

Capstone Project - The Battle of Neighborhoods

Selecting the best location for a new bookstore in New York City

INTRODUCTION

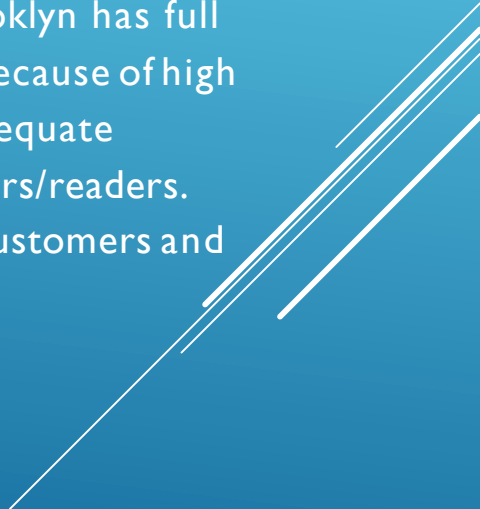
A bookstore is a place where different kinds of textbooks or reference books are sold

There are many bookstores in the city of New York. Serious considerations are required to open a new bookstore than it seems

The aim of this project is to assist investor who wants to open a new bookstore in new york

BUSINESS PROBLEM

A client hired us to help him determine what is the best place for a new bookstore in new york city. We define potential neighborhood based on the number of bookstores which are operating right in each neighborhood. Brooklyn has full potential but also is a very challenging district to open a business because of high competition. New bookstore should be open in an area that inadequate neighborhood in this way the Restaurant can attract more customers/readers. Therefore, this analysis necessary to ensure that we have enough customers and that we are not so close to other bookstores.

Several white lines of varying lengths and angles are positioned in the bottom right corner of the slide, creating a modern, abstract graphic element.

Data Selection

To identify the characteristics of our competitors' venues in Brooklyn, we would first need to find out the number of bookstores in Brooklyn currently and their location.

We then find their geographic coordinates of New York City to create a folium map

Using Foursquare API to explore the bookstores operating in Brooklyn area

| | Neighborhood | Neighborhood Latitude | Neighborhood Longitude | Venue | Venue Latitude | Venue Longitude | Venue Category |
|---|--------------|-----------------------|------------------------|------------------------|----------------|-----------------|----------------|
| 0 | Bay Ridge | 40.625801 | -74.030621 | The Bookmark Shoppe | 40.624577 | -74.030562 | Bookstore |
| 1 | Bay Ridge | 40.625801 | -74.030621 | Book Mark Shop | 40.623848 | -74.031059 | Bookstore |
| 2 | Bensonhurst | 40.611009 | -73.995180 | Excalibur Comics | 40.611408 | -73.991451 | Bookstore |
| 3 | Sunset Park | 40.645103 | -74.010316 | Koch Comics Warehouse | 40.653740 | -74.011697 | Bookstore |
| 4 | Sunset Park | 40.645103 | -74.010316 | JC Christian Bookstore | 40.640991 | -74.014412 | Bookstore |

METHODOLOGY

function to get bookstores categories in each neighborhood.

[illegible]



Bookstores in New York

Then using this feature to group the neighborhoods into clusters K-means clustering algorithm will be use to complete this task.And also,the Folium library to visualize the neighborhoods in Brooklyn and its emerging clusters.

| | 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 | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 1 | Bedford Stuyvesant | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 2 | Bensonhurst | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 3 | Boerum Hill | Bookstore | Gift Shop | Newsstand | Cosmetics Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Miscellaneous Shop | Library |
| 4 | Borough Park | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |

RESULTS

USING K-MEANS TO CLUSTERING DATA AREA WITH LESS NUMBER OF BOOKSTORES

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

| | 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 |
|----|--------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| 21 | Red Hook | Bookstore | Bike Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop |

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

| | 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 |
|----|--------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|
| 37 | Marine Park | Used Bookstore | Video Store | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store | Cosmetics Shop |


```
[ ] Brooklyn_merged.loc[Brooklyn_merged['Cluster Labels'] == 1, Brooklyn_merged.columns[[1] + list(range(5, Brooklyn_merged.shape[1]))]]
```

| | 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 | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 1 | Bensonhurst | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 2 | Sunset Park | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 6 | Sheepshead Bay | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 11 | Kensington | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 12 | Windsor Terrace | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 16 | Bustwick | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 17 | Bedford Stuyvesant | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 22 | Gowanus | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 31 | Manhattan Beach | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 34 | Borough Park | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 35 | Dyker Heights | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 42 | Prospect Lefferts Gardens | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 47 | Prospect Park South | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 53 | Fort Hamilton | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 54 | Ditmas Park | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 55 | Wingate | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 69 | Erasmus | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |

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

| | 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 |
|----|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| 13 | Prospect Heights | Bookstore | Used Bookstore | Coffee Shop | Video Store | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop |
| 24 | Park Slope | Bookstore | Used Bookstore | Gift Shop | Video Store | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Furniture / Home Store |
| 68 | Madison | Bookstore | Used Bookstore | Video Store | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |

| | | Venue | Venue | Venue | Venue | Venue | Venue | Venue | Venue | Venue | Venue |
|----|-------------------|-----------|------------------------|------------------------|------------------|------------------|------------------|--------------------|--------------------|--------------------|------------------------|
| 3 | Greenpoint | Bookstore | Restaurant | Video Store | Used Bookstore | Toy / Game Store | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 5 | Brighton Beach | Bookstore | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |
| 7 | Manhattan Terrace | Bookstore | Miscellaneous Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Library | Gift Shop | Furniture / Home Store |
| 9 | Crown Heights | Bookstore | Coffee Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop |
| 15 | Williamsburg | Bookstore | Furniture / Home Store | Comic Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library |
| 18 | Brooklyn Heights | Bookstore | Newsstand | Gift Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Miscellaneous Shop | Library | Furniture / Home Store |
| 19 | Cobble Hill | Bookstore | Gift Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Furniture / Home Store |
| 20 | Carroll Gardens | Bookstore | Gift Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Furniture / Home Store |
| 23 | Fort Greene | Bookstore | Cosmetics Shop | Coffee Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library |
| 38 | Clinton Hill | Bookstore | Coffee Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop |
| 40 | Downtown | Bookstore | Newsstand | Gift Shop | Cosmetics Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Miscellaneous Shop | Library |
| 41 | Boerum Hill | Bookstore | Gift Shop | Newsstand | Cosmetics Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Miscellaneous Shop | Library |
| 46 | Midwood | Bookstore | Miscellaneous Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Library | Gift Shop | Furniture / Home Store |
| 49 | East Williamsburg | Bookstore | Library | Furniture / Home Store | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Gift Shop |
| 50 | North Side | Bookstore | Toy / Game Store | Furniture / Home Store | Comic Shop | Video Store | Used Bookstore | Restaurant | Newsstand | Miscellaneous Shop | Library |
| 51 | South Side | Bookstore | Toy / Game Store | Furniture / Home Store | Comic Shop | Video Store | Used Bookstore | Restaurant | Newsstand | Miscellaneous Shop | Library |
| 52 | Ocean Parkway | Bookstore | Miscellaneous Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Library | Gift Shop | Furniture / Home Store |
| 61 | Fulton Ferry | Bookstore | Comic Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Newsstand | Miscellaneous Shop | Library | Gift Shop |
| 62 | Vinegar Hill | Bookstore | Newsstand | Coffee Shop | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Miscellaneous Shop | Library | Gift Shop |
| 65 | Dumbo | Bookstore | Newsstand | Video Store | Used Bookstore | Toy / Game Store | Restaurant | Miscellaneous Shop | Library | Gift Shop | Furniture / Home Store |

RESULTS



Based on analysis done, Cluster 1 (Red Hook) and Cluster 3 Marine Park areas are the best places to open a new bookstore business.

DISCUSSION

- ▶ This analysis is performed on limited data
- ▶ Marine Park is one of the good locations to open an bookstore that focus on new textbook than used books.
- ▶ Prospect Heights, Park Slope and Madison are also good places to be considered to open the new bookstore.
- ▶ Further and more detailed study on full dataset of New York is needed to have more accurate and in depth analysis will be required to have a final decision that might include budget and location mortgage prices.