

Capstone Project Battle of neighborhoods

July 18, 2020

0.1 1. Introduction

Now that you have been equipped with the skills and the tools to use location data to explore a geographical location, over the course of two weeks, you will have the opportunity to be as creative as you want and come up with an idea to leverage the Foursquare location data to explore or compare neighborhoods or cities of your choice or to come up with a problem that you can use the Foursquare location data to solve. If you cannot think of an idea or a problem, here are some ideas to get you started:

1. In Module 3, we explored New York City and the city of Toronto and segmented and clustered their neighborhoods. Both cities are very diverse and are the financial capitals of their respective countries. One interesting idea would be to compare the neighborhoods of the two cities and determine how similar or dissimilar they are. Is New York City more like Toronto or Paris or some other multicultural city? I will leave it to you to refine this idea.
2. In a city of your choice, if someone is looking to open a restaurant, where would you recommend that they open it? Similarly, if a contractor is trying to start their own business, where would you recommend that they setup their office?

These are just a couple of many ideas and problems that can be solved using location data in addition to other datasets. No matter what you decide to do, make sure to provide sufficient justification of why you think what you want to do or solve is important and why would a client or a group of people be interested in your project.

0.2 1.1. Business problem

NYC is one of the biggest megapolises in the world with a vivid and constantly changing demand for a restaurant market. Since it's a biggest business center it demands a wide choice of fine dining places. This project will be used in order to spot out a place where supposedly will make sense to open a next haute cuisine place. The project will allow to check the map for possible competition and their rating and decide whether or not opening a new French restaurant is a viable idea.

0.3 1.2. Target audience

This project will be interesting for anyone who will be willing to open a restaurant in NYC or who is offering any other types of business solution around catering business.

0.4 2. Data section

1. Foursquare API will be used in order to get list of requested properties with all possible specification for the requested analysis.

2. <https://data.cityofnewyork.us/City-Government/Borough-Boundaries/tqmj-j8zm> - government's NYC neighborhoods boundaries which will be used in order to separate the neighborhoods
3. https://cocl.us/new_york_dataset - list of NYC neighborhoods and geo locations for plotting on the map

0.5 3. Methodology

1. Function preparation before data collection
2. Data collection
3. Data cleaning and modeling
4. Analysis of outputs

0.5.1 Environment set up

```
[ ]: from bs4 import BeautifulSoup
import requests
import lxml
import numpy as np
import pandas as pd

#Setting up the environment
!conda install -c conda-forge geopy --yes
from geopy.geocoders import Nominatim # convert an address into latitude and longitude values

# Matplotlib and associated plotting modules
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
import folium # map rendering library

print('Libraries imported.')
```

0.5.2 Functions preparation

```
[7]: def geo_location(address):
    # get geo location of address
    geolocator = Nominatim(user_agent="ny_explorer")
    location = geolocator.geocode(address)
    latitude = location.latitude
    longitude = location.longitude
    return latitude, longitude
```

```
[8]: def get_venues(lat,lng):

    #set variables
    radius=1000
    LIMIT=100
    CLIENT_ID = '#####' # changed my Foursquare ID
    CLIENT_SECRET = '#####' # changed
    ↪Foursquare Secret
    VERSION = '20180605' # Foursquare API version

    #url to fetch data from foursquare api
    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)

    # get all the data
    results = requests.get(url).json()
    venue_data=results["response"]['groups'][0]['items']
    venue_details=[]
    for row in venue_data:
        try:
            venue_id=row['venue']['id']
            venue_name=row['venue']['name']
            venue_category=row['venue']['categories'][0]['name']
            venue_details.append([venue_id,venue_name,venue_category])
        except KeyError:
            pass

    column_names=['ID','Name','Category']
    df = pd.DataFrame(venue_details,columns=column_names)
    print("done")
    return df
```

```
[9]: def get_venue_details(venue_id):

    CLIENT_ID = '#####' # i have changed the id with ##
    CLIENT_SECRET = '#####' # i have changed the secret
    ↪with ##
    VERSION = '20180605' # Foursquare API version

    #url to fetch data from foursquare api
```

```

url = 'https://api.foursquare.com/v2/venues/{}?
↪&client_id={}&client_secret={}&v={}'.format(
    venue_id,
    CLIENT_ID,
    CLIENT_SECRET,
    VERSION)

# get all the data
results = requests.get(url).json()
venue_data=results['response']['venue']
venue_details=[]
try:
    venue_id=venue_data['id']
    venue_name=venue_data['name']
    venue_likes=venue_data['likes']['count']
    venue_rating=venue_data['rating']
    venue_tips=venue_data['tips']['count']
    venue_details.
↪append([venue_id,venue_name,venue_likes,venue_rating,venue_tips])
except KeyError:
    pass

column_names=['ID','Name','Likes','Rating','Tips']
df = pd.DataFrame(venue_details,columns=column_names)
return df

```

```

[10]: def get_new_york_data():
    url='https://cocl.us/new_york_dataset'
    resp=requests.get(url).json()
    # all data is present in features label
    features=resp['features']

    # define the dataframe columns
    column_names = ['Borough', 'Neighborhood', 'Latitude', 'Longitude']
    # instantiate the dataframe
    new_york_data = pd.DataFrame(columns=column_names)

    for data in features:
        borough = data['properties']['borough']
        neighborhood_name = data['properties']['name']

        neighborhood_latlon = data['geometry']['coordinates']
        neighborhood_lat = neighborhood_latlon[1]
        neighborhood_lon = neighborhood_latlon[0]

        new_york_data = new_york_data.append({'Borough': borough,
                                              'Neighborhood': neighborhood_name,

```

```

        'Latitude': neighborhood_lat,
        'Longitude': neighborhood_lon},
        ignore_index=True)

    return new_york_data

```

0.5.3 Data collection and preparation

```

[11]: # get new york data
new_york_data=get_new_york_data()
new_york_data.head()

```

```

[11]:  Borough Neighborhood  Latitude  Longitude
0   Bronx      Wakefield  40.894705 -73.847201
1   Bronx      Co-op City  40.874294 -73.829939
2   Bronx      Eastchester 40.887556 -73.827806
3   Bronx      Fieldston  40.895437 -73.905643
4   Bronx      Riverdale  40.890834 -73.912585

```

```

[12]: new_york_data.shape

```

```

[12]: (306, 4)

```

```

[13]: # prepare neighborhood list that contains French restaurants
column_names=['Borough', 'Neighborhood', 'ID','Name']
FRN=pd.DataFrame(columns=column_names)
count=1
for row in new_york_data.values.tolist():
    Borough, Neighborhood, Latitude, Longitude=row
    venues = get_venues(Latitude,Longitude)
    french_resturants=venues[venues['Category']=='French Restaurant']
    print('(',count, '/',len(new_york_data),'),'','French Resturants in_
    '+Neighborhood+', '+Borough+':'+str(len(french_resturants)))
    for resturant_detail in french_resturants.values.tolist():
        id, name , category=resturant_detail
        FRN = FRN.append({'Borough': Borough,
                           'Neighborhood': Neighborhood,
                           'ID': id,
                           'Name' : name
                           }, ignore_index=True)

    count+=1

```

```

done
( 1 / 306 ) French Resturants in Wakefield, Bronx:0
done
( 2 / 306 ) French Resturants in Co-op City, Bronx:0
done

```

(3 / 306) French Resturants in Eastchester, Bronx:0
done
(4 / 306) French Resturants in Fieldston, Bronx:0
done
(5 / 306) French Resturants in Riverdale, Bronx:0
done
(6 / 306) French Resturants in Kingsbridge, Bronx:0
done
(7 / 306) French Resturants in Marble Hill, Manhattan:0
done
(8 / 306) French Resturants in Woodlawn, Bronx:0
done
(9 / 306) French Resturants in Norwood, Bronx:0
done
(10 / 306) French Resturants in Williamsbridge, Bronx:0
done
(11 / 306) French Resturants in Baychester, Bronx:0
done
(12 / 306) French Resturants in Pelham Parkway, Bronx:0
done
(13 / 306) French Resturants in City Island, Bronx:1
done
(14 / 306) French Resturants in Bedford Park, Bronx:0
done
(15 / 306) French Resturants in University Heights, Bronx:0
done
(16 / 306) French Resturants in Morris Heights, Bronx:0
done
(17 / 306) French Resturants in Fordham, Bronx:0
done
(18 / 306) French Resturants in East Tremont, Bronx:0
done
(19 / 306) French Resturants in West Farms, Bronx:0
done
(20 / 306) French Resturants in High Bridge, Bronx:0
done
(21 / 306) French Resturants in Melrose, Bronx:0
done
(22 / 306) French Resturants in Mott Haven, Bronx:0
done
(23 / 306) French Resturants in Port Morris, Bronx:0
done
(24 / 306) French Resturants in Longwood, Bronx:0
done
(25 / 306) French Resturants in Hunts Point, Bronx:0
done
(26 / 306) French Resturants in Morrisania, Bronx:0
done

(27 / 306) French Resturants in Soundview, Bronx:0
done
(28 / 306) French Resturants in Clason Point, Bronx:0
done
(29 / 306) French Resturants in Throgs Neck, Bronx:0
done
(30 / 306) French Resturants in Country Club, Bronx:0
done
(31 / 306) French Resturants in Parkchester, Bronx:0
done
(32 / 306) French Resturants in Westchester Square, Bronx:0
done
(33 / 306) French Resturants in Van Nest, Bronx:0
done
(34 / 306) French Resturants in Morris Park, Bronx:0
done
(35 / 306) French Resturants in Belmont, Bronx:0
done
(36 / 306) French Resturants in Spuyten Duyvil, Bronx:0
done
(37 / 306) French Resturants in North Riverdale, Bronx:0
done
(38 / 306) French Resturants in Pelham Bay, Bronx:0
done
(39 / 306) French Resturants in Schuylerville, Bronx:0
done
(40 / 306) French Resturants in Edgewater Park, Bronx:0
done
(41 / 306) French Resturants in Castle Hill, Bronx:0
done
(42 / 306) French Resturants in Olinville, Bronx:0
done
(43 / 306) French Resturants in Pelham Gardens, Bronx:0
done
(44 / 306) French Resturants in Concourse, Bronx:0
done
(45 / 306) French Resturants in Unionport, Bronx:0
done
(46 / 306) French Resturants in Edenwald, Bronx:0
done
(47 / 306) French Resturants in Bay Ridge, Brooklyn:0
done
(48 / 306) French Resturants in Bensonhurst, Brooklyn:0
done
(49 / 306) French Resturants in Sunset Park, Brooklyn:0
done
(50 / 306) French Resturants in Greenpoint, Brooklyn:2
done

(51 / 306) French Resturants in Gravesend, Brooklyn:0
done

(52 / 306) French Resturants in Brighton Beach, Brooklyn:0
done

(53 / 306) French Resturants in Sheepshead Bay, Brooklyn:0
done

(54 / 306) French Resturants in Manhattan Terrace, Brooklyn:0
done

(55 / 306) French Resturants in Flatbush, Brooklyn:0
done

(56 / 306) French Resturants in Crown Heights, Brooklyn:0
done

(57 / 306) French Resturants in East Flatbush, Brooklyn:0
done

(58 / 306) French Resturants in Kensington, Brooklyn:0
done

(59 / 306) French Resturants in Windsor Terrace, Brooklyn:2
done

(60 / 306) French Resturants in Prospect Heights, Brooklyn:0
done

(61 / 306) French Resturants in Brownsville, Brooklyn:0
done

(62 / 306) French Resturants in Williamsburg, Brooklyn:0
done

(63 / 306) French Resturants in Bushwick, Brooklyn:1
done

(64 / 306) French Resturants in Bedford Stuyvesant, Brooklyn:1
done

(65 / 306) French Resturants in Brooklyn Heights, Brooklyn:1
done

(66 / 306) French Resturants in Cobble Hill, Brooklyn:1
done

(67 / 306) French Resturants in Carroll Gardens, Brooklyn:2
done

(68 / 306) French Resturants in Red Hook, Brooklyn:0
done

(69 / 306) French Resturants in Gowanus, Brooklyn:1
done

(70 / 306) French Resturants in Fort Greene, Brooklyn:2
done

(71 / 306) French Resturants in Park Slope, Brooklyn:0
done

(72 / 306) French Resturants in Cypress Hills, Brooklyn:0
done

(73 / 306) French Resturants in East New York, Brooklyn:0
done

(74 / 306) French Resturants in Starrett City, Brooklyn:0
done

(75 / 306) French Resturants in Canarsie, Brooklyn:0
 done
 (76 / 306) French Resturants in Flatlands, Brooklyn:0
 done
 (77 / 306) French Resturants in Mill Island, Brooklyn:0
 done
 (78 / 306) French Resturants in Manhattan Beach, Brooklyn:0
 done
 (79 / 306) French Resturants in Coney Island, Brooklyn:0
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 (80 / 306) French Resturants in Bath Beach, Brooklyn:0
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 (81 / 306) French Resturants in Borough Park, Brooklyn:0
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 (82 / 306) French Resturants in Dyker Heights, Brooklyn:0
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 (83 / 306) French Resturants in Gerritsen Beach, Brooklyn:0
 done
 (84 / 306) French Resturants in Marine Park, Brooklyn:0
 done
 (85 / 306) French Resturants in Clinton Hill, Brooklyn:2
 done
 (86 / 306) French Resturants in Sea Gate, Brooklyn:0
 done
 (87 / 306) French Resturants in Downtown, Brooklyn:4
 done
 (88 / 306) French Resturants in Boerum Hill, Brooklyn:2
 done
 (89 / 306) French Resturants in Prospect Lefferts Gardens, Brooklyn:0
 done
 (90 / 306) French Resturants in Ocean Hill, Brooklyn:0
 done
 (91 / 306) French Resturants in City Line, Brooklyn:0
 done
 (92 / 306) French Resturants in Bergen Beach, Brooklyn:0
 done
 (93 / 306) French Resturants in Midwood, Brooklyn:0
 done
 (94 / 306) French Resturants in Prospect Park South, Brooklyn:0
 done
 (95 / 306) French Resturants in Georgetown, Brooklyn:0
 done
 (96 / 306) French Resturants in East Williamsburg, Brooklyn:0
 done
 (97 / 306) French Resturants in North Side, Brooklyn:2
 done
 (98 / 306) French Resturants in South Side, Brooklyn:1
 done

(99 / 306) French Resturants in Ocean Parkway, Brooklyn:0
done
(100 / 306) French Resturants in Fort Hamilton, Brooklyn:0
done
(101 / 306) French Resturants in Chinatown, Manhattan:2
done
(102 / 306) French Resturants in Washington Heights, Manhattan:0
done
(103 / 306) French Resturants in Inwood, Manhattan:0
done
(104 / 306) French Resturants in Hamilton Heights, Manhattan:0
done
(105 / 306) French Resturants in Manhattanville, Manhattan:1
done
(106 / 306) French Resturants in Central Harlem, Manhattan:3
done
(107 / 306) French Resturants in East Harlem, Manhattan:1
done
(108 / 306) French Resturants in Upper East Side, Manhattan:2
done
(109 / 306) French Resturants in Yorkville, Manhattan:1
done
(110 / 306) French Resturants in Lenox Hill, Manhattan:3
done
(111 / 306) French Resturants in Roosevelt Island, Manhattan:1
done
(112 / 306) French Resturants in Upper West Side, Manhattan:0
done
(113 / 306) French Resturants in Lincoln Square, Manhattan:4
done
(114 / 306) French Resturants in Clinton, Manhattan:0
done
(115 / 306) French Resturants in Midtown, Manhattan:0
done
(116 / 306) French Resturants in Murray Hill, Manhattan:0
done
(117 / 306) French Resturants in Chelsea, Manhattan:1
done
(118 / 306) French Resturants in Greenwich Village, Manhattan:1
done
(119 / 306) French Resturants in East Village, Manhattan:0
done
(120 / 306) French Resturants in Lower East Side, Manhattan:1
done
(121 / 306) French Resturants in Tribeca, Manhattan:1
done
(122 / 306) French Resturants in Little Italy, Manhattan:1
done

(123 / 306) French Resturants in Soho, Manhattan:2
done
(124 / 306) French Resturants in West Village, Manhattan:2
done
(125 / 306) French Resturants in Manhattan Valley, Manhattan:1
done
(126 / 306) French Resturants in Morningside Heights, Manhattan:0
done
(127 / 306) French Resturants in Gramercy, Manhattan:0
done
(128 / 306) French Resturants in Battery Park City, Manhattan:1
done
(129 / 306) French Resturants in Financial District, Manhattan:1
done
(130 / 306) French Resturants in Astoria, Queens:0
done
(131 / 306) French Resturants in Woodside, Queens:0
done
(132 / 306) French Resturants in Jackson Heights, Queens:0
done
(133 / 306) French Resturants in Elmhurst, Queens:0
done
(134 / 306) French Resturants in Howard Beach, Queens:0
done
(135 / 306) French Resturants in Corona, Queens:0
done
(136 / 306) French Resturants in Forest Hills, Queens:0
done
(137 / 306) French Resturants in Kew Gardens, Queens:0
done
(138 / 306) French Resturants in Richmond Hill, Queens:0
done
(139 / 306) French Resturants in Flushing, Queens:0
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(140 / 306) French Resturants in Long Island City, Queens:0
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(141 / 306) French Resturants in Sunnyside, Queens:0
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(142 / 306) French Resturants in East Elmhurst, Queens:0
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(143 / 306) French Resturants in Maspeth, Queens:0
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(144 / 306) French Resturants in Ridgewood, Queens:0
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(145 / 306) French Resturants in Glendale, Queens:0
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(146 / 306) French Resturants in Rego Park, Queens:0
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(147 / 306) French Resturants in Woodhaven, Queens:0
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(148 / 306) French Resturants in Ozone Park, Queens:0
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(149 / 306) French Resturants in South Ozone Park, Queens:0
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(150 / 306) French Resturants in College Point, Queens:0
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(151 / 306) French Resturants in Whitestone, Queens:0
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(152 / 306) French Resturants in Bayside, Queens:0
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(153 / 306) French Resturants in Auburndale, Queens:0
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(154 / 306) French Resturants in Little Neck, Queens:1
done
(155 / 306) French Resturants in Douglaston, Queens:1
done
(156 / 306) French Resturants in Glen Oaks, Queens:0
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(157 / 306) French Resturants in Bellerose, Queens:0
done
(158 / 306) French Resturants in Kew Gardens Hills, Queens:0
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(159 / 306) French Resturants in Fresh Meadows, Queens:0
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(160 / 306) French Resturants in Briarwood, Queens:0
done
(161 / 306) French Resturants in Jamaica Center, Queens:0
done
(162 / 306) French Resturants in Oakland Gardens, Queens:0
done
(163 / 306) French Resturants in Queens Village, Queens:0
done
(164 / 306) French Resturants in Hollis, Queens:0
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(165 / 306) French Resturants in South Jamaica, Queens:0
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(166 / 306) French Resturants in St. Albans, Queens:0
done
(167 / 306) French Resturants in Rochdale, Queens:0
done
(168 / 306) French Resturants in Springfield Gardens, Queens:0
done
(169 / 306) French Resturants in Cambria Heights, Queens:0
done
(170 / 306) French Resturants in Rosedale, Queens:0
done

(171 / 306) French Resturants in Far Rockaway, Queens:0
done
(172 / 306) French Resturants in Broad Channel, Queens:0
done
(173 / 306) French Resturants in Breezy Point, Queens:0
done
(174 / 306) French Resturants in Steinway, Queens:0
done
(175 / 306) French Resturants in Beechhurst, Queens:0
done
(176 / 306) French Resturants in Bay Terrace, Queens:0
done
(177 / 306) French Resturants in Edgemere, Queens:0
done
(178 / 306) French Resturants in Arverne, Queens:0
done
(179 / 306) French Resturants in Rockaway Beach, Queens:0
done
(180 / 306) French Resturants in Neponsit, Queens:0
done
(181 / 306) French Resturants in Murray Hill, Queens:0
done
(182 / 306) French Resturants in Floral Park, Queens:0
done
(183 / 306) French Resturants in Holliswood, Queens:0
done
(184 / 306) French Resturants in Jamaica Estates, Queens:0
done
(185 / 306) French Resturants in Queensboro Hill, Queens:0
done
(186 / 306) French Resturants in Hillcrest, Queens:0
done
(187 / 306) French Resturants in Ravenswood, Queens:1
done
(188 / 306) French Resturants in Lindenwood, Queens:0
done
(189 / 306) French Resturants in Laurelton, Queens:0
done
(190 / 306) French Resturants in Lefrak City, Queens:0
done
(191 / 306) French Resturants in Belle Harbor, Queens:0
done
(192 / 306) French Resturants in Rockaway Park, Queens:1
done
(193 / 306) French Resturants in Somerville, Queens:0
done
(194 / 306) French Resturants in Brookville, Queens:0
done

(195 / 306) French Resturants in Bellaire, Queens:0
done
(196 / 306) French Resturants in North Corona, Queens:0
done
(197 / 306) French Resturants in Forest Hills Gardens, Queens:0
done
(198 / 306) French Resturants in St. George, Staten Island:0
done
(199 / 306) French Resturants in New Brighton, Staten Island:0
done
(200 / 306) French Resturants in Stapleton, Staten Island:0
done
(201 / 306) French Resturants in Rosebank, Staten Island:0
done
(202 / 306) French Resturants in West Brighton, Staten Island:0
done
(203 / 306) French Resturants in Grymes Hill, Staten Island:0
done
(204 / 306) French Resturants in Todt Hill, Staten Island:0
done
(205 / 306) French Resturants in South Beach, Staten Island:0
done
(206 / 306) French Resturants in Port Richmond, Staten Island:0
done
(207 / 306) French Resturants in Mariner's Harbor, Staten Island:0
done
(208 / 306) French Resturants in Port Ivory, Staten Island:0
done
(209 / 306) French Resturants in Castleton Corners, Staten Island:0
done
(210 / 306) French Resturants in New Springville, Staten Island:0
done
(211 / 306) French Resturants in Travis, Staten Island:0
done
(212 / 306) French Resturants in New Dorp, Staten Island:1
done
(213 / 306) French Resturants in Oakwood, Staten Island:0
done
(214 / 306) French Resturants in Great Kills, Staten Island:0
done
(215 / 306) French Resturants in Eltingville, Staten Island:0
done
(216 / 306) French Resturants in Annadale, Staten Island:0
done
(217 / 306) French Resturants in Woodrow, Staten Island:0
done
(218 / 306) French Resturants in Tottenville, Staten Island:0
done

(219 / 306) French Resturants in Tompkinsville, Staten Island:0
done
(220 / 306) French Resturants in Silver Lake, Staten Island:0
done
(221 / 306) French Resturants in Sunnyside, Staten Island:0
done
(222 / 306) French Resturants in Ditmas Park, Brooklyn:0
done
(223 / 306) French Resturants in Wingate, Brooklyn:0
done
(224 / 306) French Resturants in Rugby, Brooklyn:0
done
(225 / 306) French Resturants in Park Hill, Staten Island:0
done
(226 / 306) French Resturants in Westerleigh, Staten Island:0
done
(227 / 306) French Resturants in Graniteville, Staten Island:0
done
(228 / 306) French Resturants in Arlington, Staten Island:0
done
(229 / 306) French Resturants in Arrochar, Staten Island:0
done
(230 / 306) French Resturants in Grasmere, Staten Island:0
done
(231 / 306) French Resturants in Old Town, Staten Island:0
done
(232 / 306) French Resturants in Dongan Hills, Staten Island:0
done
(233 / 306) French Resturants in Midland Beach, Staten Island:0
done
(234 / 306) French Resturants in Grant City, Staten Island:1
done
(235 / 306) French Resturants in New Dorp Beach, Staten Island:0
done
(236 / 306) French Resturants in Bay Terrace, Staten Island:0
done
(237 / 306) French Resturants in Huguenot, Staten Island:0
done
(238 / 306) French Resturants in Pleasant Plains, Staten Island:0
done
(239 / 306) French Resturants in Butler Manor, Staten Island:0
done
(240 / 306) French Resturants in Charleston, Staten Island:0
done
(241 / 306) French Resturants in Rossville, Staten Island:0
done
(242 / 306) French Resturants in Arden Heights, Staten Island:0
done

(243 / 306) French Resturants in Greenridge, Staten Island:0
done
(244 / 306) French Resturants in Heartland Village, Staten Island:0
done
(245 / 306) French Resturants in Chelsea, Staten Island:0
done
(246 / 306) French Resturants in Bloomfield, Staten Island:0
done
(247 / 306) French Resturants in Bulls Head, Staten Island:0
done
(248 / 306) French Resturants in Carnegie Hill, Manhattan:2
done
(249 / 306) French Resturants in Noho, Manhattan:2
done
(250 / 306) French Resturants in Civic Center, Manhattan:3
done
(251 / 306) French Resturants in Midtown South, Manhattan:0
done
(252 / 306) French Resturants in Richmond Town, Staten Island:0
done
(253 / 306) French Resturants in Shore Acres, Staten Island:0
done
(254 / 306) French Resturants in Clifton, Staten Island:0
done
(255 / 306) French Resturants in Concord, Staten Island:0
done
(256 / 306) French Resturants in Emerson Hill, Staten Island:0
done
(257 / 306) French Resturants in Randall Manor, Staten Island:0
done
(258 / 306) French Resturants in Howland Hook, Staten Island:0
done
(259 / 306) French Resturants in Elm Park, Staten Island:0
done
(260 / 306) French Resturants in Remsen Village, Brooklyn:0
done
(261 / 306) French Resturants in New Lots, Brooklyn:0
done
(262 / 306) French Resturants in Paerdegat Basin, Brooklyn:0
done
(263 / 306) French Resturants in Mill Basin, Brooklyn:0
done
(264 / 306) French Resturants in Jamaica Hills, Queens:0
done
(265 / 306) French Resturants in Utopia, Queens:0
done
(266 / 306) French Resturants in Pomonok, Queens:0
done

(267 / 306) French Resturants in Astoria Heights, Queens:0
done
(268 / 306) French Resturants in Claremont Village, Bronx:0
done
(269 / 306) French Resturants in Concourse Village, Bronx:0
done
(270 / 306) French Resturants in Mount Eden, Bronx:0
done
(271 / 306) French Resturants in Mount Hope, Bronx:0
done
(272 / 306) French Resturants in Sutton Place, Manhattan:3
done
(273 / 306) French Resturants in Hunters Point, Queens:1
done
(274 / 306) French Resturants in Turtle Bay, Manhattan:1
done
(275 / 306) French Resturants in Tudor City, Manhattan:0
done
(276 / 306) French Resturants in Stuyvesant Town, Manhattan:0
done
(277 / 306) French Resturants in Flatiron, Manhattan:0
done
(278 / 306) French Resturants in Sunnyside Gardens, Queens:1
done
(279 / 306) French Resturants in Blissville, Queens:0
done
(280 / 306) French Resturants in Fulton Ferry, Brooklyn:0
done
(281 / 306) French Resturants in Vinegar Hill, Brooklyn:0
done
(282 / 306) French Resturants in Weeksville, Brooklyn:1
done
(283 / 306) French Resturants in Broadway Junction, Brooklyn:0
done
(284 / 306) French Resturants in Dumbo, Brooklyn:0
done
(285 / 306) French Resturants in Manor Heights, Staten Island:0
done
(286 / 306) French Resturants in Willowbrook, Staten Island:0
done
(287 / 306) French Resturants in Sandy Ground, Staten Island:0
done
(288 / 306) French Resturants in Egbertville, Staten Island:0
done
(289 / 306) French Resturants in Roxbury, Queens:0
done
(290 / 306) French Resturants in Homecrest, Brooklyn:0
done

```
( 291 / 306 ) French Resturants in Middle Village, Queens:0
done
( 292 / 306 ) French Resturants in Prince's Bay, Staten Island:0
done
( 293 / 306 ) French Resturants in Lighthouse Hill, Staten Island:0
done
( 294 / 306 ) French Resturants in Richmond Valley, Staten Island:0
done
( 295 / 306 ) French Resturants in Malba, Queens:0
done
( 296 / 306 ) French Resturants in Highland Park, Brooklyn:0
done
( 297 / 306 ) French Resturants in Madison, Brooklyn:0
done
( 298 / 306 ) French Resturants in Bronxdale, Bronx:0
done
( 299 / 306 ) French Resturants in Allerton, Bronx:0
done
( 300 / 306 ) French Resturants in Kingsbridge Heights, Bronx:0
done
( 301 / 306 ) French Resturants in Erasmus, Brooklyn:0
done
( 302 / 306 ) French Resturants in Hudson Yards, Manhattan:1
done
( 303 / 306 ) French Resturants in Hammels, Queens:0
done
( 304 / 306 ) French Resturants in Bayswater, Queens:0
done
( 305 / 306 ) French Resturants in Queensbridge, Queens:0
done
( 306 / 306 ) French Resturants in Fox Hills, Staten Island:0
```

```
[14]: FRN.head()
```

```
[14]:
```

	Borough	Neighborhood	ID	Name
0	Bronx	City Island	4d7aa83ee540f04d66ba16dc	Bistro SK
1	Brooklyn	Greenpoint	58fd34584382ab70ad90083e	Chez Ma Tante
2	Brooklyn	Greenpoint	4bcf1883c564ef3ba33beff0	Le Gamin
3	Brooklyn	Windsor Terrace	4e7d174cb6340a4da75a2cca	Le Paddock
4	Brooklyn	Windsor Terrace	4aee2d5cf964a520b7d221e3	Le P'tit Paris Bistro

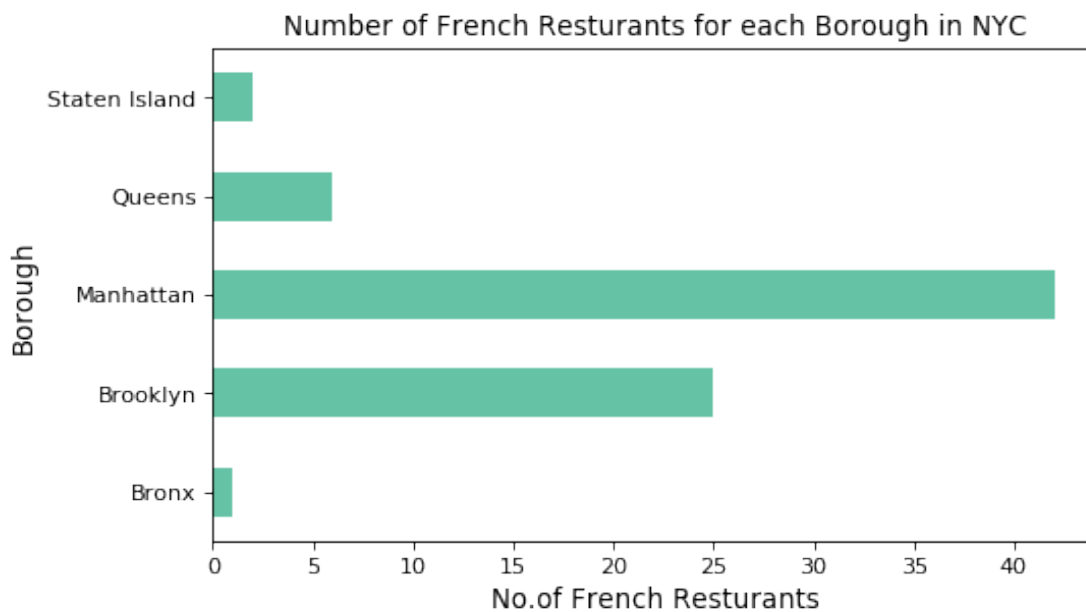
```
[15]: FRN.shape
```

```
[15]: (76, 4)
```

0.5.4 Visualisation and modeling

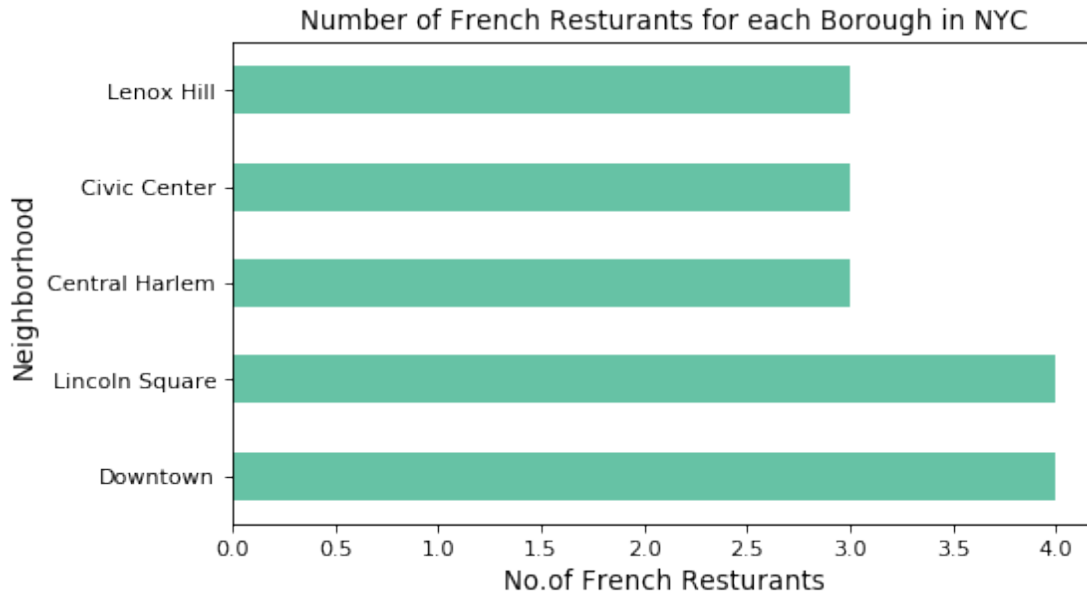
```
[16]: import matplotlib.pyplot as plt
import matplotlib.cm as cm
import matplotlib.colors as colors
%matplotlib inline
```

```
[35]: plt.figure(figsize=(7,4), dpi = 80)
# title
plt.title('Number of French Resturants for each Borough in NYC')
#On x-axis
plt.xlabel('No.of French Resturants', fontsize = 12)
#On y-axis
plt.ylabel('Borough', fontsize=12)
#giving a bar plot
FRN.groupby('Borough')['ID'].count().plot(kind='barh', colormap='Set2')
#displays the plot
plt.show()
```



```
[37]: plt.figure(figsize=(7,4), dpi = 80)
# title
plt.title('Number of French Resturants for each Borough in NYC')
#On x-axis
plt.xlabel('No.of French Resturants', fontsize = 12)
#On y-axis
plt.ylabel('Neighborhood', fontsize=12)
#giving a bar plot
```

```
FRN.groupby('Neighborhood')['ID'].count().nlargest(5).plot(kind='barh',
→ colormap='Set2')
#displays the plot
plt.show()
```



```
[39]: FRN[FRN['Neighborhood']=='Floral Park']
```

```
[39]: Empty DataFrame
Columns: [Borough, Neighborhood, ID, Name]
Index: []
```

```
[40]: # prepare neighborhood list that contains French resturants
column_names=['Borough', 'Neighborhood', 'ID', 'Name', 'Likes', 'Rating', 'Tips']
FRSNY=pd.DataFrame(columns=column_names)
count=1

for row in FRN.values.tolist():
    Borough,Neighborhood,ID,Name=row
    try:
        venue_details=get_venue_details(ID)
        print(venue_details)
        id, name, likes, rating, tips=venue_details.values.tolist()[0]
    except IndexError:
        print('No data available for id=',ID)
        # we will assign 0 value for these resturants as they may have been
        #recently opened or details does not exist in FourSquare Database
        id, name, likes, rating, tips=[0]*5
```

```

print('(',count, '/',len(FRN),')','processed')
FRSNY = FRSNY.append({'Borough': Borough,
                      'Neighborhood': Neighborhood,
                      'ID': id,
                      'Name' : name,
                      'Likes' : likes,
                      'Rating' : rating,
                      'Tips' : tips
                      }, ignore_index=True)

count+=1

```

	ID	Name	Likes	Rating	Tips
0	4d7aa83ee540f04d66ba16dc	Bistro SK	13	7.5	7
(1 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	58fd34584382ab70ad90083e	Chez Ma Tante	211	8.8	58
(2 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	4bcf1883c564ef3ba33beff0	Le Gamin	158	7.8	73
(3 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	4e7d174cb6340a4da75a2cca	Le Paddock	135	8.7	56
(4 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	4aee2d5cf964a520b7d221e3	Le P'tit Paris Bistro	55	7.5	32
(5 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	50b99e4ae4b0c22ba9633dfd	Mominette	340	8.4	80
(6 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	5003007de4b06d50188aa593	Le Paris Dakar	145	8.7	41
(7 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	4f7f8b86e4b088077df30175	Chez Moi	202	8.4	75
(8 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	4f7f8b86e4b088077df30175	Chez Moi	202	8.4	75
(9 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	5df42352f93ca9000762ff64	Bar Bête	17	8.4	3
(10 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	4e2ca88afa76bbf847e6886c	Jolie Cantina	209	8.0	78
(11 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	51e7e612498e001aa73959dd	Olivier Bistro	109	8.0	38
(12 / 76) processed					

	ID	Name	Likes	Rating	Tips
0	5250553911d262bb0c732ee8	Cafe Paulette	211	8.4	53
(13 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	422b9980f964a520d21f1fe3	Maison May	111	8.1	52
(14 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	422b9980f964a520d21f1fe3	Maison May	111	8.1	52
(15 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	5250553911d262bb0c732ee8	Cafe Paulette	211	8.4	53
(16 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	530931a5498e4079544a5f13	French Louie	569	8.7	115
(17 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	4d20bc3af7a9a143bcab2f9f	The Little Sweet Café	65	7.9	32
(18 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	5250553911d262bb0c732ee8	Cafe Paulette	211	8.4	53
(19 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	3fd66200f964a52058f11ee3	Bar Tabac	449	8.4	211
(20 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	530931a5498e4079544a5f13	French Louie	569	8.7	115
(21 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	3fd66200f964a52058f11ee3	Bar Tabac	449	8.4	211
(22 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	4554c3b0f964a520113d1fe3	Juliette	775	8.4	274
(23 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	49f38062f964a520ae6a1fe3	Pates Et Traditions	356	9.1	138
(24 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	49f38062f964a520ae6a1fe3	Pates Et Traditions	356	9.1	138
(25 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	57583641498e90001a32e13e	Le Coucou	394	9.3	90
(26 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	558ddcbe498e892dbe0d3a8b	Les Enfants de Bohème	88	8.5	19
(27 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	511a937ee88968b8acbb54b	Maison Harlem	291	8.6	88
(28 / 76) processed					

	ID	Name	Likes	Rating	Tips
0	4b80389ff964a520e95d30e3	Yatenga	105	8.7	62
(29 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	59cc6158c0af57432b9fd02b	Renaissance Harlem	12	8.0	2
(30 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	511a937ee88968b8acbb54b	Maison Harlem	291	8.6	88
(31 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	553c1b00498e7eb81316bf1b	Mountain Bird	80	9.1	18
(32 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	3fd66200f964a5207fe91ee3	Café Boulud	260	8.8	93
(33 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	4408540af964a52055301fe3	Orsay	149	8.4	45
(34 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	467ffefcf964a52019481fe3	Cafe D'Alsace	521	8.8	172
(35 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	4408540af964a52055301fe3	Orsay	149	8.4	45
(36 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	4d8e49c36174a0935ff2c4e3	Le Moulin A Cafe	152	8.5	63
(37 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	3fd66200f964a520dee71ee3	Daniel	479	9.1	186
(38 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	4d8e49c36174a0935ff2c4e3	Le Moulin A Cafe	152	8.5	63
(39 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	478cd1f3f964a520444d1fe3	Bar Boulud	380	8.0	184
(40 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	414ccc00f964a520d21c1fe3	Cafe Luxembourg	299	8.4	98
(41 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	3fd66200f964a520bee91ee3	Jean-Georges	553	8.9	283
(42 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	49e7897ff964a520b6641fe3	Nougatine at Jean Georges	274	8.8	101
(43 / 76) processed					
	ID	Name	Likes	Rating	Tips
0	5ce5b1f1f5e9d7002c4ad547	Pastis	109	9.0	16
(44 / 76) processed					

```
<ipython-input-40-bae5913f378d> in <module>
      7     Borough,Neighborhood,ID,Name=row
      8     try:
----> 9         venue_details=get_venue_details(ID)
      10         print(venue_details)
      11         id, name, likes, rating, tips=venue_details.values.
↪ tolist()[0]
```

```
KeyError: 'venue'
```

```
FRSNY.head()
```



```
[41]:
```

	Borough	Neighborhood	ID	Name \
0	Bronx	City Island	4d7aa83ee540f04d66ba16dc	Bistro SK
1	Brooklyn	Greenpoint	58fd34584382ab70ad90083e	Chez Ma Tante
2	Brooklyn	Greenpoint	4bcf1883c564ef3ba33beff0	Le Gamin
3	Brooklyn	Windsor Terrace	4e7d174cb6340a4da75a2cca	Le Paddock
4	Brooklyn	Windsor Terrace	4aee2d5cf964a520b7d221e3	Le P'tit Paris Bistro

	Likes	Rating	Tips
0	13	7.5	7
1	211	8.8	58
2	158	7.8	73
3	135	8.7	56
4	55	7.5	32

```
[42]: FRSNY.shape
```

```
[42]: (50, 7)
```

```
[43]: FRN.shape
```

```
[43]: (76, 4)
```

```
[44]: FRSNY.to_csv('FRSNY.csv', index=False)
```

```
[45]: FRSNY_csv=pd.read_csv('FRSNY.csv')
```

```
[46]: FRSNY_csv.shape
```

```
[46]: (50, 7)
```

```
[47]: FRSNY_csv.head()
```

```
[47]:
```

	Borough	Neighborhood	ID	Name \
0	Bronx	City Island	4d7aa83ee540f04d66ba16dc	Bistro SK
1	Brooklyn	Greenpoint	58fd34584382ab70ad90083e	Chez Ma Tante
2	Brooklyn	Greenpoint	4bcf1883c564ef3ba33beff0	Le Gamin
3	Brooklyn	Windsor Terrace	4e7d174cb6340a4da75a2cca	Le Paddock
4	Brooklyn	Windsor Terrace	4aee2d5cf964a520b7d221e3	Le P'tit Paris Bistro

	Likes	Rating	Tips
0	13	7.5	7
1	211	8.8	58
2	158	7.8	73
3	135	8.7	56
4	55	7.5	32

```
[48]: FRSNY.info()
```

```

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 50 entries, 0 to 49
Data columns (total 7 columns):
Borough          50 non-null object
Neighborhood      50 non-null object
ID                50 non-null object
Name              50 non-null object
Likes             50 non-null object
Rating            50 non-null float64
Tips              50 non-null object
dtypes: float64(1), object(6)
memory usage: 2.8+ KB

```

```
[49]: FRSNY['Likes']=FRSNY['Likes'].astype('float64')
```

```
[50]: FRSNY['Tips']=FRSNY['Tips'].astype('float64')
```

```
[51]: FRSNY.info()
```

```

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 50 entries, 0 to 49
Data columns (total 7 columns):
Borough          50 non-null object
Neighborhood      50 non-null object
ID                50 non-null object
Name              50 non-null object
Likes             50 non-null float64
Rating            50 non-null float64
Tips              50 non-null float64
dtypes: float64(3), object(4)
memory usage: 2.8+ KB

```

```
[52]: # Restaurant with maximum Likes
FRSNY.iloc[FRSNY['Likes'].idxmax()]
```

```
[52]: Borough          Brooklyn
Neighborhood      North Side
ID                4554c3b0f964a520113d1fe3
Name              Juliette
Likes             775
Rating            8.4
Tips              274
Name: 22, dtype: object
```

```
[53]: # Restaurant with maximum Rating
FRSNY.iloc[FRSNY['Rating'].idxmax()]
```

```
[53]: Borough           Manhattan
      Neighborhood      Chinatown
      ID                57583641498e90001a32e13e
      Name              Le Coucou
      Likes             394
      Rating            9.3
      Tips              90
      Name: 25, dtype: object
```

```
[54]: # Restaurant with maximum Tips
      FRSNY.iloc[FRSNY['Tips'].idxmax()]
```

```
[54]: Borough           Manhattan
      Neighborhood      Lincoln Square
      ID                3fd66200f964a520bee91ee3
      Name              Jean-Georges
      Likes             553
      Rating            8.9
      Tips              283
      Name: 41, dtype: object
```

```
[55]: NNS=FRSNY.groupby('Neighborhood',as_index=False).
      ↪mean()[['Neighborhood','Rating']]
      NNS.columns=['Neighborhood','Average Rating']
```

```
[56]: NNS.sort_values(['Average Rating'],ascending=False).head(10)
```

```
[56]:
```

	Neighborhood	Average Rating
19	Little Italy	9.30
24	Soho	9.15
12	East Harlem	9.10
25	South Side	9.10
6	Chelsea	9.00
16	Greenwich Village	9.00
20	Lower East Side	8.90
7	Chinatown	8.90
29	Yorkville	8.80
22	North Side	8.75

```
[57]: NBS=FRSNY.groupby('Borough',as_index=False).mean()[['Borough','Rating']]
      NBS.columns=['Borough','Average Rating']
```

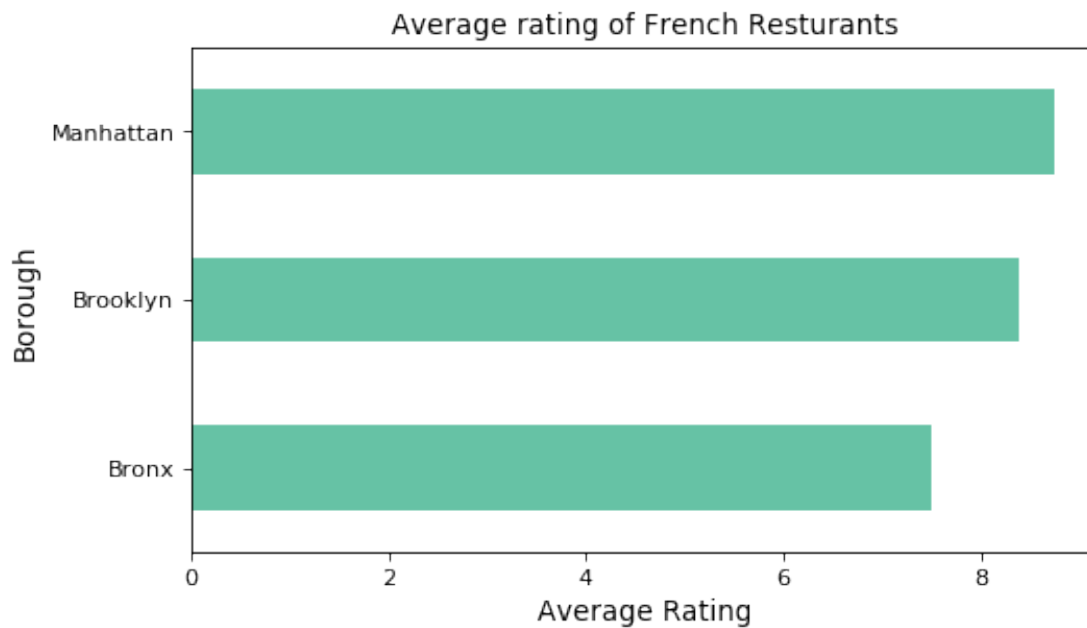
```
[58]: NBS.sort_values(['Average Rating'],ascending=False).head()
```

```
[58]:
```

	Borough	Average Rating
2	Manhattan	8.740000
1	Brooklyn	8.383333

0 Bronx 7.500000

```
[60]: plt.figure(figsize=(7,4), dpi = 80)
      # title
      plt.title('Average rating of French Resturants')
      #On x-axis
      plt.xlabel('Average Rating', fontsize = 12)
      #On y-axis
      plt.ylabel('Borough', fontsize=12)
      #giving a bar plot
      FRSNY.groupby('Borough').mean()['Rating'].plot(kind='barh', colormap='Set2')
      #displays the plot
      plt.show()
```



```
[61]: NNS=NNS[NNS['Average Rating']>=9.0]
```

```
[62]: NNS
```

```
[62]:
```

	Neighborhood	Average Rating
6	Chelsea	9.00
12	East Harlem	9.10
16	Greenwich Village	9.00
19	Little Italy	9.30
24	Soho	9.15
25	South Side	9.10

```
[63]: NNS=pd.merge(NNS,new_york_data, on='Neighborhood')
```

```
[64]: NNS=NNS[['Borough','Neighborhood','Latitude','Longitude','Average Rating']]
```

```
[65]: NNS
```

```
[65]:
```

	Borough	Neighborhood	Latitude	Longitude	Average Rating
0	Manhattan	Chelsea	40.744035	-74.003116	9.00
1	Staten Island	Chelsea	40.594726	-74.189560	9.00
2	Manhattan	East Harlem	40.792249	-73.944182	9.10
3	Manhattan	Greenwich Village	40.726933	-73.999914	9.00
4	Manhattan	Little Italy	40.719324	-73.997305	9.30
5	Manhattan	Soho	40.722184	-74.000657	9.15
6	Brooklyn	South Side	40.710861	-73.958001	9.10

```
[66]: # create map and display it
ny_map = folium.Map(location=geo_location('New York'), zoom_start=12)
```

```
[73]: # instantiate a feature group for the incidents in the dataframe
incidents = folium.map.FeatureGroup()

# loop through the 100 crimes and add each to the incidents feature group
for lat, lng, in NNS[['Latitude','Longitude']].values:
    incidents.add_child(
        folium.CircleMarker(
            [lat, lng],
            radius=10, # define how big you want the circle markers to be
            color='gold',
            fill=True,
            fill_color='green',
            fill_opacity=0.6
        )
    )
```

```
[74]: NNS['Label']=NNS['Neighborhood']+', '+NNS['Borough']+(' '+NNS['Average Rating']).
    ↪map(str)+'')
```

```
[75]: # add pop-up text to each marker on the map
for lat, lng, label in NNS[['Latitude','Longitude','Label']].values:
    folium.Marker([lat, lng], popup=label).add_to(ny_map)
# add incidents to map
ny_map.add_child(incidents)
```

```
[75]: <folium.folium.Map at 0x7ff321418128>
```

0.6 4. Result and Conclusion

So as we can see there are a two possible oportunity for the mentioned bussines model on Manhattan and Staten Island. And if on Staten Island we see a lot of possible places and districts for a new opening comparing with just one high rated French restrans. In other hand on Manhattan there are 5 high level places which could mean that a demand there is on a growing level and it could be a smart investition.

0.7 6. Next Developments

In order to make this analysys nore predictive and create straight conclusion it's better to add to the report analysys of rental rates and avrage cheque in the mentioned places. That's will help to understan why there a 5 places on Manhattan and just one on Staten Island. Probably there are no demand but also it could be just not the aim audience for this type of restrants.

[]:

[]: