

Explore Brooklyn: Stay near Indian Restaurants, Start Business too

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Part – 1: Business Problem

Introduction:

New York is the most densely populated area in United States. It's one of the World's most populous Megacities too. New York City has been described as the cultural, financial and media capital of the world, and exerts a significant impact upon commerce, entertainment, research, technology, education, politics, tourism, art, fashion, and sports.

In reality, New York City is a collection of many neighbourhoods scattered among the city's five boroughs — Manhattan, Brooklyn, the Bronx, Queens, and Staten Island— each exhibiting its own lifestyle. Moving from one city neighbourhood to the next may be like passing from one country to another. All five boroughs illustrate this melting pot of cultures through activities, museums, stores and restaurants, where you can meet people of different countries, sample exotic cuisine and products, listen to international music and watch foreign films. A recent U.S. Census Bureau report about NYC revealed an increasingly diverse and dynamic city with immigrants making up the

majority of the residents in some neighbourhoods. With almost 200 languages spoken, 40 percent of the NYC population was born outside of the United States. Conquering New York in one visit is impossible.

Problem Description:

As the culture is diverse in nature, there will be various food items which birth various restaurants like Chinese, Indian, Italian etc. Here, we'll visit "Brooklyn" and look at the Indian Restaurants.

Some of my colleagues from my company will go to Brooklyn and planning to stay there may be for some months. They wanted to find out where to stay so that they can get all their necessary amenities like - Indian Restaurants (more important), Chinese Restaurants, Gym or Fitness Centre etc. Based on above criterion, where to find the appropriate place for them to stay?

(**NOTE:** Here “My colleagues” – this term can be replaced by anybody who wants to stay in Brooklyn)

Target Audience:

- People who wants to visit some place (here Brooklyn) and prefer Indian dishes and also other items like Chinese food, fitness centre etc.
- It'll also helpful for the people who want to open Indian Restaurant in Brooklyn. They'll able find out about Indian Restaurants there along with their ratings and likes and they can find out about their competitors.
- Not only Indian Restaurant, after getting top 10 most common venues, they can choose their own business for a particular neighbourhood.

Part – 2: Data Description

For this project, various datasets are used. Please find the details below:

Dataset-1:

This dataset contains data for New York City including its Boroughs, Neighbourhoods along with their latitudes and longitudes.

Source: https://cocl.us/new_york_dataset

Details: This dataset contains total 306 data that will be used to get information about Boroughs, Neighbourhoods along with their latitudes and longitudes for New York City.

Dataset-2:

This dataset contains nearby venues of Brooklyn within 500m radius.

Source: Foursquare

Details: This dataset contains data that will be used to get information about Venues in Neighbourhoods of Brooklyn along with their IDs, latitudes and longitudes. This dataset contains total 288 unique categories of venues.

Dataset-3:

This dataset contains data for Indian Restaurants in Neighbourhoods of Brooklyn.

Source: Foursquare

Details: This dataset contains data that will be used to get information about Likes, Ratings, Tips for the Indian Restaurants for further analysis.

Part – 3: Methodology

Analytical Approach:

- **Tools/Library Used:**

Numpy, Pandas, Matplotlib, Geopy, Folium, Foursquare API

- **Analysis of Dataset-1:**

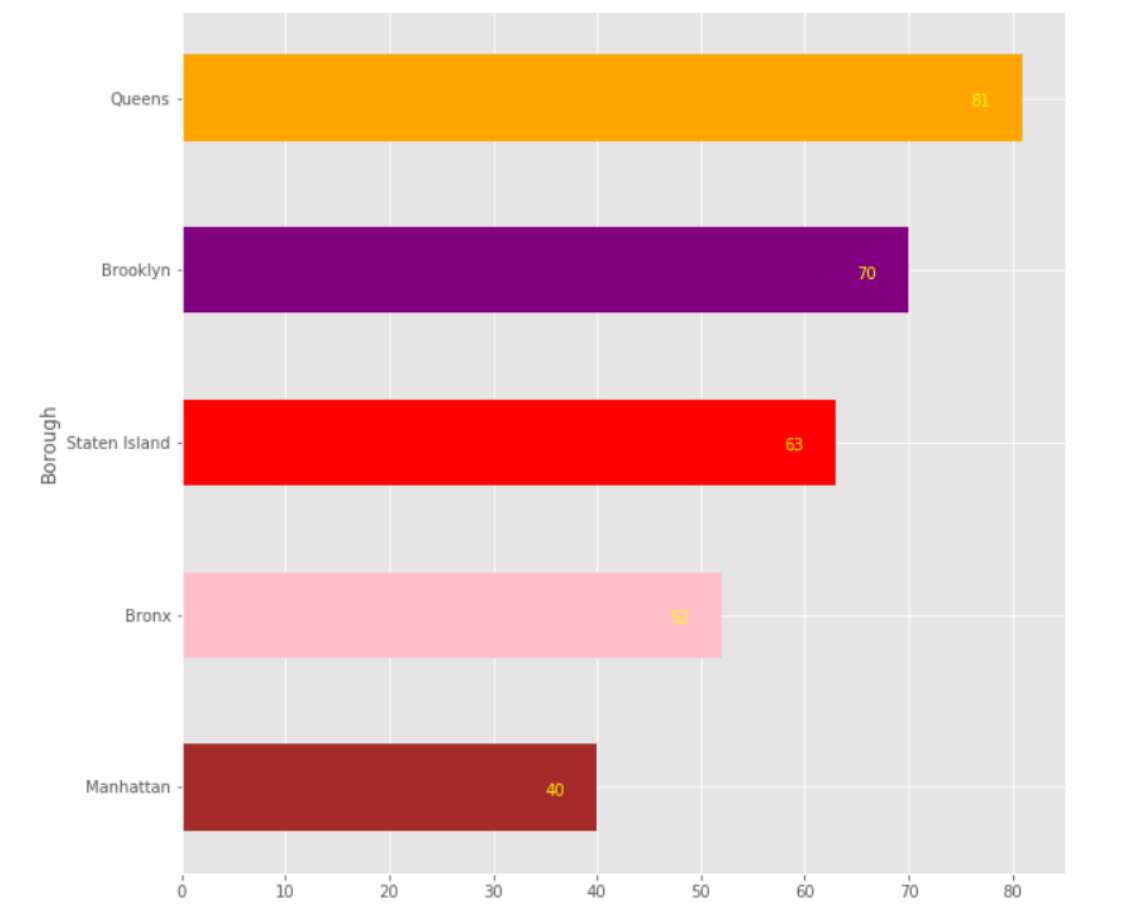
The source of the dataset is: https://cocl.us/new_york_dataset

This dataset contains total 306 data with 5 Boroughs namely Queens, Brooklyn, Staten Island, Bronx, Manhattan and their corresponding Neighbourhoods and latitudes, longitudes.

The dataset looks like:

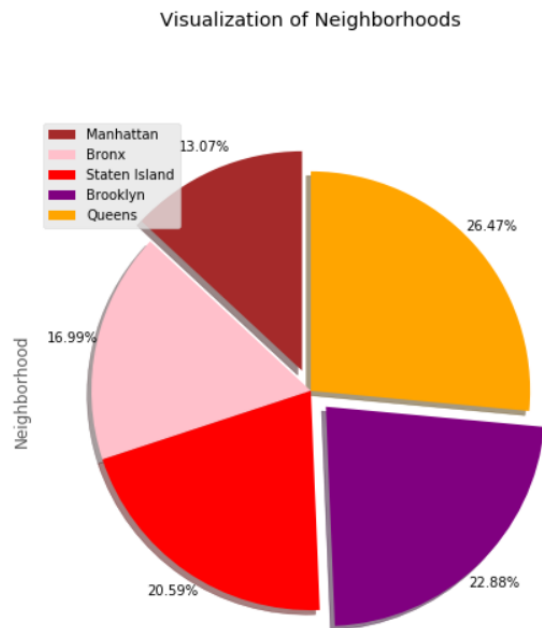
	Borough	Neighborhood	Latitude	Longitude
0	Bronx	Wakefield	40.894705	-73.847201
1	Bronx	Co-op City	40.874294	-73.829939
2	Bronx	Eastchester	40.887556	-73.827806
3	Bronx	Fieldston	40.895437	-73.905643
4	Bronx	Riverdale	40.890834	-73.912585

Neighbourhoods-distribution for each Borough is shown below:



From the above bar chart, we can see **Queens** has **maximum** number of Restaurant (**81**) and **26.47%** of total and followed by Brooklyn (**70**) **22.88%** of total and others.

Let's visualize for **Percentage distribution** of neighbourhoods among Boroughs:



- **Analysis of Dataset-2:**

The source of the dataset is: Foursquare

This dataset contains data that will be used to get information about Venues in Neighbourhoods of Brooklyn along with their IDs, latitudes and longitudes.

As my colleagues want to Visit Brooklyn and planned to stay there may be for some months. For this, I need more info about Brooklyn to give recommendation.

Firstly, I've used **geocode** to get latitude and longitude of Brooklyn.

Next, using Foursquare API, explored the venues of Brooklyn within 500 meters of radius and got the data. This dataset contains total 288 unique categories of venues.

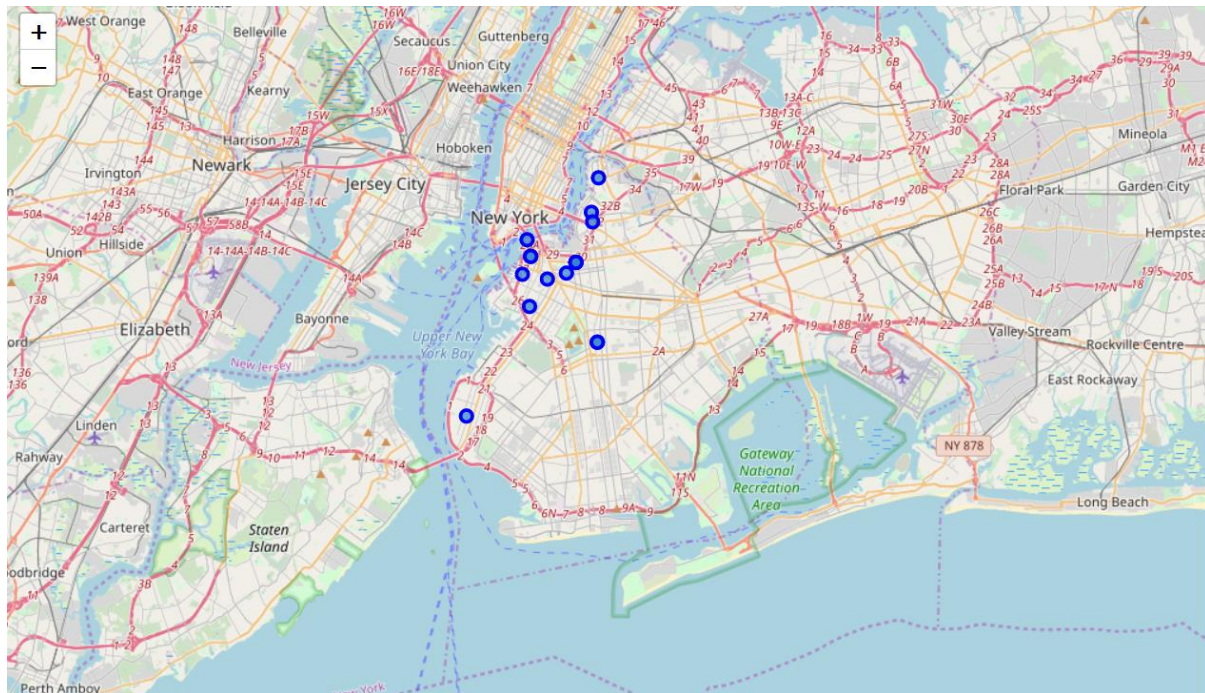
The dataset looks like:

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	ID	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Bay Ridge	40.625801	-74.030621	4b895827f964a5206c2d32e3	Pilo Arts Day Spa and Salon	40.624748	-74.030591	Spa
1	Bay Ridge	40.625801	-74.030621	4ad09cf7f964a520bed820e3	Bagel Boy	40.627896	-74.029335	Bagel Shop
2	Bay Ridge	40.625801	-74.030621	538ca7d5498ec684c6387a46	Cocoa Grinder	40.623967	-74.030863	Juice Bar
3	Bay Ridge	40.625801	-74.030621	4abe4e84f964a520958c20e3	Pegasus Cafe	40.623168	-74.031186	Breakfast Spot
4	Bay Ridge	40.625801	-74.030621	4ea17d24e5facb29c6d81d6f	Ho' Brah Taco Joint	40.622960	-74.031371	Taco Place

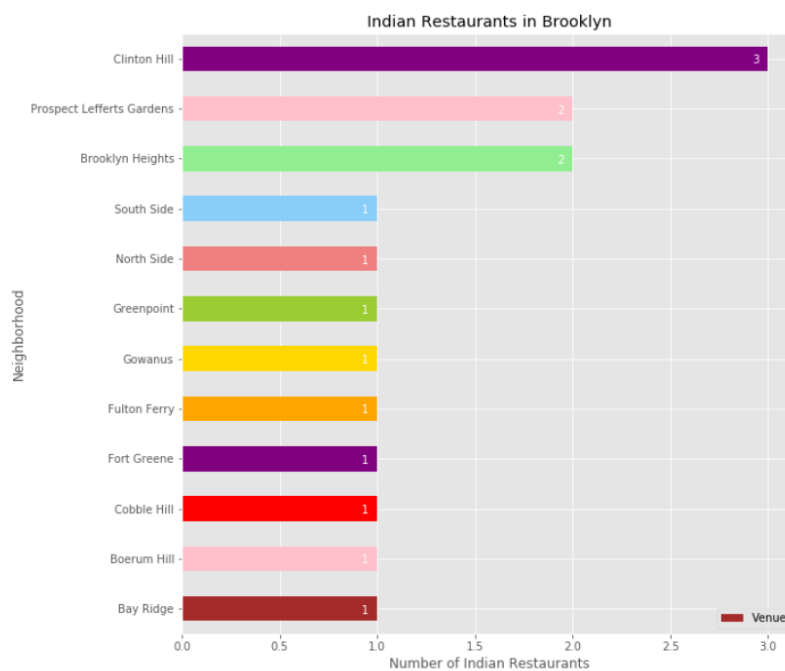
Now, my colleagues want to stay in a Neighbourhood where they can get good Indian food and other amenities. So, let's explore great Indian Restaurants nearby in each Neighbourhood.

After filtering out Indian Restaurants, I've got total 16 Indian Restaurants in Brooklyn.

So, let's visualize the Indian Restaurants I've got from Foursquare data in Map:



Now, I've analysed data for each neighbourhood in Brooklyn searching for Indian Restaurants. Look of my observation below:



From the above Bar chart, we can see that **Clinton Hill** has **maximum number (3)** of Indian Restaurants, followed by Prospect Lefferts Gardens, Brooklyn Heights and others.

- **Analysis of Dataset-3:**

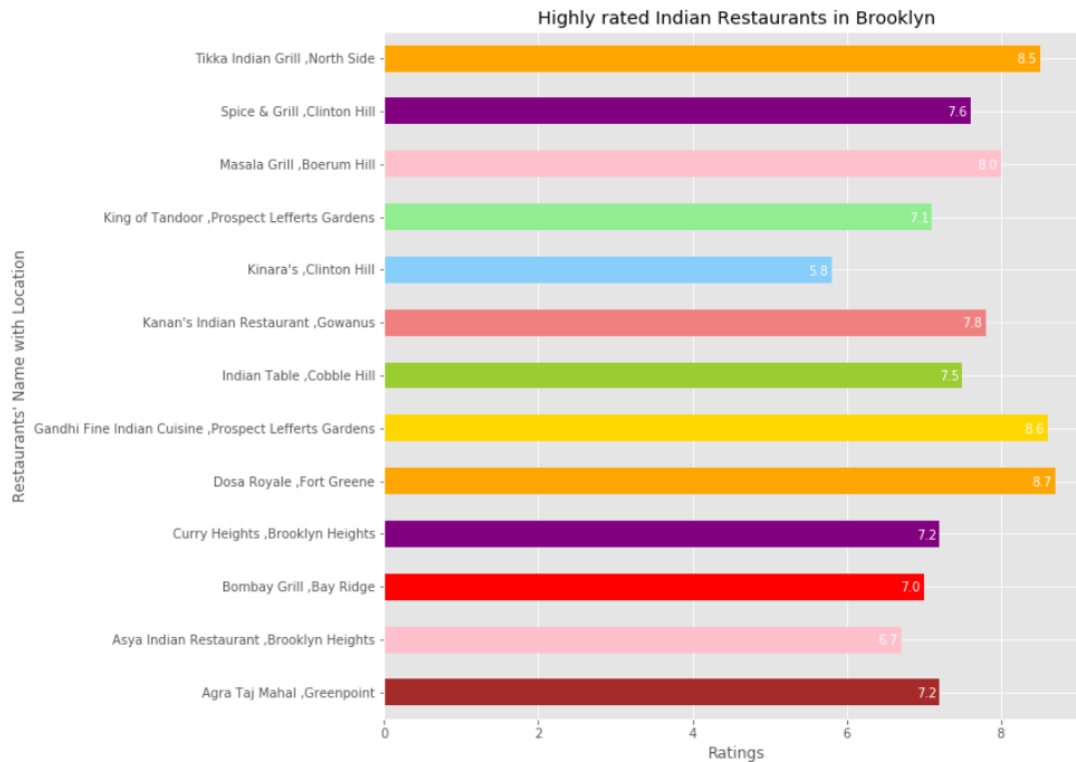
The source of the dataset is: Foursquare

Now, I've got the Indian Restaurants info, restaurants that are much loved by people, i.e. highly rated and liked ones, should be known to me.

So, I had to use Foursquare API again to get the above-mentioned info and the dataset looks like:

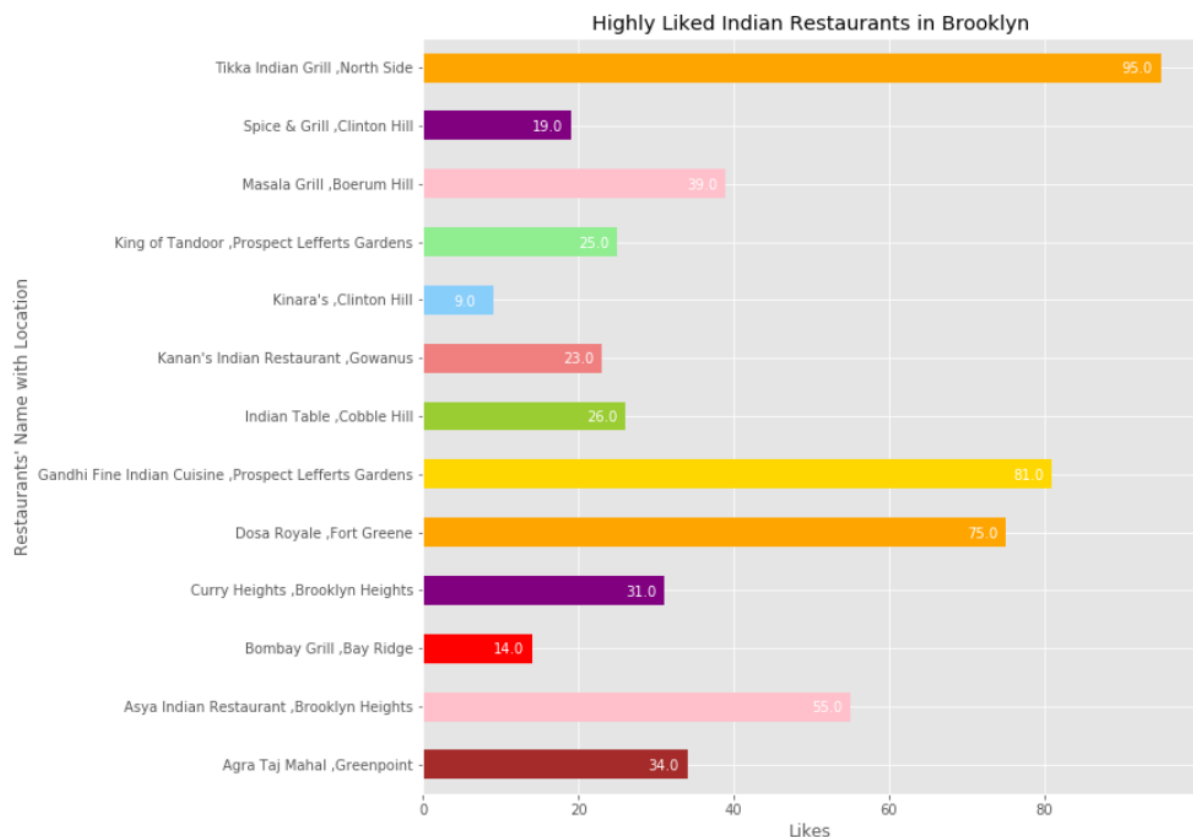
	ID	Name	Likes	Ratings	Tips
0	545835a1498e820edc6f636f	Bombay Grill	14	7.0	4
1	51a5445c498ee0f182370cb2	Agra Taj Mahal	34	7.2	16
2	4b8ffc16f964a520246e33e3	Curry Heights	31	7.2	17
3	506a2625498e3c434686abbc	Asya Indian Restaurant	55	6.7	27
4	58e81c67375c4a70bfd5380d	Indian Table	26	7.5	11

After doing some more analysis with data, let's visualize data for Highly Rated Indian Restaurants:



From above bar chart, we can see that **Dosa Royale** which is in **Fort Greene** is highly rated (**8.7**), **Gandhi Fine Indian Cuisine** in **Prospect Lefferts Gardens** is second highly rated (**8.6**) and others are also close to each other.

Let's visualize **highly Liked Restaurants**:



From above chart, we can see that **Tikka Indian Grill in North side is highly liked (95)** restaurant. From previous chart, we can see Tikka Indian Grill also gets very good rating (8.5). Highly rated Dosa Royale gets good likes (75).

Business Perspective:

Anyone who wants to open Restaurant in any Neighbourhood, after observing the rating, likes and types of food (We can understand by name like Dosa, Tikka etc), they can decide what types of Indian Restaurants they will open and which Neighbourhood.

Now we've found out which neighbourhood has which Indian Restaurants and also about their ratings and likes, but only Indian Restaurants?? These can be one of the Main reasons but not Only reason. Let's find out other amenities nearby.

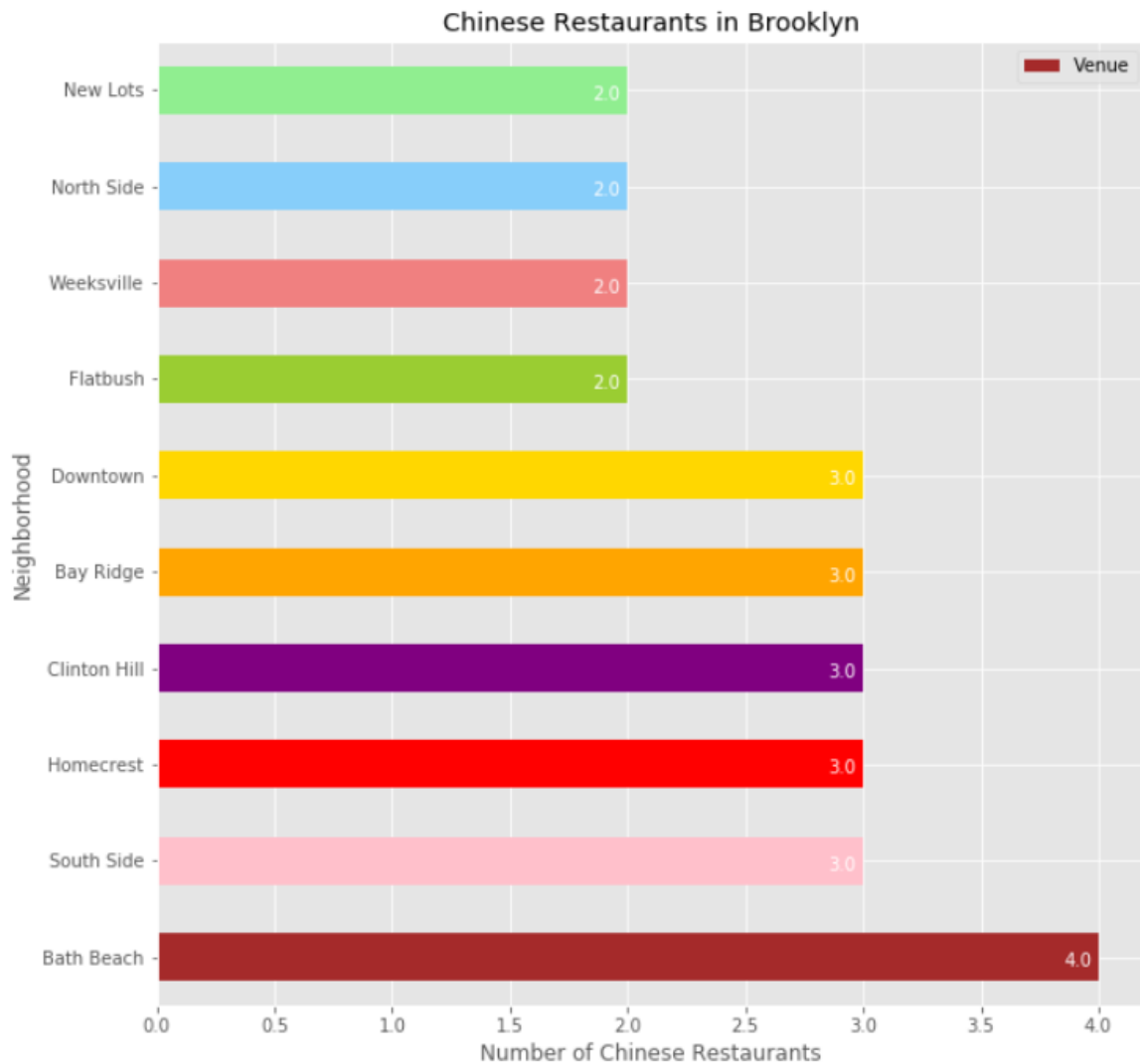
Now, I'll use the Neighbourhoods where all Indian Restaurants are.

- **Analysis of combinations of all 3 Datasets:**

Now, next priorities of my colleagues are like eating Chinese, joining Gym etc. Let's find out the places and then decide where to stay.

Chinese Restaurants:

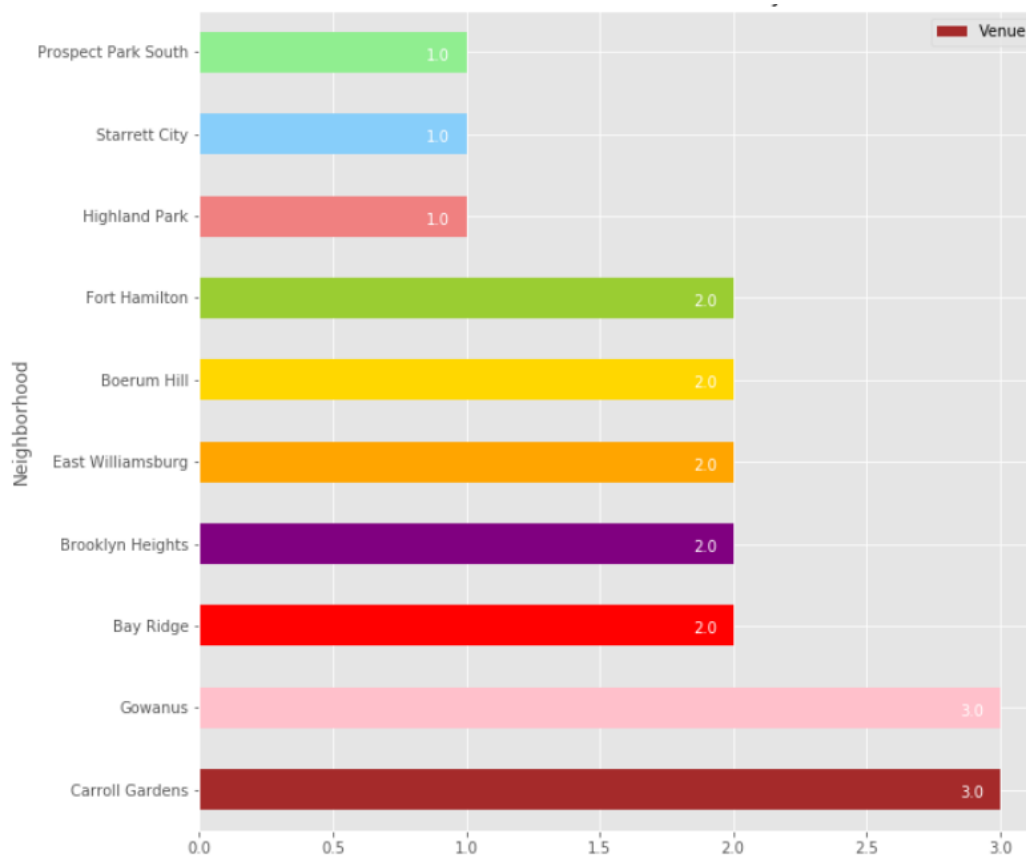
Further analysis helps to get Chinese Restaurants in Brooklyn.



We can see that **Bath Beach** has got **maximum number of Chinese Restaurants (4)**. We can also look of other Restaurants too.

Gym / Fitness Centre:

Let's visualize neighbourhoods for Gym or Fitness Centre:



So, Carroll Gardens and Gowanus took the place when it comes about Fitness Centre.

Now, apart from Indian, Chinese Restaurants, Gym, let's find out the top 5 most common venues of the neighbourhoods.

*****Bay Ridge*****			*****Greenpoint*****			*****Brooklyn Heights*****		
	venue	freq		venue	freq		venue	freq
0	Italian Restaurant	0.07	0	Bar	0.09	0	Park	0.04
1	Spa	0.06	1	Cocktail Bar	0.06	1	Deli / Bodega	0.04
2	American Restaurant	0.03	2	Coffee Shop	0.06	2	Gym	0.03
3	Pizza Place	0.03	3	Pizza Place	0.06	3	Cosmetics Shop	0.03
4	Chinese Restaurant	0.03	4	Café	0.03	4	Italian Restaurant	0.03

*****Gowanus*****			*****Fort Greene*****			*****Clinton Hill*****		
	venue	freq		venue	freq		venue	freq
0	Bar	0.06	0	Italian Restaurant	0.07	0	Pizza Place	0.05
1	Italian Restaurant	0.06	1	Coffee Shop	0.04	1	Italian Restaurant	0.05
2	Gym / Fitness Center	0.05	2	Pizza Place	0.04	2	Mexican Restaurant	0.04
3	Coffee Shop	0.05	3	Theater	0.04	3	Wine Shop	0.04
4	Furniture / Home Store	0.05	4	Opera House	0.03	4	Thai Restaurant	0.04

*****Boerum Hill*****			*****Prospect Lefferts Gardens*****			*****North Side*****		
	venue	freq		venue	freq		venue	freq
0	Dance Studio	0.04	0	Bakery	0.08	0	Coffee Shop	0.07
1	Bar	0.04	1	Café	0.08	1	American Restaurant	0.04
2	Coffee Shop	0.04	2	Caribbean Restaurant	0.06	2	Bar	0.04
3	Sandwich Place	0.03	3	Pizza Place	0.06	3	Wine Bar	0.04
4	Deli / Bodega	0.03	4	Indian Restaurant	0.04	4	Jewelry Store	0.04

So, the above top 5 lists will help them to decide besides Indian Restaurant what kind of amenities they want.

Business Perspective:

Created a separate dataset which contains all the Top 10 common venues for all Neighbourhoods of Brooklyn. The dataset looks like:

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
Bath Beach	Chinese Restaurant	Pharmacy	Pizza Place	Bubble Tea Shop	Italian Restaurant	Sushi Restaurant	Fast Food Restaurant	Donut Shop	Liquor Store	Clothing Store
Bay Ridge	Italian Restaurant	Spa	American Restaurant	Greek Restaurant	Chinese Restaurant	Pizza Place	Bar	Sandwich Place	Pharmacy	Sushi Restaurant
Bedford Stuyvesant	Coffee Shop	Café	Pizza Place	Bar	BBQ Joint	Fried Chicken Joint	Fruit & Vegetable Store	Boutique	New American Restaurant	Gourmet Shop
Bensonhurst	Pizza Place	Dessert Shop	Donut Shop	Chinese Restaurant	Ice Cream Shop	Italian Restaurant	Bakery	Sushi Restaurant	Grocery Store	Flower Shop
Bergen Beach	Harbor / Marina	Donut Shop	Other Repair Shop	Athletics & Sports	Baseball Field	Playground	Food & Drink Shop	Food	Flower Shop	Flea Market

From the dataset, people can search the Neighbourhood name and will get the Top 10 venues and based on this they can choose their business.

This dataset will also help if anyone wants to visit Brooklyn for the first time.

Part – 4: Results / Takeaways

So, Recommendation can be made after looking at the detailed analysis of Datasets and Bar Charts. For my colleagues, i.e. who wants Indian food mainly, recommended Places and Restaurants are:

1. Prospect Lefferts Gardens

• No of Restaurants: 2

(Gandhi Fine Indian Cuisine, Rating = 8.6, Likes = 81, Tips = 47) and (King of Tandoor, Rating = 7.1, Likes = 25)

- Top 5 Places:
Bakery, Café, Caribbean Restaurant, Pizza Place, Indian Restaurant
2. **North Side**
- No of Restaurants: 1
(Tikka Indian Grill, Rating = 8.5, Likes = 95, Tips = 29)
 - Top 5 Places:
Coffee Shop, American Restaurant, Bar, Wine Bar, Jewellery Store
3. **Fort Greene**
- No of Restaurants: 1
(Dosa Royale, Rating = 8.7, Likes = 75, Tips = 22)
 - Top 5 Places:
Italian Restaurant, Coffee Shop, Pizza Place, Theatre, Opera House

Business Perspective:

From the dataset people who are planning to open Restaurants in Brooklyn, could find the Top 10 common venues. It varies from person to person for what they need. After they decide, further analysis can be done like I've done for Indian Restaurants.

From the Indian Restaurant dataset, they will find out the best neighbourhood and find Restaurants of different varieties of foods and their competitors looking at Ratings, likes, tips etc. It helps for decision making.

Part – 5: Conclusion

I've performed all these analysis with the location details provided by the Foursquare. Data analysis is done for Brooklyn within 500 metres of radius. Venues could be different if analysis gets performed with different radius. So, I can that analysis is made based on a limited data.

Above, all the recommendations are totally mine based on my analysis. This varies from people to people about what really they want.

For business perspective, this analysis can be helpful. Different people have different opinions on venues, boroughs, neighbourhoods etc, and for that further analysis must be needed using the same dataset.

Part-6: References:

<https://www.greatamericancountry.com/places/local-life/cultural-diversity-in-new-york-city>

https://en.wikipedia.org/wiki/New_York_City