Capstone Project - The Battle of Neighborhoods

SELECTING THE BEST LOCATION TO OPEN A NIGHT LIFE SPOT IN NEW YORK

Introduction/Business Problem

- The City of New York is famous for its vibrant night life. New York's id emerges each night; a nocturnal other half every bit as essential to its identity as its business-hours alter ego. Hence, opening a new night club will not only enrich this culture but also have a smaller chance of failure if done right. Hence, with the following data and analysis, we'll be able to deduce the most optimum spot to open a night club.

Business Problem

- My client wants to open his business in Manhattan area, so I focus on that borough during my analysis. We define potential neighborhood based on the number of night life stops which are operating right in each neighborhood. Manhattan has full potential but also is a very challenging district to open a business because of high competition. New night club should be open in an area that inadequate neighborhood in this way the business can attract more customers. Therefore, this analysis necessary to ensure that we have enough customers and that we are not so close to other night clubs.

Data Selection

- Neighborhood has a total of 5 boroughs and 306 neighborhoods. In order to segment the neighborhoods and explore them, we will essentially need a dataset that contains the 5 boroughs and the neighborhoods that exist in each borough as well as the latitude and longitude coordinates of each neighborhood.
- This dataset exists for free on the web.
- Link to the dataset is: https://geo.nyu.edu/catalog/nyu_2451_34572
- There are 1968 Night Life spots in New York.

Data Selection

- Next, we also used Google Map API to find their geographic coordinates of the 5 locations shortlisted for our Night life spots:

	Borough	Neighborhood	Latitude	Longitude
0	Manhattan	Marble Hill	40.876551	-73.910660
1	Manhattan	Chinatown	40.715618	-73.994279
2	Manhattan	Washington Heights	40.851903	-73.936900
3	Manhattan	Inwood	40.867684	-73.921210
4	Manhattan	Hamilton Heights	40.823604	-73.949688

Table 2: Data frame containing geographic coordinates of our 5 shortlisted locations

Methodology

- Addresses are converted into their equivalent latitude and longitude values.
- Foursquare API is used to explore neighborhoods in Manhattan, New York.
- After that, explore function to get night lie spots categories in each neighborhood.

Methodology

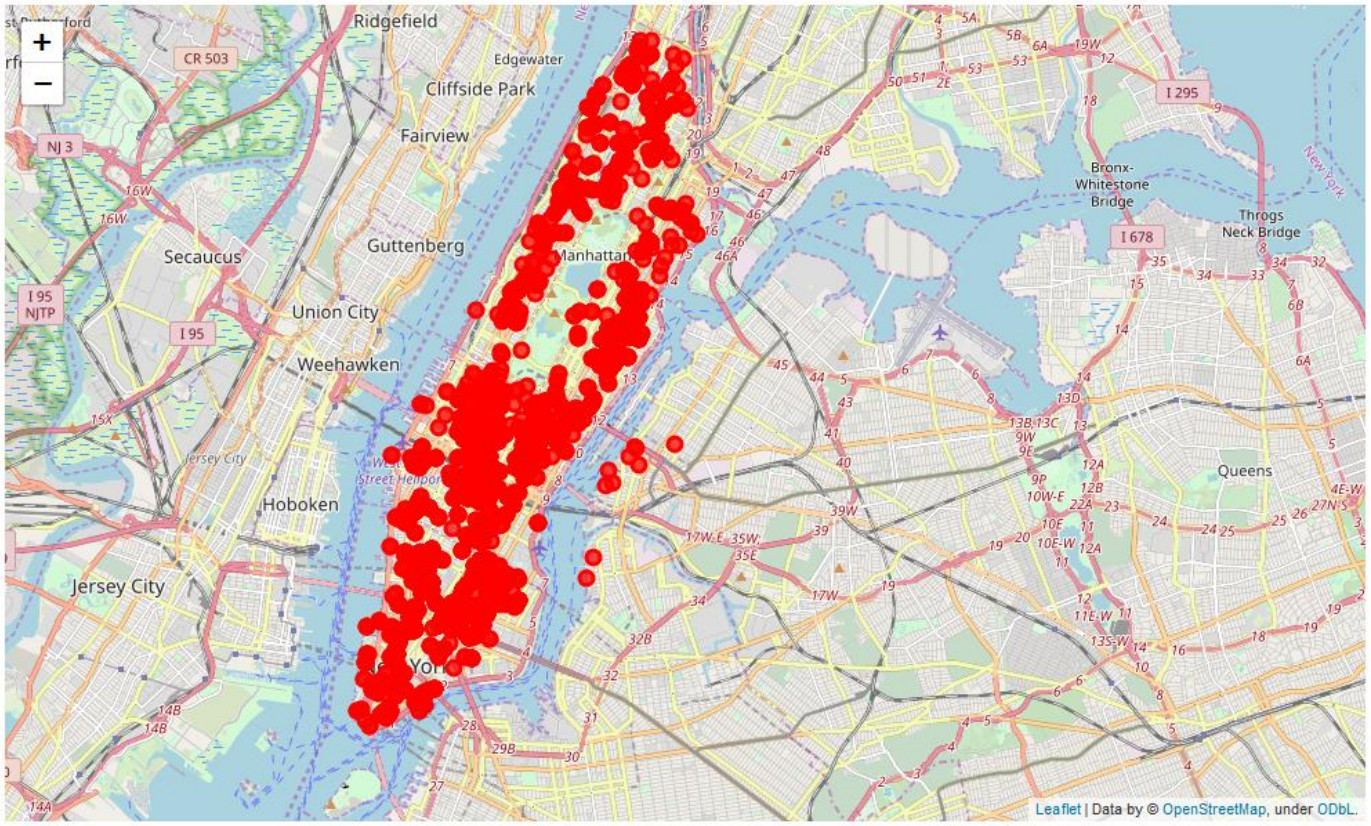
```
newyork_venues_NightLifeSpots.head()
```

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Marble Hill	40.876551	-73.91066	Applebee's Grill + Bar	40.873685	-73.908928	American Restaurant
1	Marble Hill	40.876551	-73.91066	Rowes Wharf Bar	40.883200	-73.910000	Bar
2	Marble Hill	40.876551	-73.91066	Indian Road Café	40.872922	-73.918459	Café
3	Marble Hill	40.876551	-73.91066	Irish Eyes	40.868928	-73.917465	Pub
4	Marble Hill	40.876551	-73.91066	Beach Walk at Sea Bright	40.886700	-73.911600	Beach Bar

```
newyork_venues_NightLifeSpots.shape
```

```
(1986, 7)
```

Methodology



Night life spots in Manhattan

Methodology

- 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 Manhattan and its emerging clusters.

	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	9th Most Common Venue
0	Manhattan	Marble Hill	40.876551	-73.910660	1	Bar	Pub	Other Nightlife	Nightclub	Nightlife Spot	Lounge	Beach Bar	Cocktail Bar	Sports Bar
1	Manhattan	Chinatown	40.715618	-73.994279	4	Cocktail Bar	Dive Bar	Bar	Lounge	Beer Bar	Hotel Bar	American Restaurant	Gastropub	Sports Bar
2	Manhattan	Washington Heights	40.851903	-73.936900	1	Bar	Lounge	Other Nightlife	Nightclub	Restaurant	Speakeasy	Cocktail Bar	Karaoke Bar	Tapas Restaurant
3	Manhattan	Inwood	40.867684	-73.921210	1	Bar	Lounge	Wine Bar	Cocktail Bar	Other Nightlife	Nightclub	Pub	Hookah Bar	Café
4	Manhattan	Hamilton Heights	40.823604	-73.949688	1	Bar	Other Nightlife	Cocktail Bar	Lounge	Speakeasy	Wine Bar	Hotel Bar	Nightclub	Pub

Results

- Using K-mean to clustering data area with less number of Night life spots
- **Cluster 0**

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

	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
16	Murray Hill	Bar	American Restaurant	Lounge	Cocktail Bar	Gastropub	Speakeasy	Irish Pub	Hotel Bar	Pub	Mexican Restaurant
19	East Village	Bar	Cocktail Bar	Pub	American Restaurant	Dive Bar	Speakeasy	Lounge	Café	Gastropub	Nightclub
27	Gramercy	Bar	American Restaurant	Speakeasy	Cocktail Bar	Gastropub	Mexican Restaurant	Lounge	Pub	Hookah Bar	Sake Bar
28	Battery Park City	Bar	Cocktail Bar	American Restaurant	Pub	Beer Garden	Hotel Bar	Burger Joint	Wine Bar	Gastropub	Café
34	Sutton Place	Bar	Hotel Bar	Cocktail Bar	Lounge	Beer Bar	American Restaurant	Pub	Beer Garden	Sports Bar	Restaurant
35	Turtle Bay	Bar	American Restaurant	Pub	Cocktail Bar	Beer Garden	Lounge	Café	Seafood Restaurant	Italian Restaurant	Hotel
36	Tudor City	Bar	American Restaurant	Cocktail Bar	Pub	Korean Restaurant	Seafood Restaurant	Jazz Club	Beer Bar	Hotel	Italian Restaurant
38	Flatiron	Bar	American Restaurant	Cocktail Bar	Italian Restaurant	Nightclub	Gastropub	Pub	Sports Bar	Speakeasy	Lounge

Result

Cluster 1

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

	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
8	Upper East Side	Bar	Cocktail Bar	Pub	Sports Bar	Italian Restaurant	Wine Bar	New American Restaurant	Burger Joint	Roof Deck	Ice Cream Shop
9	Yorkville	Bar	Pub	Cocktail Bar	Wine Bar	Coffee Shop	New American Restaurant	Sports Bar	Italian Restaurant	Piano Bar	Diner
10	Lenox Hill	Bar	Cocktail Bar	Pub	Gastropub	Hotel Bar	Wine Bar	Restaurant	Beer Garden	Burger Joint	Italian Restaurant
29	Financial District	Bar	Cocktail Bar	Pub	Hotel Bar	American Restaurant	Beer Garden	Mexican Restaurant	Burger Joint	Hotel	Mediterranean Restaurant
30	Carnegie Hill	Bar	Cocktail Bar	Pub	Sports Bar	Coffee Shop	Wine Bar	New American Restaurant	Roof Deck	Indian Restaurant	Residential Building (Apartment / Condo)
37	Stuyvesant Town	Bar	Cocktail Bar	Speakeasy	Wine Bar	Mexican Restaurant	Hookah Bar	Gay Bar	Dive Bar	Pub	American Restaurant

Result

- **Cluster 2**

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

	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	Lincoln Square	Bar	Gay Bar	American Restaurant	Hotel	Cocktail Bar	Pub	Lounge	Mexican Restaurant	Hotel Bar	Burrito Place
14	Clinton	Bar	Cocktail Bar	Lounge	Gay Bar	Coffee Shop	Sports Bar	Bowling Alley	English Restaurant	Pub	Gastropub
15	Midtown	Bar	Cocktail Bar	Lounge	Gay Bar	American Restaurant	Hotel	Burger Joint	Bowling Alley	Sports Bar	Japanese Restaurant
17	Chelsea	Bar	Cocktail Bar	Gay Bar	Nightclub	American Restaurant	Lounge	Mediterranean Restaurant	New American Restaurant	Gastropub	Coffee Shop
33	Midtown South	Bar	American Restaurant	Lounge	Cocktail Bar	Sports Bar	Coffee Shop	Nightclub	Bowling Alley	Tiki Bar	Seafood Restaurant
39	Hudson Yards	Bar	Cocktail Bar	Lounge	Pub	Hotel Bar	Bowling Alley	Nightclub	Gay Bar	Restaurant	Dive Bar

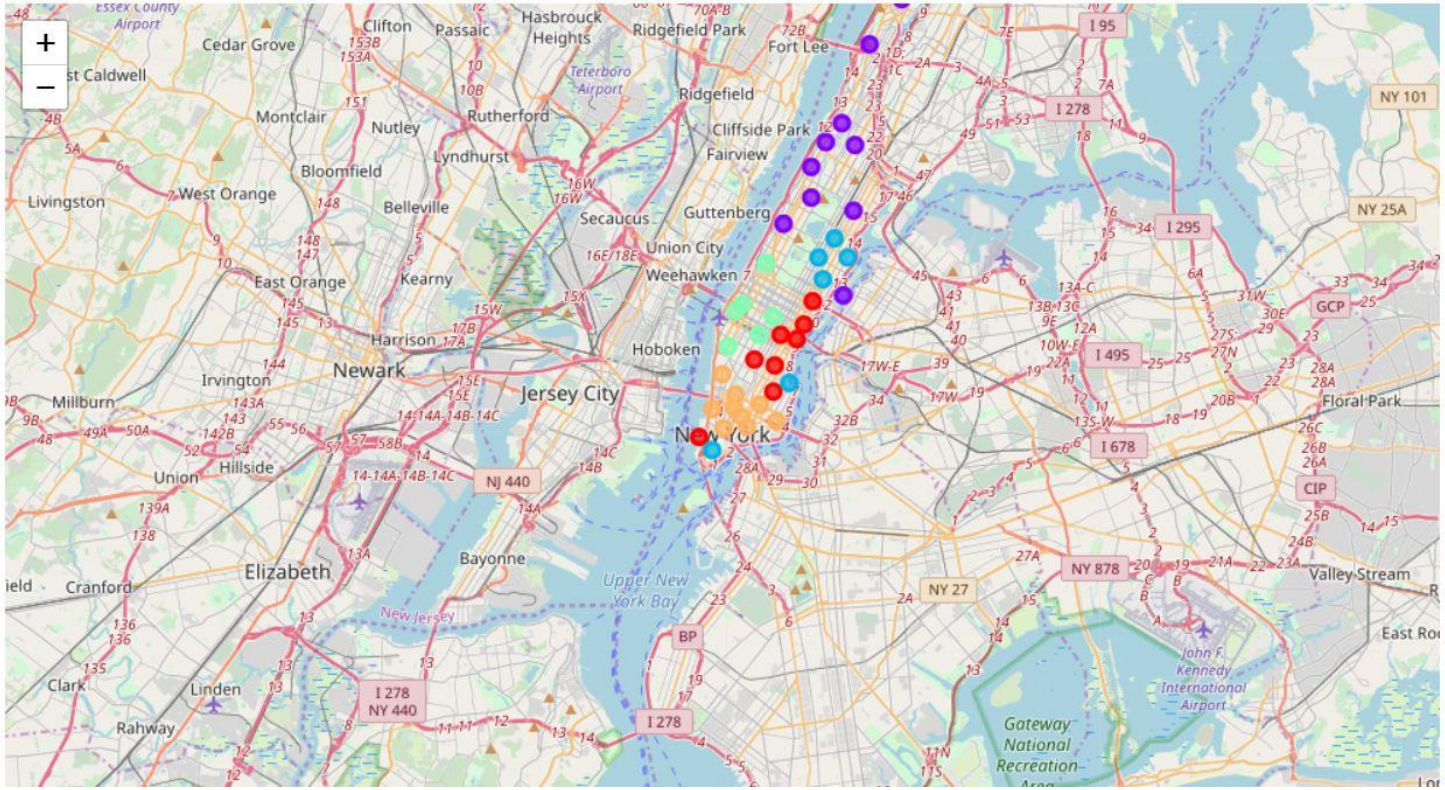
Result

Cluster 3

```
manhattan_merged.loc[manhattan_merged['Cluster Labels'] == 4, manhattan_merged.columns[[1] + list(range(5, manhattan_merged.shape
```

	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	Chinatown	Cocktail Bar	Dive Bar	Bar	Lounge	Beer Bar	Hotel Bar	American Restaurant	Gastropub	Sports Bar	Karaoke Bar
18	Greenwich Village	Cocktail Bar	Lounge	American Restaurant	Bar	Burger Joint	Beer Bar	Italian Restaurant	Pub	Hotel Bar	New American Restaurant
20	Lower East Side	Cocktail Bar	Bar	Dive Bar	Lounge	Speakeasy	American Restaurant	Café	Beer Bar	Gastropub	Hotel Bar
21	Tribeca	Cocktail Bar	Bar	Burger Joint	Pub	Speakeasy	Italian Restaurant	Wine Bar	New American Restaurant	Hotel Bar	American Restaurant
22	Little Italy	Cocktail Bar	Dive Bar	American Restaurant	Beer Bar	Hotel Bar	Lounge	Bar	Gastropub	Sports Bar	Rock Club
23	Soho	Cocktail Bar	Lounge	Hotel Bar	Dive Bar	Bar	Beer Bar	American Restaurant	Speakeasy	Wine Bar	Gastropub
24	West Village	Cocktail Bar	Bar	Italian Restaurant	New American Restaurant	Gay Bar	Speakeasy	Burger Joint	French Restaurant	Nightclub	Roof Deck
31	Noho	Cocktail Bar	Bar	American Restaurant	Lounge	Dive Bar	Beer Bar	Hotel Bar	Gastropub	Rock Club	Italian Restaurant
32	Civic Center	Cocktail Bar	Bar	Burger Joint	Wine Bar	Pub	Beer Garden	Dive Bar	Hotel Bar	Hotel	Karaoke Bar

Result


Clifton
Passaic
Hasbrouck Heights
Ridgefield Park
Fort Lee
Ridgefield
Cliffside Park
Fairview
Guttenberg
Secaucus
Union City
Weehawken
Hoboken
Jersey City
New York
Newark
Harrison
Kearny
East Orange
Irvington
Millburn
Hillside
Union
Elizabeth
Bayonne
Upper New York Bay
New Jersey
Cranford
Clark
Linden
Rahway
Montclair
Nutley
Rutherford
Lyndhurst
Bloomfield
West Orange
Livingston
Belleville
Cedar Grove
Teterboro Airport
Floral Park
Valley Stream
John F. Kennedy International Airport
Gateway National Recreation
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I 278
I 295
I 495
I 678
NY 101
NY 25A
NY 878
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GCP
CIP
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Discussion

- This analysis is performed on limited data. This may be right or may be wrong. But if good amount of data is available there is scope to come up with better results.
- Based on data frame analysis above Cluster 3 (Lincoln Square) and Cluster 4 (Chinatown) areas are the best places to open a new night life spot (Cocktail Bar) business.
- It can be done more detailed analysis by adding other factors such as transportation, demographics of inhabitants.

Conclusion

- Although all of the goals of this project were met there is definitely room for further improvement and development as noted below. However, the goals of the project were met and, with some more work, could easily be developed into a fully pledged application that could support the opening a business idea in an unknown location.