = True,
        fill_color='blue',
        fill_opacity=0.6
    ).add_to(venues_map2)
```

```
 # add the Location2 as green circle markers
for lat2l, lng2l, label2l in zip(df_Location2.lat, df_Location2.lng,␣
 ↪df_Location2.categories):
    folium.features.CircleMarker(
        [lat2l, lng2l],
        radius=4,
        color='green',
        popup=label2l,
        fill = True,
        fill_color='green',
        fill_opacity=0.6
    ).add_to(venues_map2)

# add the Location3 as cyan circle markers
for lat2l, lng2l, label2l in zip(df_Location3.lat, df_Location3.lng,␣
 ↪df_Location3.categories):
    folium.features.CircleMarker(
        [lat2l, lng2l],
        radius=4,
        color='cyan',
        popup=label2l,
        fill = True,
        fill_color='cyan',
        fill_opacity=0.6
    ).add_to(venues_map2)

# add the Location4 as magenta circle markers
for lat2l, lng2l, label2l in zip(df_Location4.lat, df_Location4.lng,␣
 ↪df_Location4.categories):
    folium.features.CircleMarker(
        [lat2l, lng2l],
        radius=4,
        color='magenta',
        popup=label2l,
        fill = True,
        fill_color='magenta',
        fill_opacity=0.6
    ).add_to(venues_map2)

# add the Location5 as orange circle markers
for lat2l, lng2l, label2l in zip(df_Location5.lat, df_Location5.lng,␣
 ↪df_Location5.categories):
    folium.features.CircleMarker(
        [lat2l, lng2l],
        radius=4,
        color='orange',
        popup=label2l,
        fill = True,
        fill_color='blue',
        fill_opacity=0.6
    ).add_to(venues_map2)


#Add Pop Up labels

# Color Legend
import sys
from termcolor import colored, cprint
print ('Map legend color is:')
cprint('Home', 'red')
cprint( Location1, 'blue')
cprint(Location2, 'green')
cprint(Location3, 'cyan')
cprint(Location4, 'magenta')
cprint(Location5, 'yellow')

# display map
venues_map2
```

```
Map legend color is:
Home
Pharmacy
Market
Library
Theater
Restaurant
```

[80]:

```
<folium.folium.Map at 0x7f4cbc450c88>
```

## 5.3.5) Calculate the median distance of each Venue type from target Neighborhood coordinates.

[81]:

```
# Find average distance to Location1



#define a procedure
lat1=df_Location1['lat'].median()
lon1= df_Location1['lng'].median()
lat0 = latitude2
lon0 = longitude2

from math import radians, cos, sin, asin, sqrt
def haversine(lon0, lat0, lon1, lat1):
    #Calculate the great circle distance between two points on the earth␣
 ↪(specified in decimal degrees)

    # convert decimal degrees to radians
    lon0, lat0, lon1, lat1 = map(radians, [lon0, lat0, lon1, lat1])
    # haversine formula
    dlon = lon1 - lon0
    dlat = lat1 - lat0
    a = sin(dlat/2)**2 + cos(lat0) * cos(lat1) * sin(dlon/2)**2
    c = 2 * asin(sqrt(a))
    # Radius of earth in kilometers is 6371
    km = 6371* c
    print (count_Loc1, Location1, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood2)
    print ('The median distance to a', Location1,'from input address-',␣
 ↪Neighborhood2, 'is:',round (km,2), 'km')
    return km

km1_2 = haversine(lon0, lat0, lon1, lat1)
print(km1_2)
```

```
5 Pharmacy were found within 2000 meters of input neighborhood: Arleta, CA, USA
The median distance to a Pharmacy from input address- Arleta, CA, USA is: 1.03
km
1.0275085737911864
```

[82]:

```
# Find average distance  to Location2



#define a procedure
lat2=df_Location2['lat'].median()
lon2= df_Location2['lng'].median()
lat0 = latitude2
lon0 = longitude2

from math import radians, cos, sin, asin, sqrt
def haversine(lon0, lat0, lon2, lat2):

    #Calculate the great circle distance between two points on the earth␣
 ↪(specified in decimal degrees)

    # convert decimal degrees to radians
    lon0, lat0, lon2, lat2 = map(radians, [lon0, lat0, lon2, lat2])
    # haversine formula
    dlon = lon2 - lon0
    dlat = lat2 - lat0
    a = sin(dlat/2)**2 + cos(lat0) * cos(lat2) * sin(dlon/2)**2
    c = 2 * asin(sqrt(a))
    # Radius of earth in kilometers is 6371
    km = 6371* c
    print (count_Loc2, Location2, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood2)
    print ('The median distance to a', Location2,'from input address-',␣
 ↪Neighborhood2, 'is:',round (km,2), 'km')
    return km

km2_2 = haversine(lon0, lat0, lon2, lat2)
print(km2_2)
```

```
4 Market were found within 2000 meters of input neighborhood: Arleta, CA, USA
The median distance to a Market from input address- Arleta, CA, USA is: 0.92 km
0.9189467051443274
```

[83]:

```
# Find average distance  to Location3



#define a procedure
lat3=df_Location3['lat'].median()
lon3= df_Location3['lng'].median()
lat0 = latitude2
lon0 = longitude2

from math import radians, cos, sin, asin, sqrt
def haversine(lon0, lat0, lon3, lat3):

    #Calculate the great circle distance between two points on the earth␣
 ↪(specified in decimal degrees)

    # convert decimal degrees to radians
    lon0, lat0, lon3, lat3 = map(radians, [lon0, lat0, lon3, lat3])
    # haversine formula
    dlon = lon3 - lon0
    dlat = lat3 - lat0
    a = sin(dlat/2)**2 + cos(lat0) * cos(lat3) * sin(dlon/2)**2
    c = 2 * asin(sqrt(a))
    # Radius of earth in kilometers is 6371
    km = 6371* c
    print (count_Loc3, Location3, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood2)
    print ('The median distance to a', Location3,'from input address-',␣
 ↪Neighborhood2, 'is:',round (km,2), 'km')
    return km

km3_2=haversine(lon0, lat0, lon3, lat3)
```

```
print (km3_2)
```

```
3 Library were found within 2000 meters of input neighborhood: Arleta, CA, USA
The median distance to a Library from input address- Arleta, CA, USA is: 2.34 km
2.3424415805346652
```

[84]:

```
# Find average distance  to Location4



#define a procedure
lat4=df_Location4['lat'].median()
lon4= df_Location4['lng'].median()
lat0 = latitude2
lon0 = longitude2

from math import radians, cos, sin, asin, sqrt
def haversine(lon0, lat0, lon4, lat4):

    #Calculate the great circle distance between two points on the earth␣
 ↪(specified in decimal degrees)

    # convert decimal degrees to radians
    lon0, lat0, lon4, lat4 = map(radians, [lon0, lat0, lon4, lat4])
    # haversine formula
    dlon = lon4 - lon0
    dlat = lat4 - lat0
    a = sin(dlat/2)**2 + cos(lat0) * cos(lat4) * sin(dlon/2)**2
    c = 2 * asin(sqrt(a))
    # Radius of earth in kilometers is 6371
    km = 6371* c
    print (count_Loc4, Location4, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood2)
    print ('The median distance to a', Location4,'from input address-',␣
 ↪Neighborhood2, 'is:',round (km,2), 'km')
    return km

km4_2=haversine(lon0, lat0, lon4, lat4)
print (km4_2)
```

```
1 Theater were found within 2000 meters of input neighborhood: Arleta, CA, USA
The median distance to a Theater from input address- Arleta, CA, USA is: 1.74 km
1.736049085896416
```

[85]:

```
# Find average distance  to Location5



#define a procedure
```

```
lat5=df_Location5['lat'].median()
lon5= df_Location5['lng'].median()
lat0 = latitude2
lon0 = longitude2

from math import radians, cos, sin, asin, sqrt
def haversine(lon0, lat0, lon5, lat5):

    #Calculate the great circle distance between two points on the earth␣
 ↪(specified in decimal degrees)

    # convert decimal degrees to radians
    lon0, lat0, lon5, lat5 = map(radians, [lon0, lat0, lon5, lat5])
    # haversine formula
    dlon = lon5 - lon0
    dlat = lat5 - lat0
    a = sin(dlat/2)**2 + cos(lat0) * cos(lat5) * sin(dlon/2)**2
    c = 2 * asin(sqrt(a))
    # Radius of earth in kilometers is 6371
    km = 6371* c
    print (count_Loc5, Location5, 'were found within', radius, 'meters of input␣
 ↪neighborhood:', Neighborhood2)
    print ('The median distance to a', Location5,'from input address-',␣
 ↪Neighborhood2, 'is:',round (km,2), 'km')
    return km

km5_2=haversine(lon0, lat0, lon5, lat5)
print (km5_2)
```

```
5 Restaurant were found within 2000 meters of input neighborhood: Arleta, CA,
USA
The median distance to a Restaurant from input address- Arleta, CA, USA is: 1.07
km
1.0654048705131864
```

## 4.6 5.3.6) CHOSEN NEIGHBORHOOD SUMMARY

[86]:

```
#Report, using dictionaries
summary2_dict={'LA_Neighborhood':[Neighborhood2, Neighborhood2, Neighborhood2,␣
 ↪Neighborhood2, Neighborhood2],
'Average_Monthly_Rent_USD':[AverageMonthlyRent2, AverageMonthlyRent2,␣
 ↪AverageMonthlyRent2, AverageMonthlyRent2, AverageMonthlyRent2],
'Radius (m)': [radius, radius, radius, radius, radius],
'Location': [Location1, Location2, Location3, Location4, Location5],
'Found' : [count_Loc1, count_Loc2, count_Loc3, count_Loc4, count_Loc5],
'Median Distance (km)' :[km1_2, km2_2, km3_2, km4_2, km5_2]}
```

```
RD_SUMMARY2=pd.DataFrame(summary2_dict)
#RD_SUMMARY= report.set_index(["Algorithm"])

#round decimals
decimals = 2
RD_SUMMARY2['Median Distance (km)'] = RD_SUMMARY2['Median Distance (km)'].
 ↪apply(lambda x: round(x, decimals))

print (Neighborhood2, 'Latitude:', latitude2, 'Longitude:', longitude2,␣
 ↪",''SUMMARY2 by RD :')
RD_SUMMARY2
```

```
Arleta, CA, USA Latitude: 34.2413266 Longitude: -118.4322047 ,SUMMARY2 by RD :
```

[86]:

```
     LA_Neighborhood  Average_Monthly_Rent_USD  Radius (m)    Location  Found  \
0  Arleta, CA, USA                    1634.0        2000    Pharmacy      5
1  Arleta, CA, USA                    1634.0        2000      Market      4
2  Arleta, CA, USA                    1634.0        2000     Library      3
3  Arleta, CA, USA                    1634.0        2000     Theater      1
4  Arleta, CA, USA                    1634.0        2000  Restaurant      5

   Median Distance (km)
0                  1.03
1                  0.92
2                  2.34
3                  1.74
4                  1.07
```

[87]:

```
# Color Legend
import sys
from termcolor import colored, cprint
print ('Map legend color is:')
cprint('Home', 'red')
cprint( Location1, 'blue')
cprint(Location2, 'green')
cprint(Location3, 'cyan')
cprint(Location4, 'magenta')
cprint(Location5, 'yellow')

# display map
venues_map2
```

```
Map legend color is:
Home
Pharmacy
Market
Library
```

```
Theater
Restaurant
```

[87]:
```
<folium.folium.Map at 0x7f4cbc450c88>
```

# 5 6) RESULTS

## 5.1 6.1 STACK ALL THE SUMMARY DATAFRAMES PREPARED FOR EACH NEIGHBORHOOD

### 5.1.1 6.1.1) NEIGHBORHOODS TABULAR SUMMARY

[88]:
```
# First Neighborhood details
yy=df_or.iloc[[y, ]]
print ('First LA_Neighborhood of interest with respect to', Common1, 'is:')
yy
```

```
First LA_Neighborhood of interest with respect to Theater is:
```

[88]:
```
               Neighborhood  AverageMonthlyRent_USD   Latitude   Longitude  \
4  Exposition Park, CA, USA                  3522.0  34.013654 -118.287211

   Cluster Labels 1st Most Common Venue   2nd Most Common Venue  \
4               0        Science Museum  College Football Field

  3rd Most Common Venue 4th Most Common Venue 5th Most Common Venue  \
4         Movie Theater                  Park           Wings Joint

  6th Most Common Venue 7th Most Common Venue 8th Most Common Venue  \
4   Filipino Restaurant  Fast Food Restaurant        Farmers Market

  9th Most Common Venue 10th Most Common Venue
4                  Farm             Donut Shop
```

[89]:
```
#Second Neighborhodod details
zz=df_or.iloc[[z, ]]
print ('Second LA_Neighborhood of interest with respect to', Common1, 'is:')
zz
```

```
Second LA_Neighborhood of interest with respect to Theater is:
```

[89]:
```
      Neighborhood  AverageMonthlyRent_USD   Latitude   Longitude  \
0  Arleta, CA, USA                  1634.0  34.241327 -118.432205

   Cluster Labels 1st Most Common Venue 2nd Most Common Venue  \
0               0         Movie Theater         Historic Site

  3rd Most Common Venue 4th Most Common Venue 5th Most Common Venue  \
0           Wings Joint            Donut Shop           Flower Shop

  6th Most Common Venue 7th Most Common Venue 8th Most Common Venue  \
0   Filipino Restaurant  Fast Food Restaurant        Farmers Market

  9th Most Common Venue 10th Most Common Venue
0                  Farm               Dive Bar
```

[90]:
```
FINAL_COMPARISON_SUMMARY = pd.concat([RD_SUMMARY1,RD_SUMMARY2], axis=0)
print ('FINAL NEIGHBORHOODS COMPARISON, SUMMARY by RD :')
FINAL_COMPARISON_SUMMARY
```

```
FINAL NEIGHBORHOODS COMPARISON, SUMMARY by RD :
```

[90]:
```
             LA_Neighborhood  Average_Monthly_Rent_USD  Radius (m)    Location  \
0  Exposition Park, CA, USA                    3522.0        2000    Pharmacy
1  Exposition Park, CA, USA                    3522.0        2000      Market
2  Exposition Park, CA, USA                    3522.0        2000     Library
3  Exposition Park, CA, USA                    3522.0        2000     Theater
4  Exposition Park, CA, USA                    3522.0        2000  Restaurant
0           Arleta, CA, USA                    1634.0        2000    Pharmacy
1           Arleta, CA, USA                    1634.0        2000      Market
2           Arleta, CA, USA                    1634.0        2000     Library
3           Arleta, CA, USA                    1634.0        2000     Theater
4           Arleta, CA, USA                    1634.0        2000  Restaurant

   Found  Median Distance (km)
0      5                  1.10
1      5                  0.90
2      5                  0.61
3      4                  0.73
4      6                  0.50
0      5                  1.03
1      4                  0.92
2      3                  2.34
3      1                  1.74
4      5                  1.07
```

### 5.2 6.2) FINAL REPORT - BATTLE OF THE NEIGHBORHOODS

[91]:
```
## import these libraries if not already done so.
#import seaborn as sns #<- Uncheck to install.
#import matplotlib.pyplot as plt. #<- Uncheck to install.
```

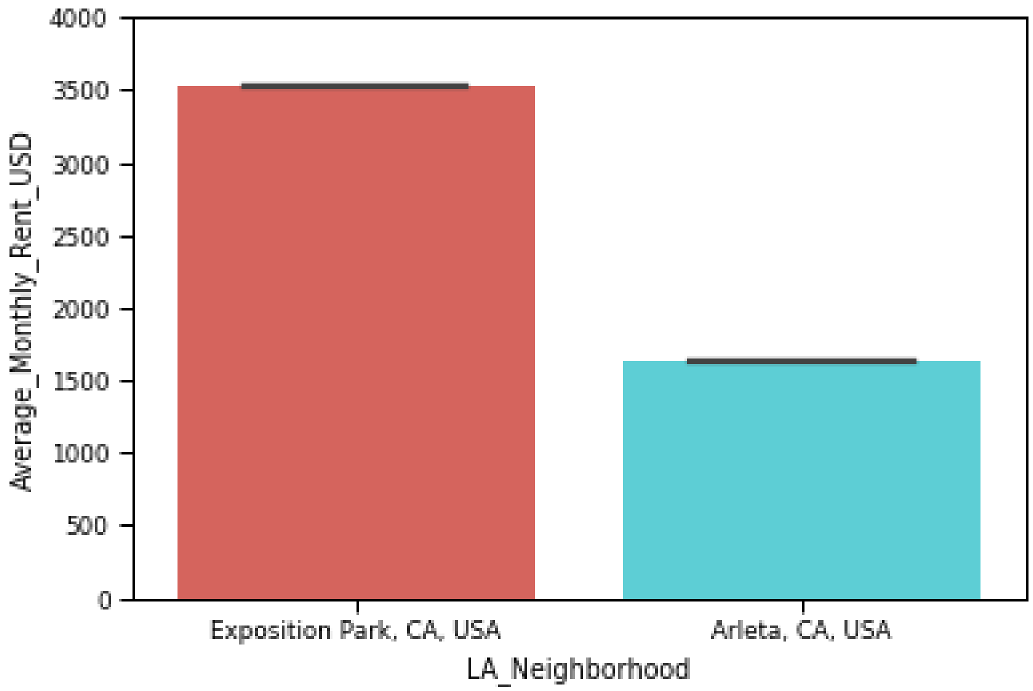
### 5.2.1 6.2.1) DISCUSSION - AVERAGE MONTHLY RENT

[92]:
```
# barplot Average_Monthly_Rent_$ by La_Neighborhood with Location
sns.set_context('paper')

# create plot
plt0=sns.barplot(x = 'LA_Neighborhood', y = 'Average_Monthly_Rent_USD', data =␣
 ↪FINAL_COMPARISON_SUMMARY,
            palette = 'hls',
            capsize = 0.5,
            saturation = 0.9,
            #errcolor = 'gray', errwidth = 2,
            #ci = 'sd'
           )

plt0.set_ylim(0.0, 4000)
plt.show
```

[92]:
```
<function matplotlib.pyplot.show(*args, **kw)>
```



**The Average monthly rent is higher in Exposition Park than in Arleta Neighborhood of Los Angeles.**

### 6.2.2) DISCUSSION - MEDIAN_DISTANCE

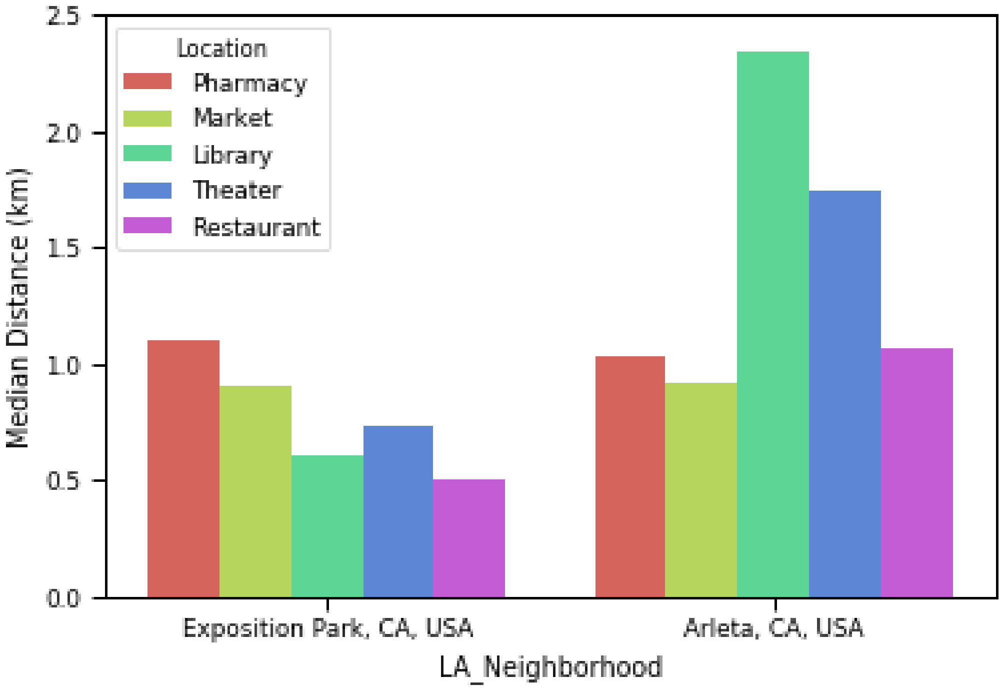
[93]:
```
FINAL_COMPARISON_SUMMARY.groupby('LA_Neighborhood', as_index=False)['Median␣
 ↪Distance (km)'].mean()
```

[93]:
```
             LA_Neighborhood  Median Distance (km)
0            Arleta, CA, USA                 1.420
1  Exposition Park, CA, USA                 0.768
```

[94]:
```
# barplot Mean Distance by La_Neighborhood with Location
sns.set_context('paper')

# create plot
plt1=sns.barplot(x = 'LA_Neighborhood', y = 'Median Distance (km)', hue =␣
 ↪'Location', data = FINAL_COMPARISON_SUMMARY,
            palette = 'hls',
            capsize = 0.5,
            saturation = 0.9,
            errcolor = 'gray', errwidth = 2,
            ci = 'sd'
           )
plt1.set_ylim(0.0,2.5)
plt.show
```

[94]:
```
<function matplotlib.pyplot.show(*args, **kw)>
```



**Both Exposition Park and Arleta neighborhoods have all of the of the five venues of interest being represented.**

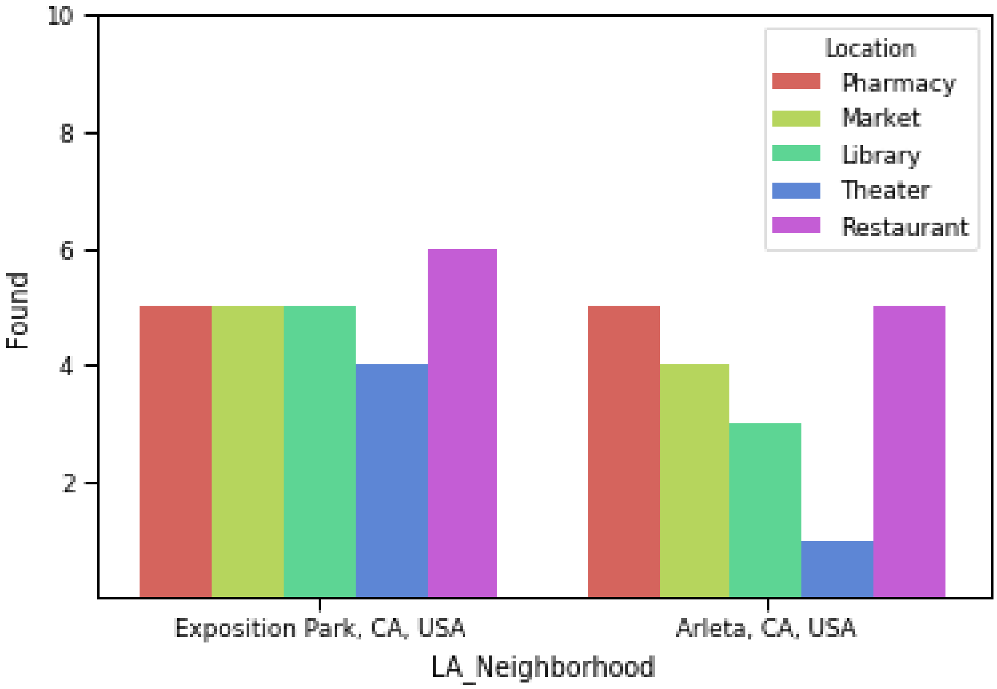
**The mean average distance to the venues present appears to be higher in Arleta than in Exposition Park.**

### 6.2.3) DISCUSSION - NUMBER OF VENUES FOUND

```
[95]: # barplot Mean Distance by La_Neighborhood with Location
      sns.set_context('paper')

      # create plot
      plt2=sns.barplot(x = 'LA_Neighborhood', y = 'Found', hue = 'Location', data =␣
       ↪FINAL_COMPARISON_SUMMARY,
                   palette = 'hls',
                   capsize = 0.5,
                   saturation = 0.9,
                   errcolor = 'gray', errwidth = 2,
                   ci = 'sd'
                   )
      plt2.set_ylim(0.05, 10)
      plt.show
```

```
[95]: <function matplotlib.pyplot.show(*args, **kw)>
```



**Both Arleta and Exposition Park have all of the five venues present within 2000m of the target co-ordinates.**

**Exposition Park has the same number or more of each venue type found, within 2000m of the target coordinates.**

[96]:
```
# Color Legend
import sys
from termcolor import colored, cprint
print ('Map legend color is:')
cprint('Home', 'red')
cprint( Location1, 'blue')
cprint(Location2, 'green')
cprint(Location3, 'cyan')
cprint(Location4, 'magenta')
cprint(Location5, 'yellow')

print (' ')
print (Neighborhood)

# display map
venues_map1
```

```
Map legend color is:
Home
Pharmacy
Market
Library
Theater
Restaurant

Exposition Park, CA, USA
```

[96]:
```
<folium.folium.Map at 0x7f4cbc500208>
```

[97]:
```
print (Neighborhood2)
venues_map2
```

```
Arleta, CA, USA
```

[97]:
```
<folium.folium.Map at 0x7f4cbc450c88>
```

## 6 7. CONCLUSION

In this assignment I tried to combine and use rental data that is available online, and the FourSquare API app to explore the neighborhoods in the city of Los Angeles, CA. The aim was to see if the combination can be used to get a better understanding of neighborhoods in a target city and if, based on user preference and input, are any neighborhoods in a city of greater interest to rent in as compared to others.

The city that I explored is Los Angeles, CA.

The data was treated as discussed in the data section.

K-Means clustering was applied to the data and the 5 clusters plotted on the map of Los Angeles using Folium

I used on hot encoding on this data to find the ten most frequently occurring venues in these neighborhoods.

I then filtered the dataset to find neighborhoods that had 'Theaters' as the top three most frequently occurring venues.

I used the Four Square API to search for the presence of five venues of my choice, in two of these neighborhoods. These five venues being 'Pharmacy', 'Market', 'Library', Theatre', Restaurant'.

This search returned the number of venues if found and the distance of each of the venues from the neighborhood coordinates.

I used all this information to put together a report that is detailed in the Results section.

### 6.0.1 To summarize:

**Within a 2000m radius of the neighborhood coordinates:**

**Exposition Park has a higher rent that Arleta and has the same number or more of the selected venues.**

**The venues in Arleta are more spread out as compared to Exposition Park.**

**From the maps it can be seen that Exposition Park is near two major freeways and Arleta sits at the intesection three freeways.**

### 6.0.2 In conclusion,

I think that it is possible to use the neighborhood data, rental data and the FourSquare API to explore and search neighborhood for venues of ones choice and come to an informed decision on which neighborhood is better to rent in.

This choice will likely be very personal.

Future Improvements:

More venues can be searched per neighborhood using a bigger radius. More than two neighborhoods can be compared.

I think that adding crime data for various neighborhoods would add a new dimension to the data, that would help make a more informed decision. ( I was unable to locate suitably paired neighborhood - rent - crime data.)

I also think that the coding efficiency for this assignment can be improved with more experience!!

THANK YOU FOR YOUR TIME!

## 7 THE END OF ASSIGNMENT REPORT

[ ]:

```
```

This notebook is part of a course on **Coursera** called *Applied Data Science Capstone*. If you accessed this notebook outside the course, you can take this course online by clicking here.