Capstone Project - The Battle of Neighborhoods

Introduction

In this Project We will try to explore and find best Indian Restaurents As we know that New-york is a multicultural city where lot of immigrants lives so This project is targeted to those people how wants to eat their cultural food and for those companies who wants to recommend best restaurents to their users using this model.

We will use our data science powers to generate a few most promissing neighborhoods based on highest rating and tips.So Based on that we will suggest users some Promising Neighborhoods/Restaurents according to their food preferences

With it's diverse culture , comes diverse food items. There are many resturants in New york City, each beloning to different categories like Chinese , Indian , French etc.

So as part of this project , we will list and visualize all major parts of New York City that has great indian resturants.

Data ¶

For this project we need the following data :

Following data sources will be needed to extract/generate the required information:

1. we will get New-york city data from https://cocl.us/new_york_dataset which contains all borough and Neighborhood details along with their latitude and longitude.

2. Restaurents details we will get from Foursquare Api which will contains information like Tips,Rating which will Certainly going to help us in this Project.

3. Using https://data.cityofnewyork.us/City-Government/Borough-Boundaries/tqmj-j8zm we will get all boroughs location which will in creating boundaries for choropleth map.

4. Using Visulizations libraries like Folium,Matplotlib we will show Visulizations of our Result.

Method

- Collect the new york city data from https://cocl.us/new_york_dataset (https://cocl.us/new_york_dataset)
- Using FourSquare API we will find all venues for each neighborhood. Filter out all venues that are
- Indian Resturants.
- Find rating , tips and like count for each Indian Resturants using FourSquare API.
- Using rating for each resturant , we will sort that data.

- Visualize the Ranking of neighborhoods using folium library(python)

In [206]:

```
import pandas as pd
import numpy as np
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)
import requests
from bs4 import BeautifulSoup
import geocoder
import os
import folium # map rendering library
from geopy.geocoders import Nominatim # convert an address into latitude and longit
# Matplotlib and associated plotting modules
import matplotlib.pyplot as plt
import matplotlib.cm as cm
import matplotlib.colors as colors
%matplotlib inline


print('Libraries imported.')
```

```
Libraries imported.
```

Now we define a function to get the geocodes i.e latitude and longitude of a given location using geopy.

In [207]:

```
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
```

We define a function to intract with FourSquare API and get top 100 venues within a radius of 1000 metres for a given latitude and longitude. Below function will return us the venue id , venue name and category.

In [208]:

```
def get_venues(lat,lng):

    #set variables
    radius=1000
    LIMIT=100
    CLIENT_ID = os.environ['CLIENT_ID'] # your Foursquare ID
    CLIENT_SECRET = os.environ['CLIENT_SECRET'] # your 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
            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)
    return df
```

Now we will define a function to get venue details like like count , rating , tip counts for a given venue id.
This will be used for ranking.

In [209]:

```
def get_venue_details(venue_id):

    CLIENT_ID = os.environ['CLIENT_ID'] # your Foursquare ID
    CLIENT_SECRET = os.environ['CLIENT_SECRET'] # your Foursquare Secret
    VERSION = '20180605' # Foursquare API version

    #url to fetch data from foursquare api
    url = 'https://api.foursquare.com/v2/venues/{}?&client_id={}&client_secret={}&v
            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_ti
    except KeyError:
        pass

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

Now we define a funtion to get the new york city data such as Boroughs, Neighborhoods along with their latitude and longitude.

In [210]:

```
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_in

    return new_york_data
```

We will call the above funtion to get the new york city data.

In [211]:

```
# get new york data
new_york_data=get_new_york_data()
```

In [212]:

```
new_york_data.head()
```

Out[212]:

	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

In [213]:

```
new_york_data.shape
```

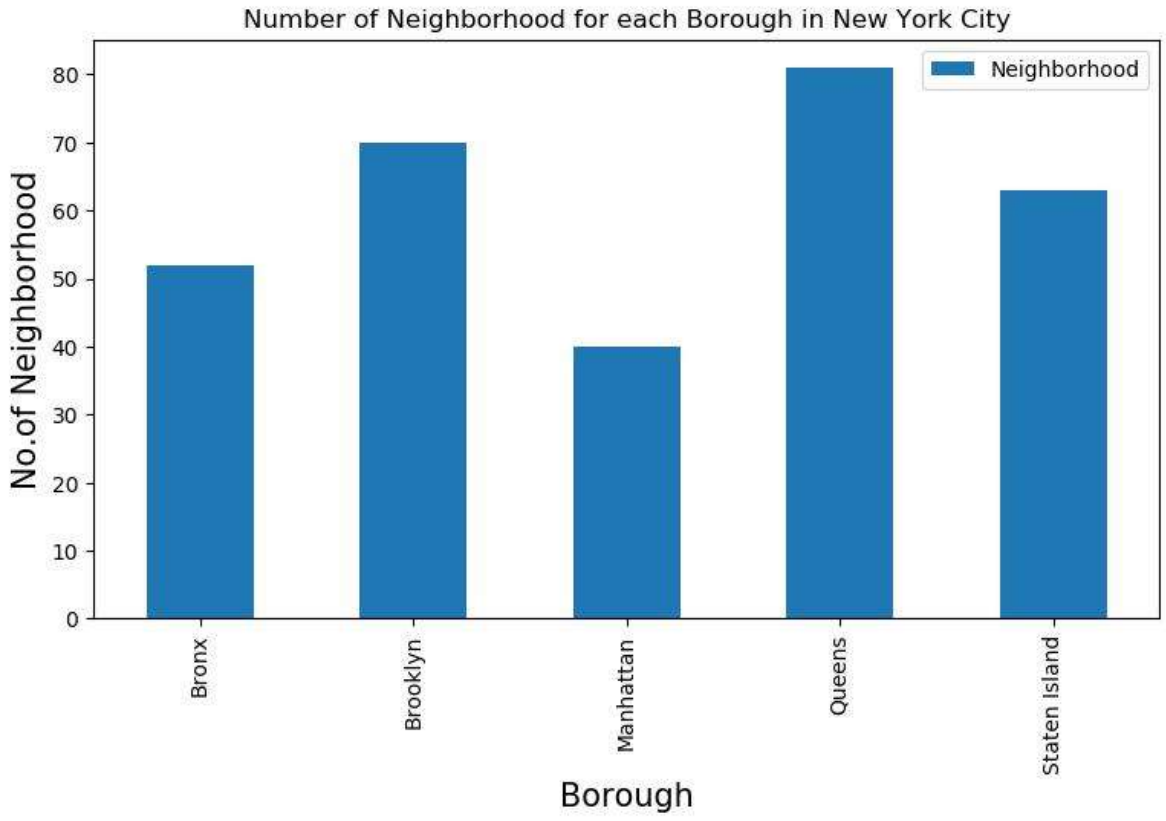
Out[213]:

```
(306, 4)
```

So there are total of 306 different Neighborhoods in New York

In [219]:

```
plt.figure(figsize=(9,5), dpi = 100)
# title
plt.title('Number of Neighborhood for each Borough in New York City')
#On x-axis
plt.xlabel('Borough', fontsize = 15)
#On y-axis
plt.ylabel('No.of Neighborhood', fontsize=15)
#giving a bar plot
new_york_data.groupby('Borough')['Neighborhood'].count().plot(kind='bar')
#legend
plt.legend()
#displays the plot
plt.show()
```



We see that Queens has highest number of neighborhoods

Now we will collect Indian resturants for each Neighborhood

In [230]:

```
# prepare neighborhood list that contains indian resturants
column_names=['Borough', 'Neighborhood', 'ID','Name']
indian_rest_ny=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)
    indian_resturants=venues[venues['Category']=='Indian Restaurant']
    print('(',count,'/',len(new_york_data),')','Indian Resturants in '+Neighborhood
    for resturant_detail in indian_resturants.values.tolist():
        id, name , category=resturant_detail
        indian_rest_ny = indian_rest_ny.append({'Borough': Borough,
                                                'Neighborhood': Neighborhood,
                                                'ID': id,
                                                'Name' : name
                                               }, ignore_index=True)
    count+=1
```

```
( 288 / 306 ) Indian Resturants in Egbertville, Staten Island:0
( 289 / 306 ) Indian Resturants in Roxbury, Queens:0
( 290 / 306 ) Indian Resturants in Homecrest, Brooklyn:0
( 291 / 306 ) Indian Resturants in Middle Village, Queens:0
( 292 / 306 ) Indian Resturants in Prince's Bay, Staten Island:0
( 293 / 306 ) Indian Resturants in Lighthouse Hill, Staten Island:0
( 294 / 306 ) Indian Resturants in Richmond Valley, Staten Island:0
( 295 / 306 ) Indian Resturants in Malba, Queens:0
( 296 / 306 ) Indian Resturants in Highland Park, Brooklyn:0
( 297 / 306 ) Indian Resturants in Madison, Brooklyn:0
( 298 / 306 ) Indian Resturants in Bronxdale, Bronx:0
( 299 / 306 ) Indian Resturants in Allerton, Bronx:0
( 300 / 306 ) Indian Resturants in Kingsbridge Heights, Bronx:0
( 301 / 306 ) Indian Resturants in Erasmus, Brooklyn:1
( 302 / 306 ) Indian Resturants in Hudson Yards, Manhattan:0
( 303 / 306 ) Indian Resturants in Hammels, Queens:0
( 304 / 306 ) Indian Resturants in Bayswater, Queens:0
( 305 / 306 ) Indian Resturants in Queensbridge, Queens:2
( 306 / 306 ) Indian Resturants in Fox Hills, Staten Island:1
```

Now that we have got all the indian resturants in new york city , we will analyze it

In [232]:

```
indian_rest_ny.head()
```

Out[232]:

	Borough	Neighborhood	ID	Name
0	Bronx	Riverdale	4c04544df423a593ac83d116	Cumin Indian Cuisine
1	Bronx	Kingsbridge	4c04544df423a593ac83d116	Cumin Indian Cuisine
2	Bronx	Woodlawn	4c0448d9310fc9b6bf1dc761	Curry Spot
3	Bronx	Parkchester	4c194631838020a13e78e561	Melanies Roti Bar And Grill
4	Bronx	Spuyten Duyvil	4c04544df423a593ac83d116	Cumin Indian Cuisine

In [233]:

```
indian_rest_ny.shape
```

Out[233]:

```
(153, 4)
```

We got 153 Indian Resturants across New York City

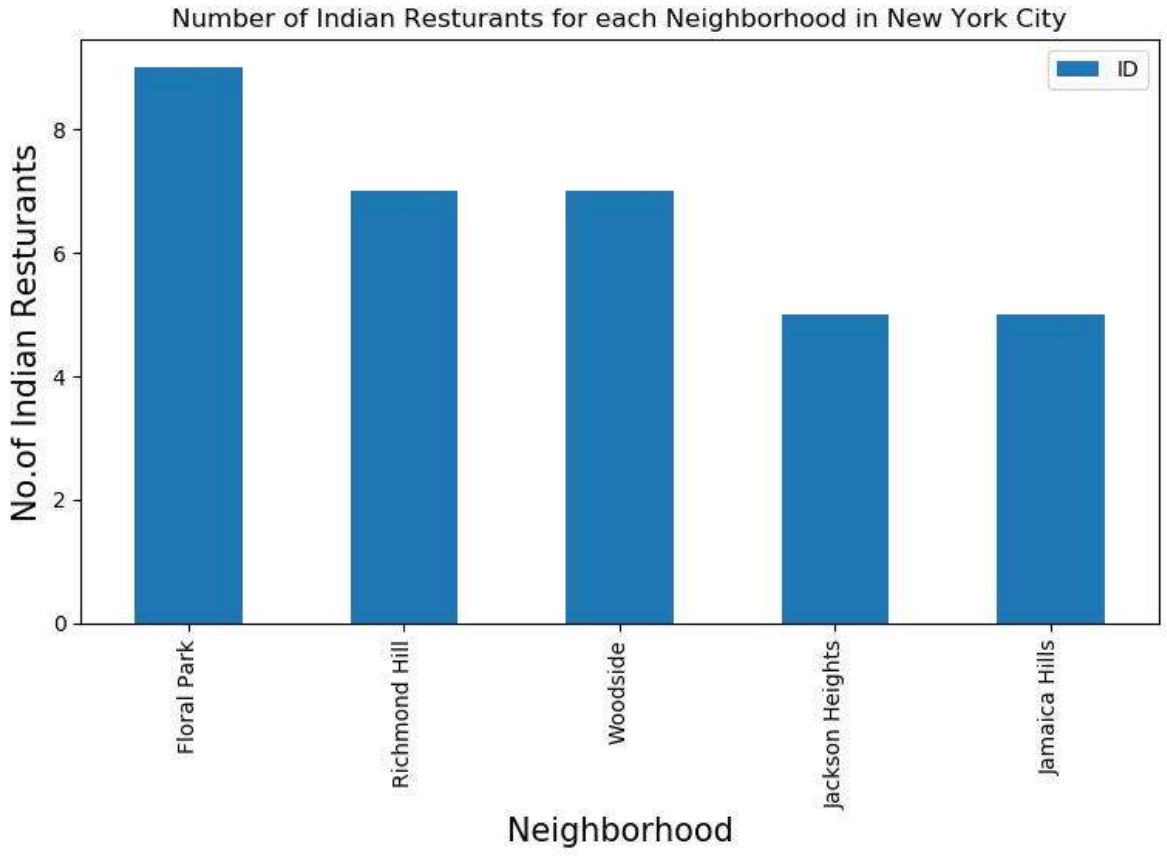
In [234]:

```
plt.figure(figsize=(9,5), dpi = 100)
# title
plt.title('Number of Indian Resturants for each Borough in New York City')
#On x-axis
plt.xlabel('Borough', fontsize = 15)
#On y-axis
plt.ylabel('No.of Indian Resturants', fontsize=15)
#giving a bar plot
indian_rest_ny.groupby('Borough')['ID'].count().plot(kind='bar')
#legend
plt.legend()
#displays the plot
plt.show()
```

We see that Queens has the largest number of indian resturants

In [236]:

```
plt.figure(figsize=(9,5), dpi = 100)
# title
plt.title('Number of Indian Resturants for each Neighborhood in New York City')
#On x-axis
plt.xlabel('Neighborhood', fontsize = 15)
#On y-axis
plt.ylabel('No.of Indian Resturants', fontsize=15)
#giving a bar plot
indian_rest_ny.groupby('Neighborhood')['ID'].count().nlargest(5).plot(kind='bar')
#legend
plt.legend()
#displays the plot
plt.show()
```



In [238]:

```
indian_rest_ny[indian_rest_ny['Neighborhood']=='Floral Park']
```

Out[238]:

	Borough	Neighborhood	ID	Name
103	Queens	Floral Park	527ffc0811d2d329d5e49abd	Jackson Diner
104	Queens	Floral Park	4b647b56f964a520c4b62ae3	Usha Foods & Usha Sweets
105	Queens	Floral Park	4b787c49f964a5209cd12ee3	Santoor Indian Restaurant
106	Queens	Floral Park	4e4e3e22bd4101d0d7a5c2d1	Kerala Kitchen
107	Queens	Floral Park	4c0c01e0bbc676b00d6b4cd5	Mumbai Xpress
108	Queens	Floral Park	4c76ff35a5676dcb72671721	Flavor Of India
109	Queens	Floral Park	4df0f39dd4c04d0392c853ea	Sagar Chinese
110	Queens	Floral Park	571af96a498e9e392d8d3786	Namaste Authenic Indian Cuisine
111	Queens	Floral Park	51d84192498ea979a3c4f13d	Sunshine Grill & Restaurant

So Floral Park in Queens has the highest number of Indian Resturants with a total count of 9.

Now we will get the ranking of each resturant for further analysis.

In [260]:

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



for row in indian_rest_ny.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(indian_rest_ny),')','processed')
    indian_rest_stats_ny = indian_rest_stats_ny.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   5b931ea69d7468002c3b1382 Adda      71     9.2    20
( 149 / 153  ) processed
                         ID                 Name  Likes  Rating Tips
0   564d283d498e6e851df79d87 Great Indian Curry       3     6.7    2
( 150 / 153  ) processed
                         ID               Name  Likes  Rating  Tips
0   4b1b341bf964a5208af923e3 Five Star Banquet      29     7.4    31
( 151 / 153  ) processed
                         ID                  Name  Likes  Rating  Ti
ps
0  50a287a7e4b0033f830f06db  Raj's Indian Kitchen     21     7.2
9
( 152 / 153 ) processed
Empty DataFrame
Columns: [ID, Name, Likes, Rating, Tips]
Index: []
No data available for id= 4b65f2e3f964a5206e0a2be3
( 153 / 153 ) processed
```

In [261]:

```
indian_rest_stats_ny.head()
```

Out[261]:

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Bronx	Riverdale	4c04544df423a593ac83d116	Cumin Indian Cuisine	13	6.6	9
1	Bronx	Kingsbridge	4c04544df423a593ac83d116	Cumin Indian Cuisine	13	6.6	9
2	Bronx	Woodlawn	4c0448d9310fc9b6bf1dc761	Curry Spot	4	7.7	10
3	Bronx	Parkchester	4c194631838020a13e78e561	Melanies Roti Bar And Grill	3	6.1	2
4	Bronx	Spuyten Duyvil	4c04544df423a593ac83d116	Cumin Indian Cuisine	13	6.6	9

In [265]:

```
indian_rest_stats_ny.shape
```

Out[265]:

```
(153, 7)
```

In [266]:

```
indian_rest_ny.shape
```

Out[266]:

```
(153, 4)
```

So we got data for all resturants Now lets save this data to a csv sheet. In case we by mistake modify it. As the number of calls to get details for venue are premium call and have limit of 500 per day, we will refer to saved data sheet csv if required

In [267]:

```
indian_rest_stats_ny.to_csv('indian_rest_stats_ny.csv', index=False)
```

Lets verify the data from saved csv file

In [268]:

```
indian_rest_stats_ny_csv=pd.read_csv('indian_rest_stats_ny.csv')
```

In [269]:

```
indian_rest_stats_ny_csv.shape
```

Out[269]:

```
(153, 7)
```

In [270]:

```
indian_rest_stats_ny_csv.head()
```

Out[270]:

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Bronx	Riverdale	4c04544df423a593ac83d116	Cumin Indian Cuisine	13	6.6	9
1	Bronx	Kingsbridge	4c04544df423a593ac83d116	Cumin Indian Cuisine	13	6.6	9
2	Bronx	Woodlawn	4c0448d9310fc9b6bf1dc761	Curry Spot	4	7.7	10
3	Bronx	Parkchester	4c194631838020a13e78e561	Melanies Roti Bar And Grill	3	6.1	2
4	Bronx	Spuyten Duyvil	4c04544df423a593ac83d116	Cumin Indian Cuisine	13	6.6	9

In [277]:

```
indian_rest_stats_ny.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 153 entries, 0 to 152
Data columns (total 7 columns):
Borough          153 non-null object
Neighborhood     153 non-null object
ID               153 non-null object
Name             153 non-null object
Likes            153 non-null object
Rating           153 non-null float64
Tips             153 non-null object
dtypes: float64(1), object(6)
memory usage: 8.4+ KB
```

We see that values like Likes, Tips are strig values. We would need to convert them into float for further analysis

In [279]:

```
indian_rest_stats_ny['Likes']=indian_rest_stats_ny['Likes'].astype('float64')
```

In [280]:

```
indian_rest_stats_ny['Tips']=indian_rest_stats_ny['Tips'].astype('float64')
```

In [283]:

```
indian_rest_stats_ny.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 153 entries, 0 to 152
Data columns (total 7 columns):
Borough          153 non-null object
Neighborhood     153 non-null object
ID               153 non-null object
Name             153 non-null object
Likes            153 non-null float64
Rating           153 non-null float64
Tips             153 non-null float64
dtypes: float64(3), object(4)
memory usage: 8.4+ KB
```

Now the data types looks correct

In [286]:

```
# Resturant with maximum Likes
indian_rest_stats_ny.iloc[indian_rest_stats_ny['Likes'].idxmax()]
```

Out[286]:

```
Borough                          Manhattan
Neighborhood                       Midtown
ID                 49d91c12f964a520015e1fe3
Name                  The Kati Roll Company
Likes                                   819
Rating                                    9
Tips                                    257
Name: 43, dtype: object
```

In [287]:

```
# Resturant with maximum Rating
indian_rest_stats_ny.iloc[indian_rest_stats_ny['Rating'].idxmax()]
```

Out[287]:

```
Borough                          Manhattan
Neighborhood                       Tribeca
ID                 4bbb9dbded7776b0e1ad3e51
Name                        Tamarind TriBeCa
Likes                                   566
Rating                                  9.2
Tips                                    141
Name: 45, dtype: object
```

In [288]:

```
# Resturant with maximum Tips
indian_rest_stats_ny.iloc[indian_rest_stats_ny['Tips'].idxmax()]
```

Out[288]:

```
Borough                          Manhattan
Neighborhood                       Midtown
ID                 49d91c12f964a520015e1fe3
Name                  The Kati Roll Company
Likes                                   819
Rating                                    9
Tips                                    257
Name: 43, dtype: object
```

Now lets visualize neighborhood with maximum average rating of resturants

In [374]:

```
ny_neighborhood_stats=indian_rest_stats_ny.groupby('Neighborhood',as_index=False).m
ny_neighborhood_stats.columns=['Neighborhood','Average Rating']
```

In [375]:

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

Out[375]:

	Neighborhood	Average Rating
0	Astoria	9.200000
71	Sunnyside	9.200000
75	Tribeca	9.200000
5	Blissville	9.200000
11	Civic Center	9.200000
47	Midtown	9.000000
48	Midtown South	9.000000
30	Gramercy	8.866667
66	Roosevelt Island	8.700000
53	North Side	8.700000

Above are the top neighborhoods with top average rating of Indian resturants

In [376]:

```
ny_borough_stats=indian_rest_stats_ny.groupby('Borough',as_index=False).mean()[['Bo
ny_borough_stats.columns=['Borough','Average Rating']
```

In [377]:

```
ny_borough_stats.sort_values(['Average Rating'],ascending=False).head()
```

Out[377]:

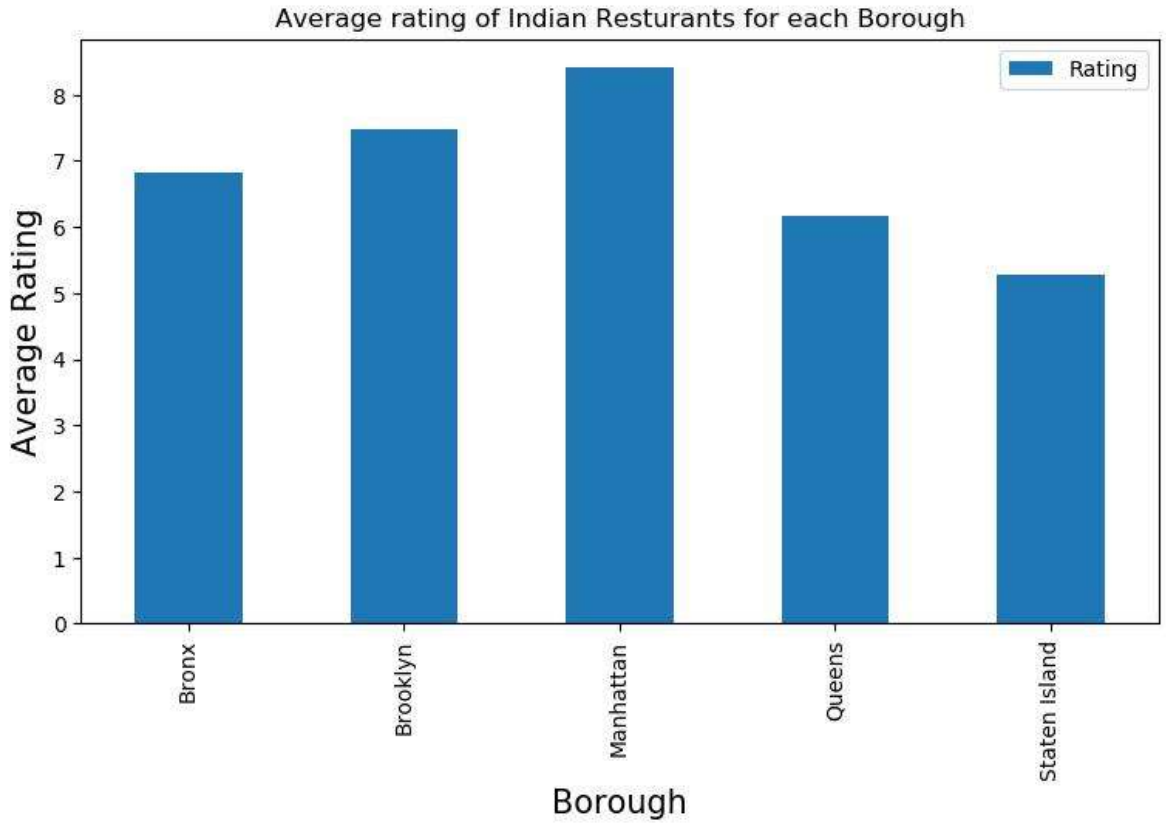
	Borough	Average Rating
2	Manhattan	8.414706
1	Brooklyn	7.478571
0	Bronx	6.812500
3	Queens	6.155844
4	Staten Island	5.266667

Similarly these are the average rating of Indian Resturants for each Borough

Lets visualize it

In [466]:

```
plt.figure(figsize=(9,5), dpi = 100)
# title
plt.title('Average rating of Indian Resturants for each Borough')
#On x-axis
plt.xlabel('Borough', fontsize = 15)
#On y-axis
plt.ylabel('Average Rating', fontsize=15)
#giving a bar plot
indian_rest_stats_ny.groupby('Borough').mean()['Rating'].plot(kind='bar')
#legend
plt.legend()
#displays the plot
plt.show()
```



We will consider all the neighborhoods with average rating greater or equal 9.0 to visualize on map

In [472]:

```
ny_neighborhood_stats=ny_neighborhood_stats[ny_neighborhood_stats['Average Rating']
```

In [473]:

```
ny_neighborhood_stats
```

Out[473]:

	Borough_x	Neighborhood	Latitude_x	Longitude_x	Average Rating	Label	Borough_y	La
0	Queens	Astoria	40.768509	-73.915654	9.2	Astoria, Queens(9.2)	Queens	40
1	Queens	Blissville	40.737251	-73.932442	9.2	Blissville, Queens(9.2)	Queens	40
2	Manhattan	Civic Center	40.715229	-74.005415	9.2	Civic Center, Manhattan(9.2)	Manhattan	40
3	Manhattan	Midtown	40.754691	-73.981669	9.0	Midtown, Manhattan(9.0)	Manhattan	40
4	Manhattan	Midtown South	40.748510	-73.988713	9.0	Midtown South, Manhattan(9.0)	Manhattan	40
5	Queens	Sunnyside	40.740176	-73.926916	9.2	Sunnyside, Queens(9.2)	Queens	40
6	Queens	Sunnyside	40.740176	-73.926916	9.2	Sunnyside, Queens(9.2)	Staten Island	40
7	Staten Island	Sunnyside	40.612760	-74.097126	9.2	Sunnyside, Staten Island(9.2)	Queens	40
8	Staten Island	Sunnyside	40.612760	-74.097126	9.2	Sunnyside, Staten Island(9.2)	Staten Island	40
9	Manhattan	Tribeca	40.721522	-74.010683	9.2	Tribeca, Manhattan(9.2)	Manhattan	40

We will join this dataset to original new york data to get lonitude and latitude

In [474]:

```
ny_neighborhood_stats=pd.merge(ny_neighborhood_stats,new_york_data, on='Neighborhoo
```

In [475]:

```
ny_neighborhood_stats=ny_neighborhood_stats[['Borough','Neighborhood','Latitude','L
```

In [476]:

```
ny_neighborhood_stats
```

Out[476]:

	Borough	Neighborhood	Latitude	Longitude	Average Rating
0	Queens	Astoria	40.768509	-73.915654	9.2
1	Queens	Blissville	40.737251	-73.932442	9.2
2	Manhattan	Civic Center	40.715229	-74.005415	9.2
3	Manhattan	Midtown	40.754691	-73.981669	9.0
4	Manhattan	Midtown South	40.748510	-73.988713	9.0
5	Queens	Sunnyside	40.740176	-73.926916	9.2
6	Staten Island	Sunnyside	40.612760	-74.097126	9.2
7	Queens	Sunnyside	40.740176	-73.926916	9.2
8	Staten Island	Sunnyside	40.612760	-74.097126	9.2
9	Queens	Sunnyside	40.740176	-73.926916	9.2
10	Staten Island	Sunnyside	40.612760	-74.097126	9.2
11	Queens	Sunnyside	40.740176	-73.926916	9.2
12	Staten Island	Sunnyside	40.612760	-74.097126	9.2
13	Manhattan	Tribeca	40.721522	-74.010683	9.2

Now we will show this data on a map

In [477]:

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

In [478]:

```
# 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 ny_neighborhood_stats[['Latitude','Longitude']].values:
    incidents.add_child( folium.CircleMarker(

            [lat, lng],
            radius=10, # define how big you want the circle markers to be
            color='yellow',
            fill=True,
            fill_color='blue',
            fill_opacity=0.6
        )
    )
```

Lets add a new field to dataframe for labeling purpose

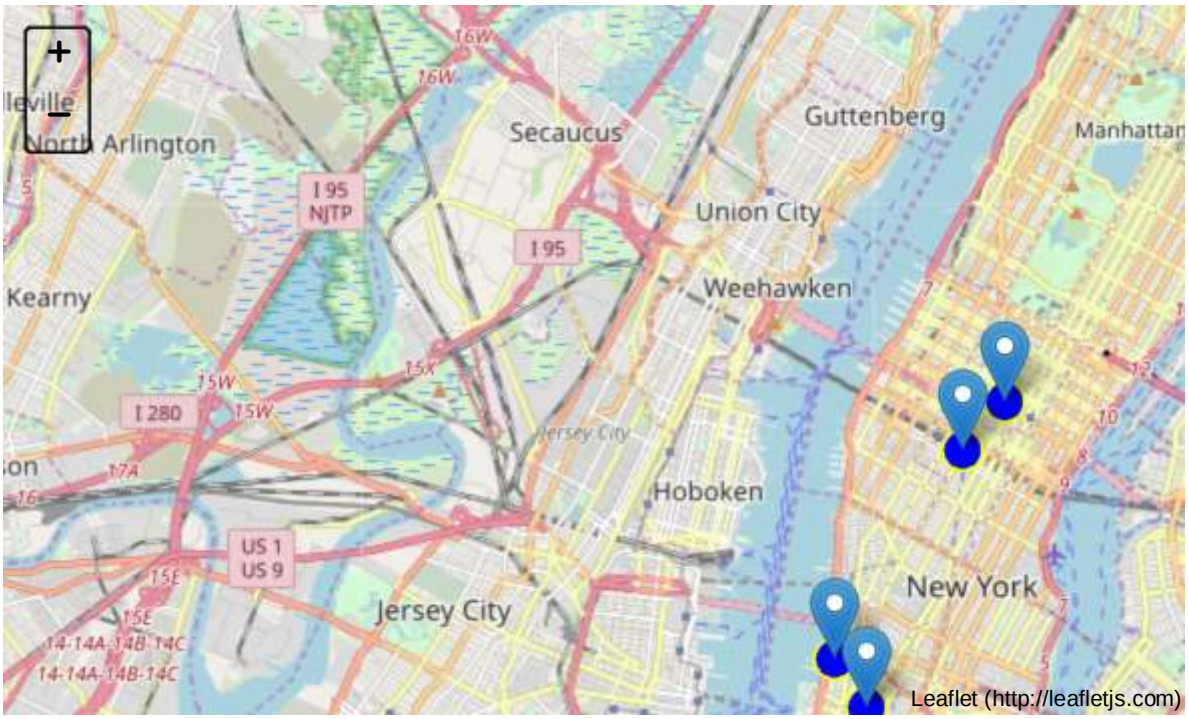
In [479]:

```
ny_neighborhood_stats['Label']=ny_neighborhood_stats['Neighborhood']+', '+ny_neighb
```

In [480]:

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

Out[480]:



Now that we have visualized the Neighborhoods.
Lets Visualize Boroughs based on average Rating

In [482]:

```
ny_map = folium.Map(location=geo_location('New York'), zoom_start=12)
ny_geo = r'Borough Boundaries.geojson'

ny_map.choropleth(
    geo_data=ny_geo,
    data=ny_borough_stats,
    columns=['Borough', 'Average Rating'],
    key_on='feature.properties.boro_name',
    fill_color='YlOrRd',
    fill_opacity=0.7,
    line_opacity=0.2,
    legend_name='Average Rating'
)

# display map
# as this is huge map data , we will save it to a file
ny_map.save('borough_rating.html')
```

Conclusion

This model is useful for explore out and find best Restaurants of various cuisines.By using Foursquare we are able to explore various indian restaurants and filter out best restaurants for each Borough and Neighborhoods.This kind of model can help users to suggest restaurants and also some companies who want to use this model to recommend their users to Best Restaurants near by their place.

- Manhattan have potential Indian Resturant Market/
- Staten Island ranks last in average rating of Indian Resturants.
- Manhattan is the best place to stay if you prefer Indian Cuisine.

Limitations

- The ranking is purely on basis of rating of resturants
- The accuracy of data depends purely depends on the data provided by FourSquare

In [ ]: