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Capstone_Project / Case study_continued.ipynb

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2374 lines (2374 sloc) 180 KB

In [58]:
```
url= "https://raw.githubusercontent.com/DeepentiA/Capstone_Project/master/best%20food.csv"
df5 = pd.read_csv(url)
df5.head()
```

In [59]:
```
import requests
url ="https://raw.githubusercontent.com/DeepentiA/Capstone_Project/master/Gurgaon_dataset.csv"
df = pd.read_csv(url)
print(df)
df.head(20)
```

```
    Unnamed: 0          Borough         Neighborhoods   Latitude  Longitude  \
0            0          Central       Cantonment area  12.972442  77.580643
1            1          Central                Domlur  12.960992  77.638726
2            2          Central           Indiranagar  12.971891  77.641151
3            3          Central     Jeevanbheemanagar  12.962900  77.659500
4            4          Central           Malleswaram  13.003100  77.564300
5            5          Central             Pete area  12.962700  77.575800
6            6          Central           Rajajinagar  12.990100  77.552500
7            7          Central         Sadashivanagar  13.006800  77.581300
8            8          Central          Seshadripuram  12.993500  77.578700
9            9          Central          Shivajinagar  12.985700  77.605700
10          10          Central                Ulsoor  12.981700  77.628600
11          11          Central         Vasanth Nagar  12.991100  77.592000
12          12          Eastern             Bellandur  12.926000  77.676200
13          13          Eastern         CV Raman Nagar  12.985500  77.663900
14          14          Eastern                 Hoodi  12.992200  77.715900
15          15          Eastern      Krishnarajapuram  13.004000  77.687800
16          16          Eastern          Mahadevapura  12.991300  77.687400
17          17          Eastern          Marathahalli  12.959200  77.697400
18          18          Eastern               Varthur  12.938900  77.741200
19          19          Eastern             Whitefield  12.969800  77.749900
20          20     NorthEastern             Banaswadi  13.012000  77.647100
21          21     NorthEastern             HBR Layout  13.037700  77.628800
22          22     NorthEastern               Horamavu  13.025100  77.659700
23          23     NorthEastern           Kammanahalli  13.015900  77.637900
24          24     NorthEastern         Lingarajapuram  13.008400  77.630600
25          25     NorthEastern      Ramamurthy Nagar  13.018400  77.678100
26          26         Northern                 Hebbal  13.035800  77.597000
27          27         Northern              Jalahalli  13.052800  77.541900
28          28         Northern              Mathikere  13.033400  77.564000
29          29         Northern                 Peenya  13.028500  77.519700
30          30         Northern            R. T. Nagar  13.019600  77.596800
31          31         Northern         Vidyaranyapura  13.085800  77.556100
32          32         Northern              Yelahanka  13.100500  77.594000
33          33         Northern           Yeshwanthpur  13.028000  77.540900
34          34     SouthEastern           Bommanahalli  12.898400  77.617900
35          35     SouthEastern           Bommasandra  12.816800  77.698900
36          36     SouthEastern             BTM Layout  12.916600  77.610100
37          37     SouthEastern       Electronic City  12.840711  77.676369
38          38     SouthEastern            HSR Layout  12.908100  77.647600
39          39     SouthEastern           Koramangala  12.927900  77.627100
40          40     SouthEastern              Madiwala  12.922600  77.617400
41          41         Southern           Banashankari  12.925500  77.546800
42          42         Southern           Basavanagudi  12.942100  77.575400
43          43         Southern              Girinagar  12.938600  77.544000
44          44         Southern            J. P. Nagar  12.910500  77.585700
45          45         Southern              Jayanagar  12.925000  77.593800
46          46         Southern    Kumaraswamy Layout  12.903800  77.561800
47          47         Southern       Padmanabhanagar  12.915600  77.556800
48          48         Southern            Uttarahalli  12.907000  77.552100
49          49  SouthernSuburbs             Anjanapura  12.860400  77.561200
50          50  SouthernSuburbs                Arekere  12.887500  77.597000
51          51  SouthernSuburbs                  Begur  12.878800  77.637700
52          52  SouthernSuburbs              Gottigere  12.855200  77.586900
53          53  SouthernSuburbs              Hulimavu  12.878900  77.609000
54          54  SouthernSuburbs                Kothnur  12.873400  77.582000
55          55          Western     Basaveshwaranagar  12.988600  77.538300
56          56          Western          Kamakshipalya  12.988700  77.527100
57          57          Western                Kengeri  12.899600  77.482700
58          58          Western    Mahalakshmi Layout  13.014600  77.551400
59          59          Western             Nagarbhavi  12.959900  77.508300
60          60          Western         Nandini Layout  13.016000  77.533800
61          61          Western           Nayandahalli  12.941100  77.524800
62          62          Western  Rajarajeshwari Nagar  12.924200  77.519100
63          63          Western            Vijayanagar  12.971900  77.529900

    Population     City  AverageIncome
0       866377  Gurgaon   18944.099790
1       743186  Gurgaon   56837.022200
2       474289  Gurgaon   41991.817440
3       527874  Gurgaon    6667.447632
4       893629  Gurgaon   53270.063890
5       730999  Gurgaon   50712.430220
6       981362  Gurgaon   60967.535870
7       662625  Gurgaon   59943.541560
```

```
8       396862  Gurgaon   58407.090340
9        77836  Gurgaon   55850.962100
10      656726  Gurgaon   41007.219540
11      942711  Gurgaon   26168.448090
12      208094  Gurgaon    7227.731930
13      122714  Gurgaon   54335.368710
14      330409  Gurgaon   22591.063480
15      351936  Gurgaon   36934.737730
16      905568  Gurgaon   35915.973330
17      249182  Gurgaon   58448.658520
18      546186  Gurgaon   36433.267300
19       83029  Gurgaon   44637.984600
20      632031  Gurgaon   53349.701180
21      822101  Gurgaon   43625.383680
22      679059  Gurgaon   13930.195750
23      730628  Gurgaon   23146.347760
24      223119  Gurgaon   55404.539140
25      468662  Gurgaon   56428.329770
26      926976  Gurgaon   39022.694140
27      569724  Gurgaon    9836.954154
28      757626  Gurgaon   61046.854720
29      661647  Gurgaon   24706.335040
30      241187  Gurgaon   64644.480990
31      704566  Gurgaon   31889.365790
32       15846  Gurgaon    5269.688407
33      333688  Gurgaon   27803.161570
34      737166  Gurgaon   11422.449970
35      723807  Gurgaon   24735.995810
36      835743  Gurgaon   49310.618880
37      781260  Gurgaon    8350.934536
38      534598  Gurgaon   45739.216290
39      288089  Gurgaon   40110.283710
40      901659  Gurgaon   15025.903390
41      810407  Gurgaon   57524.209530
42      426903  Gurgaon   63161.962220
43      783535  Gurgaon   41146.060250
44      255412  Gurgaon   61115.381150
45      103930  Gurgaon    8891.317323
46      983614  Gurgaon   10941.420380
47      561382  Gurgaon   47292.334640
48      722264  Gurgaon   63166.190380
49      940039  Gurgaon   44218.922550
50      138760  Gurgaon   29378.716630
51      594887  Gurgaon   61640.098300
52      381292  Gurgaon   25803.820490
53      949207  Gurgaon   33486.513520
54       65249  Gurgaon   55508.825050
55      628910  Gurgaon   41177.478490
56      968497  Gurgaon   39132.402990
57       14705  Gurgaon   19167.834100
58      306403  Gurgaon    8416.293069
59      623843  Gurgaon   38627.411760
60      638555  Gurgaon   32490.969170
61      474920  Gurgaon   46826.803890
62      516920  Gurgaon   12533.785280
63      791549  Gurgaon   51966.782270
```

Out[59]:

	Unnamed: 0	Borough	Neighborhoods	Latitude	Longitude	Population	City	AverageIncome
0	0	Central	Cantonment area	12.972442	77.580643	866377	Gurgaon	18944.099790
1	1	Central	Domlur	12.960992	77.638726	743186	Gurgaon	56837.022200
2	2	Central	Indiranagar	12.971891	77.641151	474289	Gurgaon	41991.817440
3	3	Central	Jeevanbheemanagar	12.962900	77.659500	527874	Gurgaon	6667.447632
4	4	Central	Malleswaram	13.003100	77.564300	893629	Gurgaon	53270.063890
5	5	Central	Pete area	12.962700	77.575800	730999	Gurgaon	50712.430220
6	6	Central	Rajajinagar	12.990100	77.552500	981362	Gurgaon	60967.535870
7	7	Central	Sadashivanagar	13.006800	77.581300	662625	Gurgaon	59943.541560
8	8	Central	Seshadripuram	12.993500	77.578700	396862	Gurgaon	58407.090340
9	9	Central	Shivajinagar	12.985700	77.605700	77836	Gurgaon	55850.962100
10	10	Central	Ulsoor	12.981700	77.628600	656726	Gurgaon	41007.219540
11	11	Central	Vasanth Nagar	12.991100	77.592000	942711	Gurgaon	26168.448090
12	12	Eastern	Bellandur	12.926000	77.676200	208094	Gurgaon	7227.731930
13	13	Eastern	CV Raman Nagar	12.985500	77.663900	122714	Gurgaon	54335.368710
14	14	Eastern	Hoodi	12.992200	77.715900	330409	Gurgaon	22591.063480
15	15	Eastern	Krishnarajapuram	13.004000	77.687800	351936	Gurgaon	36934.737730
16	16	Eastern	Mahadevapura	12.991300	77.687400	905568	Gurgaon	35915.973330

17	17	Eastern	Marathahalli	12.959200	77.697400	249182	Gurgaon	58448.658520
18	18	Eastern	Varthur	12.938900	77.741200	546186	Gurgaon	36433.267300
19	19	Eastern	Whitefield	12.969800	77.749900	83029	Gurgaon	44637.984600

In [60]:
```
import os
```

In [61]:
```
df.drop('Unnamed: 0',axis=1,inplace=True)
df.head()
```

Out[61]:

	Borough	Neighborhoods	Latitude	Longitude	Population	City	AverageIncome
0	Central	Cantonment area	12.972442	77.580643	866377	Gurgaon	18944.099790
1	Central	Domlur	12.960992	77.638726	743186	Gurgaon	56837.022200
2	Central	Indiranagar	12.971891	77.641151	474289	Gurgaon	41991.817440
3	Central	Jeevanbheemanagar	12.962900	77.659500	527874	Gurgaon	6667.447632
4	Central	Malleswaram	13.003100	77.564300	893629	Gurgaon	53270.063890

In [ ]:
```
```

In [62]:
```
url ="https://raw.githubusercontent.com/DeepentiA/Capstone_Project/master/Gurgaon_population.csv"
df1= pd.read_csv(url)
df1.head()
```

Out[62]:

	Borough	Neighborhoods	Population
0	Central	Cantonment area	866377
1	Central	Domlur	743186
2	Central	Indiranagar	474289
3	Central	Jeevanbheemanagar	527874
4	Central	Malleswaram	893629

In [63]:
```
url="https://raw.githubusercontent.com/DeepentiA/Capstone_Project/master/Gurgaon_income.csv"
df2 = pd.read_csv(url)
df2.head()
```

Out[63]:

	Borough	Neighborhoods	AverageIncome
0	Central	Cantonment area	18944.099790
1	Central	Domlur	56837.022200
2	Central	Indiranagar	41991.817440
3	Central	Jeevanbheemanagar	6667.447632
4	Central	Malleswaram	53270.063890

In [64]:
```
!pip install geopy
!pip install beautifulsoup4
```

```
Requirement already satisfied: geopy in /home/jupyterlab/conda/envs/python/lib/python3.6/site-packages (1.
20.0)
Requirement already satisfied: geographiclib<2,>=1.49 in /home/jupyterlab/conda/envs/python/lib/python3.6/
site-packages (from geopy) (1.50)
Requirement already satisfied: beautifulsoup4 in /home/jupyterlab/conda/envs/python/lib/python3.6/site-pac
kages (4.8.1)
Requirement already satisfied: soupsieve>=1.2 in /home/jupyterlab/conda/envs/python/lib/python3.6/site-pac
kages (from beautifulsoup4) (1.9.5)
```

In [65]:
```
import pandas as pd # library for data analsysis
pd.set_option("display.max_columns", None)
pd.set_option("display.max_rows", None)

import json # library to handle JSON files

from geopy.geocoders import Nominatim # convert an address into latitude and longitude values

import requests # library to handle requests
from bs4 import BeautifulSoup # library to parse HTML and XML documents

from pandas.io.json import json_normalize # tranform JSON file into a pandas dataframe

# 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

import folium # map rendering library

print("Libraries are imported.")
```

```
Libraries are imported.
```

In [66]:
```
address = 'Gurgaon'

geolocator = Nominatim(user_agent="my-application")
location = geolocator.geocode(address)
latitude = location.latitude
longitude = location.longitude
print('The geograpical coordinates of Gurgaon are {}, {}.'.format(latitude, longitude))
```

```
The geograpical coordinates of Gurgaon are 28.4646148, 77.0299194.
```

In [67]:
```
map_GGN = folium.Map(location=[latitude, longitude], zoom_start=10)

# add markers to map
for latitude,longitude, Borough, Neighborhoods in zip(df['Latitude'],df['Longitude'], df['Borough'], df['N
eighborhoods']):
    label = '{}, {}'.format(Neighborhoods, Borough)
    label = folium.Popup(label, parse_html=True)
    folium.CircleMarker(
        [lat, lng],
        radius=5,
        popup=label,
        color='blue',
        fill=True,
        fill_color='#3186cc',
        fill_opacity=0.7,
     parse_html=False).add_to(map_GGN)

map_GGN
```

Out[67]:

In [68]:
```
CLIENT_ID = 'AJ5GIVG4RTCVSPB1CQBINDQIL435MQJ5X32O3DX2C2SL2NZM'
CLIENT_SECRET = 'HT0QEMRESM552MVJNVZEX44HOYVPHNLYM0HZDRQJTH3MFIOQ'
VERSION = '20180606'
LIMIT = 150
```

In [69]:
```
gurgaon_latitude = df['Latitude'].mean()
gurgaon_longitude = df['Longitude'].mean()
print("Latitude and Longitude of Gurgaon are : ",gurgaon_latitude,gurgaon_longitude)
```

```
Latitude and Longitude of Gurgaon are :  12.9623396203125 77.601752946875
```

In [70]:
```
unique_boroughs_of_gurgaon = df['Borough'].unique().tolist
```

In [71]:
```
unique_boroughs_of_gurgaon
```

Out[71]:
```
<function ndarray.tolist>
```

In [72]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
import requests
import folium
import seaborn as sns
import matplotlib.cm as cm
import matplotlib.colors as colors
from sklearn.cluster import KMeans
```

In [73]:
```
borough_colors ={}
for i in unique_boroughs_of_gurgaon:
    borough_colors[i] = '#%02X%02X%02X' % tuple(np.random.choice(range(256),size=3))
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-73-447cd1c30259> in <module>
      1 borough_colors ={}
----> 2 for i in unique_boroughs_of_gurgaon:
      3     borough_colors[i] = '#%02X%02X%02X' % tuple(np.random.choice(range(256),size=3))

TypeError: 'builtin_function_or_method' object is not iterable
```

{'Central': '#2ECA6E', 'Eastern': '#0E1B15', 'NorthEastern': '#B12985', 'Northern': '#AF4FF5', 'SouthEastern': '#68B1E1', 'Southern': '#EACF24', 'SouthernSuburbs': '#F29B23', 'Western': '#BD51B8'}

In [ ]:
```
gurgaon_map = folium.Map(location=[gurgaon_latitude,gurgaon_longitude],zoom_start=12,control_scale=True)
```

In [ ]:
```
for lat,lng,boro,nei in zip(df['Latitude'],
                            df['Longitude'],
                            df['Borough'],
                            df['Neighborhoods']):
    label_text = boro + ' - ' + nei
    label = folium.Popup(label_text,parse_html=True)
    folium.CircleMarker(
    [lat,lng],
    tooltip = label_text,
    radius = 4,
    popup = label,
    color=borough_colors[boro],
    fill=True,
    fill_color = borough_colors[boro],
    fill_opacity=0.7).add_to(gurgon_map)
```

Exploring Gurgaon Neighborhoods using FourSquare API

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

    venues_list=[]
    for name, boro, lat, lng in zip(names, boro, latitudes, longitudes):
        print("Fetching venues for : ",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,
            boro,
            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 = ['Neighborhoods',
                             'Borough',
                             'Neighborhood Latitude',
                             'Neighborhood Longitude',
                             'Venue',
                             'Venue Latitude',
                             'Venue Longitude',
                             'Venue Category']

    return(nearby_venues)
```

In [ ]:
```
gurgaon_venues = getNearbyVenues(names=df['Neighborhoods'],latitudes=df['Latitude'],longitudes=df['Longitude'],boro=df['Borough'])
```

Fetching venues for : Cantonment area Fetching venues for : Domlur Fetching venues for : Indiranagar Fetching venues for : Jeevanbheemanagar Fetching venues for : Malleswaram Fetching venues for : Pete area Fetching venues for : Rajajinagar Fetching venues for : Sadashivanagar Fetching venues for : Seshadripuram Fetching venues for : Shivajinagar Fetching venues for : Ulsoor Fetching venues for : Vasanth Nagar Fetching venues for : Bellandur Fetching venues for : CV Raman Nagar Fetching venues for : Hoodi Fetching venues for : Krishnarajapuram Fetching venues for : Mahadevapura Fetching venues for : Marathahalli Fetching venues for : Varthur Fetching venues for : Whitefield Fetching venues for : Banaswadi Fetching venues for : HBR Layout Fetching venues for : Horamavu Fetching venues for : Kammanahalli Fetching venues for : Lingarajapuram Fetching venues for : Ramamurthy Nagar Fetching venues for : Hebbal Fetching venues for : Jalahalli Fetching venues for : Mathikere Fetching venues for : Peenya Fetching venues for : R. T. Nagar Fetching venues for : Vidyaranyapura Fetching venues for : Yelahanka Fetching venues for : Yeshwanthpur Fetching venues for : Bommanahalli Fetching venues for : Bommasandra Fetching venues for : BTM Layout Fetching venues for : Electronic City Fetching venues for : HSR Layout Fetching venues for : Koramangala Fetching venues for : Madiwala Fetching venues for : Banashankari Fetching venues for : Basavanagudi Fetching venues for : Girinagar Fetching venues for : J. P. Nagar Fetching venues for : Jayanagar Fetching venues for : Kumaraswamy Layout Fetching venues for : Padmanabhanagar Fetching venues for : Uttarahalli Fetching venues for : Anjanapura Fetching venues for : Arekere Fetching venues for : Begur Fetching venues for : Gottigere Fetching venues for : Hulimavu Fetching venues for : Kothnur Fetching venues for : Basaveshwaranagar Fetching venues for : Kamakshipalya Fetching venues for :

Kengeri Fetching venues for : Mahalakshmi Layout Fetching venues for : Nagarbhavi Fetching venues for : Nandini Layout Fetching venues for : Nayandahalli Fetching venues for : Rajarajeshwari Nagar Fetching venues for : Vijayanagar

In [ ]:
```
gurgaon_venues.head(5)
```

Neighborhood |Borough Neighborhood Latitude Neighborhood Longitude Venue Venue Latitude Venue Longitude Venue Category

0 Cantonment area Central 12.972442 77.580643 Hotel Fishland 12.975569 77.578592 Seafood Restaurant 1 Cantonment area Central 12.972442 77.580643 Sapna Book House 12.976355 77.578461 Bookstore 2 Cantonment area Central 12.972442 77.580643 Vasudev Adigas 12.973707 77.579257 Indian Restaurant 3 Cantonment area Central 12.972442 77.580643 Adigas Hotel 12.973554 77.579161 Restaurant 4 Cantonment area Central 12.972442 77.580643 Kamat Yatrinivas 12.975985 77.578125 Indian Restaurant

In [ ]:
```
gurgaon_venues.groupby('Venue Category').count()['Neighborhood'].sort_values(ascending=False).head(10)
```

Venue Category Indian Restaurant 114 Café 33 Bakery 28 Fast Food Restaurant 22 Ice Cream Shop 19 Pizza Place 17 Department Store 16 Restaurant 15 Coffee Shop 15 Chinese Restaurant 13 Name: Neighborhood, dtype: int64

In [ ]:
```
gurgaon_venues.groupby('Venue Category').count()['Neighborhood'].sort_values(ascending=False).head(10)
```

Venue Category Indian Restaurant 114 Café 33 Bakery 28 Fast Food Restaurant 22 Ice Cream Shop 19 Pizza Place 17 Department Store 16 Restaurant 15 Coffee Shop 15 Chinese Restaurant 13 Name: Neighborhood, dtype: int64

In [ ]:
```
print("Total number of unique categories in gurgaon are : ",len(bangalore_venues['Venue Category'].unique
()))
```

Total number of unique categories in gurgaon are : 132

Getting number of venues per neighborhood

In [ ]:
```
individual_gurgaon_venue_count.rename(columns={'Borough':'NumberOfVenues'},inplace=True)
```

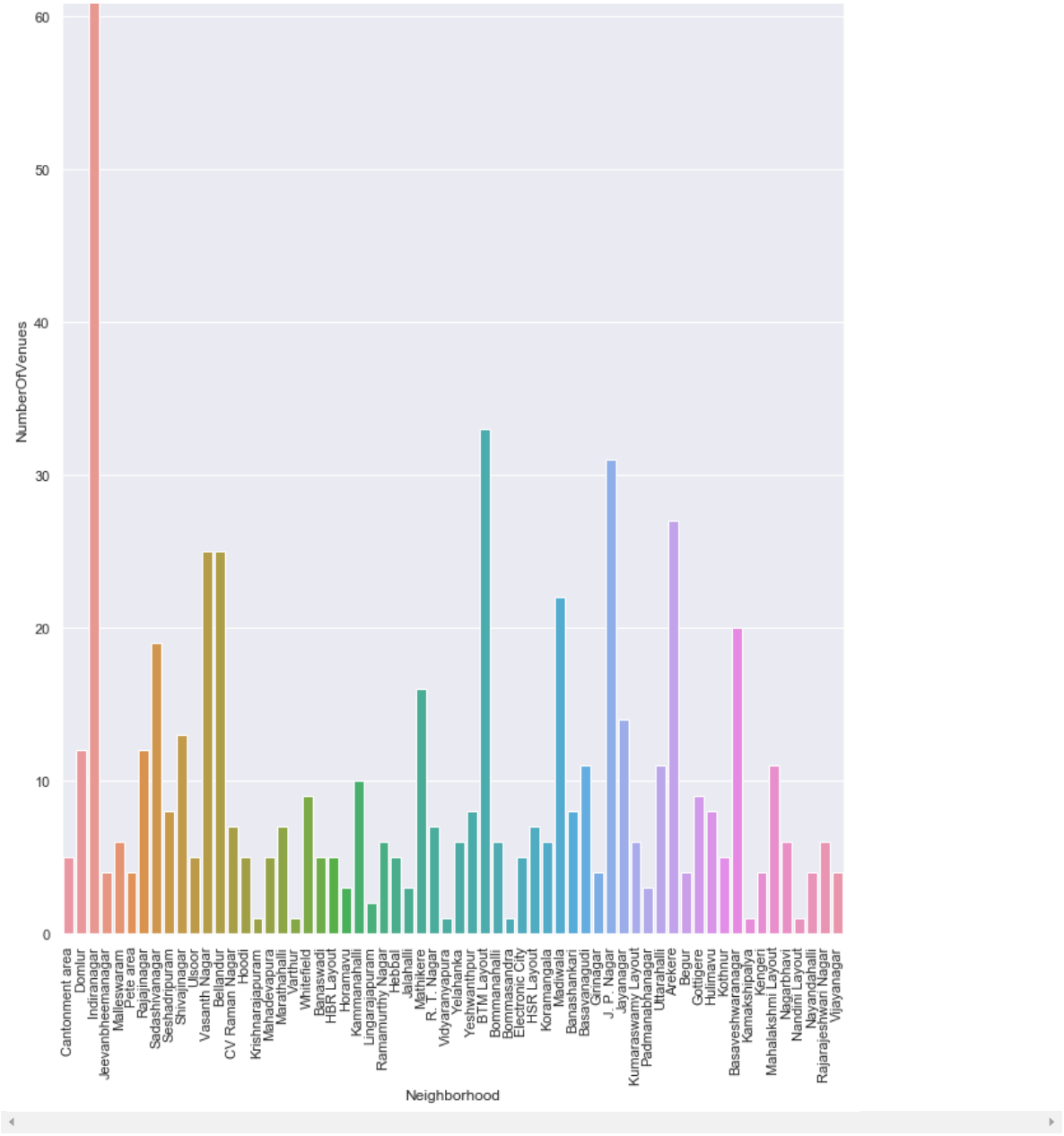
Borough Neighborhood NumberOfVenues 0 Central Cantonment area 5 1 Central Domlur 12 2 Central Indiranagar 69 3 Central Jeevanbheemanagar 4 4 Central Malleswaram 6 5 Central Pete area 4 6 Central Rajajinagar 12 7 Central Sadashivanagar 19 8 Central Seshadripuram 8 9 Central Shivajinagar 13 10 Central Ulsoor 5 11 Central Vasanth Nagar 25 12 Eastern Bellandur 25 13 Eastern CV Raman Nagar 7 14 Eastern Hoodi 5 15 Eastern Krishnarajapuram 1 16 Eastern Mahadevapura 5 17 Eastern Marathahalli 7 18 Eastern Varthur 1 19 Eastern Whitefield 9 20 NorthEastern Banaswadi 5 21 NorthEastern HBR Layout 5 22 NorthEastern Horamavu 3 23 NorthEastern Kammanahalli 10 24 NorthEastern Lingarajapuram 2 25 NorthEastern Ramamurthy Nagar 6 26 Northern Hebbal 5 27 Northern Jalahalli 3 28 Northern Mathikere 16 29 Northern R. T. Nagar 7 ... ... 32 Northern Yeshwanthpur 8 33 SouthEastern BTM Layout 33 34 SouthEastern Bommanahalli 6 35 SouthEastern Bommasandra 1 36 SouthEastern Electronic City 5 37 SouthEastern HSR Layout 7 38 SouthEastern Koramangala 6 39 SouthEastern Madiwala 22 40 Southern Banashankari 8 41 Southern Basavanagudi 11 42 Southern Girinagar 4 43 Southern J. P. Nagar 31 44 Southern Jayanagar 14 45 Southern Kumaraswamy Layout 6 46 Southern Padmanabhanagar 3 47 Southern Uttarahalli 11 48 SouthernSuburbs Arekere 27 49 SouthernSuburbs Begur 4 50 SouthernSuburbs Gottigere 9 51 SouthernSuburbs Hulimavu 8 52 SouthernSuburbs Kothnur 5 53 Western Basaveshwaranagar 20 54 Western Kamakshipalya 1 55 Western Kengeri 4 56 Western Mahalakshmi Layout 11 57 Western Nagarbhavi 6 58 Western Nandini Layout 1 59 Western Nayandahalli 4 60 Western Rajarajeshwari Nagar 6 61 Western Vijayanagar 4

In [ ]:
```
sns.set(rc={'figure.figsize':(11,16)})
plot = sns.barplot(x='Neighborhood',y='NumberOfVenues',data=individual_gurgaon_venue_count)
plot.set_xticklabels(individual_gurgaon_venue_count['Neighborhood'],rotation=90)
```

[Text(0,0,'Cantonment area'), Text(0,0,'Domlur'), Text(0,0,'Indiranagar'), Text(0,0,'Jeevanbheemanagar'), Text(0,0,'Malleswaram'), Text(0,0,'Pete area'), Text(0,0,'Rajajinagar'), Text(0,0,'Sadashivanagar'), Text(0,0,'Seshadripuram'), Text(0,0,'Shivajinagar'), Text(0,0,'Ulsoor'), Text(0,0,'Vasanth Nagar'), Text(0,0,'Bellandur'), Text(0,0,'CV Raman Nagar'), Text(0,0,'Hoodi'), Text(0,0,'Krishnarajapuram'), Text(0,0,'Mahadevapura'), Text(0,0,'Marathahalli'), Text(0,0,'Varthur'), Text(0,0,'Whitefield'), Text(0,0,'Banaswadi'), Text(0,0,'HBR Layout'), Text(0,0,'Horamavu'), Text(0,0,'Kammanahalli'), Text(0,0,'Lingarajapuram'), Text(0,0,'Ramamurthy Nagar'), Text(0,0,'Hebbal'), Text(0,0,'Jalahalli'), Text(0,0,'Mathikere'), Text(0,0,'R. T. Nagar'), Text(0,0,'Vidyaranyapura'), Text(0,0,'Yelahanka'), Text(0,0,'Yeshwanthpur'), Text(0,0,'BTM Layout'), Text(0,0,'Bommanahalli'), Text(0,0,'Bommasandra'), Text(0,0,'Electronic City'), Text(0,0,'HSR Layout'), Text(0,0,'Koramangala'), Text(0,0,'Madiwala'), Text(0,0,'Banashankari'), Text(0,0,'Basavanagudi'), Text(0,0,'Girinagar'), Text(0,0,'J. P. Nagar'), Text(0,0,'Jayanagar'), Text(0,0,'Kumaraswamy Layout'), Text(0,0,'Padmanabhanagar'), Text(0,0,'Uttarahalli'), Text(0,0,'Arekere'), Text(0,0,'Begur'), Text(0,0,'Gottigere'), Text(0,0,'Hulimavu'), Text(0,0,'Kothnur'), Text(0,0,'Basaveshwaranagar'), Text(0,0,'Kamakshipalya'), Text(0,0,'Kengeri'), Text(0,0,'Mahalakshmi Layout'), Text(0,0,'Nagarbhavi'), Text(0,0,'Nandini Layout'), Text(0,0,'Nayandahalli'), Text(0,0,'Rajarajeshwari Nagar'), Text(0,0,'Vijayanagar')]

In [79]:
```
from IPython.display import Image
from IPython.core.display import HTML
Image(url= "https://github.com/DeepentiA/Capstone_Project/blob/master/download%20(1).png?raw=true")
```

Out[79]:



In [ ]:
```
number_of_top_venues = 5
```

In [ ]:
```
for hood in bangalore_venues_grouped['Neighborhood']:
    print('---------',hood,'---------')
    temp = bangalore_venues_grouped[bangalore_venues_grouped['Neighborhood'] == hood].T.reset_index()
    temp.columns = ['Venue','Frequency']
    temp = temp.iloc[1:]
    temp['Frequency'] = temp['Frequency'].astype(float)
    temp = temp.round({'Frequency': 2})
    print(temp.sort_values('Frequency', ascending=False).reset_index(drop=True).head(number_of_top_venues
))
    print('\n')
```

--------- Arekere --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.19 1 Venue Category_Sporting Goods Shop 0.15 2 Venue Category_Department Store 0.11 3 Venue Category_Pizza Place 0.07 4 Venue Category_Bus Line 0.04 --------- BTM Layout --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.24 1 Venue Category_Ice Cream Shop 0.09 2 Venue Category_Snack Place 0.09 3 Venue Category_Vegetarian / Vegan Restaurant 0.06 4 Venue Category_Pizza Place 0.06 --------- Banashankari --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.25 1 Venue Category_Café 0.25 2 Venue Category_Clothing Store 0.25 3 Venue Category_Pizza Place 0.12 4 Venue Category_North Indian Restaurant 0.12 --------- Banaswadi --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.4 1 Venue Category_Bakery 0.2 2 Venue Category_Vegetarian / Vegan Restaurant 0.2 3 Venue Category_Café 0.2 4 Venue Category_Outlet Store 0.0 --------- Basavanagudi --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.36 1 Venue Category_Mediterranean Restaurant 0.09 2 Venue Category_Café 0.09 3 Venue Category_Indian Sweet Shop 0.09 4 Venue Category_Restaurant 0.09 --------- Basaveshwaranagar --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.15 1 Venue Category_Fast Food Restaurant 0.10 2 Venue Category_Ice Cream Shop 0.10 3 Venue Category_Juice Bar 0.05 4 Venue Category_Supermarket 0.05 --------- Begur --------- Venue Frequency 0 Venue Category_Bakery 0.25 1 Venue Category_Indian Sweet Shop 0.25 2 Venue Category_Stadium 0.25 3 Venue Category_Clothing Store 0.25 4 Venue Category_Outlet Store 0.00 --------- Bellandur --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.20 1 Venue Category_Fast Food Restaurant 0.12 2 Venue Category_Kerala Restaurant 0.08 3 Venue Category_Café 0.08 4 Venue Category_Coffee Shop 0.04 --------- Bommanahalli --------- Venue Frequency 0 Venue Category_Furniture / Home Store 0.17 1 Venue Category_Department Store 0.17 2 Venue Category_Gym / Fitness Center 0.17 3 Venue Category_Athletics & Sports 0.17 4 Venue Category_Auto Garage 0.17 --------- Bommasandra --------- Venue Frequency 0 Venue Category_Indian Restaurant 1.0 1 Venue Category_ATM 0.0 2 Venue Category_Outlet Store 0.0 3 Venue Category_Multicuisine Indian Restaurant 0.0 4 Venue

Category_Multiplex 0.0 --------- CV Raman Nagar --------- Venue Frequency 0 Venue Category_Pizza Place 0.29 1 Venue Category_Indian Restaurant 0.29 2 Venue Category_Department Store 0.14 3 Venue Category_Park 0.14 4 Venue Category_Shop & Service 0.14 --------- Cantonment area --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.4 1 Venue Category_Seafood Restaurant 0.2 2 Venue Category_Bookstore 0.2 3 Venue Category_Restaurant 0.2 4 Venue Category_Outlet Store 0.0 --------- Domlur --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.33 1 Venue Category_Café 0.17 2 Venue Category_Rajasthani Restaurant 0.08 3 Venue Category_Asian Restaurant 0.08 4 Venue Category_Pizza Place 0.08 --------- Electronic City --------- Venue Frequency 0 Venue Category_Outlet Store 0.2 1 Venue Category_Auto Garage 0.2 2 Venue Category_Bus Stop 0.2 3 Venue Category_Toll Plaza 0.2 4 Venue Category_Furniture / Home Store 0.2 --------- Girinagar --------- Venue Frequency 0 Venue Category_Fast Food Restaurant 0.25 1 Venue Category_Soccer Field 0.25 2 Venue Category_Park 0.25 3 Venue Category_Ice Cream Shop 0.25 4 Venue Category_North Indian Restaurant 0.00 --------- Gottigere --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.67 1 Venue Category_Department Store 0.11 2 Venue Category_Grocery Store 0.11 3 Venue Category_Pharmacy 0.11 4 Venue Category_North Indian Restaurant 0.00 --------- HBR Layout --------- Venue Frequency 0 Venue Category_Restaurant 0.2 1 Venue Category_Road 0.2 2 Venue Category_Coffee Shop 0.2 3 Venue Category_Café 0.2 4 Venue Category_North Indian Restaurant 0.2 --------- HSR Layout --------- Venue Frequency 0 Venue Category_Punjabi Restaurant 0.14 1 Venue Category_Chinese Restaurant 0.14 2 Venue Category_Pizza Place 0.14 3 Venue Category_Indian Restaurant 0.14 4 Venue Category_Café 0.14 --------- Hebbal --------- Venue Frequency 0 Venue Category_Department Store 0.2 1 Venue Category_Indian Restaurant 0.2 2 Venue Category_Market 0.2 3 Venue Category_Coffee Shop 0.2 4 Venue Category_Park 0.2 --------- Hoodi --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.4 1 Venue Category_Yoga Studio 0.2 2 Venue Category_Breakfast Spot 0.2 3 Venue Category_Bus Station 0.2 4 Venue Category_North Indian Restaurant 0.0 --------- Horamavu --------- Venue Frequency 0 Venue Category_Bakery 0.33 1 Venue Category_Indian Restaurant 0.33 2 Venue Category_Cosmetics Shop 0.33 3 Venue Category_Paintball Field 0.00 4 Venue Category_Multiplex 0.00 --------- Hulimavu --------- Venue Frequency 0 Venue Category_Bakery 0.25 1 Venue Category_South Indian Restaurant 0.12 2 Venue Category_Juice Bar 0.12 3 Venue Category_Gym / Fitness Center 0.12 4 Venue Category_Indian Restaurant 0.12 --------- Indiranagar --------- Venue Frequency 0 Venue Category_Café 0.10 1 Venue Category_Pub 0.09 2 Venue Category_Lounge 0.07 3 Venue Category_Indian Restaurant 0.06 4 Venue Category_Ice Cream Shop 0.06 --------- J. P. Nagar --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.29 1 Venue Category_Snack Place 0.06 2 Venue Category_Chinese Restaurant 0.06 3 Venue Category_Diner 0.03 4 Venue Category_Hyderabadi Restaurant 0.03 --------- Jalahalli --------- Venue Frequency 0 Venue Category_Indie Movie Theater 0.33 1 Venue Category_Playground 0.33 2 Venue Category_Convenience Store 0.33 3 Venue Category_ATM 0.00 4 Venue Category_Outlet Store 0.00 --------- Jayanagar --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.36 1 Venue Category_Flea Market 0.07 2 Venue Category_Multiplex 0.07 3 Venue Category_Fast Food Restaurant 0.07 4 Venue Category_Asian Restaurant 0.07 --------- Jeevanbheemanagar --------- Venue Frequency 0 Venue Category_Fast Food Restaurant 0.50 1 Venue Category_Pizza Place 0.25 2 Venue Category_Gym 0.25 3 Venue Category_ATM 0.00 4 Venue Category_Nightclub 0.00 --------- Kamakshipalya --------- Venue Frequency 0 Venue Category_South Indian Restaurant 1.0 1 Venue Category_ATM 0.0 2 Venue Category_Movie Theater 0.0 3 Venue Category_Pizza Place 0.0 4 Venue Category_Pharmacy 0.0 --------- Kammanahalli --------- Venue Frequency 0 Venue Category_Kerala Restaurant 0.1 1 Venue Category_Department Store 0.1 2 Venue Category_Snack Place 0.1 3 Venue Category_Chinese Restaurant 0.1 4 Venue Category_Fast Food Restaurant 0.1 --------- Kengeri --------- Venue Frequency 0 Venue Category_Italian Restaurant 0.25 1 Venue Category_Food Court 0.25 2 Venue Category_Indian Restaurant 0.25 3 Venue Category_Restaurant 0.25 4 Venue Category_North Indian Restaurant 0.00 --------- Koramangala --------- Venue Frequency 0 Venue Category_Hotel Bar 0.17 1 Venue Category_Restaurant 0.17 2 Venue Category_Indian Restaurant 0.17 3 Venue Category_Breakfast Spot 0.17 4 Venue Category_Bakery 0.17 --------- Kothnur --------- Venue Frequency 0 Venue Category_Department Store 0.2 1 Venue Category_Women's Store 0.2 2 Venue Category_Athletics & Sports 0.2 3 Venue Category_Restaurant 0.2 4 Venue Category_Performing Arts Venue 0.2 --------- Krishnarajapuram --------- Venue Frequency 0 Venue Category_Clothing Store 1.0 1 Venue Category_ATM 0.0 2 Venue Category_Mughlai Restaurant 0.0 3 Venue Category_Playground 0.0 4 Venue Category_Pizza Place 0.0 --------- Kumaraswamy Layout --------- Venue Frequency 0 Venue Category_Breakfast Spot 0.17 1 Venue Category_Indian Restaurant 0.17 2 Venue Category_Fast Food Restaurant 0.17 3 Venue Category_Sandwich Place 0.17 4 Venue Category_Café 0.17 --------- Lingarajapuram --------- Venue Frequency 0 Venue Category_Train Station 0.5 1 Venue Category_Electronics Store 0.5 2 Venue Category_Outlet Store 0.0 3 Venue Category_Multicuisine Indian Restaurant 0.0 4 Venue Category_Multiplex 0.0 --------- Madiwala --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.32 1 Venue Category_Fast Food Restaurant 0.09 2 Venue Category_Diner 0.05 3 Venue Category_Neighborhood 0.05 4 Venue Category_Halal Restaurant 0.05 --------- Mahadevapura --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.4 1 Venue Category_Bus Station 0.2 2 Venue Category_Convenience Store 0.2 3 Venue Category_Shopping Mall 0.2 4 Venue Category_ATM 0.0 --------- Mahalakshmi Layout --------- Venue Frequency 0 Venue Category_Coffee Shop 0.18 1 Venue Category_Hotel 0.18 2 Venue Category_Convenience Store 0.09 3 Venue Category_Grocery Store 0.09 4 Venue Category_Department Store 0.09 --------- Malleswaram --------- Venue Frequency 0 Venue Category_Ice Cream Shop 0.50 1 Venue Category_Bakery 0.17 2 Venue Category_Breakfast Spot 0.17 3 Venue Category_Indian Restaurant 0.17 4 Venue Category_Outlet Store 0.00 --------- Marathahalli --------- Venue Frequency 0 Venue Category_Clothing Store 0.43 1 Venue Category_Indian Restaurant 0.29 2 Venue Category_Movie Theater 0.14 3 Venue Category_Bakery 0.14 4 Venue Category_Pizza Place 0.00 --------- Mathikere --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.38 1 Venue Category_Kerala Restaurant 0.06 2 Venue Category_Ice Cream Shop 0.06 3 Venue Category_Shop & Service 0.06 4 Venue Category_Shoe Store 0.06 --------- Nagarbhavi --------- Venue Frequency 0 Venue Category_Gym 0.17 1 Venue Category_Andhra Restaurant 0.17 2 Venue Category_Café 0.17 3 Venue Category_Breakfast Spot 0.17 4 Venue Category_Indian Restaurant 0.17 --------- Nandini Layout --------- Venue Frequency 0 Venue Category_Vegetarian / Vegan Restaurant 1.0 1 Venue Category_ATM 0.0 2 Venue Category_North Indian Restaurant 0.0 3 Venue Category_Mughlai Restaurant 0.0 4 Venue Category_Multicuisine Indian Restaurant 0.0 --------- Nayandahalli --------- Venue Frequency 0 Venue Category_Electronics Store 0.25 1 Venue Category_Road 0.25 2 Venue Category_Fast Food Restaurant 0.25 3 Venue Category_Toll Plaza 0.25 4 Venue Category_ATM 0.00 --------- Padmanabhanagar --------- Venue Frequency 0 Venue Category_Café 0.67 1 Venue Category_Snack Place 0.33 2 Venue Category_ATM 0.00 3 Venue Category_North Indian Restaurant 0.00 4 Venue Category_Multiplex 0.00 --------- Pete area --------- Venue Frequency 0 Venue Category_Market 0.25 1 Venue Category_Bus Station 0.25 2 Venue Category_Park 0.25 3 Venue Category_Historic Site 0.25 4 Venue Category_ATM 0.00 --------- R. T. Nagar --------- Venue Frequency 0 Venue Category_Juice Bar 0.14 1 Venue Category_Gym 0.14 2 Venue Category_Resort 0.14 3 Venue Category_Fast Food Restaurant 0.14 4 Venue Category_Park 0.14 --------- Rajajinagar --------- Venue Frequency 0 Venue Category_Bakery 0.25 1 Venue Category_Indian Restaurant 0.25 2 Venue Category_Snack Place 0.25 3 Venue Category_Park 0.17 4 Venue Category_Pharmacy 0.08 --------- Rajarajeshwari Nagar --------- Venue Frequency 0 Venue Category_Pizza Place 0.17 1 Venue Category_Food Court 0.17 2 Venue Category_Café 0.17 3 Venue Category_Indian Chinese Restaurant 0.17 4 Venue Category_Ice Cream Shop 0.17 --------- Ramamurthy Nagar --------- Venue Frequency 0 Venue Category_ATM 0.17 1 Venue Category_Bakery 0.17 2 Venue Category_Multicuisine Indian Restaurant 0.17 3 Venue Category_South Indian Restaurant 0.17 4 Venue Category_Supermarket 0.17 --------- Sadashivanagar --------- Venue Frequency 0 Venue Category_Coffee Shop 0.16 1 Venue Category_Café 0.11 2 Venue Category_Department Store 0.11 3 Venue Category_Ice Cream Shop 0.11 4 Venue Category_Women's Store 0.05 --------- Seshadripuram --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.25 1 Venue Category_Hotel 0.12 2 Venue Category_Asian Restaurant 0.12 3 Venue Category_Chaat Place 0.12 4 Venue Category_Chinese Restaurant 0.12 --------- Shivajinagar --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.38 1 Venue Category_Fast Food Restaurant 0.15 2 Venue Category_Donut Shop 0.08 3 Venue Category_South Indian Restaurant 0.08 4 Venue Category_Furniture / Home Store 0.08 --------- Ulsoor --------- Venue Frequency 0 Venue Category_Café 0.4 1 Venue Category_Bridal Shop 0.2 2 Venue Category_Burger Joint 0.2 3 Venue Category_Bakery 0.2 4 Venue Category_Pizza Place 0.0 --------- Uttarahalli --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.27 1 Venue Category_Bakery 0.18 2 Venue Category_Gym 0.09 3 Venue Category_Paintball Field 0.09 4

Venue Category_Fast Food Restaurant 0.09 --------- Varthur --------- Venue Frequency 0 Venue Category_Supermarket 1.0 1 Venue Category_ATM 0.0 2 Venue Category_Nightclub 0.0 3 Venue Category_Mughlai Restaurant 0.0 4 Venue Category_Multicuisine Indian Restaurant 0.0 --------- Vasanth Nagar --------- Venue Frequency 0 Venue Category_Indian Restaurant 0.20 1 Venue Category_Coffee Shop 0.16 2 Venue Category_Italian Restaurant 0.08 3 Venue Category_Hotel 0.08 4 Venue Category_Chinese Restaurant 0.08 --------- Vidyaranyapura --------- Venue Frequency 0 Venue Category_Bus Station 1.0 1 Venue Category_ATM 0.0 2 Venue Category_Mughlai Restaurant 0.0 3 Venue Category_Playground 0.0 4 Venue Category_Pizza Place 0.0 --------- Vijayanagar --------- Venue Frequency 0 Venue Category_Bakery 0.50 1 Venue Category_Indian Restaurant 0.25 2 Venue Category_North Indian Restaurant 0.25 3 Venue Category_Outlet Store 0.00 4 Venue Category_Multicuisine Indian Restaurant 0.00 --------- Whitefield --------- Venue Frequency 0 Venue Category_Bakery 0.22 1 Venue Category_Swiss Restaurant 0.11 2 Venue Category_Kerala Restaurant 0.11 3 Venue Category_Eastern European Restaurant 0.11 4 Venue Category_Café 0.11 --------- Yelahanka --------- Venue Frequency 0 Venue Category_Jewelry Store 0.17 1 Venue Category_Smoke Shop 0.17 2 Venue Category_Indian Restaurant 0.17 3 Venue Category_Restaurant 0.17 4 Venue Category_Train Station 0.17 --------- Yeshwanthpur --------- Venue Frequency 0 Venue Category_Bar 0.12 1 Venue Category_Restaurant 0.12 2 Venue Category_Chinese Restaurant 0.12 3 Venue Category_Mediterranean Restaurant 0.12 4 Venue Category_Hotel 0.12

Frequency of each neighborhood and its top 5 venues can be known. This is very important is we can analyze top neighborhoods with most busy restaurants

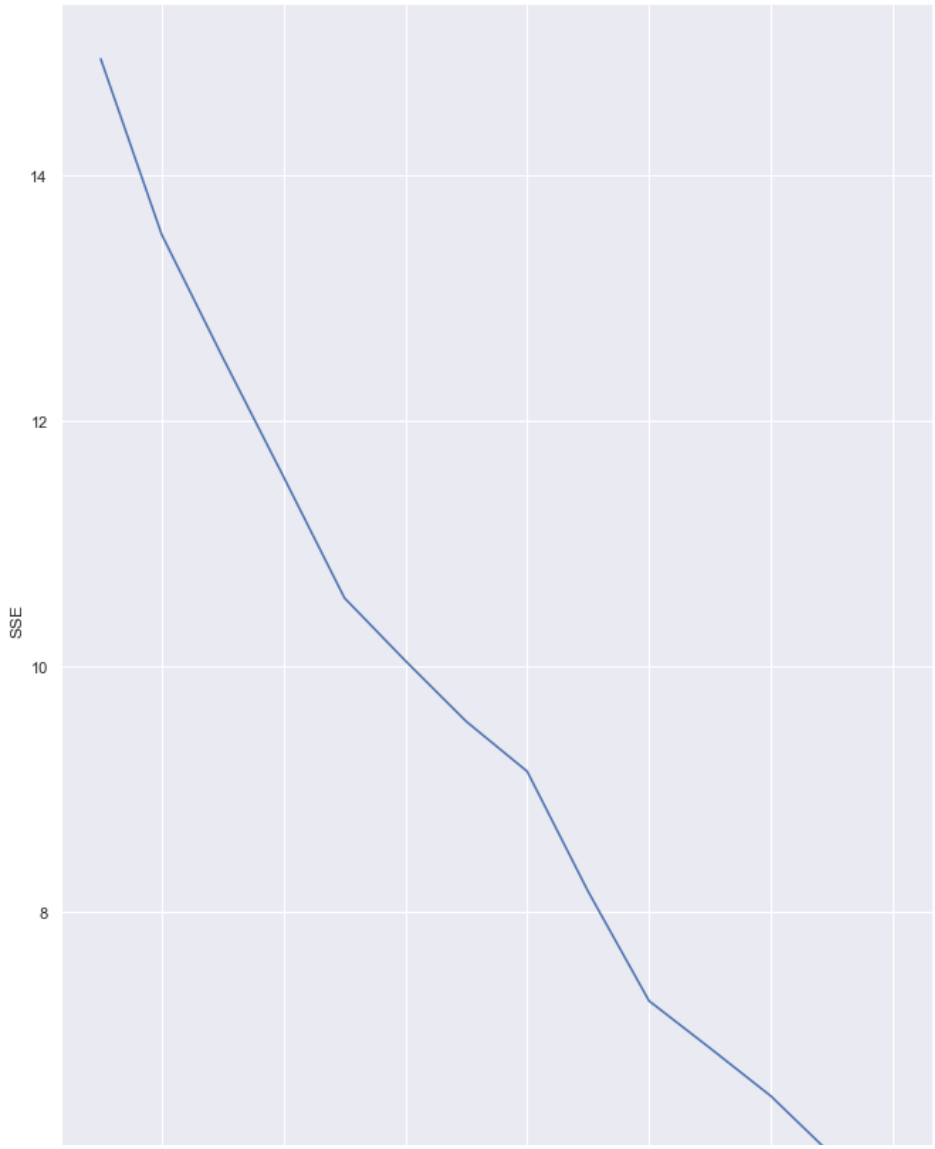
Next challenge is to find the optimal k value for clustering and we do it using the elbow method

In [ ]:
```
sse = {}
for k in range(1,15):
    kmeans = KMeans(n_clusters=k,random_state=0)
    kmeans.fit(gurgaon_venues_grouped.drop('Neighborhoods',axis=1))
    bangalore_venues_grouped['Cluster'] = kmeans.labels_
    sse[k] = kmeans.inertia_

plt.figure()
plt.plot(list(sse.keys()), list(sse.values()))
plt.xlabel("Number of cluster")
plt.ylabel("SSE")
plt.show()
```

In [78]:
```
from IPython.display import Image
from IPython.core.display import HTML
Image(url= "https://github.com/DeepentiA/Capstone_Project/blob/master/download.png?raw=true")
```

Out[78]:



From the above graph, we can see the optimal value for cluster is 5

In [ ]:
```
kmeans = KMeans(n_clusters=5,random_state=0)
```

In [ ]:
```
kmeans.fit(gurgaon_venues_grouped.drop('Neighborhoods',axis=1))
```

KMeans(algorithm='auto', copy_x=True, init='k-means++', max_iter=300, n_clusters=5, n_init=10, n_jobs=None, precompute_distances='auto', random_state=0, tol=0.0001, verbose=0)

In [ ]:
```
gurgaon_venues_grouped.groupby('Cluster')['Neighborhoods'].count()
```

Cluster 0 22 1 4 2 10 3 17 4 9 Name: Neighborhood, dtype: int64

In [ ]:
```
gurgaon_venues_grouped.columns
```

Index(['Neighborhood', 'Venue Category_ATM', 'Venue Category_American Restaurant', 'Venue Category_Andhra Restaurant', 'Venue Category_Art Museum', 'Venue Category_Asian Restaurant', 'Venue Category_Athletics & Sports', 'Venue Category_Auto Garage', 'Venue Category_BBQ Joint', 'Venue Category_Badminton Court', ... 'Venue Category_Toll Plaza', 'Venue Category_Train Station', 'Venue Category_Travel & Transport', 'Venue Category_Udupi Restaurant', 'Venue Category_Vegetarian / Vegan Restaurant', 'Venue Category_Vietnamese Restaurant', 'Venue Category_Wine Bar', 'Venue Category_Women's Store', 'Venue Category_Yoga Studio', 'Cluster'], dtype='object', length=134)

In [ ]:
```
# create map
map_clusters = folium.Map(location=[gurgaon_latitude, gurgaon_longitude], zoom_start=11)
```

In [ ]:
```
# set color scheme for the clusters
x = np.arange(6)
ys = [i + x + (i*x)**2 for i in range(6)]
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(neighborhoods_venues_sorted['Neighborhood Latitude'], neighborhoods_venues_sorted['Neighborhood Longitude'], neighborhoods_venues_sorted['Neighborhood'], neighborhoods_venues_sorted['Cluster']):
    label = folium.Popup(str(poi) + ' Cluster ' + str(cluster), parse_html=True)
    folium.CircleMarker(
        [lat, lon],
        radius=5,
        popup=label,
        color=rainbow[cluster-1],
        fill=True,
        fill_color=rainbow[cluster-1],
        fill_opacity=0.7).add_to(map_clusters)
```

In [ ]:
```
top3 = recommended_neighborhoods.groupby(['Neighborhoods','1st Most Common Venue','2nd Most Common Venue','3rd Most Common Venue'])['Ranking'].unique()
```

In [ ]:
```
top3_df = pd.DataFrame(top3).reset_index()
```

In [86]:
```
url= "https://raw.githubusercontent.com/DeepentiA/Capstone_Project/master/best%20food.csv"
df5 = pd.read_csv(url)
df5.head()
```

Out[86]:

	Neighborhoods	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	Ranking
0	Begur	Venue Category_Bakery	Venue Category_Indian Sweet Shop	Venue Category_Stadium	[0.7361321887351776]
1	Hulimavu	Venue Category_Bakery	Venue Category_Indian Restaurant	Venue Category_Badminton Court	[0.7638135476902764]
2	Kamakshipalya	Venue Category_South Indian Restaurant	Venue Category_Yoga Studio	Venue Category_Food Truck	[0.80418735993893]

Conclusion :

Here, according the data, we see that 'Begur,Hulimavu and kamakshipalya' are top 3 neighborhoods to find similar food to whitefield