tter-place-in-scarborough-toronto

July 23, 2023

# 1 Capstone Project – The Battle of Neighborhoods | Finding a Better Place in Scarborough, Toronto

### 1.0.1 1. Installing and Importing Python Libraries and Dependencies

[1]:
```
!pip install geocoder
!pip install folium
```

```
Collecting geocoder
  Downloading https://files.pythonhosted.org/packages/4f/6b/13166c909ad2f2
d76b929a4227c952630ebaf0d729f6317eb09cbceccbab/geocoder-1.38.1-py2.py3-none-
any.whl (98kB)
     |                  | 102kB 17.1MB/s ta 0:00:01
Requirement already satisfied: six in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from geocoder) (1.12.0)
Requirement already satisfied: requests in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from geocoder) (2.21.0)
Requirement already satisfied: future in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from geocoder) (0.17.1)
Collecting ratelim (from geocoder)
  Downloading https://files.pythonhosted.org/packages/f2/98/7e6d147fd16a10a5f821
db6e25f192265d6ecca3d82957a4fdd592cad49c/ratelim-0.1.6-py2.py3-none-any.whl
Requirement already satisfied: click in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from geocoder) (7.0)
Requirement already satisfied: certifi>=2017.4.17 in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from requests->geocoder)
(2019.9.11)
Requirement already satisfied: idna<2.9,>=2.5 in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from requests->geocoder)
(2.8)
Requirement already satisfied: urllib3<1.25,>=1.21.1 in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from requests->geocoder)
(1.24.1)
Requirement already satisfied: chardet<3.1.0,>=3.0.2 in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from requests->geocoder)
(3.0.4)
Requirement already satisfied: decorator in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from ratelim->geocoder)
```

```
(4.3.2)
Installing collected packages: ratelim, geocoder
Successfully installed geocoder-1.38.1 ratelim-0.1.6
Collecting folium
  Downloading https://files.pythonhosted.org/packages/72/ff/004bfe344150a0
64e558cb2aedeaa02ecbf75e60e148a55a9198f0c41765/folium-0.10.0-py2.py3-none-
any.whl (91kB)
     |                  | 92kB 12.7MB/s eta 0:00:01
Requirement already satisfied: jinja2>=2.9 in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from folium) (2.10)
Requirement already satisfied: numpy in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from folium) (1.15.4)
Requirement already satisfied: requests in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from folium) (2.21.0)
Collecting branca>=0.3.0 (from folium)
  Downloading https://files.pythonhosted.org/packages/63/36/1c93318e9653f4e414a2
e0c3b98fc898b4970e939afeedeee6075dd3b703/branca-0.3.1-py3-none-any.whl
Requirement already satisfied: MarkupSafe>=0.23 in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from jinja2>=2.9->folium)
(1.1.0)
Requirement already satisfied: certifi>=2017.4.17 in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from requests->folium)
(2019.9.11)
Requirement already satisfied: urllib3<1.25,>=1.21.1 in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from requests->folium)
(1.24.1)
Requirement already satisfied: idna<2.9,>=2.5 in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from requests->folium)
(2.8)
Requirement already satisfied: chardet<3.1.0,>=3.0.2 in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from requests->folium)
(3.0.4)
Requirement already satisfied: six in
/opt/conda/envs/Python36/lib/python3.6/site-packages (from
branca>=0.3.0->folium) (1.12.0)
Installing collected packages: branca, folium
Successfully installed branca-0.3.1 folium-0.10.0
```

Importing Libraries

[2]:
```
import pandas as pd
import requests
import numpy as np
import geocoder
import folium
import requests
import matplotlib.cm as cm
import matplotlib.colors as colors
```

```
import json
import xml
import matplotlib.pyplot as plt
%matplotlib inline
import warnings
warnings.filterwarnings("ignore")

from pandas.io.json import json_normalize
from sklearn.cluster import KMeans
from geopy.geocoders import Nominatim
from bs4 import BeautifulSoup

pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)

print("All Required Libraries Imported!")
```

```
All Required Libraries Imported!
```

### 1.0.2 2. Data Extraction and Cleaning

Using BeautifulSoup Scraping List of Postal Codes of Given Wikipedia Page. Link: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M

[3]:
```
url = "https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M"
extracting_data = requests.get(url).text
wiki_data = BeautifulSoup(extracting_data, 'lxml')
```

Converting content of PostalCode HTML table as dataframe

[4]:
```
column_names = ['Postalcode','Borough','Neighborhood']
toronto = pd.DataFrame(columns = column_names)

content = wiki_data.find('div', class_='mw-parser-output')
table = content.table.tbody
postcode = 0
borough = 0
neighborhood = 0

for tr in table.find_all('tr'):
    i = 0
    for td in tr.find_all('td'):
        if i == 0:
            postcode = td.text
            i = i + 1
        elif i == 1:
            borough = td.text
            i = i + 1
```

```
        elif i == 2:
            neighborhood = td.text.strip('\n').replace(']','')
    toronto = toronto.append({'Postalcode': postcode,'Borough':␣
 ↪borough,'Neighborhood': neighborhood},ignore_index=True)
```

[5]:
```
# clean dataframe
toronto = toronto[toronto.Borough!='Not assigned']
toronto = toronto[toronto.Borough!= 0]
toronto.reset_index(drop = True, inplace = True)
i = 0
for i in range(0,toronto.shape[0]):
    if toronto.iloc[i][2] == 'Not assigned':
        toronto.iloc[i][2] = toronto.iloc[i][1]
        i = i+1
```

[6]:
```
df = toronto.groupby(['Postalcode','Borough'])['Neighborhood'].apply(', '.join).
 ↪reset_index()
df.head()
```

[6]:

| | Postalcode | Borough | Neighborhood |
|---|---|---|---|
| 0 | M1B | Scarborough | Rouge, Malvern |
| 1 | M1C | Scarborough | Highland Creek, Rouge Hill, Port Union |
| 2 | M1E | Scarborough | Guildwood, Morningside, West Hill |
| 3 | M1G | Scarborough | Woburn |
| 4 | M1H | Scarborough | Cedarbrae |

[7]:
```
df.describe()
```

[7]:

| | Postalcode | Borough | Neighborhood |
|---|---|---|---|
| count | 103 | 103 | 103 |
| unique | 103 | 11 | 103 |
| top | M2M | North York | York Mills West |
| freq | 1 | 24 | 1 |

[8]:
```
df = df.dropna()
empty = 'Not assigned'
df = df[(df.Postalcode != empty ) & (df.Borough != empty) & (df.Neighborhood !=␣
 ↪empty)]
```

[9]:
```
df.head()
```

[9]:

| | Postalcode | Borough | Neighborhood |
|---|---|---|---|
| 0 | M1B | Scarborough | Rouge, Malvern |
| 1 | M1C | Scarborough | Highland Creek, Rouge Hill, Port Union |
| 2 | M1E | Scarborough | Guildwood, Morningside, West Hill |
| 3 | M1G | Scarborough | Woburn |
| 4 | M1H | Scarborough | Cedarbrae |

[10]:
```
def neighborhood_list(grouped):
    return ', '.join(sorted(grouped['Neighborhood'].tolist()))

grp = df.groupby(['Postalcode', 'Borough'])
df_2 = grp.apply(neighborhood_list).reset_index(name='Neighborhood')
```

[11]:
```
df_2.describe()
```

[11]:

| | Postalcode | Borough | Neighborhood |
|---|---|---|---|
| count | 103 | 103 | 103 |
| unique | 103 | 11 | 103 |
| top | M2M | North York | York Mills West |
| freq | 1 | 24 | 1 |

[12]:
```
print(df_2.shape)
df_2.head()
```

```
(103, 3)
```

[12]:

| | Postalcode | Borough | Neighborhood |
|---|---|---|---|
| 0 | M1B | Scarborough | Rouge, Malvern |
| 1 | M1C | Scarborough | Highland Creek, Rouge Hill, Port Union |
| 2 | M1E | Scarborough | Guildwood, Morningside, West Hill |
| 3 | M1G | Scarborough | Woburn |
| 4 | M1H | Scarborough | Cedarbrae |

[13]:
```
def get_latilong(postal_code):
    lati_long_coords = None
    while(lati_long_coords is None):
        g = geocoder.arcgis('{}, Toronto, Ontario'.format(postal_code))
        lati_long_coords = g.latlng
    return lati_long_coords

get_latilong('M4G')
```

[13]:
```
[43.70949500000006, -79.36398897099997]
```

[14]:
```
# Retrieving Postal Code Co-ordinates
postal_codes = df_2['Postalcode']
coords = [ get_latilong(postal_code) for postal_code in postal_codes.tolist() ]
```

[15]:
```
# Adding Columns Latitude & Longitude
df_coords = pd.DataFrame(coords, columns=['Latitude', 'Longitude'])
df_2['Latitude'] = df_coords['Latitude']
df_2['Longitude'] = df_coords['Longitude']
```

[16]:
```
df_2[df_2.Postalcode == 'M5G']
```

[16]:
```
   Postalcode           Borough        Neighborhood   Latitude  Longitude
57        M5G  Downtown Toronto  Central Bay Street  43.656091  -79.38493
```

[17]:
```
df_2.head(10)
```

[17]:
```
  Postalcode      Borough                                    Neighborhood  \
0        M1B  Scarborough                                  Rouge, Malvern
1        M1C  Scarborough          Highland Creek, Rouge Hill, Port Union
2        M1E  Scarborough               Guildwood, Morningside, West Hill
3        M1G  Scarborough                                          Woburn
4        M1H  Scarborough                                       Cedarbrae
5        M1J  Scarborough                             Scarborough Village
6        M1K  Scarborough    East Birchmount Park, Ionview, Kennedy Park
7        M1L  Scarborough                 Clairlea, Golden Mile, Oakridge
8        M1M  Scarborough  Cliffcrest, Cliffside, Scarborough Village West
9        M1N  Scarborough                      Birch Cliff, Cliffside West

    Latitude  Longitude
0  43.811525 -79.195517
1  43.785665 -79.158725
2  43.765815 -79.175193
3  43.768369 -79.217590
4  43.769688 -79.239440
5  43.743125 -79.231750
6  43.726276 -79.263625
7  43.713054 -79.285055
8  43.724235 -79.227925
9  43.696770 -79.259967
```

[18]:
```
address = 'Scarborough,Toronto'

geolocator = Nominatim()
location = geolocator.geocode(address)
latitude_x = location.latitude
longitude_y = location.longitude
print('The Geograpical Co-ordinate of Seattle,Washington are {}, {}.'.
 ↪format(latitude_x, longitude_y))
```

```
The Geograpical Co-ordinate of Seattle,Washington are 43.773077, -79.257774.
```

### 1.0.3 3. Map of Scarborough

[19]:
```
map_Scarborough = folium.Map(location=[latitude_x, longitude_y], zoom_start=10)

for lat, lng, nei in zip(df_2['Latitude'], df_2['Longitude'],␣
 ↪df_2['Neighborhood']):
```

```
    label = '{}'.format(nei)
    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_Scarborough)

map_Scarborough
```

[19]:
```
<folium.folium.Map at 0x7f24255bdac8>
```

[20]:
```
address = 'Scarborough,Toronto'

geolocator = Nominatim()
location = geolocator.geocode(address)
latitude_n1 = location.latitude
longitude_n1 = location.longitude
print('The Geograpical Co-ordinate of Neighborhood_1 are {}, {}.'.
 ↪format(latitude_x, longitude_y))
```

```
The Geograpical Co-ordinate of Neighborhood_1 are 43.773077, -79.257774.
```

[21]:
```
# @hiddel_cell
CLIENT_ID = 'DPBYY4JUY3DU2OALPSUV4ONY2K1GOJJKJ1NIHBB32XEMOVYY' # my Foursquare␣
 ↪ID
CLIENT_SECRET = '1MV443TYEP4HUOOWDUW5NQ5W1OL2Y4GO5NWG11WIR3NUGC5B' # my␣
 ↪Foursquare Secret
VERSION = '20180604'
LIMIT = 30
print('Your credentails:')
print('CLIENT_ID: '+CLIENT_ID)
print('CLIENT_SECRET: '+CLIENT_SECRET)
```

```
Your credentails:
CLIENT_ID: DPBYY4JUY3DU2OALPSUV4ONY2K1GOJJKJ1NIHBB32XEMOVYY
CLIENT_SECRET: 1MV443TYEP4HUOOWDUW5NQ5W1OL2Y4GO5NWG11WIR3NUGC5B
```

[22]:
```
radius = 700
LIMIT = 100
url = 'https://api.foursquare.com/v2/venues/explore?
 ↪&client_id={}&client_secret={}&v={}&ll={},{}&radius={}&limit={}'.format(
    CLIENT_ID,
```

```
    CLIENT_SECRET,
    VERSION,
    latitude_n1,
   longitude_n1,
    radius,
   LIMIT)
results = requests.get(url).json()
```

[23]:
```
venues=results['response']['groups'][0]['items']
nearby_venues = json_normalize(venues)
nearby_venues.columns
```

[23]:
```
Index(['reasons.count', 'reasons.items', 'referralId', 'venue.categories',
       'venue.events.count', 'venue.events.summary', 'venue.id',
       'venue.location.address', 'venue.location.cc', 'venue.location.city',
       'venue.location.country', 'venue.location.crossStreet',
       'venue.location.distance', 'venue.location.formattedAddress',
       'venue.location.labeledLatLngs', 'venue.location.lat',
       'venue.location.lng', 'venue.location.neighborhood',
       'venue.location.postalCode', 'venue.location.state', 'venue.name',
       'venue.photos.count', 'venue.photos.groups', 'venue.venuePage.id'],
      dtype='object')
```

[24]:
```
def get_category_type(row):
    try:
        categories_list = row['categories']
    except:
        categories_list = row['venue.categories']

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

### 1.0.4 4. Nearby Venues/Locations

[25]:
```
filtered_columns = ['venue.name', 'venue.categories', 'venue.location.lat',␣
 ↪'venue.location.lng']
nearby_venues =nearby_venues.loc[:, filtered_columns]
nearby_venues.head()
```

[25]:
```
                    venue.name  \
0                  Disney Store
1     American Eagle Outfitters
2                       SEPHORA
3         Canyon Creek Chophouse
```

```
4  Coliseum Scarborough Cinemas

                                    venue.categories  venue.location.lat  \
0  [{'id': '4bf58dd8d48988d1f3941735', 'name': 'T…           43.775537
1  [{'id': '4bf58dd8d48988d103951735', 'name': 'C…           43.775908
2  [{'id': '4bf58dd8d48988d10c951735', 'name': 'C…           43.775017
3  [{'id': '4bf58dd8d48988d1cc941735', 'name': 'S…           43.776959
4  [{'id': '4bf58dd8d48988d17f941735', 'name': 'M…           43.775995

   venue.location.lng
0         -79.256833
1         -79.258352
2         -79.258109
3         -79.261694
4         -79.255649
```

### 1.0.5 5. Categories of Nearby Venues/Locations

[26]:
```
nearby_venues['venue.categories'] = nearby_venues.apply(get_category_type,␣
↪axis=1)

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

nearby_venues.head(5)
```

[26]:
```
                          name        categories        lat        lng
0                 Disney Store  Toy / Game Store  43.775537 -79.256833
1     American Eagle Outfitters    Clothing Store  43.775908 -79.258352
2                       SEPHORA    Cosmetics Shop  43.775017 -79.258109
3        Canyon Creek Chophouse        Steakhouse  43.776959 -79.261694
4  Coliseum Scarborough Cinemas     Movie Theater  43.775995 -79.255649
```

[27]:
```
# Top 10 Categories
a=pd.Series(nearby_venues.categories)
a.value_counts()[:10]
```

[27]:
```
Clothing Store         8
Coffee Shop            5
Restaurant             3
Cosmetics Shop         3
Sporting Goods Shop    2
Pharmacy               2
Wings Joint            2
Tea Room               2
Sandwich Place         2
Electronics Store      1
```

```
Name: categories, dtype: int64
```

[28]:
```
def getNearbyVenues(names, latitudes, longitudes, radius=700):

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

        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)

        # making GET request
        venue_results = requests.get(url).
↪json()["response"]['groups'][0]['items']

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

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

    return(nearby_venues)
```

[29]:
```
# Nearby Venues
Scarborough_venues = getNearbyVenues(names=df_2['Neighborhood'],
                                     latitudes=df_2['Latitude'],
```

```
                                    longitudes=df_2['Longitude']
                                   )
```

```
Rouge, Malvern
Highland Creek, Rouge Hill, Port Union
Guildwood, Morningside, West Hill
Woburn
Cedarbrae
Scarborough Village
East Birchmount Park, Ionview, Kennedy Park
Clairlea, Golden Mile, Oakridge
Cliffcrest, Cliffside, Scarborough Village West
Birch Cliff, Cliffside West
Dorset Park, Scarborough Town Centre, Wexford Heights
Maryvale, Wexford
Agincourt
Clarks Corners, Sullivan, Tam O'Shanter
Agincourt North, L'Amoreaux East, Milliken, Steeles East
L'Amoreaux West
Upper Rouge
Hillcrest Village
Fairview, Henry Farm, Oriole
Bayview Village
Silver Hills, York Mills
Newtonbrook, Willowdale
Willowdale South
York Mills West
Willowdale West
Parkwoods
Don Mills North
Flemingdon Park, Don Mills South
Bathurst Manor, Downsview North, Wilson Heights
Northwood Park, York University
CFB Toronto, Downsview East
Downsview West
Downsview Central
Downsview Northwest
Victoria Village
Woodbine Gardens, Parkview Hill
Woodbine Heights
The Beaches
Leaside
Thorncliffe Park
East Toronto
The Danforth West, Riverdale
The Beaches West, India Bazaar
Studio District
```

Lawrence Park
Davisville North
North Toronto West
Davisville
Moore Park, Summerhill East
Deer Park, Forest Hill SE, Rathnelly, South Hill, Summerhill West
Rosedale
Cabbagetown, St. James Town
Church and Wellesley
Harbourfront, Regent Park
Ryerson, Garden District
St. James Town
Berczy Park
Central Bay Street
Adelaide, King, Richmond
Harbourfront East, Toronto Islands, Union Station
Design Exchange, Toronto Dominion Centre
Commerce Court, Victoria Hotel
Bedford Park, Lawrence Manor East
Roselawn
Forest Hill North, Forest Hill West
The Annex, North Midtown, Yorkville
Harbord, University of Toronto
Chinatown, Grange Park, Kensington Market
CN Tower, Bathurst Quay, Island airport, Harbourfront West, King and Spadina,
Railway Lands, South Niagara
Stn A PO Boxes 25 The Esplanade
First Canadian Place, Underground city
Lawrence Heights, Lawrence Manor
Glencairn
Humewood-Cedarvale
Caledonia-Fairbanks
Christie
Dovercourt Village, Dufferin
Little Portugal, Trinity
Brockton, Exhibition Place, Parkdale Village
Downsview, North Park, Upwood Park
Del Ray, Keelesdale, Mount Dennis, Silverthorn
The Junction North, Runnymede
High Park, The Junction South
Parkdale, Roncesvalles
Runnymede, Swansea
Queen's Park
Canada Post Gateway Processing Centre
Business Reply Mail Processing Centre 969 Eastern
Humber Bay Shores, Mimico South, New Toronto
Alderwood, Long Branch
The Kingsway, Montgomery Road, Old Mill North

```
Humber Bay, King's Mill Park, Kingsway Park South East, Mimico NE, Old Mill
South, The Queensway East, Royal York South East, Sunnylea
Kingsway Park South West, Mimico NW, The Queensway West, Royal York South West,
South of Bloor
Islington Avenue
Cloverdale, Islington, Martin Grove, Princess Gardens, West Deane Park
Bloordale Gardens, Eringate, Markland Wood, Old Burnhamthorpe
Humber Summit
Emery, Humberlea
Weston
Westmount
Kingsview Village, Martin Grove Gardens, Richview Gardens, St. Phillips
Albion Gardens, Beaumond Heights, Humbergate, Jamestown, Mount Olive,
Silverstone, South Steeles, Thistletown
Northwest
```

[30]:
```
print('There are {} Uniques Categories.'.format(len(Scarborough_venues['Venue␣
↪Category'].unique())))
Scarborough_venues.groupby('Neighborhood').count().head()
```

```
There are 299 Uniques Categories.
```

[30]:

| Neighborhood | Neighborhood Latitude | Neighborhood Longitude | Venue | Venue Latitude | Venue Longitude |
|---|---|---|---|---|---|
| Adelaide, King, Richmond | 100 | 100 | 100 | 100 | 100 |
| Agincourt | 29 | 29 | 29 | 29 | 29 |
| Agincourt North, L'Amoreaux East, Milliken, Ste… | 4 | 4 | 4 | 4 | 4 |
| Albion Gardens, Beaumond Heights, Humbergate, J… | 12 | 12 | 12 | 12 | 12 |
| Alderwood, Long Branch | 9 | 9 | 9 | 9 | 9 |

```
Neighborhood
Adelaide, King, Richmond                                    100
Agincourt                                                    29
Agincourt North, L'Amoreaux East, Milliken, Ste…             4
Albion Gardens, Beaumond Heights, Humbergate, J…            12
Alderwood, Long Branch                                       9

                                                    Venue Category
Neighborhood
Adelaide, King, Richmond                                   100
Agincourt                                                   29
Agincourt North, L'Amoreaux East, Milliken, Ste…            4
Albion Gardens, Beaumond Heights, Humbergate, J…           12
Alderwood, Long Branch                                      9
```

### 1.0.6 One Hot Encoding of Features

[31]:
```
# one hot encoding
Scarborough_onehot = pd.get_dummies(Scarborough_venues[['Venue Category']],␣
 ↪prefix="", prefix_sep="")

# add neighborhood column back to dataframe
Scarborough_onehot['Neighborhood'] = Scarborough_venues['Neighborhood']

# move neighborhood column to the first column
fixed_columns = [Scarborough_onehot.columns[-1]] + list(Scarborough_onehot.
 ↪columns[:-1])
Scarborough_onehot = Scarborough_onehot[fixed_columns]
Scarborough_grouped = Scarborough_onehot.groupby('Neighborhood').mean().
 ↪reset_index()
Scarborough_onehot.head(5)
```

[31]:

| | Zoo Exhibit | Accessories Store | Afghan Restaurant | African Restaurant | \ |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | |
| 1 | 0 | 0 | 0 | 0 | |
| 2 | 1 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | |

| | Airport | American Restaurant | Antique Shop | Arcade | Art Gallery | \ |
|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | |
| 1 | 0 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | 0 | |

```
   Art Museum  Arts & Crafts Store  Asian Restaurant  Athletics & Sports  \
0           0                    0                 0                   0
1           0                    0                 0                   0
2           0                    0                 0                   0
3           0                    0                 0                   0
4           0                    0                 0                   0

   Auto Dealership  BBQ Joint  Baby Store  Bagel Shop  Bakery  Bank  Bar  \
0                0          0           0           0       0     0    0
1                0          0           0           0       0     0    0
2                0          0           0           0       0     0    0
3                0          0           0           0       0     0    0
4                0          0           0           0       0     0    1

   Baseball Field  Basketball Stadium  Beach  Beer Bar  Beer Store  \
0               0                   0      0         0           0
1               0                   0      0         0           0
2               0                   0      0         0           0
3               0                   0      0         0           0
4               0                   0      0         0           0

   Belgian Restaurant  Big Box Store  Bike Rental / Bike Share  Bike Shop  \
0                   0              0                         0          0
1                   0              0                         0          0
2                   0              0                         0          0
3                   0              0                         0          0
4                   0              0                         0          0

   Bistro  Boat or Ferry  Bookstore  Boutique  Brazilian Restaurant  \
0       0              0          0         0                     0
1       0              0          0         0                     0
2       0              0          0         0                     0
3       0              0          0         0                     0
4       0              0          0         0                     0

   Breakfast Spot  Brewery  Bridge  Bubble Tea Shop  Buffet  Building  \
0               0        0       0                0       0         0
1               0        0       0                0       0         0
2               0        0       0                0       0         0
3               0        0       0                0       0         0
4               0        0       0                0       0         0

   Burger Joint  Burrito Place  Bus Line  Bus Station  Bus Stop  \
0             0              0         0            0         0
1             0              0         0            0         0
2             0              0         0            0         0
3             0              0         0            0         0
```

```
4             0              0         0            0          0

   Business Service  Butcher  Café  Cajun / Creole Restaurant  Camera Store  \
0                 0        0     0                          0             0
1                 0        0     0                          0             0
2                 0        0     0                          0             0
3                 0        0     0                          0             0
4                 0        0     0                          0             0

   Candy Store  Cantonese Restaurant  Caribbean Restaurant  Castle  Cemetery  \
0            0                     0                     0       0         0
1            0                     0                     0       0         0
2            0                     0                     0       0         0
3            0                     0                     0       0         0
4            0                     0                     0       0         0

   Cheese Shop  Chinese Restaurant  Chiropractor  Chocolate Shop  Church  \
0            0                   0             0               0       0
1            0                   0             0               0       0
2            0                   0             0               0       0
3            0                   0             0               0       0
4            0                   0             0               0       0

   Climbing Gym  Clothing Store  Cocktail Bar  Coffee Shop  \
0             0               0             0            0
1             0               0             0            0
2             0               0             0            0
3             0               0             0            0
4             0               0             0            0

   College Arts Building  College Gym  College Rec Center  College Stadium  \
0                      0            0                   0                0
1                      0            0                   0                0
2                      0            0                   0                0
3                      0            0                   0                0
4                      0            0                   0                0

   College Theater  Colombian Restaurant  Comedy Club  \
0                0                     0            0
1                0                     0            0
2                0                     0            0
3                0                     0            0
4                0                     0            0

   Comfort Food Restaurant  Comic Shop  Concert Hall  \
0                        0           0             0
1                        0           0             0
```

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

   Construction & Landscaping  Convenience Store  Cosmetics Shop  Creperie  \
0                           0                  0               0         0
1                           0                  0               0         0
2                           0                  0               0         0
3                           1                  0               0         0
4                           0                  0               0         0

   Cuban Restaurant  Cupcake Shop  Curling Ice  Dance Studio  Deli / Bodega  \
0                 0             0            0             0              0
1                 0             0            0             0              0
2                 0             0            0             0              0
3                 0             0            0             0              0
4                 0             0            0             0              0

   Dentist's Office  Department Store  Design Studio  Dessert Shop  \
0                 0                 0              0             0
1                 0                 0              0             0
2                 0                 0              0             0
3                 0                 0              0             0
4                 0                 0              0             0

   Dim Sum Restaurant  Diner  Disc Golf  Discount Store  Doctor's Office  \
0                   0      0          0               0                0
1                   0      0          0               0                0
2                   0      0          0               0                0
3                   0      0          0               0                0
4                   0      0          0               0                0

   Dog Run  Doner Restaurant  Donut Shop  Dumpling Restaurant  \
0        0                 0           0                    0
1        0                 0           0                    0
2        0                 0           0                    0
3        0                 0           0                    0
4        0                 0           0                    0

   Eastern European Restaurant  Electronics Store  Elementary School  \
0                            0                  0                  0
1                            0                  0                  0
2                            0                  0                  0
3                            0                  0                  0
4                            0                  0                  0

   Ethiopian Restaurant  Event Space  Falafel Restaurant  Farm  \
```

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

   Farmers Market  Fast Food Restaurant  Field  Filipino Restaurant  \
0               0                     1      0                    0
1               0                     0      0                    0
2               0                     0      0                    0
3               0                     0      0                    0
4               0                     0      0                    0

   Financial or Legal Service  Fish & Chips Shop  Fish Market  Flea Market  \
0                           0                  0            0            0
1                           1                  0            0            0
2                           0                  0            0            0
3                           0                  0            0            0
4                           0                  0            0            0

   Flower Shop  Food  Food & Drink Shop  Food Court  Food Truck  Fountain  \
0            0     0                  0           0           0         0
1            0     0                  0           0           0         0
2            0     0                  0           0           0         0
3            0     0                  0           0           0         0
4            0     0                  0           0           0         0

   French Restaurant  Fried Chicken Joint  Frozen Yogurt Shop  \
0                  0                    0                   0
1                  0                    0                   0
2                  0                    0                   0
3                  0                    0                   0
4                  0                    0                   0

   Furniture / Home Store  Gaming Cafe  Garden  Gas Station  Gastropub  \
0                       0            0       0            0          0
1                       0            0       0            0          0
2                       0            0       0            0          0
3                       0            0       0            0          0
4                       0            0       0            0          0

   Gay Bar  General Entertainment  General Travel  German Restaurant  \
0        0                      0               0                  0
1        0                      0               0                  0
2        0                      0               0                  0
3        0                      0               0                  0
4        0                      0               0                  0
```

```
   Gift Shop  Golf Course  Golf Driving Range  Gourmet Shop  Greek Restaurant  \
0          0            0                   0             0                  0
1          0            0                   0             0                  0
2          0            0                   0             0                  0
3          0            0                   0             0                  0
4          0            0                   0             0                  0

   Grocery Store  Gym  Gym / Fitness Center  Gym Pool  Hakka Restaurant  \
0              0    0                     0         0                 0
1              0    0                     0         0                 0
2              0    0                     0         0                 0
3              0    0                     0         0                 0
4              0    0                     0         0                 0

   Harbor / Marina  Hardware Store  Hawaiian Restaurant  \
0                0               0                    0
1                0               0                    0
2                0               0                    0
3                0               0                    0
4                0               0                    0

   Health & Beauty Service  Health Food Store  Historic Site  History Museum  \
0                        0                  0              0               0
1                        0                  0              0               0
2                        0                  0              0               0
3                        0                  0              0               0
4                        0                  0              0               0

   Hobby Shop  Hockey Arena  Home Service  Hong Kong Restaurant  Hookah Bar  \
0           0             0             0                     0           0
1           0             0             0                     0           0
2           0             0             0                     0           0
3           0             0             0                     0           0
4           0             0             0                     0           0

   Hostel  Hot Dog Joint  Hotel  Hotel Bar  Hotpot Restaurant  Ice Cream Shop  \
0       0              0      0          0                  0               0
1       0              0      0          0                  0               0
2       0              0      0          0                  0               0
3       0              0      0          0                  0               0
4       0              0      0          0                  0               0

   Indian Restaurant  Indie Movie Theater  Indonesian Restaurant  \
0                  0                    0                      0
1                  0                    0                      0
2                  0                    0                      0
```

```
3                  0                    0                     0
4                  0                    0                     0

   Intersection  Irish Pub  Italian Restaurant  Japanese Restaurant  \
0             0          0                   0                    0
1             0          0                   0                    0
2             0          0                   0                    0
3             0          0                   0                    0
4             0          0                   0                    0

   Jazz Club  Jewelry Store  Jewish Restaurant  Juice Bar  Karaoke Bar  \
0          0              0                  0          0            0
1          0              0                  0          0            0
2          0              0                  0          0            0
3          0              0                  0          0            0
4          0              0                  0          0            0

   Kids Store  Kitchen Supply Store  Korean Restaurant  \
0           0                     0                  0
1           0                     0                  0
2           0                     0                  0
3           0                     0                  0
4           0                     0                  0

   Latin American Restaurant  Laundry Service  Leather Goods Store  Library  \
0                          0                0                    0        0
1                          0                0                    0        0
2                          0                0                    0        0
3                          0                0                    0        0
4                          0                0                    0        0

   Light Rail Station  Lingerie Store  Liquor Store  Lounge  \
0                   0               0             0       0
1                   0               0             0       0
2                   0               0             0       0
3                   0               0             0       0
4                   0               0             0       0

   Mac & Cheese Joint  Malay Restaurant  Market  Martial Arts Dojo  \
0                   0                 0       0                  0
1                   0                 0       0                  0
2                   0                 0       0                  0
3                   0                 0       0                  0
4                   0                 0       0                  0

   Massage Studio  Mediterranean Restaurant  Men's Store  Metro Station  \
0               0                         0            0              0
```

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

   Mexican Restaurant  Middle Eastern Restaurant  Miscellaneous Shop  \
0                   0                          0                   0
1                   0                          0                   0
2                   0                          0                   0
3                   0                          0                   0
4                   0                          0                   0

   Mobile Phone Shop  Modern European Restaurant  \
0                  0                           0
1                  0                           0
2                  0                           0
3                  0                           0
4                  0                           0

   Molecular Gastronomy Restaurant  Monument / Landmark  Movie Theater  \
0                                0                    0              0
1                                0                    0              0
2                                0                    0              0
3                                0                    0              0
4                                0                    0              0

   Moving Target  Museum  Music Store  Music Venue  \
0              0       0            0            0
1              0       0            0            0
2              0       0            0            0
3              0       0            0            0
4              0       0            0            0

                           Neighborhood  New American Restaurant  Nightclub  \
0                         Rouge, Malvern                        0          0
1                         Rouge, Malvern                        0          0
2                         Rouge, Malvern                        0          0
3                         Rouge, Malvern                        0          0
4  Highland Creek, Rouge Hill, Port Union                       0          0

   Noodle House  Office  Opera House  Optical Shop  Organic Grocery  \
0             0       0            0             0                0
1             0       0            0             0                0
2             0       0            0             0                0
3             0       0            0             0                0
4             0       0            0             0                0
```

```
   Other Great Outdoors  Other Nightlife  Paper / Office Supplies Store  Park  \
0                     0                0                              0     0
1                     0                0                              0     0
2                     0                0                              0     0
3                     0                0                              0     0
4                     0                0                              0     0

   Pastry Shop  Performing Arts Venue  Peruvian Restaurant  Pet Store  \
0            0                      0                    0          0
1            0                      0                    0          0
2            0                      0                    0          0
3            0                      0                    0          0
4            0                      0                    0          0

   Pharmacy  Pier  Pilates Studio  Pizza Place  Platform  Playground  Plaza  \
0         0     0               0            0         0           0      0
1         0     0               0            0         0           0      0
2         0     0               0            0         0           0      0
3         0     0               0            0         0           0      0
4         0     0               0            0         0           0      0

   Poke Place  Pool  Pool Hall  Portuguese Restaurant  Poutine Place  \
0           0     0          0                      0              0
1           0     0          0                      0              0
2           0     0          0                      0              0
3           0     0          0                      0              0
4           0     0          0                      0              0

   Print Shop  Pub  Ramen Restaurant  Record Shop  Rental Car Location  \
0           0    0                 0            0                    0
1           0    0                 0            0                    0
2           0    0                 0            0                    0
3           0    0                 0            0                    0
4           0    0                 0            0                    0

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

   Rock Climbing Spot  Rock Club  Sake Bar  Salad Place  Salon / Barbershop  \
0                   0          0         0            0                   0
1                   0          0         0            0                   0
2                   0          0         0            0                   0
3                   0          0         0            0                   0
```

```
4                   0          0         0            0                     0

   Sandwich Place  Scenic Lookout  Science Museum  Seafood Restaurant  \
0               0               0               0                   0
1               0               0               0                   0
2               0               0               0                   0
3               0               0               0                   0
4               0               0               0                   0

   Shanghai Restaurant  Shoe Store  Shopping Mall  Skate Park  Skating Rink  \
0                    0           0              0           0             0
1                    0           0              0           0             0
2                    0           0              0           0             0
3                    0           0              0           0             0
4                    0           0              0           0             0

   Smoke Shop  Smoothie Shop  Snack Place  Soccer Field  Soccer Stadium  \
0           0              0            0             0               0
1           0              0            0             0               0
2           0              0            0             0               0
3           0              0            0             0               0
4           0              0            0             0               0

   Social Club  Soup Place  Southern / Soul Food Restaurant  Souvlaki Shop  \
0            0           0                                0              0
1            0           0                                0              0
2            0           0                                0              0
3            0           0                                0              0
4            0           0                                0              0

   Spa  Spanish Restaurant  Speakeasy  Sporting Goods Shop  Sports Bar  \
0    0                   0          0                    0           0
1    0                   0          0                    0           0
2    0                   0          0                    0           0
3    0                   0          0                    0           0
4    0                   0          0                    0           0

   Sports Club  Stationery Store  Steakhouse  Storage Facility  Supermarket  \
0            0                 0           0                 0            0
1            0                 0           0                 0            0
2            0                 0           0                 0            0
3            0                 0           0                 0            0
4            0                 0           0                 0            0

   Sushi Restaurant  Taco Place  Tailor Shop  Taiwanese Restaurant  \
0                 0           0            0                     0
1                 0           0            0                     0
```

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

   Tanning Salon  Tapas Restaurant  Tea Room  Tech Startup  Tennis Court  \
0              0                 0         0             0             0
1              0                 0         0             0             0
2              0                 0         0             0             0
3              0                 0         0             0             0
4              0                 0         0             0             0

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

   Theme Restaurant  Thrift / Vintage Store  Toy / Game Store  Track  Trail  \
0                 0                       0                 0      0      0
1                 0                       0                 0      0      0
2                 0                       0                 0      0      0
3                 0                       0                 0      0      0
4                 0                       0                 0      0      0

   Train Station  University  Vegetarian / Vegan Restaurant  Video Game Store  \
0              0           0                              0                 0
1              0           0                              0                 0
2              0           0                              0                 0
3              0           0                              0                 0
4              0           0                              0                 0

   Video Store  Vietnamese Restaurant  Warehouse Store  Wine Bar  Wine Shop  \
0            0                      0                0         0          0
1            0                      0                0         0          0
2            0                      0                0         0          0
3            0                      0                0         0          0
4            0                      0                0         0          0

   Wings Joint  Women's Store  Yoga Studio
0            0              0            0
1            0              0            0
2            0              0            0
3            0              0            0
4            0              0            0
```

[32]:
```
num_top_venues = 5
for hood in Scarborough_grouped['Neighborhood']:
    print("---- "+hood+" ----")
    temp =Scarborough_grouped[Scarborough_grouped['Neighborhood'] == hood].T.
 ↪reset_index()
    temp.columns = ['venue','freq']
    temp = temp.iloc[1:]
    temp['freq'] = temp['freq'].astype(float)
    temp = temp.round({'freq': 2})
    print(temp.sort_values('freq', ascending=False).reset_index(drop=True).
 ↪head(num_top_venues))
    print('\n')
```

```
---- Adelaide, King, Richmond ----
          venue  freq
0   Coffee Shop  0.09
1          Café  0.07
2         Hotel  0.06
3  Burger Joint  0.03
4           Bar  0.03


---- Agincourt ----
                  venue  freq
0         Shopping Mall  0.07
1    Chinese Restaurant  0.07
2  Hong Kong Restaurant  0.03
3   Filipino Restaurant  0.03
4   Shanghai Restaurant  0.03


---- Agincourt North, L'Amoreaux East, Milliken, Steeles East ----
              venue  freq
0          Pharmacy  0.50
1    Sandwich Place  0.25
2  Sushi Restaurant  0.25
3       Zoo Exhibit  0.00
4     Movie Theater  0.00


---- Albion Gardens, Beaumond Heights, Humbergate, Jamestown, Mount Olive,
Silverstone, South Steeles, Thistletown ----
                 venue  freq
0        Grocery Store  0.17
1       Hardware Store  0.08
2  Fried Chicken Joint  0.08
3       Sandwich Place  0.08
```

```
4       Discount Store  0.08


---- Alderwood, Long Branch ----
               venue  freq
0  Convenience Store  0.11
1        Coffee Shop  0.11
2     Sandwich Place  0.11
3       Dance Studio  0.11
4                Pub  0.11


---- Bathurst Manor, Downsview North, Wilson Heights ----
                       venue  freq
0                Pizza Place  0.18
1                Coffee Shop  0.09
2   Mediterranean Restaurant  0.09
3              Deli / Bodega  0.09
4  Middle Eastern Restaurant  0.09


---- Bayview Village ----
              venue  freq
0  Asian Restaurant  0.25
1       Flower Shop  0.25
2              Park  0.25
3             Trail  0.25
4       Zoo Exhibit  0.00


---- Bedford Park, Lawrence Manor East ----
                venue  freq
0    Sushi Restaurant  0.07
1         Coffee Shop  0.07
2  Italian Restaurant  0.07
3               Café  0.04
4           Juice Bar  0.04


---- Berczy Park ----
         venue  freq
0  Coffee Shop  0.09
1   Restaurant  0.05
2         Café  0.05
3        Hotel  0.05
4     Beer Bar  0.04
```

```
---- Birch Cliff, Cliffside West ----
                  venue  freq
0                  Park  0.22
1         Baseball Field  0.11
2           Skating Rink  0.11
3  General Entertainment  0.11
4                   Gym  0.11


---- Bloordale Gardens, Eringate, Markland Wood, Old Burnhamthorpe ----
               venue  freq
0     Baseball Field  0.09
1  Fish & Chips Shop  0.09
2     Sandwich Place  0.09
3      Shopping Mall  0.09
4      Grocery Store  0.09


---- Brockton, Exhibition Place, Parkdale Village ----
                    venue  freq
0             Coffee Shop  0.08
1                    Café  0.07
2                     Bar  0.06
3              Restaurant  0.04
4  Furniture / Home Store  0.04


---- Business Reply Mail Processing Centre 969 Eastern ----
              venue  freq
0       Coffee Shop  0.10
1              Café  0.06
2             Hotel  0.04
3               Bar  0.04
4  Sushi Restaurant  0.03


---- CFB Toronto, Downsview East ----
          venue  freq
0  Soccer Field   0.2
1    Food Court   0.2
2       Airport   0.2
3          Park   0.2
4   Coffee Shop   0.2


---- CN Tower, Bathurst Quay, Island airport, Harbourfront West, King and
Spadina, Railway Lands, South Niagara ----
               venue  freq
```

```
0         Coffee Shop  0.10
1          Restaurant  0.05
2                Café  0.05
3  Italian Restaurant  0.05
4                 Gym  0.04


---- Cabbagetown, St. James Town ----
                venue  freq
0          Restaurant  0.06
1         Coffee Shop  0.06
2         Pizza Place  0.05
3  Japanese Restaurant  0.03
4              Bakery  0.03


---- Caledonia-Fairbanks ----
                venue  freq
0                Park  0.17
1  Sporting Goods Shop  0.08
2            Bus Stop  0.08
3                Café  0.08
4              Market  0.08


---- Canada Post Gateway Processing Centre ----
             venue  freq
0       Coffee Shop  0.10
1             Café  0.06
2            Hotel  0.04
3              Bar  0.04
4  Sushi Restaurant  0.03


---- Cedarbrae ----
                  venue  freq
0  Caribbean Restaurant  0.12
1          Flower Shop  0.12
2     Indian Restaurant  0.12
3                 Bank  0.12
4               Bakery  0.12


---- Central Bay Street ----
                venue  freq
0         Coffee Shop  0.06
1      Clothing Store  0.04
2      Cosmetics Shop  0.04
```

```
3      Ice Cream Shop  0.03
4  Italian Restaurant  0.03


---- Chinatown, Grange Park, Kensington Market ----
                          venue  freq
0                         Café  0.06
1             Chinese Restaurant  0.05
2                           Bar  0.05
3          Vietnamese Restaurant  0.04
4  Vegetarian / Vegan Restaurant  0.04


---- Christie ----
               venue  freq
0  Korean Restaurant  0.18
1      Grocery Store  0.10
2              Diner  0.04
3  Indian Restaurant  0.04
4               Café  0.04


---- Church and Wellesley ----
                 venue  freq
0          Coffee Shop  0.09
1  Japanese Restaurant  0.04
2                Café  0.03
3     Sushi Restaurant  0.03
4           Restaurant  0.03


---- Clairlea, Golden Mile, Oakridge ----
          venue  freq
0  Intersection  0.17
1      Bus Line  0.11
2   Coffee Shop  0.11
3         Diner  0.11
4        Bakery  0.11


---- Clarks Corners, Sullivan, Tam O'Shanter ----
                   venue  freq
0   Fast Food Restaurant  0.10
1            Pizza Place  0.10
2  Vietnamese Restaurant  0.07
3            Golf Course  0.03
4                 Market  0.03
```

```
---- Cliffcrest, Cliffside, Scarborough Village West ----
                 venue  freq
0  Fast Food Restaurant  0.17
1                  Park  0.08
2          Flower Shop  0.08
3         Liquor Store  0.08
4          Pizza Place  0.08


---- Cloverdale, Islington, Martin Grove, Princess Gardens, West Deane Park ----
                venue  freq
0         Pizza Place  0.25
1   Convenience Store  0.12
2  Mexican Restaurant  0.12
3                Bank  0.12
4                 Gym  0.12


---- Commerce Court, Victoria Hotel ----
         venue  freq
0  Coffee Shop  0.10
1        Hotel  0.06
2         Café  0.05
3   Restaurant  0.04
4    Gastropub  0.04


---- Davisville ----
            venue  freq
0    Dessert Shop  0.10
1     Pizza Place  0.10
2     Coffee Shop  0.07
3  Sandwich Place  0.07
4             Gym  0.05


---- Davisville North ----
            venue  freq
0             Gym  0.09
1     Yoga Studio  0.04
2        Pharmacy  0.04
3  Breakfast Spot  0.04
4         Brewery  0.04


---- Deer Park, Forest Hill SE, Rathnelly, South Hill, Summerhill West ----
             venue  freq
```

```
0               Pub  0.10
1       Coffee Shop  0.10
2      Skating Rink  0.10
3  Sushi Restaurant  0.10
4       Yoga Studio  0.05
```

```
---- Del Ray, Keelesdale, Mount Dennis, Silverthorn ----
                         venue  freq
0  Construction & Landscaping   0.2
1                  Playground   0.2
2            Storage Facility   0.2
3                 Coffee Shop   0.2
4        Fast Food Restaurant   0.2
```

```
---- Design Exchange, Toronto Dominion Centre ----
         venue  freq
0  Coffee Shop  0.13
1         Café  0.08
2        Hotel  0.07
3   Restaurant  0.04
4    Gastropub  0.03
```

```
---- Don Mills North ----
                venue  freq
0         Coffee Shop  0.11
1        Burger Joint  0.05
2  Italian Restaurant  0.05
3        Soccer Field  0.05
4       Smoothie Shop  0.05
```

```
---- Dorset Park, Scarborough Town Centre, Wexford Heights ----
         venue  freq
0       Bakery  0.33
1         Park  0.33
2    Wine Shop  0.17
3  Coffee Shop  0.17
4  Zoo Exhibit  0.00
```

```
---- Dovercourt Village, Dufferin ----
          venue  freq
0           Bar  0.10
1   Coffee Shop  0.10
2        Bakery  0.08
```

```
3          Café  0.06
4  Cocktail Bar  0.04


---- Downsview Central ----
               venue  freq
0       Home Service  0.29
1      Moving Target  0.14
2  Mobile Phone Shop  0.14
3               Park  0.14
4     Baseball Field  0.14


---- Downsview Northwest ----
                   venue  freq
0          Grocery Store  0.07
1            Pizza Place  0.07
2   Fast Food Restaurant  0.07
3  Vietnamese Restaurant  0.07
4          Shopping Mall  0.07


---- Downsview West ----
            venue  freq
0     Coffee Shop  0.10
1   Grocery Store  0.05
2  Discount Store  0.05
3  Sandwich Place  0.05
4   Big Box Store  0.05


---- Downsview, North Park, Upwood Park ----
                        venue  freq
0           Convenience Store   0.2
1  Construction & Landscaping   0.2
2                Home Service   0.2
3                      Bakery   0.2
4                        Park   0.2


---- East Birchmount Park, Ionview, Kennedy Park ----
               venue  freq
0  Convenience Store  0.25
1     Discount Store  0.25
2        Coffee Shop  0.25
3   Department Store  0.25
4        Music Venue  0.00
```

```
---- East Toronto ----
                venue  freq
0      Sandwich Place  0.14
1  Italian Restaurant  0.14
2         Coffee Shop  0.14
3                Park  0.14
4  Athletics & Sports  0.14


---- Emery, Humberlea ----
            venue  freq
0     Coffee Shop  0.29
1            Park  0.14
2  Discount Store  0.14
3            Café  0.14
4       Nightclub  0.14


---- Fairview, Henry Farm, Oriole ----
                  venue  freq
0        Clothing Store  0.16
1  Fast Food Restaurant  0.10
2           Coffee Shop  0.07
3         Women's Store  0.04
4                Bakery  0.03


---- First Canadian Place, Underground city ----
                venue  freq
0          Coffee Shop  0.14
1                Hotel  0.08
2                 Café  0.07
3            Gastropub  0.03
4  American Restaurant  0.03


---- Flemingdon Park, Don Mills South ----
                venue  freq
0  Japanese Restaurant  0.08
1       Science Museum  0.08
2     Asian Restaurant  0.08
3           Beer Store  0.08
4                  Gym  0.08


---- Forest Hill North, Forest Hill West ----
            venue  freq
```

```
0            Café   0.2
1     Coffee Shop   0.1
2       Bookstore   0.1
3    Burger Joint   0.1
4  Ice Cream Shop   0.1


---- Glencairn ----
                      venue  freq
0      Fast Food Restaurant  0.18
1             Grocery Store  0.18
2             Metro Station  0.09
3       Japanese Restaurant  0.09
4  Mediterranean Restaurant  0.09


---- Guildwood, Morningside, West Hill ----
                  venue  freq
0                  Park  0.29
1                  Pool  0.14
2     Indian Restaurant  0.14
3   Fried Chicken Joint  0.14
4  Gym / Fitness Center  0.14


---- Harbord, University of Toronto ----
         venue  freq
0         Café  0.07
1   Restaurant  0.06
2  Coffee Shop  0.05
3  Pizza Place  0.04
4          Bar  0.04


---- Harbourfront East, Toronto Islands, Union Station ----
             venue  freq
0             Café  0.29
1  Harbor / Marina  0.14
2             Park  0.14
3             Pier  0.14
4            Beach  0.14


---- Harbourfront, Regent Park ----
         venue  freq
0  Coffee Shop  0.12
1      Theater  0.06
2       Bakery  0.06
```

```
3         Café  0.04
4   Restaurant  0.04


---- High Park, The Junction South ----
               venue  freq
0  Convenience Store  0.09
1               Park  0.07
2               Café  0.07
3                Bar  0.07
4    Thai Restaurant  0.04


---- Highland Creek, Rouge Hill, Port Union ----
          venue  freq
0           Bar   1.0
1        Museum   0.0
2   Opera House   0.0
3        Office   0.0
4  Noodle House   0.0


---- Hillcrest Village ----
                                     venue  freq
0                                     Park  0.29
1                     Fast Food Restaurant  0.14
2                                  Bakery  0.14
3  Residential Building (Apartment / Condo)  0.14
4                                 Pharmacy  0.14


---- Humber Bay Shores, Mimico South, New Toronto ----
               venue  freq
0               Park  0.14
1     Grocery Store  0.10
2  Convenience Store  0.10
3       Skating Rink  0.05
4     Breakfast Spot  0.05


---- Humber Bay, King's Mill Park, Kingsway Park South East, Mimico NE, Old Mill
South, The Queensway East, Royal York South East, Sunnylea ----
                venue  freq
0         Coffee Shop  0.19
1      Sandwich Place  0.06
2  Italian Restaurant  0.06
3        Liquor Store  0.06
4                Bank  0.06
```

```
---- Humber Summit ----
               venue  freq
0  Electronics Store   1.0
1        Zoo Exhibit   0.0
2        Opera House   0.0
3       Noodle House   0.0
4          Nightclub   0.0


---- Humewood-Cedarvale ----
               venue  freq
0  Convenience Store  0.14
1              Trail  0.14
2       Hockey Arena  0.14
3      Grocery Store  0.14
4      Deli / Bodega  0.14


---- Islington Avenue ----
               venue  freq
0           Pharmacy  0.25
1  Convenience Store  0.08
2      Shopping Mall  0.08
3      Grocery Store  0.08
4               Bank  0.08


---- Kingsview Village, Martin Grove Gardens, Richview Gardens, St. Phillips
----
                 venue  freq
0             Pharmacy   0.2
1    Mobile Phone Shop   0.2
2             Bus Line   0.2
3  American Restaurant   0.2
4          Coffee Shop   0.2


---- Kingsway Park South West, Mimico NW, The Queensway West, Royal York South
West, South of Bloor ----
             venue  freq
0    Burrito Place  0.12
1              Gym  0.08
2             Bank  0.04
3    Grocery Store  0.04
4  Thai Restaurant  0.04
```

```
---- L'Amoreaux West ----
                  venue  freq
0               Pharmacy  0.13
1  Fast Food Restaurant  0.13
2    Chinese Restaurant  0.13
3  Other Great Outdoors  0.07
4         Grocery Store  0.07


---- Lawrence Heights, Lawrence Manor ----
              venue  freq
0    Clothing Store  0.17
1      Dessert Shop  0.05
2  Toy / Game Store  0.03
3        Restaurant  0.03
4  Greek Restaurant  0.03


---- Lawrence Park ----
         venue  freq
0     Bus Line  0.14
1         Park  0.14
2         Café  0.14
3  Coffee Shop  0.14
4   Restaurant  0.14


---- Leaside ----
                    venue  freq
0             Coffee Shop  0.10
1       Electronics Store  0.06
2     Sporting Goods Shop  0.06
3  Furniture / Home Store  0.06
4                 Brewery  0.04


---- Little Portugal, Trinity ----
                venue  freq
0                 Bar  0.08
1         Coffee Shop  0.05
2          Restaurant  0.05
3                Café  0.04
4  Italian Restaurant  0.04


---- Maryvale, Wexford ----
                      venue  freq
```

```
0                 Hookah Bar   0.2
1               Pizza Place   0.2
2  Middle Eastern Restaurant   0.2
3               Gas Station   0.2
4              Burger Joint   0.2


---- Moore Park, Summerhill East ----
             venue  freq
0             Park   0.4
1   Grocery Store   0.2
2              Gym   0.2
3  Thai Restaurant   0.2
4      Zoo Exhibit   0.0


---- Newtonbrook, Willowdale ----
                       venue  freq
0          Korean Restaurant  0.12
1  Middle Eastern Restaurant  0.12
2                      Café  0.09
3               Coffee Shop  0.09
4        Fried Chicken Joint  0.03


---- North Toronto West ----
                 venue  freq
0          Coffee Shop  0.09
1  Sporting Goods Shop  0.09
2                Café  0.09
3       Clothing Store  0.09
4           Restaurant  0.06


---- Northwest ----
              venue  freq
0    Sandwich Place  0.17
1       Coffee Shop  0.17
2  Storage Facility  0.17
3      Burger Joint  0.17
4               Gym  0.17


---- Northwood Park, York University ----
                 venue  freq
0  Japanese Restaurant  0.12
1                  Bar  0.12
2                 Bank  0.12
```

```
3          Pizza Place  0.12
4       Massage Studio  0.12


---- Parkdale, Roncesvalles ----
                        venue  freq
0                 Coffee Shop  0.09
1                      Bakery  0.06
2  Eastern European Restaurant  0.04
3            Sushi Restaurant  0.04
4             Thai Restaurant  0.04


---- Parkwoods ----
                         venue  freq
0          Food & Drink Shop  0.33
1                        Park  0.33
2                   Pet Store  0.33
3  Middle Eastern Restaurant  0.00
4         Miscellaneous Shop  0.00


---- Queen's Park ----
                 venue  freq
0          Coffee Shop  0.20
1                Café  0.08
2       Sandwich Place  0.05
3   Italian Restaurant  0.04
4  Japanese Restaurant  0.04


---- Rosedale ----
           venue  freq
0           Park   0.4
1     Playground   0.2
2  Grocery Store   0.2
3    Candy Store   0.2
4    Zoo Exhibit   0.0


---- Roselawn ----
              venue  freq
0        Playground   0.4
1            Garden   0.2
2  Business Service   0.2
3         Pet Store   0.2
4       Zoo Exhibit   0.0
```

```
---- Rouge, Malvern ----
                        venue  freq
0                 Zoo Exhibit  0.25
1  Financial or Legal Service  0.25
2        Fast Food Restaurant  0.25
3  Construction & Landscaping  0.25
4           Hotpot Restaurant  0.00


---- Runnymede, Swansea ----
              venue  freq
0              Café  0.10
1       Coffee Shop  0.08
2            Bakery  0.05
3       Pizza Place  0.05
4  Sushi Restaurant  0.03


---- Ryerson, Garden District ----
                       venue  freq
0                Coffee Shop  0.07
1             Clothing Store  0.05
2             Cosmetics Shop  0.04
3  Middle Eastern Restaurant  0.04
4                 Restaurant  0.03


---- Scarborough Village ----
                  venue  freq
0  Fast Food Restaurant  0.33
1        Sandwich Place  0.22
2         Train Station  0.11
3         Big Box Store  0.11
4     Indian Restaurant  0.11


---- Silver Hills, York Mills ----
           venue  freq
0           Park   1.0
1    Zoo Exhibit   0.0
2  Moving Target   0.0
3   Noodle House   0.0
4      Nightclub   0.0


---- St. James Town ----
                venue  freq
```

```
0         Coffee Shop  0.07
1               Hotel  0.06
2                Café  0.06
3  Italian Restaurant  0.04
4             Bakery  0.04


---- Stn A PO Boxes 25 The Esplanade ----
              venue  freq
0       Coffee Shop  0.10
1              Café  0.06
2             Hotel  0.04
3               Bar  0.04
4  Sushi Restaurant  0.03


---- Studio District ----
                venue  freq
0         Coffee Shop  0.07
1                Café  0.05
2  Italian Restaurant  0.05
3              Diner  0.05
4             Bakery  0.05


---- The Annex, North Midtown, Yorkville ----
                venue  freq
0  Italian Restaurant  0.08
1                Café  0.08
2         Coffee Shop  0.08
3      Sandwich Place  0.08
4      History Museum  0.05


---- The Beaches ----
                 venue  freq
0                  Pub  0.06
1          Pizza Place  0.06
2  Japanese Restaurant  0.06
3                  Bar  0.06
4                Café  0.03


---- The Beaches West, India Bazaar ----
                venue  freq
0                Park  0.08
1                Café  0.05
2             Bakery  0.05
```

```
3  Italian Restaurant  0.05
4             Brewery  0.05


---- The Danforth West, Riverdale ----
              venue  freq
0  Greek Restaurant  0.13
1    Ice Cream Shop  0.07
2             Café  0.07
3       Yoga Studio  0.03
4   Bubble Tea Shop  0.03


---- The Junction North, Runnymede ----
                    venue  freq
0                 Brewery  0.38
1                    Park  0.25
2      Athletics & Sports  0.12
3             Coffee Shop  0.12
4  Furniture / Home Store  0.12


---- The Kingsway, Montgomery Road, Old Mill North ----
               venue  freq
0   Sushi Restaurant  0.07
1     Breakfast Spot  0.07
2  French Restaurant  0.07
3       Burger Joint  0.07
4   Toy / Game Store  0.04


---- Thorncliffe Park ----
               venue  freq
0       Burger Joint  0.11
1  Indian Restaurant  0.11
2        Yoga Studio  0.06
3     Discount Store  0.06
4             Bridge  0.06


---- Victoria Village ----
                       venue  freq
0  Middle Eastern Restaurant  0.14
1      Portuguese Restaurant  0.14
2                Pizza Place  0.14
3          French Restaurant  0.14
4                       Park  0.14
```

```
---- Westmount ----
                venue  freq
0         Pizza Place  0.18
1  Golf Driving Range  0.09
2      Discount Store  0.09
3         Supermarket  0.09
4  Chinese Restaurant  0.09


---- Weston ----
                       venue  freq
0               Train Station  0.15
1                 Coffee Shop  0.15
2              Sandwich Place  0.08
3  Middle Eastern Restaurant  0.08
4                 Pizza Place  0.08


---- Willowdale South ----
              venue  freq
0       Coffee Shop  0.07
1  Ramen Restaurant  0.05
2       Pizza Place  0.05
3              Café  0.05
4    Sandwich Place  0.05


---- Willowdale West ----
                         venue  freq
0                  Coffee Shop  0.15
1                         Park  0.08
2  Eastern European Restaurant  0.08
3                Grocery Store  0.08
4                       Bakery  0.08


---- Woburn ----
                  venue  freq
0           Coffee Shop   0.4
1                  Park   0.2
2      Business Service   0.2
3  Fast Food Restaurant   0.2
4           Zoo Exhibit   0.0


---- Woodbine Gardens, Parkview Hill ----
                  venue  freq
```

```
0  Fast Food Restaurant  0.10
1               Brewery  0.10
2           Pizza Place  0.10
3          Home Service  0.10
4            Restaurant  0.05


---- Woodbine Heights ----
            venue  freq
0        Bus Line  0.06
1     Pizza Place  0.06
2     Coffee Shop  0.06
3   Grocery Store  0.06
4  Sandwich Place  0.06


---- York Mills West ----
           venue  freq
0    Coffee Shop  0.16
1     Restaurant  0.12
2            Gym  0.12
3  Burrito Place  0.04
4           Bank  0.04
```

[33]:
```
def return_most_common_venues(row, num_top_venues):
    row_categories = row.iloc[1:]
    row_categories_sorted = row_categories.sort_values(ascending=False)

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

### 1.0.7 Most Common venues near neighborhood

[34]:
```
import numpy as np
num_top_venues = 10

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

columns = ['Neighborhood']
for ind in np.arange(num_top_venues):
    try:
        columns.append('{}{} Most Common Venue'.format(ind+1, indicators[ind]))
    except:
        columns.append('{}th Most Common Venue'.format(ind+1))

neighborhoods_venues_sorted = pd.DataFrame(columns=columns)
```

```
neighborhoods_venues_sorted['Neighborhood'] =␣
 ↪Scarborough_grouped['Neighborhood']

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

neighborhoods_venues_sorted.head()
```

[34]:

| | Neighborhood | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue | 8th Most Common Venue | 9th Most Common Venue | 10th Most Common Venue |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Adelaide, King, Richmond | Coffee Shop | Café | Hotel | Gastropub | Burger Joint | Asian Restaurant | Bar | Restaurant | American Restaurant | Steakhouse |
| 1 | Agincourt | Chinese Restaurant | Shopping Mall | Pizza Place | Supermarket | Sushi Restaurant | Breakfast Spot | Print Shop | Mediterranean Restaurant | Coffee Shop | Pool |
| 2 | Agincourt North, L'Amoreaux East, Milliken, St… | Pharmacy | Sandwich Place | Sushi Restaurant | Doner Restaurant | Donut Shop | Dumpling Restaurant | Eastern European Restaurant | Electronics Store | Elementary School | Ethiopian Restaurant |
| 3 | Albion Gardens, Beaumond Heights, Humbergate, … | Grocery Store | Park | Sandwich Place | Discount Store | Japanese Restaurant | Fried Chicken Joint | Beer Store | Hardware Store | Pizza Place | Fast Food Restaurant |
| 4 | Alderwood, Long Branch | Convenience Store | Pub | Sandwich Place | Coffee Shop | Gas Station | Dance Studio | Gym | Pharmacy | Pizza Place | Falafel Restaurant |

### 1.0.8 K-Means Clustering Approach

[35]:
```
# Using K-Means to cluster neighborhood into 3 clusters
Scarborough_grouped_clustering = Scarborough_grouped.drop('Neighborhood', 1)
kmeans = KMeans(n_clusters=3, random_state=0).
 ↪fit(Scarborough_grouped_clustering)
kmeans.labels_
```

[35]:
```
array([0, 0, 0, 0, 0, 0, 2, 0, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 2, 0, 0, 0, 0, 2, 0, 0, 0, 0,
       0, 0, 0, 0, 2, 0, 0, 0, 0, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 2, 0, 0, 0, 0, 0, 2, 0, 2, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0,
       0, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0], dtype=int32)
```

[36]:
```
neighborhoods_venues_sorted.insert(0, 'Cluster Labels', kmeans.labels_)

Scarborough_merged =df_2.iloc[:16,:]

# merge toronto_grouped with toronto_data to add latitude/longitude for each␣
 ↪neighborhood
Scarborough_merged = Scarborough_merged.join(neighborhoods_venues_sorted.
 ↪set_index('Neighborhood'), on='Neighborhood')

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

[36]:

| | Postalcode | Borough | Neighborhood | Latitude | Longitude | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue | 8th Most Common Venue |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | M1B | Scarborough | Rouge, Malvern | 43.811525 | -79.195517 | 0 | Zoo Exhibit | Financial or Legal Service | Fast Food Restaurant | Construction & Landscaping | Fish & Chips Shop | Filipino Restaurant | Field | Fish Market |
| 1 | M1C | Scarborough | Highland Creek, Rouge Hill, Port Union | 43.785665 | -79.158725 | 0 | Bar | Falafel Restaurant | Donut Shop | Dumpling Restaurant | Eastern European Restaurant | | | |
| 2 | M1E | Scarborough | Guildwood, Morningside, West Hill | 43.765815 | -79.175193 | 2 | Park | Gym / Fitness Center | Pool | Fried Chicken Joint | Indian Restaurant | | | |
| 3 | M1G | Scarborough | Woburn | 43.768369 | -79.217590 | 0 | Coffee Shop | Fast Food Restaurant | Business Service | Park | Yoga Studio | | | |
| 4 | M1H | Scarborough | Cedarbrae | 43.769688 | -79.239440 | 0 | Flower Shop | Athletics & Sports | Thai Restaurant | Bank | Bakery | | | |

```
1     Electronics Store            Elementary School  Ethiopian Restaurant
2    Athletics & Sports         Ethiopian Restaurant            Donut Shop
3   Dumpling Restaurant  Eastern European Restaurant     Electronics Store
4  Caribbean Restaurant              Hakka Restaurant     Indian Restaurant

         9th Most Common Venue       10th Most Common Venue
0               Farmers Market             Doner Restaurant
1                  Event Space                  Yoga Studio
2          Dumpling Restaurant  Eastern European Restaurant
3            Elementary School         Ethiopian Restaurant
4  Eastern European Restaurant            Electronics Store
```

### 1.0.9 Map of Clusters

[37]:
```
kclusters = 10
```

[38]:
```
# create map
map_clusters = folium.Map(location=[latitude_x, longitude_y], zoom_start=11)

# set color scheme for the clusters
x = np.arange(kclusters)
colors_array = cm.rainbow(np.linspace(0, 1, kclusters))
rainbow = [colors.rgb2hex(i) for i in colors_array]
print(rainbow)
# add markers to the map

markers_colors = []
for lat, lon, nei , cluster in zip(Scarborough_merged['Latitude'],
                                   Scarborough_merged['Longitude'],
                                   Scarborough_merged['Neighborhood'],
                                   Scarborough_merged['Cluster Labels']):
    label = folium.Popup(str(nei) + ' 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)

map_clusters
```

```
['#8000ff', '#4856fb', '#10a2f0', '#2adddd', '#62fbc4', '#9cfba4', '#d4dd80',
'#ffa256', '#ff562c', '#ff0000']
```

[38]:
```
<folium.folium.Map at 0x7f2424441128>
```

[39]:
```
df1=Scarborough_merged.loc[Scarborough_merged['Cluster Labels'] ==␣
↪0,Scarborough_merged.columns[[2] + list(range(5, Scarborough_merged.
↪shape[1]))]]
df2=Scarborough_merged.loc[Scarborough_merged['Cluster Labels'] ==␣
↪1,Scarborough_merged.columns[[2] + list(range(5, Scarborough_merged.
↪shape[1]))]]
df3=Scarborough_merged.loc[Scarborough_merged['Cluster Labels'] ==␣
↪2,Scarborough_merged.columns[[2] + list(range(5, Scarborough_merged.
↪shape[1]))]]
```

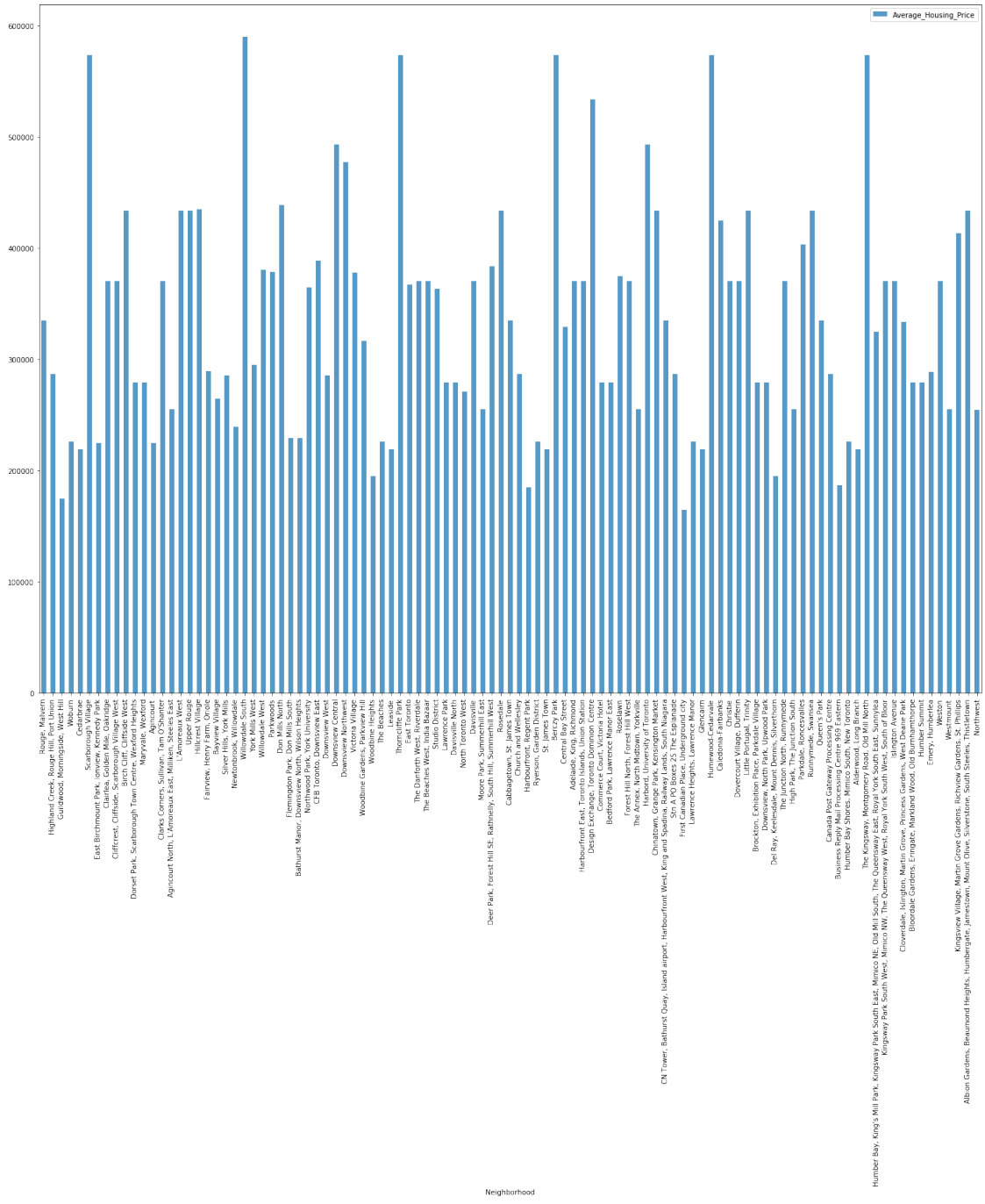
[40]:
```
Scarborough_Avg_HousingPrice=pd.DataFrame({"Neighborhood":df_2["Neighborhood"],
                                           "Average_Housing_Price":[335000.0,286600.
↪0,175000.0,225900.0,219400.0,
                                                                    573900.0,225000.
↪0,370500.0,370500.0,433500.0,279200.0,
                                                                    279200.0,225000.
↪0,370500.,255400.0,433500.0,433500.0,
                                                                    435000.0,289500.
↪0,265000.0,285900.0,239400.0,
                                                                    589900.0,295000.
↪0,380500.0,378500.0,438500.0,229200.0,
                                                                    229200.0,365000.
↪0,388500.,285400.0,493500.0,477500.0,378000.0,316600.0,195000.0,225900.
↪0,219400.0,
                                                                    573900.0,367000.
↪0,370500.0,370500.0,363500.0,279200.0,
                                                                    279200.0,271000.
↪0,370500.,255400.0,383500.0,433500.0,335000.0,286600.0,185000.0,225900.
↪0,219400.0,
                                                                    573900.0,329000.
↪0,370500.0,370500.0,533500.0,279200.0,
                                                                    279200.0,375000.
↪0,370500.,255400.0,493500.0,433500.0,335000.0,286600.0,165000.0,225900.
↪0,219400.0,
                                                                    573900.0,425000.
↪0,370500.0,370500.0,433500.0,279200.0,
                                                                    279200.0,195000.
↪0,370500.,255400.0,403500.0,433500.0,335000.0,286600.0,187000.0,225900.
↪0,219400.0,
                                                                    573900.0,325000.
↪0,370500.0,370500.0,333500.0,279200.0,
                                                                    279200.0,289000.
↪0,370500.,255400.0,413500.0,433500.0,254800.0


                                                                ]})
```

[41]:
```
Scarborough_Avg_HousingPrice.set_index('Neighborhood',inplace=True,drop=True)
```

[42]:
```
Scarborough_Avg_HousingPrice.plot(kind='bar',figsize=(24,18),alpha=0.75)
```

[42]: <matplotlib.axes._subplots.AxesSubplot at 0x7f24243f3320>



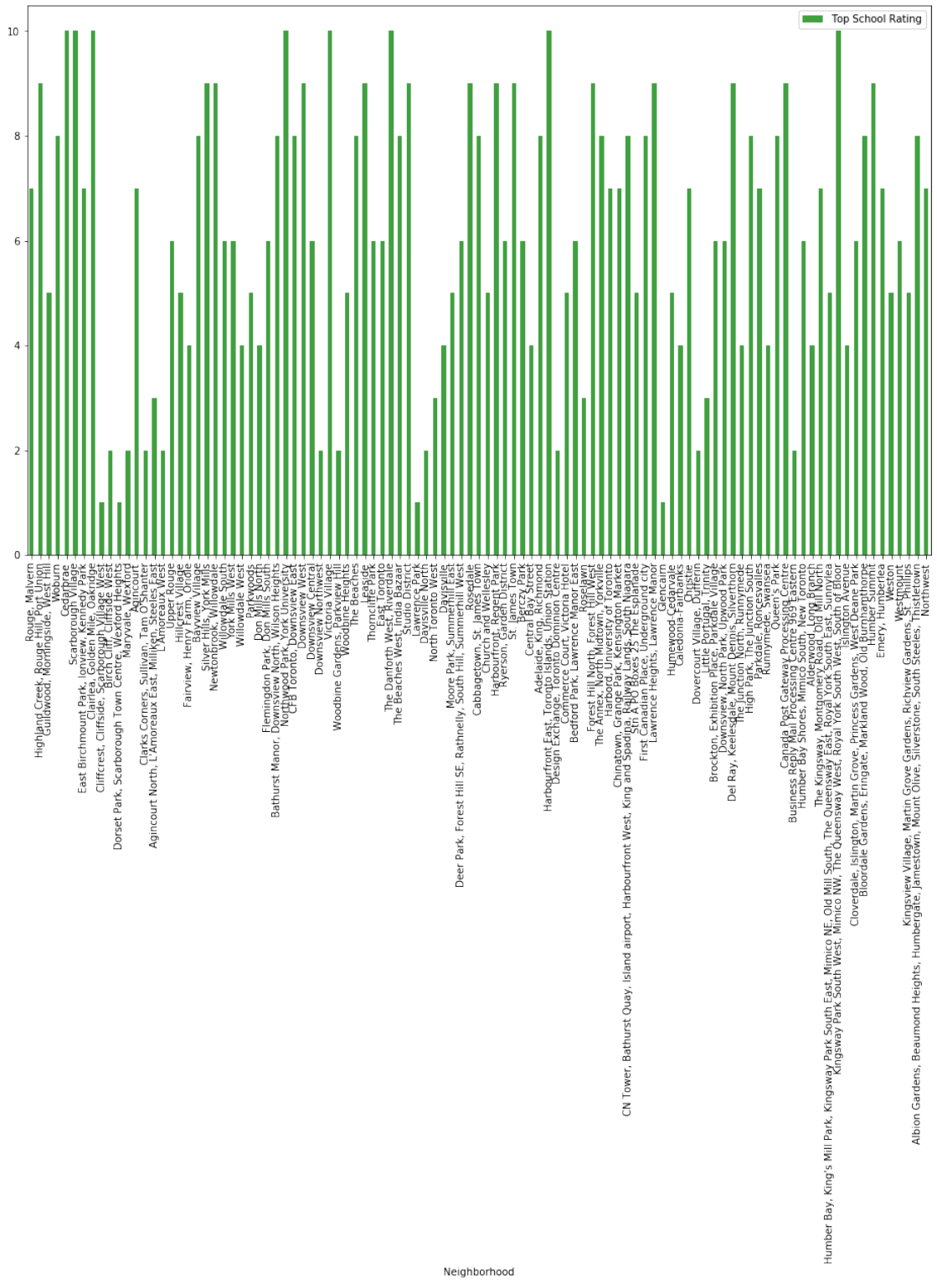
### 1.0.10 School Rating by Clusters

[43]:
```
clusters=pd.DataFrame({"Cluster1":df1["Neighborhood"],
                       "Cluster2":df2["Neighborhood"],
                       "Cluster4":df3["Neighborhood"]})
clusters = clusters.replace(np.nan, '', regex=True)
```

[44]:
```
new_Scarborough=Scarborough_merged.set_index("Neighborhood",drop=True)
#Source:https://www.greatschools.org
Scarborough_school_ratings=pd.DataFrame({"Neighborhood":df["Neighborhood"],
                                         "Top School Rating":
 ↪[7,9,5,8,10,10,7,10,1,2,1,2,7,2,3,2,6,
                                                                 ␣
 ↪5,4,8,9,9,6,6,4,5,4,6,8,10,8,9,6,2,
                                                                 ␣
 ↪10,2,5,8,9,6,6,10,8,9,1,2,3,4,5,6,9,
                                                                 ␣
 ↪8,5,9,6,9,6,4,8,10,2,5,6,3,9,8,7,
                                                                 ␣
 ↪7,8,5,8,9,1,5,4,7,2,3,6,6,9,4,8,7,
                                                                 ␣
 ↪4,8,9,2,6,4,7,5,10,4,6,8,9,7,5,6,5,8,7
                                                                  ]})
```

[45]:
```
Scarborough_school_ratings.set_index('Neighborhood',inplace=True,drop=True)
```

[46]:
```
Scarborough_school_ratings.
 ↪plot(kind='bar',figsize=(16,10),color='green',alpha=0.75);
```




Conclusion: In this project, using k-means cluster algorithm I separated the neighborhood into 10(Ten) different clusters and for 103 different lattitude and logitude from dataset, which have

very-similar neighborhoods around them. Using the charts above results presented to a particular neighborhood based on average house prices and school rating have been made.