

Data Science Capstone Project

December 31, 2020

1 Final Data Science Capstone

1.1 Introduction - Business Problem

In this project, we will explore London, the most multicultural city in the United kingdom and its financial capital.

We explore places around London and discuss what makes London unique! London is truly a multicultural city with various restaurants like African restuarants, Chinese restuarants, German resturants and many more.

The beautiful places around London is a reason why you need to visit London. Lonson is known for its vibrant social life and it is a good place to start business. London is a city where businesses thrive. There are many amazing businesses around London.

First, we determine the places to start a restaurant in London.

and why London is a good place to live. London's vibrant social life is due to its many bars, restaurants, museums, pubs, and many more.

We use the postal district dataset given in the folowing link https://en.wikipedia.org/wiki/London_postal_district. The link provides the postal district code, postal town, coverage and local authority area(s) of postal districts of London.

We use the Foursquare API to explore the venues given the location of the London's districts.

Finally, we use K-means clustering to cluster all the coverages(districts) in London. We then group then base on the clusters.

1.2 Data Section

In order to achieve our objectives stated in the Introduction. We use the postcode areas dataset in the folowing link https://en.wikipedia.org/wiki/London_postal_district. We scrap using pandas.

The postcode areas in london are N, NW, SW, SE, W, WC, E and EC postcode areas. For each postcode area, we collect data on all the postcode districts, post town, coverage and local authority area(s) in the area. We merge all the 8 postcode areas to generate our final dataset with all coverages(distincts) given.

We remove the data points where the local authgority area(s) is non-geographic and other None values.

We use the Geopy library to find the location data for each district in our dataset.

Finally, we use the Foursquare API to explore the venues around each district using the location data provided by Geopy.

1.3 Methodology

Firstly, we want to do web scraping using pandas by extracting the postal table from https://en.wikipedia.org/wiki/London_postal_district using pandas.

1.4 Import all the necessary Libraries

```
[1]: #import necessary libraries
!pip install geocoder
import geocoder # import geocoder

import numpy as np # library to handle data in a vectorized manner

import pandas as pd # library for data analysis
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)

import json # library to handle JSON files

!pip install geopy # uncomment this line if you haven't completed the
    ↳Foursquare API lab
!pip install folium
from geopy.geocoders import Nominatim # convert an address into latitude and
    ↳longitude values

import requests # library to handle requests
from pandas.io.json import json_normalize # tranform JSON file into a pandas
    ↳dataframe

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

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

#!conda install -c conda-forge folium=0.5.0 --yes # uncomment this line if you
    ↳haven't completed the Foursquare API lab
import folium # map rendering library

print('Libraries imported.')
```

Requirement already satisfied: geocoder in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (1.38.1)
Requirement already satisfied: requests in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from geocoder)
(2.24.0)
Requirement already satisfied: click in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from geocoder)
(7.1.2)
Requirement already satisfied: ratelim in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from geocoder)
(0.1.6)
Requirement already satisfied: six in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from geocoder)
(1.15.0)
Requirement already satisfied: future in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from geocoder)
(0.18.2)
Requirement already satisfied: chardet<4,>=3.0.2 in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from
requests->geocoder) (3.0.4)
Requirement already satisfied: certifi>=2017.4.17 in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from
requests->geocoder) (2020.12.5)
Requirement already satisfied: urllib3!=1.25.0,!1.25.1,<1.26,>=1.21.1 in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from
requests->geocoder) (1.25.9)
Requirement already satisfied: idna<3,>=2.5 in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from
requests->geocoder) (2.9)
Requirement already satisfied: decorator in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from
ratelim->geocoder) (4.4.2)
Requirement already satisfied: geopy in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (2.0.0)
Requirement already satisfied: geographiclib<2,>=1.49 in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from geopy) (1.50)
Requirement already satisfied: folium in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (0.11.0)
Requirement already satisfied: branca>=0.3.0 in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from folium)
(0.4.2)
Requirement already satisfied: requests in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from folium)
(2.24.0)
Requirement already satisfied: numpy in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from folium)
(1.18.5)
Requirement already satisfied: jinja2>=2.9 in

```

/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from folium)
(2.11.2)
Requirement already satisfied: certifi>=2017.4.17 in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from
requests->folium) (2020.12.5)
Requirement already satisfied: idna<3,>=2.5 in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from
requests->folium) (2.9)
Requirement already satisfied: urllib3!=1.25.0,!1.25.1,<1.26,>=1.21.1 in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from
requests->folium) (1.25.9)
Requirement already satisfied: chardet<4,>=3.0.2 in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from
requests->folium) (3.0.4)
Requirement already satisfied: MarkupSafe>=0.23 in
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages (from
jinja2>=2.9->folium) (1.1.1)
Libraries imported.

```

1.5 Read the table using pandas.read_html function

There are 8 post areas in London as listed in postal_areas below

```

[2]: postal_areas = [ 'N', 'NW', 'SW', 'SE', 'W', 'WC', 'E' , 'EC']
     tables = []

     for item in postal_areas:

         if item != 'EC':
             url = 'https://en.wikipedia.org/wiki/{}_postcode_area'.format(item)
             tables_pd = pd.read_html(url)
             tables.append(tables_pd[1])

         elif item == 'EC':
             url = 'https://en.wikipedia.org/wiki/{}_postcode_area'.format(item)
             tables_pd = pd.read_html(url)
             tables.append(tables_pd[2])

         else:
             pass

```

The number of tables in tables can be calculated as follows:

```

[3]: len(tables)

```

[3]: 8

Merge all the eight tables together

```
[4]: result_df = pd.concat(tables)
```

```
[5]: result_df.head()
```

```
[5]:   Postcode district Post town \
0          N1      LONDON
1         N1C      LONDON
2         N1P      LONDON
3          N2      LONDON
4          N3      LONDON

                                Coverage \
0 Northern head district: Barnsbury (part), Cano...
1                                Kings Cross Central
2                                PO boxes in N1 and N1C
3 East Finchley district: East Finchley, Fortis ...
4 Finchley district: Finchley, Church End, Finch...

      Local authority area(s)
0 Hackney, Islington, Camden
1                        Camden
2                non-geographic
3       Barnet, Haringey
4                        Barnet
```

Find the types of the columns in the dataset

```
[6]: result_df.dtypes
```

```
[6]: Postcode district      object
Post town                  object
Coverage                   object
Local authority area(s)    object
dtype: object
```

The number of rows and columns in our dataset can be calculated as follows

```
[7]: print('There are {} rows and {} columns in our dataset'.format(result_df.
    →shape[0], result_df.shape[1]))
```

There are 184 rows and 4 columns in our dataset

Next, collect all the data points where the Local authority area(s) = non-geographic

```
[8]: nongeo_df = result_df[result_df['Local authority area(s)'] == 'non-geographic']
nongeo_df.head()
```

```
[8]:
```

	Postcode	district	Post town	Coverage \
2	N1P	LONDON	PO boxes in N1 and N1C	
24	N81	LONDON	Electoral Reform Services	
1	NW1W	LONDON	PO boxes in NW1[4]	
12	NW26	LONDON	PO boxes in NW10[4]	
1	SE1P	LONDON		NaN

	Local authority area(s)
2	non-geographic
24	non-geographic
1	non-geographic
12	non-geographic
1	non-geographic

Next, remove all the data points where the Local authority area(s) != non-geographic and find the resulting dataset

```
[9]: result_df = result_df[result_df['Local authority area(s)'] != 'non-geographic']
```

```
[10]: result_df = result_df.drop('Local authority area(s)', axis = 1).dropna()
```

```
[11]: result_df.shape
```

```
[11]: (173, 3)
```

```
[12]: result_df.head()
```

```
[12]:
```

	Postcode	district	Post town \
0	N1	LONDON	
1	N1C	LONDON	
3	N2	LONDON	
4	N3	LONDON	
5	N4	LONDON	

	Coverage
0	Northern head district: Barnsbury (part), Cano...
1	Kings Cross Central
3	East Finchley district: East Finchley, Fortis ...
4	Finchley district: Finchley, Church End, Finch...
5	Finsbury Park district: Finsbury Park, Manor H...

```
[13]: result_df['Coverage'] = result_df['Coverage'].map(lambda name: name.split(':',
→')[0])
result_df = result_df.reset_index(drop = True)
```

1.6 Use Geopy to find the location data (longitude and latitude) of all districts

```
[14]: post_data = result_df['Postcode district']
latitudes = []
longitudes = []
for post in post_data:
    geolocator = Nominatim(user_agent="my_app")
    location = geolocator.geocode("{} , England".format(post))
    if location != None:
        latitudes.append(location.latitude)
        longitudes.append(location.longitude)
    else:
        latitudes.append('NA')
        longitudes.append('NA')
```

```
[15]: location_data = pd.DataFrame(columns = ['Postcode district', 'Latitude', 'Longitude'])
```

1.7 Location data is given as follows

```
[16]: location_data['Postcode district'] = result_df['Postcode district']
location_data['Latitude'] = pd.Series(latitudes)
location_data['Longitude'] = pd.Series(longitudes)
result_df['Latitude'] = location_data['Latitude']
result_df['Longitude'] = location_data['Longitude']
location_data.head()
```

```
[16]: Postcode district Latitude Longitude
0          N1    52.599 -2.09829
1         N1C    51.5347 -0.124548
2          N2    52.6013 -2.09711
3          N3    52.5998 -2.09297
4          N4    52.5987 -2.09266
```

```
[17]: result_df = result_df.reset_index(drop=True)
```

The resulting dataset is given below after including the location data for each district

```
[18]: result_df.head()
```

```
[18]: Postcode district Post town Coverage Latitude Longitude
0          N1    LONDON Northern head district    52.599 -2.09829
1         N1C    LONDON Kings Cross Central    51.5347 -0.124548
2          N2    LONDON East Finchley district    52.6013 -2.09711
3          N3    LONDON Finchley district    52.5998 -2.09297
4          N4    LONDON Finsbury Park district    52.5987 -2.09266
```

```
[19]: result_df = result_df[result_df['Latitude'] != 'NA']
```

```
[20]: result_df.shape
```

```
[20]: (166, 5)
```

```
[21]: result_df.head()
```

```
[21]:
```

	Postcode	district	Post town	Coverage	Latitude	Longitude
0		N1	LONDON	Northern head district	52.599	-2.09829
1		N1C	LONDON	Kings Cross Central	51.5347	-0.124548
2		N2	LONDON	East Finchley district	52.6013	-2.09711
3		N3	LONDON	Finchley district	52.5998	-2.09297
4		N4	LONDON	Finsbury Park district	52.5987	-2.09266

1.8 Map of London, England with all the districts

```
[22]: address = 'London, England'

geolocator = Nominatim(user_agent="my_app")
lond_location = geolocator.geocode(address)
lond_latitude = lond_location.latitude
lond_longitude = lond_location.longitude
print('The geographical coordinate of London are {}, {}'.format(lond_latitude,
    lond_longitude))
```

The geographical coordinate of London are 51.5073219, -0.1276474.

```
[23]: # create map of London using latitude and longitude values
map_london = folium.Map(location=[lond_latitude, lond_longitude], zoom_start=10)

# add markers to map
for lat, lng, post_town, coverage in zip(result_df['Latitude'],
    result_df['Longitude'], result_df['Post town'], result_df['Coverage']):
    label = '{} {}'.format(coverage, post_town)
    label = folium.Popup(label, parse_html=True)
    folium.CircleMarker(
        [lat, lng],
        radius=5,
        popup=label,
        color='green',
        fill=True,
        fill_color='#3186cc',
        fill_opacity=0.7,
        parse_html=False).add_to(map_london)

map_london
```



```
[23]: <folium.folium.Map at 0x7f92c63bc110>
```

1.9 Foursquare API

It's time to explore the locations nearby the districts using Foursquare API. We will start with the Foursquare details.

```
[24]: CLIENT_ID = 'BL2ZUBYOFSD40CFRZHGTIVR0WZCIC2RBXY3CP52YQJYQ4B12' # your Foursquare ID
      CLIENT_SECRET = 'UCAMQEVD AOWSKEGJE10Y001ZYDR1T4KBJAD4DXG3LCMXREPC' # your Foursquare Secret
      VERSION = '20180605' # Foursquare API version
      LIMIT = 100 # A default Foursquare API limit value

      print('Your credentails:')
      print('CLIENT_ID: ' + CLIENT_ID)
      print('CLIENT_SECRET:' + CLIENT_SECRET)
```

Your credentails:

CLIENT_ID: BL2ZUBYOFSD40CFRZHGTIVR0WZCIC2RBXY3CP52YQJYQ4B12

CLIENT_SECRET:UCAMQEVD AOWSKEGJE10Y001ZYDR1T4KBJAD4DXG3LCMXREPC

Let us explore the first coverage(district)

```
[25]: result_df.loc[0, 'Coverage']
```

```
[25]: 'Northern head district'
```

```
[26]: # the location data for the first district

      district_latitude = result_df.loc[0, 'Latitude'] # neighborhood latitude value
      district_longitude = result_df.loc[0, 'Longitude'] # neighborhood longitude value

      district_name = result_df.loc[0, 'Coverage'] # neighborhood name

      print('Latitude and longitude values of {} are {}, {}.'.format(district_name,
      district_latitude, district_longitude))
```

Latitude and longitude values of Northern head district are 52.5989524, -2.0982864.

```
[27]: LIMIT = 100 # limit of number of venues returned by Foursquare API

      radius = 500 # define radius

      url = 'https://api.foursquare.com/v2/venues/explore?
      &client_id={}&client_secret={}&v={}&ll={},{}&radius={}&limit={}'.format(
      CLIENT_ID,
```

```

CLIENT_SECRET,
VERSION,
district_latitude,
district_longitude,
radius,
LIMIT
)
print(url)

```

```

https://api.foursquare.com/v2/venues/explore?&client_id=BL2ZUBYOFSD40CFRZHGTYYVRO
WZCIC2RBXY3CP52YQJYQ4B12&client_secret=UCAMQEVDAAOWSKEGJE10Y001ZYDR1T4KBJAD4DXG3L
CMXREPC&v=20180605&ll=52.5989524,-2.0982864&radius=500&limit=100

```

```
[28]: results = requests.get(url).json()
```

```
[29]: 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']

```

```
[30]: venues = results['response']['groups'][0]['items']

nearby_venues = pd.json_normalize(venues) # flatten JSON

# filter columns
filtered_columns = ['venue.name', 'venue.categories', 'venue.location.lat', 'venue.location.lng']
nearby_venues = nearby_venues.loc[:, filtered_columns]

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

# clean columns
nearby_venues.columns = [col.split(".")[-1] for col in nearby_venues.columns]

nearby_venues.head()

```

```
[30]:
```

	name	categories	lat	lng
0	WHSmith	Stationery Store	52.599423	-2.095442
1	Cineworld	Movie Theater	52.596291	-2.092581

2	Heath Town Park	Park	52.596837	-2.099860
3	Eastside Coffee Shop	Coffee Shop	52.600520	-2.094384
4	Greggs	Bakery	52.601881	-2.092942

```
[31]: print('{} venues were returned by Foursquare.'.format(nearby_venues.shape[0]))
```

6 venues were returned by Foursquare.

1.10 Explore all the venues in all the districts in London using the result_df dataset

```
[32]: def getNearbyVenues(names, latitudes, longitudes, radius=500):

    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 = ['Coverage',
                            'Coverage Latitude',
                            'Coverage Longitude',
                            'Venue',
                            'Venue Latitude',
```

```

        'Venue Longitude',
        'Venue Category']

    return(nearby_venues)

```

```

[33]: london_venues = getNearbyVenues(names=result_df['Coverage'],
                                     latitudes=result_df['Latitude'],
                                     longitudes=result_df['Longitude']
                                     )

```

London has many restaurants, bars, clothing stores, pubs, shopping malls, science museums, and theaters. It is indeed a good place for social life.

1.11 Now, we want to find districts or places in London where there are no restaurants. One of those places is a good location to start a restaurant

The 'london_nonrestaurants_venues' table contains that list

```

[36]: london_nonrestaurants_venues = london_venues.where(~london_venues['Venue_
    ↳Category'].str.contains('Restaurant'))
london_nonrestaurants_venues = london_nonrestaurants_venues.dropna().
    ↳reset_index(drop=True)
london_nonrestaurants_venues['Coverage'].unique()[:5]

```

```

[36]: array(['Northern head district', 'Kings Cross Central',
            'East Finchley district', 'Finchley district',
            'Finsbury Park district'], dtype=object)

```

```

[37]: london_venues.groupby('Coverage').count().head()

```

```

[37]:
Coverage Latitude \
Coverage
A projection around Parliament Square. Nearby W...    55
Abbey Wood district                                   3
All but the west of St James's                        88
Anerley district                                       5
Balham district                                       61

Coverage Longitude Venue \
Coverage
A projection around Parliament Square. Nearby W...    55    55
Abbey Wood district                                   3     3
All but the west of St James's                        88    88
Anerley district                                       5     5
Balham district                                       61    61

Venue Latitude \

```

Coverage	
A projection around Parliament Square. Nearby W...	55
Abbey Wood district	3
All but the west of St James's	88
Anerley district	5
Balham district	61

	Venue Longitude \
Coverage	
A projection around Parliament Square. Nearby W...	55
Abbey Wood district	3
All but the west of St James's	88
Anerley district	5
Balham district	61

	Venue Category
Coverage	
A projection around Parliament Square. Nearby W...	55
Abbey Wood district	3
All but the west of St James's	88
Anerley district	5
Balham district	61

```
[38]: print('There are {} uniques categories.'.format(len(london_venues['Venue_
→Category'].unique())))
```

There are 334 uniques categories.

```
[39]: # one hot encoding
london_onehot = pd.get_dummies(london_venues[['Venue Category']], prefix="",
→prefix_sep="")

# add neighborhood column back to dataframe
london_onehot['Coverage'] = london_venues['Coverage']

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

london_onehot.head()
```

```
[39]:
```

	Coverage	Accessories Store	African Restaurant \
0 Northern head district		0	0
1 Northern head district		0	0
2 Northern head district		0	0
3 Northern head district		0	0
4 Northern head district		0	0

	Airport Lounge	Airport Service	American Restaurant	Antique Shop	Arcade	\
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	

	Argentinian Restaurant	Art Gallery	Art Museum	Arts & Crafts Store	\
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	

	Asian Restaurant	Athletics & Sports	Australian Restaurant	\
0	0	0	0	
1	0	0	0	
2	0	0	0	
3	0	0	0	
4	0	0	0	

	Austrian Restaurant	BBQ Joint	Baby Store	Badminton Court	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	

	Bakery	Bar	Beach	Bed & Breakfast	Beer Bar	Beer Garden	Beer Store	\
0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	
2	0	0	0	0	0	0	0	
3	0	0	0	0	0	0	0	
4	1	0	0	0	0	0	0	

	Bike Rental / Bike Share	Bike Shop	Bistro	Boat or Ferry	Bookstore	\
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	

	Botanical Garden	Boutique	Bowling Alley	Boxing Gym	Brasserie	\
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

	Brazilian Restaurant	Breakfast Spot	Brewery	Bubble Tea Shop	Buffet	\
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	

	Building	Bulgarian Restaurant	Burger Joint	Burrito Place	Bus Station	\
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	

	Bus Stop	Business Service	Butcher	Café	Camera Store	Canal	Canal Lock	\
0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	
2	0	0	0	0	0	0	0	
3	0	0	0	0	0	0	0	
4	0	0	0	0	0	0	0	

	Candy Store	Cantonese Restaurant	Caribbean Restaurant	Casino	Castle	\
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	

	Champagne Bar	Cheese Shop	Chinese Restaurant	Chocolate Shop	Church	\
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	

	Cigkofte Place	Climbing Gym	Clothing Store	Club House	Cocktail Bar	\
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	

	Coffee Shop	College Cafeteria	College Residence Hall	Comedy Club	\
0	0	0	0	0	

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

	Comic Shop	Concert Hall	Construction & Landscaping	Convenience Store	\
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	

	Convention Center	Cosmetics Shop	Costume Shop	Coworking Space	Creperie	\
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	

	Cricket Ground	Cuban Restaurant	Cupcake Shop	Cycle Studio	Dance Studio	\
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	

	Deli / Bodega	Department Store	Design Studio	Dessert 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	

	Dim Sum Restaurant	Diner	Discount Store	Distillery	Dog Run	Donut Shop	\
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	

	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	\
0	0	0	0	
1	0	0	0	
2	0	0	0	
3	0	0	0	
4	0	0	0	

	Electronics Store	English Restaurant	Escape Room	Ethiopian Restaurant	\
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	

	Event Service	Event Space	Exhibit	Fabric Shop	Falafel Restaurant	Farm	\
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	

	Farmers Market	Fast Food Restaurant	Film Studio	Fish & Chips 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	

	Fish Market	Flea Market	Flower Shop	Food & Drink Shop	Food Court	\
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	

	Food Stand	Food Truck	Fountain	French Restaurant	Fried Chicken Joint	\
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	

	Frozen Yogurt Shop	Furniture / Home Store	Garden	Garden Center	\
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	

	Gas Station	Gastropub	Gay Bar	Gelato Shop	General Entertainment	\
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
---	---	---	---	---	---

	German Restaurant	Gift Shop	Go Kart Track	Golf Course	Gourmet 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

	Greek Restaurant	Grocery Store	Gym	Gym / Fitness Center	Gym Pool \
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

	Harbor / Marina	Hardware Store	Health & Beauty Service \
0	0	0	0
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0

	Health Food Store	Hill	Himalayan Restaurant	Historic Site \
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

	History Museum	Hockey Field	Hookah Bar	Hostel	Hotel	Hotel Bar \
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

	Ice Cream Shop	Indian Restaurant	Indie Movie Theater	Indie Theater \
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

	Indoor Play Area	Iraqi Restaurant	Irish Pub	Israeli Restaurant \
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

	Italian Restaurant	Japanese Curry Restaurant	Japanese Restaurant	\
0	0		0	0
1	0		0	0
2	0		0	0
3	0		0	0
4	0		0	0

	Jazz Club	Jewelry Store	Juice Bar	Kebab Restaurant	Kids Store	\
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

	Kitchen Supply Store	Knitting Store	Korean Restaurant	Kosher Restaurant	\
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

	Lake	Laser Tag	Latin American Restaurant	Leather Goods Store	\
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

	Lebanese Restaurant	Library	Lingerie Store	Liquor Store	Lounge	\
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

	Malay Restaurant	Market	Massage Studio	Mediterranean Restaurant	\
0		0	0		0
1		0	0		0
2		0	0		0
3		0	0		0
4		0	0		0

	Memorial Site	Men's Store	Metro Station	Mexican Restaurant	\
--	---------------	-------------	---------------	--------------------	---

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

	Middle Eastern Restaurant	Mini Golf	Mobile Phone Shop	\
0		0	0	0
1		0	0	0
2		0	0	0
3		0	0	0
4		0	0	0

	Modern European Restaurant	Molecular Gastronomy Restaurant	\
0		0	0
1		0	0
2		0	0
3		0	0
4		0	0

	Monument / Landmark	Moroccan Restaurant	Motorcycle Shop	Movie Theater	\
0		0	0	0	0
1		0	0	0	1
2		0	0	0	0
3		0	0	0	0
4		0	0	0	0

	Multiplex	Museum	Music Store	Music Venue	Nature Preserve	Neighborhood	\
0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0

	New American Restaurant	Nightclub	Noodle House	North Indian Restaurant	\
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

	Office	Okonomiyaki Restaurant	Opera House	Optical Shop	Organic Grocery	\
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

	Other Great Outdoors	Outdoor Gym	Outdoor Sculpture	Paintball Field	\
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	

	Pakistani Restaurant	Palace	Paper / Office Supplies Store	Park	\
0	0	0		0	0
1	0	0		0	0
2	0	0		0	1
3	0	0		0	0
4	0	0		0	0

	Pastry Shop	Pedestrian Plaza	Performing Arts Venue	Perfume 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	

	Persian Restaurant	Peruvian Restaurant	Pet Store	Pharmacy	\
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	

	Physical Therapist	Piano Bar	Pie Shop	Pier	Pilates Studio	Pizza Place	\
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	

	Platform	Playground	Plaza	Poke Place	Polish Restaurant	Pool	\
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	

	Portuguese Restaurant	Pub	Public Art	Ramen Restaurant	Record 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

	Recording Studio	Recreation Center	Rental Car Location	\
0	0	0	0	
1	0	0	0	
2	0	0	0	
3	0	0	0	
4	0	0	0	

	Residential Building (Apartment / Condo)	Restaurant	Road	Rock Club	\
0		0	0	0	
1		0	0	0	
2		0	0	0	
3		0	0	0	
4		0	0	0	

	Roof Deck	Rugby Pitch	Russian Restaurant	Salad Place	\
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	

	Salon / Barbershop	Sandwich Place	Scandinavian Restaurant	\
0	0	0	0	
1	0	0	0	
2	0	0	0	
3	0	0	0	
4	0	0	0	

	Scenic Lookout	Science Museum	Scottish Restaurant	Sculpture Garden	\
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	

	Seafood Restaurant	Shabu-Shabu Restaurant	Shoe Store	Shop & Service	\
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	

	Shopping Mall	Shopping Plaza	Skating Rink	Smoke Shop	Smoothie 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

	Snack Place	Soccer Field	Soccer Stadium	Social Club	Soup Place	\
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	

	South American Restaurant	South Indian Restaurant	Souvenir Shop	\
0		0	0	
1		0	0	
2		0	0	
3		0	0	
4		0	0	

	Souvlaki Shop	Spa	Spanish Restaurant	Speakeasy	Sporting Goods 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	

	Sports Bar	Sports Club	Sri Lankan Restaurant	Stadium	Stationery Store	\
0	0	0	0	0	1	
1	0	0	0	0	0	
2	0	0	0	0	0	
3	0	0	0	0	0	
4	0	0	0	0	0	

	Steakhouse	Street Art	Street Food Gathering	Student Center	Supermarket	\
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	

	Sushi Restaurant	Szechuan Restaurant	Taco Place	Taiwanese Restaurant	\
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	

	Tapas Restaurant	Tea Room	Tennis Court	Thai Restaurant	Theater	\
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	

	Theme Park Ride / Attraction	Thrift / Vintage Store	Tour Provider	\
0		0	0	0
1		0	0	0
2		0	0	0
3		0	0	0
4		0	0	0

	Toy / Game Store	Trail	Train Station	Tram Station	Tree	Tunnel	\
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	

	Turkish Restaurant	Udon Restaurant	Used Bookstore	\
0	0	0	0	
1	0	0	0	
2	0	0	0	
3	0	0	0	
4	0	0	0	

	Vegetarian / Vegan Restaurant	Video Game Store	Vietnamese Restaurant	\
0		0	0	0
1		0	0	0
2		0	0	0
3		0	0	0
4		0	0	0

	Warehouse Store	Watch Shop	Waterfront	Whisky Bar	Wine Bar	Wine Shop	\
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	

	Wings Joint	Women's Store	Xinjiang Restaurant	Yoga Studio	\
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
---	---	---	---	---

Yoshoku Restaurant

0	0
1	0
2	0
3	0
4	0

1.12 Districts where you can find African Restaurants in London

```
[40]: african_venues = london_venues[london_venues['Venue Category'] == 'African_
      ↳Restaurant']
      african_venues
```

```
[40]:
```

		Coverage	Coverage Latitude	Coverage Longitude \
285	South Tottenham district		51.589918	-0.099070
509	Wood Green district		51.592298	-0.105241
1819	Stockwell district		51.476685	-0.111061
3293	Fitzrovia, Tottenham Court Road		51.524002	-0.140537
3596	Shepherds Bush district		51.504004	-0.230712
5378	Finsbury, Finsbury Estate (west)		51.528399	-0.106873

	Venue	Venue Latitude	Venue Longitude \
285	Le Chamarel	51.589688	-0.105921
509	Le Chamarel	51.589688	-0.105921
1819	Adulis	51.479486	-0.111702
3293	African Kitchen Gallery	51.527265	-0.136386
3596	Red Sea Restaurant	51.506485	-0.235160
5378	Spinach & Agushi	51.525288	-0.110348

	Venue Category
285	African Restaurant
509	African Restaurant
1819	African Restaurant
3293	African Restaurant
3596	African Restaurant
5378	African Restaurant

List of the districts where you can find african restaurants

```
[41]: for district in african_venues.Coverage:
      print(district)
```

```
South Tottenham district
Wood Green district
Stockwell district
```

Fitzrovia, Tottenham Court Road
Shepherds Bush district
Finsbury, Finsbury Estate (west)

1.13 Map of African Restaurants in London

```
[42]: # create map of London using latitude and longitude values
def create_venues_map(venues):
    map_london = folium.Map(location=[lond_latitude, lond_longitude],
    zoom_start=10)
    for lat, lng, venue, category in zip(venues['Venue Latitude'], venues['Venue_
    Longitude'], venues['Venue'], venues['Venue Category']):
        label = '{} , {}'.format(venue, category)
        label = folium.Popup(label, parse_html=True)
        folium.CircleMarker(
            [lat, lng],
            radius=5,
            popup=label,
            color='green',
            fill=True,
            fill_color='#3186cc',
            fill_opacity=0.7,
            parse_html=False).add_to(map_london)
    return map_london
create_venues_map(african_venues)
```

```
[42]: <folium.folium.Map at 0x7f92c4743410>
```

1.14 Districts where you can find American Restaurants in London

```
[43]: american_venues = london_venues[london_venues['Venue Category'] == 'American_
    Restaurant']
for district in american_venues.Coverage:
    print(district)
```

Tottenham district
Barnes district
Portland Place, Regent Street
Marylebone
Marylebone
Fitzrovia, Tottenham Court Road
Great Portland Street, Fitzrovia
University College London, SOAS
Covent Garden
Somerset House, Temple (west)
Woodford and South Woodford district

Non-geographic postcode district (NatWest, delivers to E1)
 Non-geographic postcode district (News International, delivers to E1W)

1.15 Map of American Restaurants in London

```
[44]: create_venues_map(american_venues)
```

```
[44]: <folium.folium.Map at 0x7f92c46bf410>
```

```
[45]: london_grouped = london_onehot.groupby('Coverage').mean().reset_index()
london_grouped.head()
```

```
[45]:
```

		Coverage	Accessories Store	\
0	A projection around Parliament Square. Nearby ...		0.0	
1	Abbey Wood district		0.0	
2	All but the west of St James's		0.0	
3	Anerley district		0.0	
4	Balham district		0.0	

	African Restaurant	Airport Lounge	Airport Service	American Restaurant	\
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	

	Antique Shop	Arcade	Argentinian Restaurant	Art Gallery	Art Museum	\
0	0.0	0.0	0.0	0.000000	0.000000	
1	0.0	0.0	0.0	0.000000	0.000000	
2	0.0	0.0	0.0	0.022727	0.022727	
3	0.0	0.0	0.0	0.000000	0.000000	
4	0.0	0.0	0.0	0.000000	0.000000	

	Arts & Crafts Store	Asian Restaurant	Athletics & Sports	\
0	0.000000	0.018182	0.0	
1	0.000000	0.000000	0.0	
2	0.011364	0.000000	0.0	
3	0.000000	0.000000	0.0	
4	0.000000	0.016393	0.0	

	Australian Restaurant	Austrian Restaurant	BBQ Joint	Baby 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	

	Badminton Court	Bagel Shop	Bakery	Bar	Beach	Bed & Breakfast	\
0	0.0	0.0	0.000000	0.036364	0.0	0.0	
1	0.0	0.0	0.000000	0.000000	0.0	0.0	
2	0.0	0.0	0.011364	0.011364	0.0	0.0	
3	0.0	0.0	0.000000	0.000000	0.0	0.0	
4	0.0	0.0	0.049180	0.032787	0.0	0.0	

	Beer Bar	Beer Garden	Beer Store	Bike Rental / Bike Share	Bike Shop	\
0	0.018182	0.0	0.000000		0.0	0.000000
1	0.000000	0.0	0.000000		0.0	0.000000
2	0.000000	0.0	0.000000		0.0	0.011364
3	0.000000	0.0	0.000000		0.0	0.000000
4	0.000000	0.0	0.016393		0.0	0.000000

	Bistro	Boat or Ferry	Bookstore	Botanical Garden	Boutique	\
0	0.0	0.0	0.000000	0.0	0.018182	
1	0.0	0.0	0.000000	0.0	0.000000	
2	0.0	0.0	0.034091	0.0	0.011364	
3	0.0	0.0	0.000000	0.0	0.000000	
4	0.0	0.0	0.016393	0.0	0.000000	

	Bowling Alley	Boxing Gym	Brasserie	Brazilian Restaurant	Breakfast Spot	\
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	0.0	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	

	Brewery	Bubble Tea Shop	Buffet	Building	Bulgarian Restaurant	\
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	0.0	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	

	Burger Joint	Burrito Place	Bus Station	Bus Stop	Business Service	\
0	0.000000	0.0	0.0	0.0	0.0	
1	0.000000	0.0	0.0	0.0	0.0	
2	0.011364	0.0	0.0	0.0	0.0	
3	0.000000	0.0	0.0	0.0	0.0	
4	0.016393	0.0	0.0	0.0	0.0	

	Butcher	Café	Camera Store	Canal	Canal Lock	Candy Store	\
0	0.0	0.127273	0.0	0.0	0.0	0.000000	
1	0.0	0.000000	0.0	0.0	0.0	0.000000	
2	0.0	0.045455	0.0	0.0	0.0	0.022727	
3	0.0	0.000000	0.0	0.0	0.0	0.000000	

4	0.0	0.032787	0.0	0.0	0.0	0.000000
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	Cantonese Restaurant	Caribbean Restaurant	Casino	Castle	Champagne Bar	\
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	0.0	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	

	Cheese Shop	Chinese Restaurant	Chocolate Shop	Church	Cigkofte Place	\
0	0.0	0.018182	0.0	0.000000	0.0	
1	0.0	0.000000	0.0	0.000000	0.0	
2	0.0	0.000000	0.0	0.011364	0.0	
3	0.0	0.000000	0.0	0.000000	0.0	
4	0.0	0.000000	0.0	0.000000	0.0	

	Climbing Gym	Clothing Store	Club House	Cocktail Bar	Coffee Shop	\
0	0.0	0.000000	0.0	0.000000	0.127273	
1	0.0	0.000000	0.0	0.000000	0.000000	
2	0.0	0.011364	0.0	0.011364	0.034091	
3	0.0	0.000000	0.0	0.000000	0.000000	
4	0.0	0.016393	0.0	0.016393	0.147541	

	College Cafeteria	College Residence Hall	Comedy Club	Comic Shop	\
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	

	Concert Hall	Construction & Landscaping	Convenience Store	\
0	0.018182	0.0	0.0	
1	0.000000	0.0	0.0	
2	0.000000	0.0	0.0	
3	0.000000	0.0	0.2	
4	0.000000	0.0	0.0	

	Convention Center	Cosmetics Shop	Costume Shop	Coworking Space	Creperie	\
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	0.0	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	

	Cricket Ground	Cuban Restaurant	Cupcake Shop	Cycle Studio	Dance Studio	\
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	0.0	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

	Deli / Bodega	Department Store	Design Studio	Dessert Shop	\
0	0.0	0.000000	0.0	0.000000	
1	0.0	0.000000	0.0	0.000000	
2	0.0	0.011364	0.0	0.011364	
3	0.0	0.000000	0.0	0.000000	
4	0.0	0.000000	0.0	0.000000	

	Dim Sum Restaurant	Diner	Discount Store	Distillery	Dog Run	Donut Shop	\
0	0.0	0.0	0.0	0.0	0.0	0.000000	
1	0.0	0.0	0.0	0.0	0.0	0.000000	
2	0.0	0.0	0.0	0.0	0.0	0.011364	
3	0.0	0.0	0.0	0.0	0.0	0.000000	
4	0.0	0.0	0.0	0.0	0.0	0.000000	

	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	\
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	

	Electronics Store	English Restaurant	Escape Room	Ethiopian Restaurant	\
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	

	Event Service	Event Space	Exhibit	Fabric Shop	Falafel Restaurant	Farm	\
0	0.0	0.018182	0.0	0.0	0.0	0.0	
1	0.0	0.000000	0.0	0.0	0.0	0.0	
2	0.0	0.011364	0.0	0.0	0.0	0.0	
3	0.0	0.000000	0.0	0.0	0.0	0.0	
4	0.0	0.000000	0.0	0.0	0.0	0.0	

	Farmers Market	Fast Food Restaurant	Film Studio	Fish & Chips Shop	\
0	0.000000	0.018182	0.0	0.000000	
1	0.000000	0.000000	0.0	0.333333	
2	0.000000	0.000000	0.0	0.000000	
3	0.000000	0.200000	0.0	0.000000	
4	0.016393	0.016393	0.0	0.000000	

	Fish Market	Flea Market	Flower Shop	Food & Drink Shop	Food Court	\
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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	0.0	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

	Food Stand	Food Truck	Fountain	French Restaurant	Fried Chicken Joint	\
0	0.018182	0.0	0.000000	0.000000	0.0	
1	0.000000	0.0	0.000000	0.000000	0.0	
2	0.000000	0.0	0.011364	0.011364	0.0	
3	0.000000	0.0	0.000000	0.000000	0.0	
4	0.000000	0.0	0.000000	0.000000	0.0	

	Frozen Yogurt Shop	Furniture / Home Store	Garden	Garden Center	\
0	0.0	0.0	0.018182	0.0	
1	0.0	0.0	0.000000	0.0	
2	0.0	0.0	0.011364	0.0	
3	0.0	0.0	0.000000	0.0	
4	0.0	0.0	0.000000	0.0	

	Gas Station	Gastropub	Gay Bar	Gelato Shop	General Entertainment	\
0	0.0	0.0	0.0	0.000000	0.0	
1	0.0	0.0	0.0	0.000000	0.0	
2	0.0	0.0	0.0	0.022727	0.0	
3	0.0	0.0	0.0	0.000000	0.0	
4	0.0	0.0	0.0	0.000000	0.0	

	German Restaurant	Gift Shop	Go Kart Track	Golf Course	Gourmet Shop	\
0	0.0	0.018182	0.0	0.0	0.000000	
1	0.0	0.000000	0.0	0.0	0.000000	
2	0.0	0.000000	0.0	0.0	0.022727	
3	0.0	0.000000	0.0	0.0	0.000000	
4	0.0	0.000000	0.0	0.0	0.000000	

	Greek Restaurant	Grocery Store	Gym	Gym / Fitness Center	Gym Pool	\
0	0.000000	0.036364	0.000000	0.000000	0.0	
1	0.000000	0.333333	0.000000	0.000000	0.0	
2	0.011364	0.011364	0.000000	0.000000	0.0	
3	0.000000	0.200000	0.000000	0.000000	0.0	
4	0.000000	0.016393	0.016393	0.016393	0.0	

	Harbor / Marina	Hardware Store	Health & Beauty Service	\
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	

	Health Food Store	Hill	Himalayan Restaurant	Historic Site	\
0	0.0	0.0	0.0	0.036364	
1	0.0	0.0	0.0	0.000000	
2	0.0	0.0	0.0	0.000000	
3	0.0	0.0	0.0	0.000000	
4	0.0	0.0	0.0	0.000000	

	History Museum	Hockey Field	Hookah Bar	Hostel	Hotel	Hotel Bar	\
0	0.000000	0.0	0.0	0.0	0.036364	0.018182	
1	0.000000	0.0	0.0	0.0	0.000000	0.000000	
2	0.011364	0.0	0.0	0.0	0.056818	0.000000	
3	0.000000	0.0	0.0	0.0	0.200000	0.000000	
4	0.000000	0.0	0.0	0.0	0.016393	0.000000	

	Ice Cream Shop	Indian Restaurant	Indie Movie Theater	Indie Theater	\
0	0.000000	0.018182	0.000000	0.0	
1	0.000000	0.000000	0.000000	0.0	
2	0.011364	0.022727	0.011364	0.0	
3	0.000000	0.000000	0.000000	0.0	
4	0.000000	0.065574	0.000000	0.0	

	Indoor Play Area	Iraqi Restaurant	Irish Pub	Israeli Restaurant	\
0	0.0	0.0	0.000000	0.000000	
1	0.0	0.0	0.000000	0.000000	
2	0.0	0.0	0.011364	0.011364	
3	0.0	0.0	0.000000	0.000000	
4	0.0	0.0	0.000000	0.000000	

	Italian Restaurant	Japanese Curry Restaurant	Japanese Restaurant	\
0	0.036364	0.0	0.000000	
1	0.000000	0.0	0.000000	
2	0.011364	0.0	0.011364	
3	0.000000	0.0	0.000000	
4	0.049180	0.0	0.016393	

	Jazz Club	Jewelry Store	Juice Bar	Kebab Restaurant	Kids Store	\
0	0.0	0.0	0.0	0.0	0.000000	
1	0.0	0.0	0.0	0.0	0.000000	
2	0.0	0.0	0.0	0.0	0.000000	
3	0.0	0.0	0.0	0.0	0.000000	
4	0.0	0.0	0.0	0.0	0.016393	

	Kitchen Supply Store	Knitting Store	Korean Restaurant	Kosher Restaurant	\
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

	Lake	Laser Tag	Latin American Restaurant	Leather Goods 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

	Lebanese Restaurant	Library	Lingerie Store	Liquor Store	Lounge \
0	0.0	0.0	0.0	0.0	0.000000
1	0.0	0.0	0.0	0.0	0.000000
2	0.0	0.0	0.0	0.0	0.022727
3	0.0	0.0	0.0	0.0	0.000000
4	0.0	0.0	0.0	0.0	0.000000

	Malay Restaurant	Market	Massage Studio	Mediterranean Restaurant \
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

	Memorial Site	Men's Store	Metro Station	Mexican Restaurant \
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

	Middle Eastern Restaurant	Mini Golf	Mobile Phone Shop \
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

	Modern European Restaurant	Molecular Gastronomy Restaurant \
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

	Monument / Landmark	Moroccan Restaurant	Motorcycle Shop	Movie Theater \
0	0.018182	0.000000	0.0	0.0

1	0.000000	0.000000	0.0	0.0
2	0.022727	0.000000	0.0	0.0
3	0.000000	0.000000	0.0	0.0
4	0.000000	0.016393	0.0	0.0

	Multiplex	Museum	Music Store	Music Venue	Nature Preserve	Neighborhood \
0	0.000000	0.0	0.0	0.0	0.0	0.0
1	0.000000	0.0	0.0	0.0	0.0	0.0
2	0.011364	0.0	0.0	0.0	0.0	0.0
3	0.000000	0.0	0.0	0.0	0.0	0.0
4	0.000000	0.0	0.0	0.0	0.0	0.0

	New American Restaurant	Nightclub	Noodle House	North Indian Restaurant \
0	0.0	0.000000	0.0	0.0
1	0.0	0.000000	0.0	0.0
2	0.0	0.011364	0.0	0.0
3	0.0	0.000000	0.0	0.0
4	0.0	0.000000	0.0	0.0

	Office	Okonomiyaki Restaurant	Opera House	Optical Shop	Organic Grocery \
0	0.0	0.0	0.000000	0.0	0.000000
1	0.0	0.0	0.000000	0.0	0.000000
2	0.0	0.0	0.011364	0.0	0.000000
3	0.0	0.0	0.000000	0.0	0.000000
4	0.0	0.0	0.000000	0.0	0.016393

	Other Great Outdoors	Outdoor Gym	Outdoor Sculpture	Paintball Field \
0	0.0	0.0	0.054545	0.0
1	0.0	0.0	0.000000	0.0
2	0.0	0.0	0.022727	0.0
3	0.0	0.0	0.000000	0.0
4	0.0	0.0	0.000000	0.0

	Pakistani Restaurant	Palace	Paper / Office Supplies Store	Park \
0	0.0	0.018182	0.0	0.036364
1	0.0	0.000000	0.0	0.000000
2	0.0	0.011364	0.0	0.022727
3	0.0	0.000000	0.0	0.000000
4	0.0	0.000000	0.0	0.000000

	Pastry Shop	Pedestrian Plaza	Performing Arts Venue	Perfume Shop \
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

	Persian Restaurant	Peruvian Restaurant	Pet Store	Pharmacy \
0	0.000000	0.0	0.0	0.000000
1	0.000000	0.0	0.0	0.000000
2	0.011364	0.0	0.0	0.000000
3	0.000000	0.0	0.0	0.000000
4	0.000000	0.0	0.0	0.016393

	Physical Therapist	Piano Bar	Pie Shop	Pier	Pilates Studio	Pizza Place \
0	0.000000	0.0	0.0	0.0	0.0	0.000000
1	0.000000	0.0	0.0	0.0	0.0	0.000000
2	0.000000	0.0	0.0	0.0	0.0	0.011364
3	0.000000	0.0	0.0	0.0	0.0	0.000000
4	0.016393	0.0	0.0	0.0	0.0	0.065574

	Platform	Playground	Plaza	Poke Place	Polish Restaurant	Pool \
0	0.0	0.0	0.054545	0.0	0.0	0.0
1	0.0	0.0	0.000000	0.0	0.0	0.0
2	0.0	0.0	0.056818	0.0	0.0	0.0
3	0.0	0.0	0.000000	0.0	0.0	0.0
4	0.0	0.0	0.000000	0.0	0.0	0.0

	Portuguese Restaurant	Pub	Public Art	Ramen Restaurant	Record Shop \
0	0.000000	0.036364	0.0	0.0	0.0
1	0.000000	0.000000	0.0	0.0	0.0
2	0.000000	0.034091	0.0	0.0	0.0
3	0.000000	0.000000	0.0	0.0	0.0
4	0.016393	0.081967	0.0	0.0	0.0

	Recording Studio	Recreation Center	Rental Car Location \
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

	Residential Building (Apartment / Condo)	Restaurant	Road	Rock Club \
0	0.0	0.036364	0.0	0.0
1	0.0	0.000000	0.0	0.0
2	0.0	0.011364	0.0	0.0
3	0.0	0.000000	0.0	0.0
4	0.0	0.016393	0.0	0.0

	Roof Deck	Rugby Pitch	Russian Restaurant	Salad Place \
0	0.0	0.0	0.0	0.018182
1	0.0	0.0	0.0	0.000000
2	0.0	0.0	0.0	0.000000
3	0.0	0.0	0.0	0.000000

4	0.0	0.0	0.0	0.000000
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	Salon / Barbershop	Sandwich Place	Scandinavian Restaurant	\
0	0.0	0.054545	0.0	
1	0.0	0.000000	0.0	
2	0.0	0.000000	0.0	
3	0.0	0.000000	0.0	
4	0.0	0.032787	0.0	

	Scenic Lookout	Science Museum	Scottish Restaurant	Sculpture Garden	\
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	

	Seafood Restaurant	Shabu-Shabu Restaurant	Shoe Store	Shop & Service	\
0	0.000000	0.0	0.0	0.000000	
1	0.000000	0.0	0.0	0.000000	
2	0.022727	0.0	0.0	0.000000	
3	0.000000	0.0	0.0	0.000000	
4	0.000000	0.0	0.0	0.016393	

	Shopping Mall	Shopping Plaza	Skating Rink	Smoke Shop	Smoothie Shop	\
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	0.0	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	

	Snack Place	Soccer Field	Soccer Stadium	Social Club	Soup Place	\
0	0.0	0.000000	0.0	0.0	0.0	
1	0.0	0.333333	0.0	0.0	0.0	
2	0.0	0.000000	0.0	0.0	0.0	
3	0.0	0.000000	0.0	0.0	0.0	
4	0.0	0.000000	0.0	0.0	0.0	

	South American Restaurant	South Indian Restaurant	Souvenir Shop	\
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

	Souvlaki Shop	Spa	Spanish Restaurant	Speakeasy	\
0	0.0	0.000000	0.000000	0.0	
1	0.0	0.000000	0.000000	0.0	

2	0.0	0.011364	0.011364	0.0
3	0.0	0.000000	0.000000	0.0
4	0.0	0.000000	0.000000	0.0

	Sporting Goods Shop	Sports Bar	Sports Club	Sri Lankan Restaurant \
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

	Stadium	Stationery Store	Steakhouse	Street Art	Street Food Gathering \
0	0.0	0.0	0.000000	0.0	0.0
1	0.0	0.0	0.000000	0.0	0.0
2	0.0	0.0	0.011364	0.0	0.0
3	0.0	0.0	0.000000	0.0	0.0
4	0.0	0.0	0.016393	0.0	0.0

	Student Center	Supermarket	Sushi Restaurant	Szechuan Restaurant \
0	0.0	0.00000	0.018182	0.0
1	0.0	0.00000	0.000000	0.0
2	0.0	0.00000	0.000000	0.0
3	0.0	0.20000	0.000000	0.0
4	0.0	0.04918	0.000000	0.0

	Taco Place	Taiwanese Restaurant	Tapas Restaurant	Tea Room	Tennis Court \
0	0.0	0.0	0.0	0.000000	0.0
1	0.0	0.0	0.0	0.000000	0.0
2	0.0	0.0	0.0	0.011364	0.0
3	0.0	0.0	0.0	0.000000	0.0
4	0.0	0.0	0.0	0.000000	0.0

	Thai Restaurant	Theater	Theme Park Ride / Attraction \
0	0.0	0.000000	0.0
1	0.0	0.000000	0.0
2	0.0	0.045455	0.0
3	0.0	0.000000	0.0
4	0.0	0.000000	0.0

	Thrift / Vintage Store	Tour Provider	Toy / Game Store	Trail \
0	0.000000	0.0	0.000000	0.0
1	0.000000	0.0	0.000000	0.0
2	0.000000	0.0	0.011364	0.0
3	0.000000	0.0	0.000000	0.0
4	0.016393	0.0	0.000000	0.0

	Train Station	Tram Station	Tree	Tunnel	Turkish Restaurant \
--	---------------	--------------	------	--------	----------------------

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	0.0	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

	Udon Restaurant	Used Bookstore	Vegetarian / Vegan Restaurant	\
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

	Video Game Store	Vietnamese Restaurant	Warehouse Store	Watch Shop	\
0	0.0	0.000000	0.0	0.0	0.0
1	0.0	0.000000	0.0	0.0	0.0
2	0.0	0.011364	0.0	0.0	0.0
3	0.0	0.000000	0.0	0.0	0.0
4	0.0	0.000000	0.0	0.0	0.0

	Waterfront	Whisky Bar	Wine Bar	Wine Shop	Wings Joint	Women's Store	\
0	0.0	0.0	0.0	0.000000	0.0	0.0	0.0
1	0.0	0.0	0.0	0.000000	0.0	0.0	0.0
2	0.0	0.0	0.0	0.011364	0.0	0.0	0.0
3	0.0	0.0	0.0	0.000000	0.0	0.0	0.0
4	0.0	0.0	0.0	0.000000	0.0	0.0	0.0

	Xinjiang Restaurant	Yoga Studio	Yoshoku Restaurant
0	0.0	0.000000	0.0
1	0.0	0.000000	0.0
2	0.0	0.000000	0.0
3	0.0	0.000000	0.0
4	0.0	0.016393	0.0

1.16 Top 5 venues in each district

```
[46]: num_top_venues = 5

for hood in london_grouped['Coverage']:
    print("----"+hood+"----")
    temp = london_grouped[london_grouped['Coverage'] == 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')

```

----A projection around Parliament Square. Nearby Westminster School to Westminster Cathedral to CCAL, University of the Arts, London (omitting all backstreets nearest to Vauxhall Bridge Road) - derivation----

	venue	freq
0	Coffee Shop	0.13
1	Café	0.13
2	Sandwich Place	0.05
3	Outdoor Sculpture	0.05
4	Plaza	0.05

----Abbey Wood district----

	venue	freq
0	Soccer Field	0.33
1	Fish & Chips Shop	0.33
2	Grocery Store	0.33
3	Accessories Store	0.00
4	Palace	0.00

----All but the west of St James's----

	venue	freq
0	Plaza	0.06
1	Hotel	0.06
2	Café	0.05
3	Theater	0.05
4	Pub	0.03

----Anerley district----

	venue	freq
0	Fast Food Restaurant	0.2
1	Hotel	0.2
2	Supermarket	0.2
3	Convenience Store	0.2
4	Grocery Store	0.2

----Balham district----

	venue	freq
0	Coffee Shop	0.15
1	Pub	0.08
2	Indian Restaurant	0.07

3	Pizza Place	0.07
4	Bakery	0.05

----Bank of England----

	venue	freq
0	Coffee Shop	0.10
1	Gym / Fitness Center	0.05
2	Italian Restaurant	0.05
3	French Restaurant	0.04
4	Sandwich Place	0.04

----Barbican----

	venue	freq
0	Italian Restaurant	0.07
1	Gym / Fitness Center	0.07
2	Coffee Shop	0.07
3	Deli / Bodega	0.04
4	Café	0.04

----Barnes district----

	venue	freq
0	American Restaurant	0.5
1	Seafood Restaurant	0.5
2	Accessories Store	0.0
3	Palace	0.0
4	Persian Restaurant	0.0

----Battersea head district----

	venue	freq
0	Pub	0.12
1	Café	0.07
2	Pharmacy	0.05
3	Supermarket	0.05
4	Cocktail Bar	0.05

----Bethnal Green district----

	venue	freq
0	Turkish Restaurant	0.24
1	Café	0.08
2	Clothing Store	0.05
3	Discount Store	0.03
4	Hardware Store	0.03

----Blackfriars----

	venue	freq
0	Coffee Shop	0.08
1	Sandwich Place	0.06
2	Italian Restaurant	0.03
3	Restaurant	0.03
4	French Restaurant	0.03

----Blackheath district----

	venue	freq
0	Pub	0.11
1	Bakery	0.11
2	Pizza Place	0.07
3	Café	0.07
4	Bus Stop	0.04

----Bloomsbury, British Museum, Southampton Row----

	venue	freq
0	Chinese Restaurant	0.07
1	Hotel	0.05
2	Pub	0.05
3	Sandwich Place	0.05
4	Coffee Shop	0.05

----Bow district----

	venue	freq
0	Bus Stop	0.2
1	Hockey Field	0.2
2	Market	0.2
3	Park	0.2
4	Plaza	0.2

----Brixton district----

	venue	freq
0	Grocery Store	0.29
1	Bus Stop	0.14
2	Pub	0.14
3	Portuguese Restaurant	0.14
4	Coffee Shop	0.14

----Broadgate, Liverpool Street----

	venue	freq
--	-------	------

0	Hotel	0.05
1	Coffee Shop	0.04
2	Wine Bar	0.04
3	Pub	0.04
4	Italian Restaurant	0.04

----Brockley district----

	venue	freq
0	Beer Store	0.10
1	Gastropub	0.10
2	Grocery Store	0.10
3	Coffee Shop	0.10
4	Vietnamese Restaurant	0.05

----Camberwell district----

	venue	freq
0	Pub	0.10
1	Café	0.07
2	Park	0.07
3	Bus Stop	0.05
4	Gastropub	0.05

----Cannon Street----

	venue	freq
0	Gym / Fitness Center	0.09
1	Vietnamese Restaurant	0.05
2	Sandwich Place	0.05
3	Steakhouse	0.05
4	Cocktail Bar	0.05

----Catford district----

	venue	freq
0	Coffee Shop	0.29
1	Recreation Center	0.14
2	Grocery Store	0.14
3	Chinese Restaurant	0.14
4	Fried Chicken Joint	0.14

----Charing Cross----

	venue	freq
0	Theater	0.07
1	Bakery	0.06
2	Coffee Shop	0.05

3	Plaza	0.04
4	Ice Cream Shop	0.04

----Charlton district----

	venue	freq
0	Paintball Field	0.11
1	Café	0.11
2	Discount Store	0.11
3	Soccer Stadium	0.11
4	Go Kart Track	0.11

----Chelsea district----

	venue	freq
0	Café	0.07
1	Clothing Store	0.06
2	Italian Restaurant	0.05
3	Hotel	0.05
4	Japanese Restaurant	0.04

----Chingford district----

	venue	freq
0	Bus Stop	0.2
1	Hockey Field	0.2
2	Market	0.2
3	Park	0.2
4	Plaza	0.2

----Clapham district----

	venue	freq
0	Pub	0.08
1	Coffee Shop	0.07
2	Café	0.05
3	Italian Restaurant	0.04
4	Bar	0.04

----Clapton district----

	venue	freq
0	Athletics & Sports	0.17
1	Bus Stop	0.17
2	Hockey Field	0.17
3	Market	0.17
4	Park	0.17

----Clerkenwell, Farringdon----

	venue	freq
0	Food Truck	0.08
1	Pub	0.06
2	Hotel	0.06
3	Coffee Shop	0.05
4	Café	0.05

----Cornhill, Gracechurch Street, Lombard Street----

	venue	freq
0	Coffee Shop	0.07
1	Gym / Fitness Center	0.07
2	Pub	0.05
3	Vietnamese Restaurant	0.05
4	Cocktail Bar	0.04

----Covent Garden----

	venue	freq
0	Theater	0.07
1	Burger Joint	0.06
2	Ice Cream Shop	0.05
3	Coffee Shop	0.04
4	Bakery	0.04

----Cricklewood district----

	venue	freq
0	Grocery Store	0.10
1	Bus Stop	0.10
2	Hotel	0.10
3	Fast Food Restaurant	0.10
4	Supermarket	0.05

----Deptford district----

	venue	freq
0	Fast Food Restaurant	0.12
1	Platform	0.12
2	Bus Stop	0.12
3	Pub	0.12
4	Café	0.12

----Drury Lane, Kingsway, Aldwych----

	venue	freq
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0	Pub	0.07
1	Sandwich Place	0.07
2	Coffee Shop	0.05
3	Café	0.05
4	Chinese Restaurant	0.05

----Dulwich district----

	venue	freq
0	Café	0.25
1	Brewery	0.25
2	Train Station	0.12
3	Pub	0.12
4	Italian Restaurant	0.12

----Ealing district----

	venue	freq
0	Golf Course	0.25
1	Airport Service	0.25
2	Italian Restaurant	0.25
3	Hotel	0.25
4	Pakistani Restaurant	0.00

----Earls Court district----

	venue	freq
0	Hotel	0.30
1	Garden	0.06
2	Italian Restaurant	0.04
3	Cocktail Bar	0.04
4	Café	0.03

----East Dulwich district----

	venue	freq
0	Café	0.13
1	Pub	0.10
2	Gastropub	0.06
3	Indian Restaurant	0.06
4	Coffee Shop	0.06

----East Finchley district----

	venue	freq
0	Stationery Store	0.33
1	Bakery	0.33
2	Coffee Shop	0.33

3	Peruvian Restaurant	0.00
4	Perfume Shop	0.00

----East Ham district----

	venue	freq
0	Clothing Store	0.10
1	Pub	0.04
2	Pharmacy	0.04
3	Coffee Shop	0.04
4	Fast Food Restaurant	0.04

----Eastern head district----

	venue	freq
0	Indian Restaurant	0.33
1	Beer Garden	0.33
2	Nature Preserve	0.33
3	Accessories Store	0.00
4	Perfume Shop	0.00

----Eltham district----

	venue	freq
0	Event Service	0.33
1	Soccer Field	0.33
2	Park	0.33
3	Accessories Store	0.00
4	Palace	0.00

----Fetter Lane----

	venue	freq
0	Pub	0.12
1	Coffee Shop	0.10
2	Italian Restaurant	0.07
3	Sandwich Place	0.06
4	Wine Bar	0.04

----Finchley district----

	venue	freq
0	Clothing Store	0.12
1	Sporting Goods Shop	0.08
2	Coffee Shop	0.08
3	Fast Food Restaurant	0.08
4	Warehouse Store	0.04

----Finsbury (east), Moorfields Eye Hospital----

	venue	freq
0	Coffee Shop	0.13
1	Café	0.07
2	Pub	0.07
3	Sandwich Place	0.06
4	Italian Restaurant	0.06

----Finsbury Park district----

	venue	freq
0	Clothing Store	0.13
1	Fast Food Restaurant	0.06
2	Sporting Goods Shop	0.06
3	Supermarket	0.06
4	Coffee Shop	0.06

----Finsbury, Finsbury Estate (west)----

	venue	freq
0	Coffee Shop	0.09
1	Pub	0.08
2	Café	0.08
3	Gym / Fitness Center	0.05
4	Bar	0.05

----Fitzrovia, Tottenham Court Road----

	venue	freq
0	Coffee Shop	0.10
1	Indian Restaurant	0.04
2	Restaurant	0.04
3	Pub	0.03
4	Furniture / Home Store	0.03

----Forest Gate district----

	venue	freq
0	Bus Stop	0.2
1	Hockey Field	0.2
2	Market	0.2
3	Park	0.2
4	Plaza	0.2

----Forest Hill district----

	venue	freq
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0	Garden	0.5
1	Park	0.5
2	Pakistani Restaurant	0.0
3	Persian Restaurant	0.0
4	Perfume Shop	0.0

----Fulham district----

	venue	freq
0	Coffee Shop	0.16
1	Café	0.06
2	Pub	0.04
3	Bakery	0.04
4	French Restaurant	0.04

----Golders Green district----

	venue	freq
0	Coffee Shop	0.12
1	Korean Restaurant	0.08
2	Turkish Restaurant	0.08
3	Grocery Store	0.08
4	Café	0.08

----Gray's Inn----

	venue	freq
0	Coffee Shop	0.11
1	Pub	0.07
2	Hotel	0.06
3	Restaurant	0.03
4	Gym / Fitness Center	0.03

----Great Portland Street, Fitzrovia----

	venue	freq
0	Coffee Shop	0.14
1	Pub	0.06
2	Indian Restaurant	0.04
3	Vietnamese Restaurant	0.04
4	Restaurant	0.04

----Greenwich district----

	venue	freq
0	Pub	0.13
1	Pier	0.05
2	Turkish Restaurant	0.05

3	Café	0.05
4	Grocery Store	0.05

----Guildhall----

	venue	freq
0	Coffee Shop	0.10
1	Italian Restaurant	0.04
2	Sandwich Place	0.04
3	French Restaurant	0.04
4	Bakery	0.03

----Hackney district----

	venue	freq
0	Bus Stop	0.2
1	Hockey Field	0.2
2	Market	0.2
3	Park	0.2
4	Plaza	0.2

----Hampstead district----

	venue	freq
0	Café	0.17
1	Hotel Bar	0.09
2	Italian Restaurant	0.09
3	Breakfast Spot	0.04
4	Hotel	0.04

----Hatton Garden----

	venue	freq
0	Pub	0.09
1	Coffee Shop	0.09
2	Sandwich Place	0.05
3	Bar	0.03
4	Food Truck	0.03

----Hendon district----

	venue	freq
0	Clothing Store	0.12
1	Coffee Shop	0.10
2	Café	0.10
3	Department Store	0.07
4	Supermarket	0.05

----Herne Hill district----

	venue	freq
0	Fish & Chips Shop	0.2
1	Stadium	0.1
2	Playground	0.1
3	Food & Drink Shop	0.1
4	Gym / Fitness Center	0.1

----High Holborn----

	venue	freq
0	Pub	0.07
1	Coffee Shop	0.05
2	Chinese Restaurant	0.05
3	Sandwich Place	0.05
4	Bookstore	0.04

----Highbury district----

	venue	freq
0	Rental Car Location	0.25
1	Bus Stop	0.17
2	Hotel	0.17
3	Airport Service	0.08
4	Coffee Shop	0.08

----Highgate district----

	venue	freq
0	Airport Service	0.5
1	Coffee Shop	0.5
2	Accessories Store	0.0
3	Palace	0.0
4	Persian Restaurant	0.0

----Homerton district----

	venue	freq
0	Park	1.0
1	Accessories Store	0.0
2	Peruvian Restaurant	0.0
3	Perfume Shop	0.0
4	Performing Arts Venue	0.0

----Hornsey district----

	venue	freq
--	-------	------

0	Pharmacy	0.5
1	Spa	0.5
2	Accessories Store	0.0
3	Paintball Field	0.0
4	Performing Arts Venue	0.0

----Kennington district----

	venue	freq
0	Pub	0.22
1	Coffee Shop	0.08
2	Indian Restaurant	0.05
3	Café	0.05
4	Pizza Place	0.05

----Kentish Town district----

	venue	freq
0	Café	0.15
1	Pub	0.12
2	Gym / Fitness Center	0.09
3	Italian Restaurant	0.09
4	Convenience Store	0.09

----Kilburn district----

	venue	freq
0	Café	0.06
1	Grocery Store	0.06
2	Coffee Shop	0.06
3	Fish & Chips Shop	0.06
4	Gym / Fitness Center	0.06

----Kings Cross Central----

	venue	freq
0	Café	0.08
1	Park	0.03
2	Breakfast Spot	0.03
3	Train Station	0.03
4	Movie Theater	0.03

----Kings Cross, Finsbury (west), Clerkenwell (north)----

	venue	freq
0	Coffee Shop	0.11
1	History Museum	0.06
2	Bookstore	0.04

3	Restaurant	0.04
4	Garden	0.04

----Lee district----

	venue	freq
0	Gym	0.5
1	Convenience Store	0.5
2	Accessories Store	0.0
3	Pakistani Restaurant	0.0
4	Perfume Shop	0.0

----Leicester Square, St. Giles----

	venue	freq
0	Coffee Shop	0.07
1	Bakery	0.06
2	Theater	0.05
3	Ice Cream Shop	0.05
4	Sushi Restaurant	0.04

----Lewisham district----

	venue	freq
0	Clothing Store	0.09
1	Grocery Store	0.07
2	Coffee Shop	0.07
3	Pub	0.05
4	Fast Food Restaurant	0.05

----Leyton district----

	venue	freq
0	Park	0.2
1	Coffee Shop	0.1
2	Farm	0.1
3	Train Station	0.1
4	Hotel	0.1

----Leytonstone district----

	venue	freq
0	Restaurant	0.25
1	Irish Pub	0.25
2	Park	0.25
3	Supermarket	0.25
4	Accessories Store	0.00

----Lincoln's Inn Fields, Royal Courts of Justice, Chancery Lane----

	venue	freq
0	Pub	0.16
1	Coffee Shop	0.11
2	Sandwich Place	0.08
3	Hotel	0.05
4	Bar	0.04

----Lloyd's of London, Fenchurch Street----

	venue	freq
0	Hotel	0.08
1	Restaurant	0.06
2	Sandwich Place	0.06
3	Pub	0.06
4	Gym / Fitness Center	0.05

----Lower Edmonton district----

	venue	freq
0	Coffee Shop	0.09
1	Hotel	0.09
2	Bar	0.09
3	Theater	0.06
4	Pub	0.06

----Manor Park district----

	venue	freq
0	Indian Restaurant	0.2
1	Restaurant	0.2
2	Gym / Fitness Center	0.2
3	Turkish Restaurant	0.2
4	Park	0.2

----Mansion House----

	venue	freq
0	Coffee Shop	0.06
1	Pub	0.06
2	Gym / Fitness Center	0.06
3	Clothing Store	0.04
4	Wine Bar	0.04

----Marylebone----

	venue	freq
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0	Coffee Shop	0.06
1	Hotel	0.06
2	Café	0.04
3	French Restaurant	0.04
4	Clothing Store	0.04

----Mayfair (east), Hanover Square, Savile Row, Royal Academy----

	venue	freq
0	Boutique	0.06
1	Clothing Store	0.05
2	Indian Restaurant	0.05
3	Seafood Restaurant	0.04
4	Hotel	0.04

----Mayfair (north), Grosvenor Square----

	venue	freq
0	Hotel	0.14
1	Café	0.06
2	Coffee Shop	0.06
3	French Restaurant	0.05
4	Hotel Bar	0.04

----Mayfair (south), Piccadilly----

	venue	freq
0	Clothing Store	0.08
1	Boutique	0.07
2	Hotel	0.05
3	Jewelry Store	0.03
4	Coffee Shop	0.03

----Mill Hill district----

	venue	freq
0	Bus Stop	0.11
1	Coffee Shop	0.11
2	Grocery Store	0.11
3	Pharmacy	0.05
4	Salon / Barbershop	0.05

----Monument, Billingsgate----

	venue	freq
0	Garden	0.08
1	Hotel	0.08
2	Scenic Lookout	0.05

3	History Museum	0.05
4	Gym / Fitness Center	0.05

----Mortlake district----

	venue	freq
0	Sports Club	0.14
1	Rugby Pitch	0.14
2	Park	0.14
3	Gym	0.14
4	Farmers Market	0.14

----Muswell Hill district----

	venue	freq
0	Café	0.14
1	Pizza Place	0.09
2	Coffee Shop	0.09
3	Bakery	0.06
4	Pub	0.06

----New Cross district----

	venue	freq
0	Clothing Store	0.14
1	Electronics Store	0.14
2	Bus Stop	0.14
3	Restaurant	0.14
4	Train Station	0.14

----New Oxford Street----

	venue	freq
0	Chinese Restaurant	0.06
1	Hotel	0.06
2	Plaza	0.05
3	Café	0.05
4	Coffee Shop	0.05

----New Southgate district----

	venue	freq
0	Airport Lounge	0.27
1	Airport Service	0.18
2	Champagne Bar	0.18
3	English Restaurant	0.09
4	Spa	0.09

----Non-geographic postcode district (NatWest, delivers to E1)----

	venue	freq
0	American Restaurant	0.5
1	Seafood Restaurant	0.5
2	Accessories Store	0.0
3	Palace	0.0
4	Persian Restaurant	0.0

----Non-geographic postcode district (News International, delivers to E1W)----

	venue	freq
0	American Restaurant	0.5
1	Seafood Restaurant	0.5
2	Accessories Store	0.0
3	Palace	0.0
4	Persian Restaurant	0.0

----North Finchley district----

	venue	freq
0	Café	0.15
1	Park	0.10
2	Coffee Shop	0.10
3	Vegetarian / Vegan Restaurant	0.05
4	Modern European Restaurant	0.05

----North Kensington district----

	venue	freq
0	Coffee Shop	0.06
1	Grocery Store	0.06
2	Café	0.06
3	Bakery	0.06
4	Pizza Place	0.04

----North Western head district----

	venue	freq
0	Garden	0.28
1	Park	0.22
2	Café	0.17
3	Coffee Shop	0.11
4	Pedestrian Plaza	0.06

----Northern 'Victoria' around Buckingham Gate (a street) to include both sides of part of Victoria Street----

	venue	freq
0	Coffee Shop	0.11
1	Hotel	0.10
2	Theater	0.06
3	Sushi Restaurant	0.05
4	Sandwich Place	0.03

----Northern head district----

	venue	freq
0	Stationery Store	0.17
1	Pub	0.17
2	Bakery	0.17
3	Coffee Shop	0.17
4	Park	0.17

----Norwood district----

	venue	freq
0	Coffee Shop	0.17
1	Breakfast Spot	0.08
2	Asian Restaurant	0.08
3	Thrift / Vintage Store	0.08
4	Gastropub	0.08

----Notting Hill district----

	venue	freq
0	Butcher	0.07
1	Italian Restaurant	0.07
2	Gym / Fitness Center	0.07
3	Grocery Store	0.07
4	Chocolate Shop	0.07

----Olympic Park district----

	venue	freq
0	Clothing Store	0.07
1	Café	0.05
2	Coffee Shop	0.05
3	Italian Restaurant	0.04
4	Burger Joint	0.04

----Palmers Green district----

	venue	freq
0	Golf Course	0.14
1	Pub	0.14

2	Park	0.14
3	Tennis Court	0.14
4	Outdoor Gym	0.14

----Peckham district----

	venue	freq
0	Grocery Store	0.18
1	Bus Station	0.09
2	Supermarket	0.09
3	Park	0.09
4	Bar	0.09

----Plaistow district----

	venue	freq
0	Café	0.2
1	Grocery Store	0.2
2	Bus Stop	0.1
3	Vietnamese Restaurant	0.1
4	Park	0.1

----Poplar district----

	venue	freq
0	Café	0.07
1	Pizza Place	0.07
2	Park	0.07
3	Tapas Restaurant	0.07
4	Harbor / Marina	0.07

----Portland Place, Regent Street----

	venue	freq
0	Gym / Fitness Center	0.05
1	French Restaurant	0.05
2	Pub	0.05
3	Park	0.05
4	Gastropub	0.05

----Putney district----

	venue	freq
0	Coffee Shop	0.09
1	Sandwich Place	0.05
2	Bar	0.05
3	Grocery Store	0.05
4	Café	0.05

----Rest of Belgravia (north of Eaton Square), Knightsbridge (eastern half) and Chelsea (a corner)----

	venue	freq
0	Hotel	0.12
1	Boutique	0.08
2	Café	0.06
3	Italian Restaurant	0.06
4	Plaza	0.04

----Rotherhithe district----

	venue	freq
0	Bus Stop	0.11
1	Fast Food Restaurant	0.11
2	Café	0.11
3	Supermarket	0.07
4	Pizza Place	0.07

----Russell Square, Great Ormond Street----

	venue	freq
0	Coffee Shop	0.10
1	Bookstore	0.10
2	Pub	0.08
3	Garden	0.06
4	Plaza	0.04

----Shepherds Bush district----

	venue	freq
0	Pub	0.07
1	Middle Eastern Restaurant	0.07
2	Grocery Store	0.07
3	Chinese Restaurant	0.07
4	Fast Food Restaurant	0.04

----Shoreditch----

	venue	freq
0	Hotel	0.08
1	Food Truck	0.07
2	Coffee Shop	0.07
3	Italian Restaurant	0.05
4	Sandwich Place	0.04

----Soho (south east); Chinatown, Soho Square----

	venue	freq
0	Bakery	0.06
1	Theater	0.05
2	Coffee Shop	0.05
3	Hotel	0.04
4	Cocktail Bar	0.03

----Somerset House, Temple (west)----

	venue	freq
0	Pub	0.12
1	Hotel	0.09
2	Theater	0.09
3	Restaurant	0.05
4	Coffee Shop	0.05

----South Eastern head district----

	venue	freq
0	Pub	0.20
1	Bus Stop	0.15
2	Middle Eastern Restaurant	0.10
3	Cocktail Bar	0.05
4	Indian Restaurant	0.05

----South Kensington district----

	venue	freq
0	Hotel	0.10
1	Exhibit	0.06
2	Italian Restaurant	0.05
3	Burger Joint	0.05
4	Science Museum	0.04

----South Lambeth district----

	venue	freq
0	Bus Stop	0.15
1	Portuguese Restaurant	0.15
2	Convenience Store	0.08
3	Brewery	0.08
4	Coffee Shop	0.08

----South Norwood district----

	venue	freq
0	Platform	0.24

1	Café	0.18
2	Pub	0.12
3	Coffee Shop	0.12
4	Gas Station	0.06

----South Tottenham district----

	venue	freq
0	Bus Stop	0.12
1	Coffee Shop	0.06
2	Café	0.06
3	Pub	0.06
4	Indian Restaurant	0.06

----South or lower Belgravia and Chelsea (a corner), from Sloane Square to Victoria Station to Grosvenor Waterside basin----

	venue	freq
0	Hotel	0.12
1	Pub	0.09
2	Italian Restaurant	0.09
3	Café	0.06
4	Bakery	0.04

----Southgate district----

	venue	freq
0	Fast Food Restaurant	0.15
1	Coffee Shop	0.10
2	Pizza Place	0.10
3	Dance Studio	0.05
4	Sandwich Place	0.05

----St Bartholomew's Hospital----

	venue	freq
0	Pub	0.13
1	Coffee Shop	0.04
2	Sandwich Place	0.04
3	Bar	0.04
4	Café	0.03

----St John's Wood district----

	venue	freq
0	Cricket Ground	0.11
1	Café	0.08
2	Pub	0.05

3	French Restaurant	0.05
4	Deli / Bodega	0.05

----St Luke's, Bunhill Fields----

	venue	freq
0	Coffee Shop	0.11
1	Gym / Fitness Center	0.06
2	Food Truck	0.06
3	Bar	0.05
4	Italian Restaurant	0.04

----St Pancras, UCL Institute of Education----

	venue	freq
0	Coffee Shop	0.08
1	Café	0.08
2	Pub	0.07
3	Hotel	0.07
4	Burger Joint	0.04

----St Paul's----

	venue	freq
0	Pub	0.10
1	Italian Restaurant	0.08
2	Coffee Shop	0.06
3	Sandwich Place	0.05
4	Salad Place	0.04

----Stockwell district----

	venue	freq
0	Café	0.17
1	Deli / Bodega	0.11
2	Gym / Fitness Center	0.11
3	Sushi Restaurant	0.06
4	Bakery	0.06

----Stoke Newington district----

	venue	freq
0	Cocktail Bar	0.11
1	Café	0.09
2	Pub	0.09
3	Turkish Restaurant	0.05
4	Breakfast Spot	0.05

----Stratford district----

	venue	freq
0	Hotel	0.29
1	Park	0.29
2	Bulgarian Restaurant	0.14
3	Fast Food Restaurant	0.14
4	Breakfast Spot	0.14

----Streatham district----

	venue	freq
0	Pub	0.14
1	Supermarket	0.09
2	Coffee Shop	0.09
3	Gastropub	0.09
4	Bus Stop	0.05

----Surrounds of St James's Park tube station centred on Broadway, Queen Anne's Gate and Old Queen Street to include both sides of part of Victoria Street - derivation----

	venue	freq
0	Coffee Shop	0.12
1	Hotel	0.09
2	Outdoor Sculpture	0.07
3	Pub	0.07
4	Historic Site	0.07

----Sydenham district----

	venue	freq
0	Supermarket	0.12
1	Café	0.12
2	Sandwich Place	0.06
3	Park	0.06
4	Pharmacy	0.06

----Temple----

	venue	freq
0	Pub	0.16
1	Hotel	0.09
2	Coffee Shop	0.09
3	Restaurant	0.05
4	Wine Bar	0.04

----The Hyde district----

	venue	freq
0	Office	0.33
1	Bus Stop	0.33
2	Park	0.33
3	Pakistani Restaurant	0.00
4	Persian Restaurant	0.00

----Tooting district----

	venue	freq
0	Indian Restaurant	0.13
1	Convenience Store	0.07
2	Grocery Store	0.07
3	Pub	0.07
4	Supermarket	0.07

----Tottenham district----

	venue	freq
0	American Restaurant	0.5
1	Seafood Restaurant	0.5
2	Accessories Store	0.0
3	Palace	0.0
4	Persian Restaurant	0.0

----University College London, SOAS----

	venue	freq
0	Coffee Shop	0.13
1	Greek Restaurant	0.05
2	Plaza	0.05
3	Pizza Place	0.05
4	Italian Restaurant	0.03

----Upper Edmonton district----

	venue	freq
0	Clothing Store	0.09
1	Coffee Shop	0.06
2	Café	0.05
3	Ice Cream Shop	0.03
4	Italian Restaurant	0.03

----Upper Holloway district----

	venue	freq
0	Coffee Shop	0.11

1	Pub	0.11
2	Grocery Store	0.11
3	Fast Food Restaurant	0.07
4	Bus Stop	0.07

----Victoria Docks and North Woolwich district----

	venue	freq
0	Vietnamese Restaurant	0.25
1	Business Service	0.25
2	Café	0.25
3	Park	0.25
4	Accessories Store	0.00

----Walthamstow district----

	venue	freq
0	Sandwich Place	0.06
1	Coffee Shop	0.06
2	Pizza Place	0.06
3	Café	0.06
4	Grocery Store	0.04

----Walworth district----

	venue	freq
0	Café	0.21
1	Pharmacy	0.04
2	Park	0.04
3	Falafel Restaurant	0.04
4	Middle Eastern Restaurant	0.04

----Wandsworth district----

	venue	freq
0	Garden Center	0.2
1	Pub	0.2
2	Breakfast Spot	0.2
3	Tennis Court	0.2
4	Convenience Store	0.2

----Wapping, St Katharine Docks, Stepney (part), Shadwell (part), Whitechapel (part)----

	venue	freq
0	Pub	0.15
1	Coffee Shop	0.09
2	History Museum	0.06

3	Harbor / Marina	0.06
4	Park	0.06

----West Brompton district----

	venue	freq
0	Italian Restaurant	0.11
1	Pub	0.08
2	Restaurant	0.08
3	Grocery Store	0.06
4	Nightclub	0.06

----West Ealing district----

	venue	freq
0	Fast Food Restaurant	0.25
1	Park	0.25
2	Supermarket	0.25
3	Hotel	0.25
4	Accessories Store	0.00

----West Kensington district----

	venue	freq
0	Hotel	0.10
1	Café	0.10
2	Pub	0.10
3	Coffee Shop	0.10
4	Grocery Store	0.07

----West Norwood district----

	venue	freq
0	Brewery	0.50
1	Pub	0.25
2	Park	0.25
3	Accessories Store	0.00
4	Pakistani Restaurant	0.00

----West Wimbledon district----

	venue	freq
0	Café	0.10
1	Pub	0.10
2	Indian Restaurant	0.10
3	Platform	0.06
4	Grocery Store	0.06

----Whetstone district----

	venue	freq
0	Pub	0.25
1	Coffee Shop	0.25
2	Café	0.12
3	Mediterranean Restaurant	0.12
4	Brazilian Restaurant	0.12

----Whitehall, Buckingham Palace, the Houses of Parliament and west of St James's----

	venue	freq
0	Hotel	0.07
1	Boutique	0.07
2	Clothing Store	0.05
3	French Restaurant	0.05
4	Seafood Restaurant	0.04

----Willesden district----

	venue	freq
0	Café	0.29
1	Rental Car Location	0.14
2	Train Station	0.14
3	Middle Eastern Restaurant	0.14
4	Pub	0.14

----Wimbledon district----

	venue	freq
0	Bar	0.07
1	Pub	0.06
2	Coffee Shop	0.06
3	Clothing Store	0.05
4	Grocery Store	0.03

----Winchmore Hill district----

	venue	freq
0	Italian Restaurant	0.2
1	Bus Stop	0.1
2	Supermarket	0.1
3	Bistro	0.1
4	Train Station	0.1

----Wood Green district----

	venue	freq
0	Fast Food Restaurant	0.09
1	Clothing Store	0.09
2	Coffee Shop	0.07
3	Sandwich Place	0.07
4	Turkish Restaurant	0.05

----Woodford and South Woodford district----

	venue	freq
0	American Restaurant	0.5
1	Seafood Restaurant	0.5
2	Accessories Store	0.0
3	Palace	0.0
4	Persian Restaurant	0.0

----Woolwich district----

	venue	freq
0	Train Station	0.25
1	Park	0.25
2	Supermarket	0.25
3	Hotel	0.25
4	Pakistani Restaurant	0.00

----between Vauxhall Bridge, Grosvenor (or Victoria Railway) Bridge and Victoria Station, taking in both sides of Vauxhall Bridge Road; includes Pimlico----

	venue	freq
0	Hotel	0.07
1	Coffee Shop	0.07
2	Pub	0.05
3	Italian Restaurant	0.05
4	Restaurant	0.04

1.17 Ten most common venues in each district

```
[47]: 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]
```

```
[48]: def ten_most_common_venues(data = london_grouped):
```

```

num_top_venues = 10
indicators = ['st', 'nd', 'rd']

# create columns according to number of top venues

columns = ['Coverage']

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

coverages_venues_sorted = pd.DataFrame(columns=columns)

coverages_venues_sorted['Coverage'] = data['Coverage']

for ind in np.arange(data.shape[0]):

    coverages_venues_sorted.iloc[ind, 1:] = return_most_common_venues(data.
→iloc[ind, :], num_top_venues)

return coverages_venues_sorted

```

```

[49]: coverages_venues_sorted = ten_most_common_venues(london_grouped)
coverages_venues_sorted.head()

```

```

[49]:
Coverage 1st Most Common Venue \
0 A projection around Parliament Square. Nearby ... Coffee Shop
1 Abbey Wood district Fish & Chips Shop
2 All but the west of St James's Hotel
3 Anerley district Hotel
4 Balham district Coffee Shop

2nd Most Common Venue 3rd Most Common Venue 4th Most Common Venue \
0 Café Sandwich Place Outdoor Sculpture
1 Grocery Store Soccer Field Film Studio
2 Plaza Theater Café
3 Grocery Store Convenience Store Fast Food Restaurant
4 Pub Indian Restaurant Pizza Place

5th Most Common Venue 6th Most Common Venue 7th Most Common Venue \
0 Plaza Restaurant Historic Site

```

1	Exhibit	Fabric Shop	Falafel Restaurant
2	Bookstore	Pub	Coffee Shop
3	Supermarket	Yoshoku Restaurant	Fabric Shop
4	Italian Restaurant	Supermarket	Bakery

	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Grocery Store	Bar	Park
1	Farm	Farmers Market	Fast Food Restaurant
2	Art Museum	Gelato Shop	Lounge
3	Falafel Restaurant	Farm	Farmers Market
4	Café	Bar	Sandwich Place

1.18 Clustering using KMeans

```
[50]: # set number of clusters
kclusters = 5

london_grouped_clustering = london_grouped.drop('Coverage', 1)

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

# check cluster labels generated for each row in the dataframe
kmeans.labels_[0:20]
```

```
[50]: array([3, 3, 3, 3, 3, 3, 3, 2, 3, 3, 3, 3, 3, 4, 3, 3, 3, 3, 3, 3],
      dtype=int32)
```

```
[51]: # add clustering labels
coverages_venues_sorted.insert(0, 'Cluster Labels', kmeans.labels_)

#coverages_venues_sorted['Cluster Labels'] = coverages_venues_sorted['Cluster_
    →Labels'].astype(int)

london_merged = result_df

# merge london_grouped with london_data to add latitude/longitude for each_
    →neighborhood

london_merged = london_merged.join(coverages_venues_sorted.
    →set_index('Coverage'), on='Coverage')

london_merged = london_merged.dropna()
london_merged.head()
```

```
[51]: Postcode district Post town Coverage Latitude Longitude \
0 N1 LONDON Northern head district 52.599 -2.09829
1 N1C LONDON Kings Cross Central 51.5347 -0.124548
2 N2 LONDON East Finchley district 52.6013 -2.09711
3 N3 LONDON Finchley district 52.5998 -2.09297
4 N4 LONDON Finsbury Park district 52.5987 -2.09266
```

```
Cluster Labels 1st Most Common Venue 2nd Most Common Venue \
0 3.0 Pub Park
1 3.0 Café Burger Joint
2 3.0 Bakery Stationery Store
3 3.0 Clothing Store Fast Food Restaurant
4 3.0 Clothing Store Supermarket
```

```
3rd Most Common Venue 4th Most Common Venue 5th Most Common Venue \
0 Bakery Stationery Store Movie Theater
1 Plaza Breakfast Spot Bar
2 Coffee Shop Yoshoku Restaurant Fish & Chips Shop
3 Sporting Goods Shop Coffee Shop Mexican Restaurant
4 Coffee Shop Sporting Goods Shop Fast Food Restaurant
```

```
6th Most Common Venue 7th Most Common Venue 8th Most Common Venue \
0 Coffee Shop Yoshoku Restaurant Fish & Chips Shop
1 Train Station Chocolate Shop Coffee Shop
2 Fabric Shop Falafel Restaurant Farm
3 Bakery Shopping Plaza Sandwich Place
4 Asian Restaurant Bowling Alley Sandwich Place
```

```
9th Most Common Venue 10th Most Common Venue
0 Falafel Restaurant Farm
1 Park Movie Theater
2 Farmers Market Fast Food Restaurant
3 Pharmacy Asian Restaurant
4 Mexican Restaurant Stationery Store
```

```
[52]: # create map
map_clusters = folium.Map(location=[lond_latitude, lond_longitude],
    ↪zoom_start=11)

# 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(london_merged['Latitude'],
    ↳london_merged['Longitude'], london_merged['Coverage'], london_merged['Cluster_
    ↳Labels']):
    label = folium.Popup(str(poi) + ' Cluster ' + str(cluster), parse_html=True)
    folium.CircleMarker(
        [lat, lon],
        radius=5,
        popup=label,
        color=rainbow[int(cluster)-1],
        fill=True,
        fill_color=rainbow[int(cluster)-1],
        fill_opacity=0.7).add_to(map_clusters)

map_clusters

```

[52]: <folium.folium.Map at 0x7f92c46bd410>

1.19 Cluster 1

```

[53]: london_merged.loc[london_merged['Cluster Labels'] == 0, london_merged.
    ↳columns[[1, 2] + list(range(5, london_merged.shape[1]))]]

```

```

[53]:
Post town                                Coverage Cluster Labels \
13      LONDON                        Palmers Green district          0.0
23      LONDON                   North Western head district          0.0
54      LONDON                        Mortlake district              0.0
68      LONDON                       Deptford district              0.0
69      LONDON                       Eltham district                0.0
74      LONDON                       New Cross district           0.0
78      LONDON                       Woolwich district           0.0
83      LONDON                       Forest Hill district         0.0
87      LONDON                       West Norwood district         0.0
112     LONDON                       West Ealing district         0.0
138     LONDON                       Leyton district             0.0
139     LONDON                       Leytonstone district         0.0
140     LONDON                       Manor Park district          0.0
143     LONDON                       Stratford district          0.0
144     LONDON  Victoria Docks and North Woolwich district          0.0

1st Most Common Venue 2nd Most Common Venue 3rd Most Common Venue \
13      Outdoor Gym      Park      Pub
23      Garden           Park      Café
54      Sports Club      Pub      Gym
68      Pub              Cosmetics Shop      Park
69      Event Service    Park      Soccer Field
74      Park             Bus Stop      Train Station
78      Hotel            Train Station      Park

```


83	Garden	Park	Yoshoku Restaurant
87	Brewery	Pub	Park
112	Hotel	Park	Fast Food Restaurant
138	Park	Fried Chicken Joint	Indian Restaurant
139	Irish Pub	Park	Restaurant
140	Gym / Fitness Center	Restaurant	Park
143	Hotel	Park	Bulgarian Restaurant
144	Vietnamese Restaurant	Park	Business Service

	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue \
13	Tennis Court	Golf Course	Farm
23	Coffee Shop	Pedestrian Plaza	Tennis Court
54	Park	Bus Stop	Farmers Market
68	Fast Food Restaurant	Platform	Café
69	Fish & Chips Shop	Fabric Shop	Falafel Restaurant
74	Clothing Store	Restaurant	Electronics Store
78	Supermarket	Fish & Chips Shop	Exhibit
83	Fish Market	Fabric Shop	Falafel Restaurant
87	Yoshoku Restaurant	Fish Market	Falafel Restaurant
112	Supermarket	Yoshoku Restaurant	Fabric Shop
138	Train Station	Farm	Coffee Shop
139	Supermarket	Yoshoku Restaurant	Film Studio
140	Indian Restaurant	Turkish Restaurant	Fast Food Restaurant
143	Breakfast Spot	Fast Food Restaurant	Falafel Restaurant
144	Café	Flea Market	Falafel Restaurant

	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue \
13	Playground	Yoshoku Restaurant	Fabric Shop
23	Theater	Fountain	Discount Store
54	Rugby Pitch	Film Studio	Fabric Shop
68	Vietnamese Restaurant	Bus Stop	Food & Drink Shop
69	Farm	Farmers Market	Fast Food Restaurant
74	Supermarket	Yoshoku Restaurant	Fast Food Restaurant
78	Fabric Shop	Falafel Restaurant	Farm
83	Farm	Farmers Market	Fast Food Restaurant
87	Farm	Farmers Market	Fast Food Restaurant
112	Falafel Restaurant	Farm	Farmers Market
138	Convenience Store	Hotel	Cricket Ground
139	Exhibit	Fabric Shop	Falafel Restaurant
140	Event Space	Exhibit	Fabric Shop
143	Farm	Farmers Market	Film Studio
144	Farm	Farmers Market	Fast Food Restaurant

	10th Most Common Venue
13	Falafel Restaurant
23	Distillery
54	Falafel Restaurant

```

68          Food Court
69          Film Studio
74          Fabric Shop
78      Farmers Market
83          Film Studio
87          Film Studio
112         Film Studio
138         Flower Shop
139             Farm
140      Falafel Restaurant
143      Fish & Chips Shop
144          Film Studio

```

1.20 Cluster 2

```
[54]: london_merged.loc[london_merged['Cluster Labels'] == 1, london_merged.
      ↪columns[[1, 2] + list(range(5, london_merged.shape[1]))]]
```

```
[54]:      Post town      Coverage Cluster Labels 1st Most Common Venue \
137    LONDON  Homerton district          1.0          Park

      2nd Most Common Venue 3rd Most Common Venue 4th Most Common Venue \
137    Yoshoku Restaurant          Event Space          Fabric Shop

      5th Most Common Venue 6th Most Common Venue 7th Most Common Venue \
137    Falafel Restaurant          Farm          Farmers Market

      8th Most Common Venue 9th Most Common Venue 10th Most Common Venue
137    Fast Food Restaurant          Film Studio          Fish & Chips Shop

```

1.21 Cluster 3

```
[55]: london_merged.loc[london_merged['Cluster Labels'] == 2, london_merged.
      ↪columns[[1, 2] + list(range(5, london_merged.shape[1]))]]
```

```
[55]:      Post town      Coverage \
17    LONDON          Tottenham district
53    LONDON          Barnes district
146   LONDON          Woodford and South Woodford district
148   LONDON  Non-geographic postcode district (NatWest, del...
149   LONDON  Non-geographic postcode district (News Interna...

      Cluster Labels 1st Most Common Venue 2nd Most Common Venue \
17          2.0    Seafood Restaurant    American Restaurant
53          2.0    Seafood Restaurant    American Restaurant
146         2.0    Seafood Restaurant    American Restaurant

```

148	2.0	Seafood Restaurant	American Restaurant
149	2.0	Seafood Restaurant	American Restaurant

	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	\
17	Yoshoku Restaurant	Fish & Chips Shop	Exhibit	
53	Yoshoku Restaurant	Fish & Chips Shop	Exhibit	
146	Yoshoku Restaurant	Fish & Chips Shop	Exhibit	
148	Yoshoku Restaurant	Fish & Chips Shop	Exhibit	
149	Yoshoku Restaurant	Fish & Chips Shop	Exhibit	

	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	\
17	Fabric Shop	Falafel Restaurant	Farm	
53	Fabric Shop	Falafel Restaurant	Farm	
146	Fabric Shop	Falafel Restaurant	Farm	
148	Fabric Shop	Falafel Restaurant	Farm	
149	Fabric Shop	Falafel Restaurant	Farm	

	9th Most Common Venue	10th Most Common Venue
17	Farmers Market	Fast Food Restaurant
53	Farmers Market	Fast Food Restaurant
146	Farmers Market	Fast Food Restaurant
148	Farmers Market	Fast Food Restaurant
149	Farmers Market	Fast Food Restaurant

1.22 Cluster 4

```
[56]: london_merged.loc[london_merged['Cluster Labels'] == 3, london_merged.
      →columns[[1, 2] + list(range(5, london_merged.shape[1]))]]
```

```
[56]: Post town Coverage \
0      LONDON      Northern head district
1      LONDON      Kings Cross Central
2      LONDON      East Finchley district
3      LONDON      Finchley district
4      LONDON      Finsbury Park district
5      LONDON      Highbury district
6      LONDON      Highgate district
8      LONDON      Hornsey district
9      LONDON      Lower Edmonton district
10     LONDON      Muswell Hill district
11     LONDON      New Southgate district
12     LONDON      North Finchley district
14     LONDON      Southgate district
15     LONDON      South Tottenham district
16     LONDON      Stoke Newington district
18     LONDON      Upper Edmonton district
19     LONDON      Upper Holloway district
```

20	LONDON	Whetstone district
21	LONDON	Winchmore Hill district
22	LONDON	Wood Green district
24	LONDON	Cricklewood district
25	LONDON	Hampstead district
26	LONDON	Hendon district
27	LONDON	Kentish Town district
28	LONDON	Kilburn district
29	LONDON	Mill Hill district
30	LONDON	St John's Wood district
32	LONDON	Willesden district
33	LONDON	Golders Green district
34	LONDON	Whitehall, Buckingham Palace, the Houses of Pa...
35	LONDON	Northern 'Victoria' around Buckingham Gate (a ...
36	LONDON	Surrounds of St James's Park tube station cent...
37	LONDON	A projection around Parliament Square. Nearby ...
38	LONDON	between Vauxhall Bridge, Grosvenor (or Victori...
39	LONDON	South or lower Belgravia and Chelsea (a corner...
40	LONDON	Rest of Belgravia (north of Eaton Square), Kni...
41	LONDON	All but the west of St James's
42	LONDON	Brixton district
43	LONDON	Chelsea district
44	LONDON	Clapham district
45	LONDON	Earls Court district
46	LONDON	Fulham district
47	LONDON	South Kensington district
48	LONDON	South Lambeth district
49	LONDON	Stockwell district
50	LONDON	West Brompton district
51	LONDON	Battersea head district
52	LONDON	Balham district
55	LONDON	Putney district
56	LONDON	Streatham district
57	LONDON	Tooting district
58	LONDON	Wandsworth district
59	LONDON	Wimbledon district
60	LONDON	West Wimbledon district
61	LONDON	South Eastern head district
62	LONDON	Abbey Wood district
63	LONDON	Blackheath district
64	LONDON	Brockley district
65	LONDON	Camberwell district
66	LONDON	Catford district
67	LONDON	Charlton district
70	LONDON	Greenwich district
71	LONDON	Kennington district
72	LONDON	Lee district

73	LONDON	Lewisham district
75	LONDON	Peckham district
76	LONDON	Rotherhithe district
77	LONDON	Walworth district
79	LONDON	Norwood district
80	LONDON	Anerley district
81	LONDON	Dulwich district
82	LONDON	East Dulwich district
84	LONDON	Herne Hill district
85	LONDON	South Norwood district
86	LONDON	Sydenham district
89	LONDON	Portland Place, Regent Street
91	LONDON	Soho (south east); Chinatown, Soho Square
94	LONDON	Marylebone
95	LONDON	Mayfair (south), Piccadilly
96	LONDON	Mayfair (north), Grosvenor Square
97	LONDON	Mayfair (east), Hanover Square, Savile Row, Ro...
98	LONDON	Fitzrovia, Tottenham Court Road
99	LONDON	Marylebone
100	LONDON	Great Portland Street, Fitzrovia
104	LONDON	Ealing district
109	LONDON	North Kensington district
110	LONDON	Notting Hill district
111	LONDON	Shepherds Bush district
113	LONDON	West Kensington district
114	LONDON	New Oxford Street
115	LONDON	Bloomsbury, British Museum, Southampton Row
116	LONDON	University College London, SOAS
117	LONDON	St Pancras, UCL Institute of Education
118	LONDON	Russell Square, Great Ormond Street
119	LONDON	Gray's Inn
120	LONDON	High Holborn
121	LONDON	Kings Cross, Finsbury (west), Clerkenwell (north)
122	LONDON	Lincoln's Inn Fields, Royal Courts of Justice,...
123	LONDON	Drury Lane, Kingsway, Aldwych
124	LONDON	Covent Garden
125	LONDON	Leicester Square, St. Giles
126	LONDON	Charing Cross
127	LONDON	Somerset House, Temple (west)
128	LONDON	Eastern head district
129	LONDON	Wapping, St Katharine Docks, Stepney (part), S...
130	LONDON	Bethnal Green district
134	LONDON	East Ham district
141	LONDON	Plaistow district
142	LONDON	Poplar district
145	LONDON	Walthamstow district
147	LONDON	Olympic Park district

150	LONDON	St Bartholomew's Hospital
151	LONDON	Clerkenwell, Farringdon
152	LONDON	Hatton Garden
153	LONDON	Finsbury, Finsbury Estate (west)
154	LONDON	Finsbury (east), Moorfields Eye Hospital
155	LONDON	St Luke's, Bunhill Fields
156	LONDON	Shoreditch
157	LONDON	Broadgate, Liverpool Street
159	LONDON	Bank of England
160	LONDON	Guildhall
161	LONDON	Barbican
163	LONDON	Lloyd's of London, Fenchurch Street
165	LONDON	Monument, Billingsgate
166	LONDON	Cornhill, Gracechurch Street, Lombard Street
167	LONDON	Fetter Lane
168	LONDON	St Paul's
169	LONDON	Mansion House
170	LONDON	Cannon Street
171	LONDON	Blackfriars
172	LONDON	Temple

	Cluster Labels	1st Most Common Venue	2nd Most Common Venue \
0	3.0	Pub	Park
1	3.0	Café	Burger Joint
2	3.0	Bakery	Stationery Store
3	3.0	Clothing Store	Fast Food Restaurant
4	3.0	Clothing Store	Supermarket
5	3.0	Rental Car Location	Bus Stop
6	3.0	Airport Service	Coffee Shop
8	3.0	Pharmacy	Spa
9	3.0	Bar	Hotel
10	3.0	Café	Pizza Place
11	3.0	Airport Lounge	Airport Service
12	3.0	Café	Park
14	3.0	Fast Food Restaurant	Pizza Place
15	3.0	Bus Stop	Coffee Shop
16	3.0	Cocktail Bar	Café
18	3.0	Clothing Store	Coffee Shop
19	3.0	Pub	Coffee Shop
20	3.0	Pub	Coffee Shop
21	3.0	Italian Restaurant	Bus Stop
22	3.0	Fast Food Restaurant	Clothing Store
24	3.0	Grocery Store	Bus Stop
25	3.0	Café	Italian Restaurant
26	3.0	Clothing Store	Café
27	3.0	Café	Pub
28	3.0	Burger Joint	BBQ Joint

29	3.0	Bus Stop	Grocery Store
30	3.0	Cricket Ground	Café
32	3.0	Café	Pub
33	3.0	Coffee Shop	Turkish Restaurant
34	3.0	Hotel	Boutique
35	3.0	Coffee Shop	Hotel
36	3.0	Coffee Shop	Hotel
37	3.0	Coffee Shop	Café
38	3.0	Coffee Shop	Hotel
39	3.0	Hotel	Pub
40	3.0	Hotel	Boutique
41	3.0	Hotel	Plaza
42	3.0	Grocery Store	Pub
43	3.0	Café	Clothing Store
44	3.0	Pub	Coffee Shop
45	3.0	Hotel	Garden
46	3.0	Coffee Shop	Café
47	3.0	Hotel	Exhibit
48	3.0	Portuguese Restaurant	Bus Stop
49	3.0	Café	Gym / Fitness Center
50	3.0	Italian Restaurant	Pub
51	3.0	Pub	Café
52	3.0	Coffee Shop	Pub
55	3.0	Coffee Shop	Bar
56	3.0	Pub	Supermarket
57	3.0	Indian Restaurant	Convenience Store
58	3.0	Pub	Garden Center
59	3.0	Bar	Pub
60	3.0	Pub	Café
61	3.0	Pub	Bus Stop
62	3.0	Fish & Chips Shop	Grocery Store
63	3.0	Bakery	Pub
64	3.0	Grocery Store	Beer Store
65	3.0	Pub	Café
66	3.0	Coffee Shop	Chinese Restaurant
67	3.0	Paintball Field	Electronics Store
70	3.0	Pub	Turkish Restaurant
71	3.0	Pub	Coffee Shop
72	3.0	Gym	Convenience Store
73	3.0	Clothing Store	Coffee Shop
75	3.0	Grocery Store	Bus Station
76	3.0	Bus Stop	Café
77	3.0	Café	Bagel Shop
79	3.0	Coffee Shop	Pub
80	3.0	Hotel	Grocery Store
81	3.0	Brewery	Café
82	3.0	Café	Pub

84	3.0	Fish & Chips Shop	Gym / Fitness Center
85	3.0	Platform	Café
86	3.0	Café	Supermarket
89	3.0	Park	Coffee Shop
91	3.0	Bakery	Theater
94	3.0	Hotel	Coffee Shop
95	3.0	Clothing Store	Boutique
96	3.0	Hotel	Coffee Shop
97	3.0	Boutique	Indian Restaurant
98	3.0	Coffee Shop	Indian Restaurant
99	3.0	Hotel	Coffee Shop
100	3.0	Coffee Shop	Pub
104	3.0	Italian Restaurant	Airport Service
109	3.0	Grocery Store	Café
110	3.0	Pub	Latin American Restaurant
111	3.0	Pub	Grocery Store
113	3.0	Coffee Shop	Pub
114	3.0	Chinese Restaurant	Hotel
115	3.0	Chinese Restaurant	Pub
116	3.0	Coffee Shop	Plaza
117	3.0	Café	Coffee Shop
118	3.0	Bookstore	Coffee Shop
119	3.0	Coffee Shop	Pub
120	3.0	Pub	Chinese Restaurant
121	3.0	Coffee Shop	History Museum
122	3.0	Pub	Coffee Shop
123	3.0	Pub	Sandwich Place
124	3.0	Theater	Burger Joint
125	3.0	Coffee Shop	Bakery
126	3.0	Theater	Bakery
127	3.0	Pub	Theater
128	3.0	Nature Preserve	Beer Garden
129	3.0	Pub	Coffee Shop
130	3.0	Turkish Restaurant	Café
134	3.0	Clothing Store	Pharmacy
141	3.0	Café	Grocery Store
142	3.0	Jazz Club	Pizza Place
145	3.0	Café	Pizza Place
147	3.0	Clothing Store	Café
150	3.0	Pub	Bar
151	3.0	Food Truck	Hotel
152	3.0	Pub	Coffee Shop
153	3.0	Coffee Shop	Pub
154	3.0	Coffee Shop	Café
155	3.0	Coffee Shop	Gym / Fitness Center
156	3.0	Hotel	Food Truck
157	3.0	Hotel	Italian Restaurant

159	3.0	Coffee Shop	Italian Restaurant
160	3.0	Coffee Shop	Italian Restaurant
161	3.0	Italian Restaurant	Gym / Fitness Center
163	3.0	Hotel	Pub
165	3.0	Garden	Hotel
166	3.0	Gym / Fitness Center	Coffee Shop
167	3.0	Pub	Coffee Shop
168	3.0	Pub	Italian Restaurant
169	3.0	Pub	Coffee Shop
170	3.0	Gym / Fitness Center	Steakhouse
171	3.0	Coffee Shop	Sandwich Place
172	3.0	Pub	Coffee Shop

	3rd Most Common Venue	4th Most Common Venue \
0	Bakery	Stationery Store
1	Plaza	Breakfast Spot
2	Coffee Shop	Yoshoku Restaurant
3	Sporting Goods Shop	Coffee Shop
4	Coffee Shop	Sporting Goods Shop
5	Hotel	Gym / Fitness Center
6	Yoshoku Restaurant	Fish Market
8	Yoshoku Restaurant	Fish Market
9	Coffee Shop	Italian Restaurant
10	Coffee Shop	Gym / Fitness Center
11	Champagne Bar	Clothing Store
12	Coffee Shop	Pub
14	Coffee Shop	Italian Restaurant
15	Café	Pub
16	Pub	Pizza Place
18	Café	Ice Cream Shop
19	Grocery Store	Pizza Place
20	Mediterranean Restaurant	Park
21	Pub	Bar
22	Coffee Shop	Sandwich Place
24	Fast Food Restaurant	Hotel
25	Hotel Bar	Hill
26	Coffee Shop	Department Store
27	Convenience Store	Italian Restaurant
28	Pub	Convenience Store
29	Coffee Shop	Pharmacy
30	Deli / Bodega	Pub
32	Rental Car Location	Train Station
33	Café	Grocery Store
34	Clothing Store	French Restaurant
35	Theater	Sushi Restaurant
36	Outdoor Sculpture	Pub
37	Sandwich Place	Outdoor Sculpture

38	Pub	Italian Restaurant
39	Italian Restaurant	Café
40	Café	Italian Restaurant
41	Theater	Café
42	Portuguese Restaurant	Bus Stop
43	Hotel	Italian Restaurant
44	Café	Burger Joint
45	Italian Restaurant	Cocktail Bar
46	Pub	Bakery
47	Italian Restaurant	Burger Joint
48	Gym / Fitness Center	Coffee Shop
49	Deli / Bodega	Pub
50	Restaurant	Grocery Store
51	Pharmacy	Pizza Place
52	Indian Restaurant	Pizza Place
55	Grocery Store	Café
56	Coffee Shop	Gastropub
57	Pub	Supermarket
58	Breakfast Spot	Convenience Store
59	Coffee Shop	Clothing Store
60	Indian Restaurant	Platform
61	Middle Eastern Restaurant	Lebanese Restaurant
62	Soccer Field	Film Studio
63	Café	Pizza Place
64	Coffee Shop	Gastropub
65	Park	Beer Bar
66	Recreation Center	Fried Chicken Joint
67	Café	Go Kart Track
70	Café	Pier
71	Café	Indian Restaurant
72	Yoshoku Restaurant	Fish Market
73	Grocery Store	Pharmacy
75	Hotel	Bar
76	Fast Food Restaurant	Pizza Place
77	Food & Drink Shop	Caribbean Restaurant
79	Diner	Breakfast Spot
80	Convenience Store	Fast Food Restaurant
81	Italian Restaurant	Pub
82	Coffee Shop	Indian Restaurant
84	Bakery	Stadium
85	Pub	Coffee Shop
86	Pub	Pharmacy
89	Pub	Vietnamese Restaurant
91	Coffee Shop	Hotel
94	Café	Clothing Store
95	Hotel	Dessert Shop
96	Café	French Restaurant

97	Clothing Store	Seafood Restaurant
98	Restaurant	Plaza
99	Café	Clothing Store
100	Vietnamese Restaurant	Restaurant
104	Golf Course	Hotel
109	Bakery	Coffee Shop
110	Butcher	Cheese Shop
111	Chinese Restaurant	Middle Eastern Restaurant
113	Hotel	Café
114	Sandwich Place	Plaza
115	Coffee Shop	Sandwich Place
116	Greek Restaurant	Pizza Place
117	Pub	Hotel
118	Pub	Garden
119	Hotel	Food Truck
120	Coffee Shop	Sandwich Place
121	Garden	Food Truck
122	Sandwich Place	Hotel
123	Café	Chinese Restaurant
124	Ice Cream Shop	Bakery
125	Theater	Ice Cream Shop
126	Coffee Shop	Plaza
127	Hotel	Coffee Shop
128	Indian Restaurant	Yoshoku Restaurant
129	Italian Restaurant	History Museum
130	Clothing Store	Gym / Fitness Center
134	Coffee Shop	Pub
141	Vietnamese Restaurant	Park
142	Café	Park
145	Coffee Shop	Sandwich Place
147	Coffee Shop	Burger Joint
150	Coffee Shop	Sandwich Place
151	Pub	Café
152	Sandwich Place	Bar
153	Café	Bar
154	Pub	Sandwich Place
155	Food Truck	Bar
156	Coffee Shop	Italian Restaurant
157	Pub	Coffee Shop
159	Gym / Fitness Center	Wine Bar
160	French Restaurant	Sandwich Place
161	Coffee Shop	Pub
163	Sandwich Place	Restaurant
165	Scenic Lookout	Gym / Fitness Center
166	Pub	Vietnamese Restaurant
167	Italian Restaurant	Sandwich Place
168	Coffee Shop	Sandwich Place

169	Gym / Fitness Center	Vietnamese Restaurant
170	Historic Site	Seafood Restaurant
171	French Restaurant	Restaurant
172	Hotel	Restaurant
	5th Most Common Venue	6th Most Common Venue \
0	Movie Theater	Coffee Shop
1	Bar	Train Station
2	Fish & Chips Shop	Fabric Shop
3	Mexican Restaurant	Bakery
4	Fast Food Restaurant	Asian Restaurant
5	Airport Service	Chinese Restaurant
6	Fabric Shop	Falafel Restaurant
8	Fabric Shop	Falafel Restaurant
9	Plaza	Pub
10	Grocery Store	Bakery
11	Spa	Cosmetics Shop
12	Fish & Chips Shop	Gym / Fitness Center
14	Turkish Restaurant	Pub
15	Indian Restaurant	Sandwich Place
16	Turkish Restaurant	Coffee Shop
18	Burger Joint	Italian Restaurant
19	Fast Food Restaurant	Bus Stop
20	Brazilian Restaurant	Café
21	Train Station	Bistro
22	Turkish Restaurant	Mediterranean Restaurant
24	Supermarket	Clothing Store
25	Pub	Department Store
26	Supermarket	Electronics Store
27	Gym / Fitness Center	Coffee Shop
28	Coffee Shop	Park
29	Café	Stationery Store
30	French Restaurant	Coffee Shop
32	Movie Theater	Middle Eastern Restaurant
33	Korean Restaurant	Fast Food Restaurant
34	Seafood Restaurant	Coffee Shop
35	Garden	Juice Bar
36	Historic Site	Café
37	Plaza	Restaurant
38	Restaurant	Theater
39	Bakery	Coffee Shop
40	Plaza	Department Store
41	Bookstore	Pub
42	Coffee Shop	Dry Cleaner
43	Pub	Bakery
44	Bar	Japanese Restaurant
45	Pub	Bar

46	French Restaurant	Wine Shop
47	Science Museum	Ice Cream Shop
48	Performing Arts Venue	Diner
49	Hotel	Bus Stop
50	Nightclub	Sandwich Place
51	Breakfast Spot	Supermarket
52	Italian Restaurant	Supermarket
55	Sandwich Place	Clothing Store
56	Diner	Park
57	Grocery Store	Coffee Shop
58	Tennis Court	Yoshoku Restaurant
59	Sandwich Place	Thai Restaurant
60	Pharmacy	Coffee Shop
61	Music Venue	Park
62	Exhibit	Fabric Shop
63	Himalayan Restaurant	Greek Restaurant
64	Café	Deli / Bodega
65	Gastropub	Bakery
66	Grocery Store	Other Great Outdoors
67	Construction & Landscaping	Warehouse Store
70	Grocery Store	Playground
71	Pizza Place	Art Gallery
72	Fabric Shop	Falafel Restaurant
73	Fast Food Restaurant	Pub
75	Park	Supermarket
76	Supermarket	Health Food Store
77	Fish & Chips Shop	Brewery
79	Gastropub	Thai Restaurant
80	Supermarket	Yoshoku Restaurant
81	Train Station	Indian Restaurant
82	Gastropub	Italian Restaurant
84	Train Station	Food & Drink Shop
85	Bus Stop	Gas Station
86	Portuguese Restaurant	Breakfast Spot
89	Gym / Fitness Center	Gastropub
91	Cocktail Bar	Tapas Restaurant
94	Juice Bar	French Restaurant
95	Jewelry Store	Coffee Shop
96	Hotel Bar	Seafood Restaurant
97	French Restaurant	Hotel
98	Café	Pub
99	Juice Bar	French Restaurant
100	Indian Restaurant	Café
104	Yoshoku Restaurant	Fish & Chips Shop
109	Pub	Gym / Fitness Center
110	Chocolate Shop	Bookstore
111	Thai Restaurant	Bus Stop

113	Grocery Store	Indian Restaurant
114	Coffee Shop	Café
115	Hotel	Café
116	Organic Grocery	Furniture / Home Store
117	Burger Joint	Breakfast Spot
118	Plaza	Exhibit
119	Sandwich Place	Gym / Fitness Center
120	Café	Bookstore
121	Bookstore	Hotel
122	French Restaurant	Restaurant
123	Coffee Shop	Bookstore
124	Coffee Shop	Restaurant
125	Sushi Restaurant	Plaza
126	Hotel	Ice Cream Shop
127	Restaurant	Japanese Restaurant
128	Fish Market	Fabric Shop
129	Park	Harbor / Marina
130	Hardware Store	Furniture / Home Store
134	Fast Food Restaurant	Indian Restaurant
141	Convenience Store	Gym / Fitness Center
142	Tapas Restaurant	Tennis Court
145	Grocery Store	Pharmacy
147	Italian Restaurant	Gym / Fitness Center
150	Pizza Place	Vietnamese Restaurant
151	Coffee Shop	French Restaurant
152	Gym / Fitness Center	Food Truck
153	Gym / Fitness Center	Wine Shop
154	Vietnamese Restaurant	Italian Restaurant
155	Gastropub	Hotel
156	Sandwich Place	Café
157	Wine Bar	Pizza Place
159	Sandwich Place	French Restaurant
160	Clothing Store	Restaurant
161	Plaza	Café
163	Gym / Fitness Center	French Restaurant
165	Castle	Restaurant
166	Cocktail Bar	Seafood Restaurant
167	Hotel	Wine Bar
168	Gym / Fitness Center	Bakery
169	Sushi Restaurant	Clothing Store
170	Sandwich Place	Vietnamese Restaurant
171	Wine Bar	Steakhouse
172	Sandwich Place	Italian Restaurant
7th Most Common Venue		8th Most Common Venue \
0	Yoshoku Restaurant	Fish & Chips Shop
1	Chocolate Shop	Coffee Shop

2	Falafel Restaurant	Farm
3	Shopping Plaza	Sandwich Place
4	Bowling Alley	Sandwich Place
5	Coffee Shop	Indian Restaurant
6	Farm	Farmers Market
8	Farm	Farmers Market
9	Clothing Store	Theater
10	Japanese Restaurant	Pub
11	English Restaurant	Yoshoku Restaurant
12	Beer Bar	Modern European Restaurant
14	Dance Studio	Dessert Shop
15	Malay Restaurant	Turkish Restaurant
16	Breakfast Spot	Convenience Store
18	Toy / Game Store	Cosmetics Shop
19	Historic Site	Sandwich Place
20	Fish & Chips Shop	Fabric Shop
21	Coffee Shop	Supermarket
22	Pub	Pharmacy
24	Gym / Fitness Center	Hardware Store
25	Plaza	Playground
26	Sandwich Place	Grocery Store
27	Gastropub	Pool
28	Falafel Restaurant	Chinese Restaurant
29	Chinese Restaurant	Park
30	Grocery Store	Sandwich Place
32	Yoshoku Restaurant	Film Studio
33	Shabu-Shabu Restaurant	Sushi Restaurant
34	Italian Restaurant	Dessert Shop
35	Sporting Goods Shop	Sandwich Place
36	Monument / Landmark	Garden
37	Historic Site	Grocery Store
38	Café	Sandwich Place
39	Cupcake Shop	Sandwich Place
40	French Restaurant	Cocktail Bar
41	Coffee Shop	Art Museum
42	Yoshoku Restaurant	Fish & Chips Shop
43	Restaurant	Bookstore
44	Italian Restaurant	Cocktail Bar
45	Café	Thai Restaurant
46	Italian Restaurant	Climbing Gym
47	Café	Bakery
48	Brewery	Pizza Place
49	Coffee Shop	Bakery
50	Supermarket	Gastropub
51	Cocktail Bar	Thai Restaurant
52	Bakery	Café
55	Gym / Fitness Center	Bakery

56	Skating Rink	Bar
57	Italian Restaurant	Candy Store
58	Fish Market	Falafel Restaurant
59	Italian Restaurant	Burger Joint
60	Fast Food Restaurant	Grocery Store
61	Bike Shop	Cocktail Bar
62	Falafel Restaurant	Farm
63	French Restaurant	Farmers Market
64	Italian Restaurant	Indian Restaurant
65	Coffee Shop	Gym / Fitness Center
66	Film Studio	Fabric Shop
67	Discount Store	Supermarket
70	Garden	Lake
71	Farm	Film Studio
72	Farm	Farmers Market
73	Café	Sporting Goods Shop
75	Gym / Fitness Center	Pedestrian Plaza
76	Brewery	Fish & Chips Shop
77	Falafel Restaurant	Middle Eastern Restaurant
79	Train Station	Turkish Restaurant
80	Fabric Shop	Falafel Restaurant
81	Yoshoku Restaurant	Fish & Chips Shop
82	Convenience Store	Park
84	Convenience Store	Playground
85	Fish & Chips Shop	Asian Restaurant
86	Gastropub	Bistro
89	French Restaurant	Modern European Restaurant
91	Steakhouse	Italian Restaurant
94	Burger Joint	Italian Restaurant
95	Steakhouse	Indian Restaurant
96	Indian Restaurant	Restaurant
97	Art Gallery	Cocktail Bar
98	Vietnamese Restaurant	Cocktail Bar
99	Burger Joint	Italian Restaurant
100	Burger Joint	Sandwich Place
104	Fabric Shop	Falafel Restaurant
109	Scandinavian Restaurant	Pizza Place
110	Grocery Store	Gym / Fitness Center
111	Fried Chicken Joint	Fast Food Restaurant
113	Persian Restaurant	Convention Center
114	Burger Joint	History Museum
115	Plaza	Bookstore
116	Science Museum	Bakery
117	Sandwich Place	Bakery
118	Park	Pizza Place
119	Restaurant	Café
120	Clothing Store	Hotel

121	Restaurant	Lebanese Restaurant
122	Bar	Garden
123	Theater	Restaurant
124	Hotel	Clothing Store
125	Dessert Shop	Asian Restaurant
126	Burger Joint	Garden
127	Tea Room	Cocktail Bar
128	Falafel Restaurant	Farm
129	Event Space	Performing Arts Venue
130	Train Station	Trail
134	Bookstore	Café
141	Bus Stop	Pub
142	Grocery Store	Gym
145	Bakery	Bookstore
147	Hotel	Ice Cream Shop
150	Breakfast Spot	Park
151	Gym / Fitness Center	Concert Hall
152	Hotel	Tapas Restaurant
153	Park	Bakery
154	Park	Gym / Fitness Center
155	Italian Restaurant	Café
156	Plaza	Pub
157	Cocktail Bar	Salad Place
159	Asian Restaurant	Hotel
160	Bakery	Gym / Fitness Center
161	Deli / Bodega	Hotel
163	Seafood Restaurant	Cocktail Bar
165	History Museum	Trail
166	Steakhouse	Restaurant
167	Sushi Restaurant	Gym / Fitness Center
168	Sushi Restaurant	Salad Place
169	Italian Restaurant	Sandwich Place
170	Cocktail Bar	Coffee Shop
171	Modern European Restaurant	Italian Restaurant
172	Wine Bar	History Museum

	9th Most Common Venue	10th Most Common Venue
0	Falafel Restaurant	Farm
1	Park	Movie Theater
2	Farmers Market	Fast Food Restaurant
3	Pharmacy	Asian Restaurant
4	Mexican Restaurant	Stationery Store
5	Film Studio	Exhibit
6	Fast Food Restaurant	Film Studio
8	Fast Food Restaurant	Film Studio
9	Pharmacy	Beer Bar
10	French Restaurant	Stationery Store

11	Fish Market	Farm
12	Convenience Store	Vegetarian / Vegan Restaurant
14	Pharmacy	Sandwich Place
15	Park	Grocery Store
16	Train Station	Bistro
18	Juice Bar	Grocery Store
19	Park	Farmers Market
20	Falafel Restaurant	Farm
21	Middle Eastern Restaurant	Film Studio
22	Park	Discount Store
24	Coffee Shop	Bakery
25	Coffee Shop	French Restaurant
26	Snack Place	Burger Joint
27	Tennis Court	Thai Restaurant
28	Fish & Chips Shop	Café
29	Train Station	Bagel Shop
30	Bakery	Gym / Fitness Center
32	Fabric Shop	Falafel Restaurant
33	Park	Sandwich Place
34	Jewelry Store	Restaurant
35	Restaurant	Historic Site
36	Sushi Restaurant	Plaza
37	Bar	Park
38	Turkish Restaurant	Burger Joint
39	Gym / Fitness Center	Gastropub
40	Coffee Shop	Restaurant
41	Gelato Shop	Lounge
42	Falafel Restaurant	Farm
43	Gym / Fitness Center	Japanese Restaurant
44	Fast Food Restaurant	Bakery
45	Gym / Fitness Center	Lebanese Restaurant
46	Thai Restaurant	Grocery Store
47	Sandwich Place	Coffee Shop
48	Convenience Store	Bakery
49	Sushi Restaurant	Gym
50	Furniture / Home Store	Sports Bar
51	French Restaurant	Indian Restaurant
52	Bar	Sandwich Place
55	Pizza Place	Portuguese Restaurant
56	Train Station	Hardware Store
57	Bus Stop	Burger Joint
58	Farm	Farmers Market
59	Grocery Store	Sushi Restaurant
60	Bakery	Chinese Restaurant
61	Coffee Shop	Bar
62	Farmers Market	Fast Food Restaurant
63	Park	Train Station

64	Pub	Train Station
65	Grocery Store	Bus Stop
66	Falafel Restaurant	Farm
67	Soccer Stadium	Yoshoku Restaurant
70	Bar	Beach
71	Motorcycle Shop	Restaurant
72	Fast Food Restaurant	Film Studio
73	Platform	Video Game Store
75	Pub	Fried Chicken Joint
76	Mobile Phone Shop	Chinese Restaurant
77	Park	Grocery Store
79	Asian Restaurant	Thrift / Vintage Store
80	Farm	Farmers Market
81	Fabric Shop	Falafel Restaurant
82	Grocery Store	Cocktail Bar
84	Flower Shop	Fast Food Restaurant
85	Sports Bar	Indian Restaurant
86	Park	Bakery
89	Falafel Restaurant	Persian Restaurant
91	Tea Room	Seafood Restaurant
94	Hotel Bar	Shoe Store
95	Lounge	Spanish Restaurant
96	Cocktail Bar	Japanese Restaurant
97	Coffee Shop	Dessert Shop
98	Furniture / Home Store	Sandwich Place
99	Hotel Bar	Shoe Store
100	Italian Restaurant	Gym / Fitness Center
104	Farm	Farmers Market
109	Street Art	Beer Store
110	Sandwich Place	Massage Studio
111	Falafel Restaurant	Coffee Shop
113	Supermarket	Sandwich Place
114	Bookstore	English Restaurant
115	Exhibit	Shopping Mall
116	Bookstore	Italian Restaurant
117	Train Station	Deli / Bodega
118	Cheese Shop	Bar
119	Bookstore	Bakery
120	Korean Restaurant	Bakery
121	Bar	Theme Park Ride / Attraction
122	Burger Joint	Building
123	Clothing Store	Hotel
124	Steakhouse	Wine Bar
125	Steakhouse	Bookstore
126	Steakhouse	Wine Bar
127	Hotel Bar	Scenic Lookout
128	Farmers Market	Fast Food Restaurant

129	Gym / Fitness Center	Cocktail Bar
130	Coffee Shop	Building
134	Theater	Sandwich Place
141	Food & Drink Shop	Fast Food Restaurant
142	Harbor / Marina	Bar
145	Clothing Store	Gift Shop
147	Toy / Game Store	Pizza Place
150	Cocktail Bar	Middle Eastern Restaurant
151	Beer Bar	Cocktail Bar
152	Burrito Place	Grocery Store
153	Italian Restaurant	Sandwich Place
154	Bar	Sushi Restaurant
155	Cocktail Bar	Turkish Restaurant
156	Gym / Fitness Center	Pizza Place
157	Gym / Fitness Center	Food Truck
159	Steakhouse	Restaurant
160	Steakhouse	Café
161	Turkish Restaurant	Art Gallery
163	Coffee Shop	Fast Food Restaurant
165	Exhibit	Beer Bar
166	Sandwich Place	Yoga Studio
167	French Restaurant	Bar
168	Cocktail Bar	Falafel Restaurant
169	Seafood Restaurant	Wine Bar
170	Portuguese Restaurant	Pizza Place
171	Bakery	Asian Restaurant
172	Library	Tea Room

1.23 Cluster 5

```
[57]: london_merged.loc[london_merged['Cluster Labels'] == 4, london_merged.
      ↪columns[[1, 2] + list(range(5, london_merged.shape[1]))]]
```

[57]:	Post town	Coverage	Cluster Labels	1st Most Common Venue	\
31	LONDON	The Hyde district	4.0	Office	
131	LONDON	Bow district	4.0	Market	
132	LONDON	Chingford district	4.0	Market	
133	LONDON	Clapton district	4.0	Athletics & Sports	
135	LONDON	Forest Gate district	4.0	Market	
136	LONDON	Hackney district	4.0	Market	

	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	\
31	Bus Stop	Park	Yoshoku Restaurant	
131	Bus Stop	Park	Plaza	
132	Bus Stop	Park	Plaza	
133	Bus Stop	Market	Park	
135	Bus Stop	Park	Plaza	

136	Bus Stop	Park	Plaza
	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue \
31	Fish Market	Falafel Restaurant	Farm
131	Hockey Field	Yoshoku Restaurant	Film Studio
132	Hockey Field	Yoshoku Restaurant	Film Studio
133	Plaza	Hockey Field	Yoshoku Restaurant
135	Hockey Field	Yoshoku Restaurant	Film Studio
136	Hockey Field	Yoshoku Restaurant	Film Studio
	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
31	Farmers Market	Fast Food Restaurant	Film Studio
131	Fabric Shop	Falafel Restaurant	Farm
132	Fabric Shop	Falafel Restaurant	Farm
133	Fabric Shop	Falafel Restaurant	Farm
135	Fabric Shop	Falafel Restaurant	Farm
136	Fabric Shop	Falafel Restaurant	Farm

2 Conclusion

London is truly a multicultural city. It has many restaurants ranging from African restaurants, Chinese restaurants, German restaurants and many more.

There are many businesses in London and they thrive. This means that London is one of the best place in the world to start a business.

Someone can start a restaurants in many areas of London like Northern head district 1. Kings Cross Central 2. East Finchley district 3. Finchley district 4. Finsbury Park district 5. Highbury district 6. Highgate district 7. Hornsey district 8. Lower Edmonton district and many more.

Finally, we use Kmeans Clustering to cluster the venues into 5 clusters.