

# Capstone Project

*IBM Data Science Professional Certificate - Coursera*

# Introduction/Business Problem

New York city is much bigger trade center and dream to lot of growing business and people. We eventually know that New York comprises of 5 boroughs and in this project, we will try to explore BROOKLYN and what it has to offer to the growing city.

Every new person who enter the land of New York has lot of choices to hang in to enjoy be it cafe's, parks or hotels or some come for businesses. Below are some points –

- Even with new age smartphone people still find it difficult to get choices of best attraction available nearby.
- People who come to start their new businesses often find it difficult to locate the best place they can establish their startup.
- If every place is bifurcated by its common venues it become easy to know where to find best things.

Stakeholders – Businessman, Tourists.

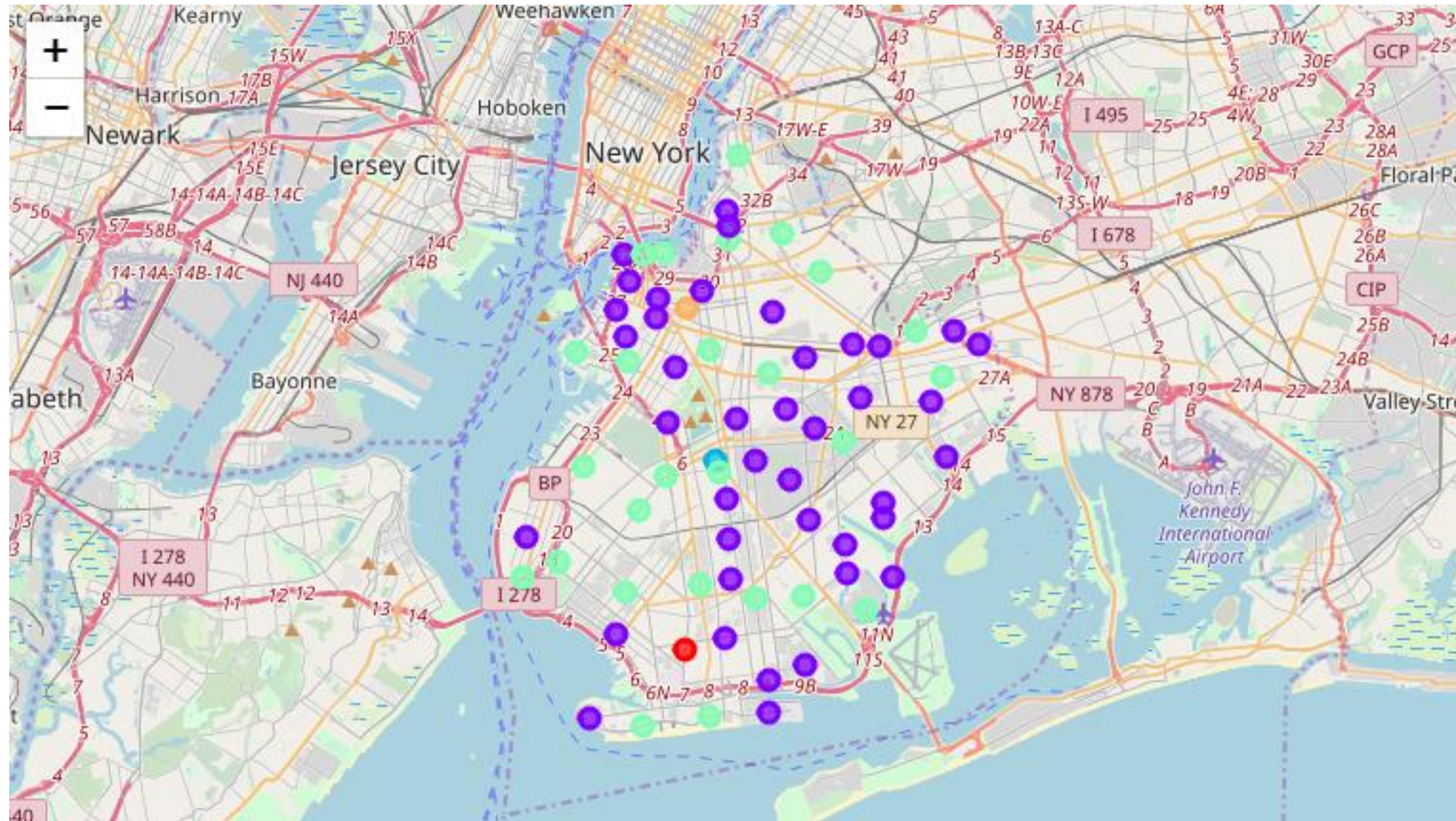
# Methodology

- The data was extracted and cleaned, and the feature selection was made
- Map for all the offices in the bay area was plotted
- Foursquare API was used to figure out the nearest restaurants
- The restaurants were classified using KMeans ML algorithm
- The clustered restaurants were plotted along with the companies in the Bay Area

# Data/Libraries Used

- We have used New York dataset which contains details of all Borough in New York and their corresponding neighborhoods
- Next we have used Foursquare API to fetch location specific venues from each neighborhood
- We have used Folium and Matplotlib libraries to visualize the neighborhoods
- We have used Numpy, Pandas for data wrangling, analysis and cleaning
- We have used skit-learn library for building Machine Learning model

# Neighbourhood Maps for Brooklyn



# Neighbourhood Clusters for Brooklyn

- **Cluster 01:** The Italian Restaurant were the most common venue, followed by Pizza Place and Chinese Restaurant
- **Cluster 02:** There were multiple neighborhoods in the cluster 02, with Italian, Chinese, Mexican and Caribbean Restaurants were the most common venue, followed by Pizza Place and Fast Food Restaurant

Cluster 1

```
In [41]: brooklyn_merged.loc[brooklyn_merged['Cluster Labels'] == 0, brooklyn_merged.columns[[1] + list(range(5, brooklyn_merged.shape[1])
```

Out[41]:

	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
4	Gravesend	Italian Restaurant	Metro Station	Pizza Place	Chinese Restaurant	Lounge	Spa	Bakery	Bus Station	Music Store	Men's Store

Cluster 2

```
In [42]: brooklyn_merged.loc[brooklyn_merged['Cluster Labels'] == 1, brooklyn_merged.columns[[1] + list(range(5, brooklyn_merged.shape[1])
```

Out[42]:

	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	Bay Ridge	Spa	Italian Restaurant	Pizza Place	Bagel Shop	American Restaurant	Bar	Greek Restaurant	Grocery Store	Ice Cream Shop	Sandwich Place
6	Sheepshead Bay	Dessert Shop	Turkish Restaurant	Restaurant	Sandwich Place	Yoga Studio	Pizza Place	Department Store	Creperie	Russian Restaurant	Café
7	Manhattan Terrace	Pizza Place	Chinese Restaurant	Ice Cream Shop	Donut Shop	Grocery Store	Japanese Restaurant	Cosmetics Shop	Nightclub	Steakhouse	Bank
8	Flatbush	Mexican Restaurant	Coffee Shop	Caribbean Restaurant	Pharmacy	Chinese Restaurant	Laundromat	Bank	Bagel Shop	Lounge	Middle Eastern Restaurant
10	East Flatbush	Department Store	Pharmacy	Supermarket	Caribbean Restaurant	Fast Food Restaurant	Hardware Store	Park	Moving Target	Wine Shop	Deli / Bodega
12	Windsor Terrace	Deli / Bodega	Italian Restaurant	Plaza	Diner	Park	Sushi Restaurant	Coffee Shop	Grocery Store	Bookstore	Bar

# Neighbourhood Clusters for Brooklyn

- **Cluster 03:** The Caribbean Restaurant were the most common venue, followed by Fast Food and Pizza Place
- **Cluster 04:** The Italian Restaurants were the most common venue, followed by Pizza Place, Sushi and Chinese Restaurants.
- **Cluster 05:** The Italian Restaurant were the most common venue, followed by Pizza Place.

Cluster 3

```
In [43]: brooklyn_merged.loc[brooklyn_merged['Cluster Labels'] == 2, brooklyn_merged.columns[[1] + list(range(5, brooklyn_merged.shape[1])
```

Out[43]:

	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
47	Prospect Park South	Caribbean Restaurant	Fast Food Restaurant	Mobile Phone Shop	Grocery Store	Pizza Place	Pharmacy	Clothing Store	Donut Shop	Chinese Restaurant	Latin American Restaurant

Cluster 5

```
In [45]: brooklyn_merged.loc[brooklyn_merged['Cluster Labels'] == 4, brooklyn_merged.columns[[1] + list(range(5, brooklyn_merged.shape[1])
```

Out[45]:

	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
23	Fort Greene	Italian Restaurant	Flower Shop	Pizza Place	Coffee Shop	Yoga Studio	Spa	Mexican Restaurant	French Restaurant	Cocktail Bar	New American Restaurant

Cluster 4

```
In [44]: brooklyn_merged.loc[brooklyn_merged['Cluster Labels'] == 3, brooklyn_merged.columns[[1] + list(range(5, brooklyn_merged.shape[1])
```

Out[44]:

	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
1	Bensonhurst	Italian Restaurant	Sushi Restaurant	Ice Cream Shop	Chinese Restaurant	Dessert Shop	Bakery	Bagel Shop	Noodle House	Liquor Store	Grocery Store
2	Sunset Park	Bakery	Latin American Restaurant	Mexican Restaurant	Bank	Pizza Place	Gym	Mobile Phone Shop	Pharmacy	Sandwich Place	Supplement Shop
3	Greenpoint	Bar	Pizza Place	Boutique	Cocktail Bar	Mexican Restaurant	Café	Record Shop	Coffee Shop	Bakery	Yoga Studio
5	Brighton Beach	Restaurant	Beach	Eastern European Restaurant	Russian Restaurant	Gourmet Shop	Sushi Restaurant	Bank	Fast Food Restaurant	Mobile Phone Shop	Pharmacy
9	Crown Heights	Pizza Place	Grocery Store	Museum	Café	Playground	Supermarket	Farmers Market	Coffee Shop	Sushi Restaurant	Bakery
11	Kensington	Grocery Store	Sandwich Place	Ice Cream Shop	Pizza Place	Thai Restaurant	Restaurant	Japanese Restaurant	Outdoors & Recreation	Mobile Phone Shop	Mexican Restaurant
13	Prospect Heights	Bar	Cocktail Bar	Mexican Restaurant	Bakery	Gourmet Shop	Pizza Place	Thai Restaurant	Wine Shop	Southern / Soul Food Restaurant	Coffee Shop



# Conclusion

- Restaurants were among the most common venue among most of the neighborhoods. However, there were a number of neighborhood where restaurants were not among the top 03 common venue, like: Kensington and East Flashbush.
- For East Flashbush: Departmental Stores, Pharmacy and Supermarket were among the top 03 most common venue.
- For Kensington: Grocery Store, Sandwich Place and Ice Cream Shop were among the top 03 most common venue.
- Both the places look as a good option to start a new restaurant, however East Flashbush looks a better option as there is no food related option among the top 03. Therefore, we can conclude as East Flashbush as the best neighborhood to start a new restaurant.



# Future Directions

- We will need to look into more details for the neighborhood, like population density, residential or office area, number of offices, number of apartments, etc.
- These additional points will help us to make more efficient decision.

Thank You