



CAPSTONE PROJECT

THE BATTLE OF NEIGHBORHOOD

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Where can be the best NYC neighborhood for the tourism office?

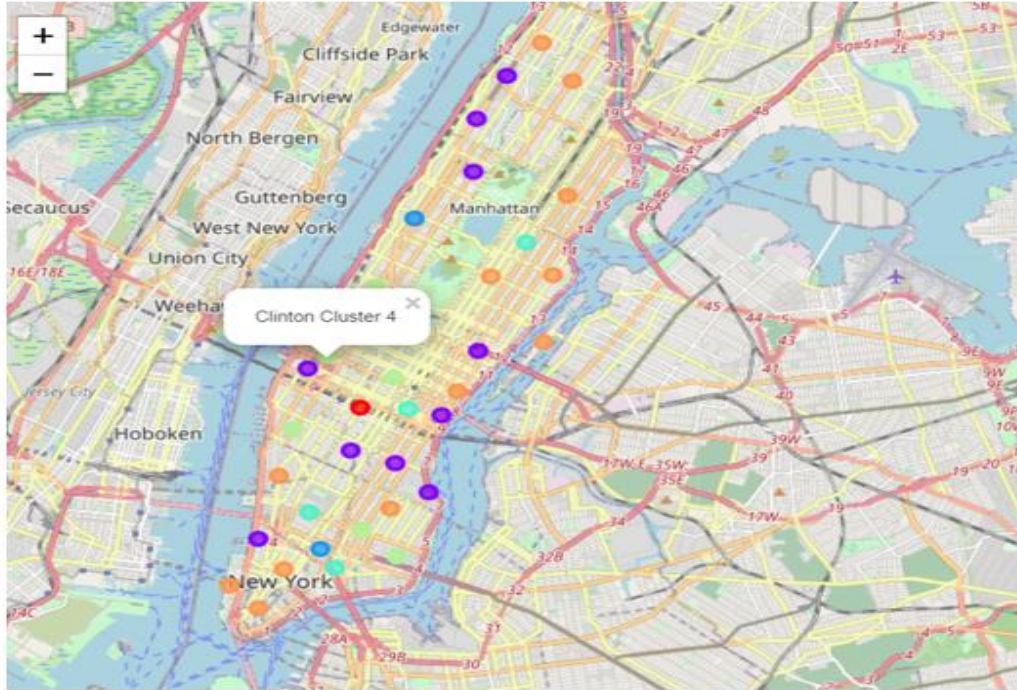
Is this right time to open the tourism office?

- 8.3MM NYC population plus 63MM visitors
- Clinton or Lincoln Square?
- Clinton, known as Hell's Kitchen, is a neighborhood on west of Midtown Manhattan, bordered by 34th Street to the south, 59th Street to the north, Eighth Avenue to the Hudson River, adjacent to top5 tourist attractions
- Lincoln Square is the home of Lincoln Center, a performing-arts venue with 30 indoor and outdoor performance venues in the Lincoln Center complex
- Additional factors like attractiveness of each location-real estate availability, prices, social and economic dynamics of neighborhood etc

Data sources

- Demographics of New York City: Population, Gross Domestic Product and Gross Domestic Product per capita of year 2019
- Tourism in New York City – Visitors data: Domestic/International visitors with visitor spending from year 1991 thru 2018 - page[0] on html
- Tourism in New York City – Most visited attractions: name, numbers of visitors and locations of most visited attractions visited with 2MM visitors - page[1] on html
- NYC neighborhoods: 5 boroughs and 306 neighborhoods with the latitude & longitude
- All attractions in NYC: Foursquare API conjunction with neighborhoods' coordinate

k-means clustering (k-6) with top 10 venue and 6 neighborhoods



Neighborhood

Lincoln Square

Clinton

Midtown

Chelsea

Lower East
Side

Noho

6 neighborhoods on cluster 4 have theater on the 1st most common venue

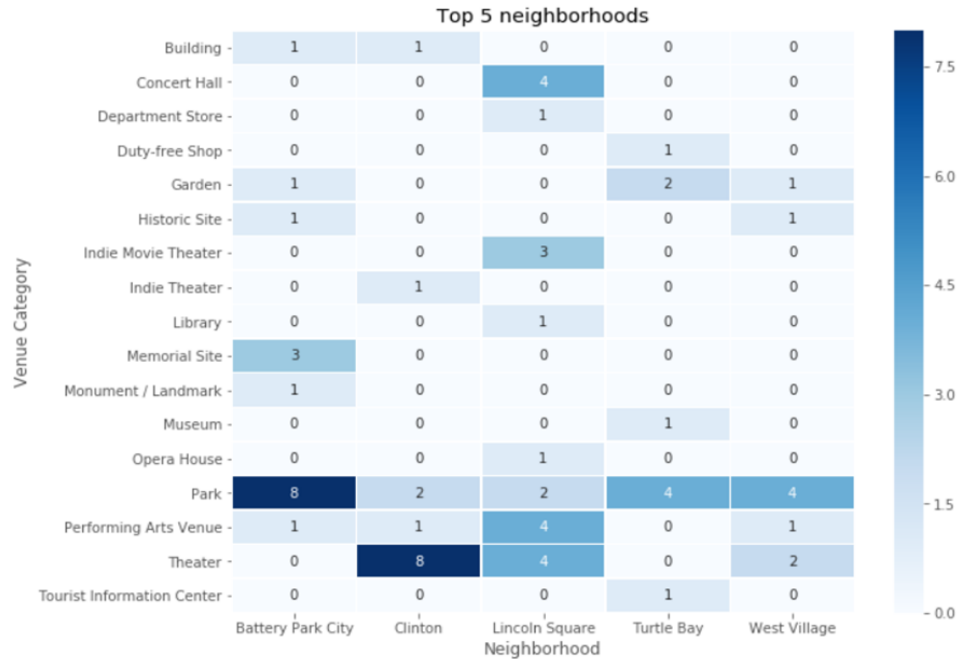
Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
Lincoln Square	Theater	Performing Arts Venue	Concert Hall	Indie Movie Theater	Park
Clinton	Theater	Park	Building	Performing Arts Venue	Indie Theater
Midtown	Theater	Train Station	Concert Hall	Park	Historic Site
Chelsea	Theater	Park	Indie Theater	Train Station	Indie Movie Theater
Lower East Side	Theater	Performing Arts Venue	Park	Train Station	Indie Movie Theater
Noho	Theater	Indie Movie Theater	Music Venue	Train Station	Building

Top 5 neighborhoods with the most venues

	Neighborhood	Number of Venues
0	Lincoln Square	20
1	Battery Park City	16
2	Clinton	13
3	Turtle Bay	9
4	West Village	9

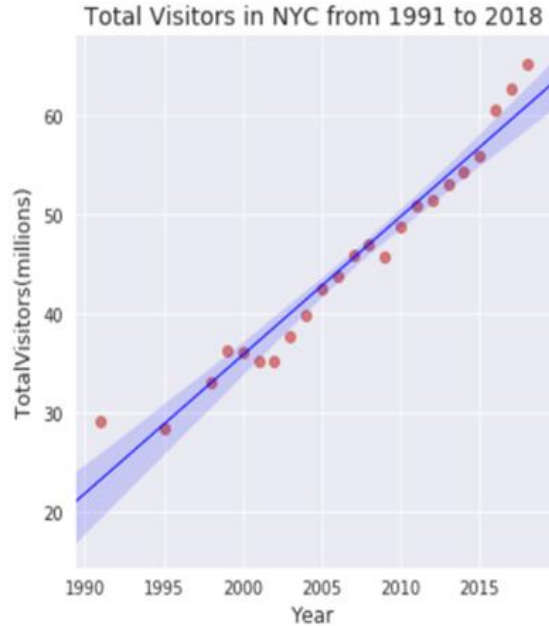
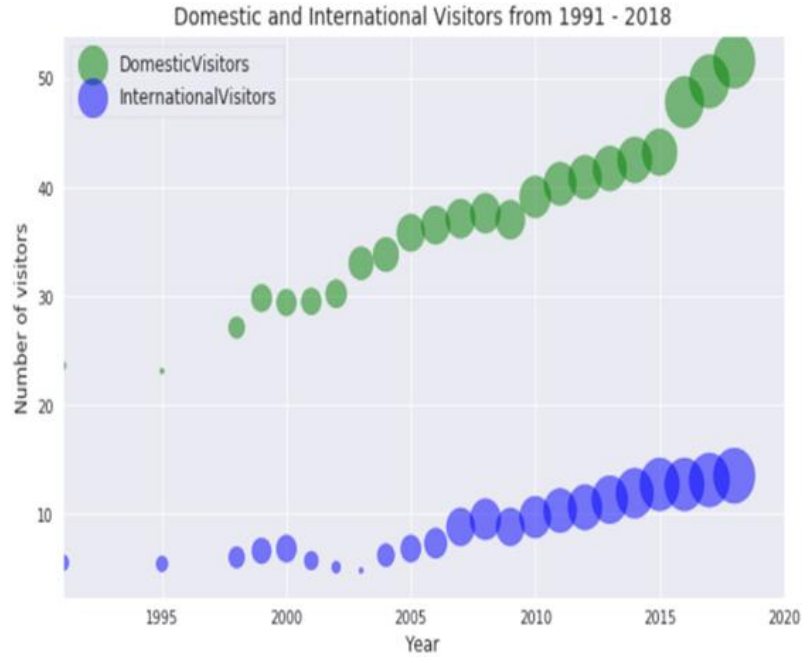
Lincoln Square and Clinton from cluster 4 were also in top 5 neighborhoods which those neighborhoods have the most venues mapped to tourist place.

Top 5 neighborhoods with venue categories from foursquare API



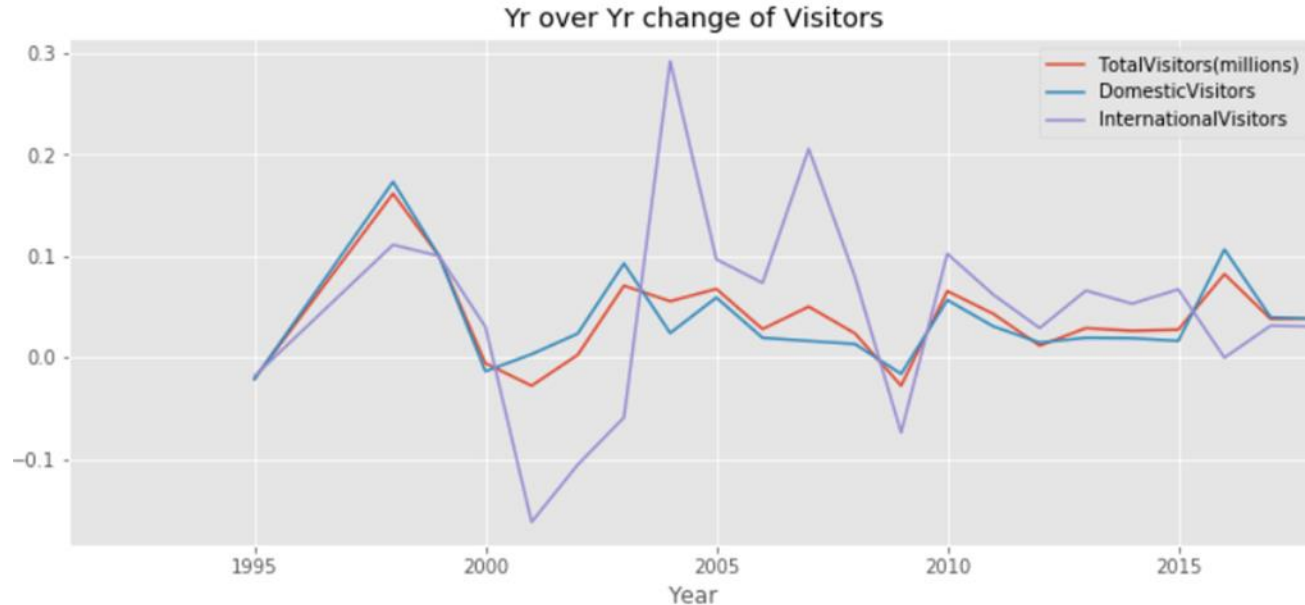
Lincoln Square and Clinton have more venues than other neighbors. Clinton has more theaters since it is located or nearby Theater Districts and Lincoln Square has more Performing Art Venues, Concert hall and theater since it has Lincoln Center complex.

Total visitors including domestic and international from 1991 to 2018



Big events like 9/11 and financial crisis have more impact on international visitors compared to domestic visitors. That's understandable that international travel costs more preparation and expenses.

Year over Year Change on Total Visitors from 1991 to 2018



After huge drop due to 9/11 international visitors jumped 29% on 2004 and another jump 20% on 2007 just before financial crisis. Pandemic can be like 9/11 since air travel has major impact due to fear of virus. So we can expect the trend can be recovered from big drop after 2 or 3 years.

Linear Regression Model to predict total visitors



- Coefficients: `[[1.33741868]]`
- Intercept: `[-2638.90219563]`
- Mean absolute error: 1.73
- Residual sum of squares (MSE): 5.57
- **R2-score: 0.85**

R-squared is a popular metric for accuracy of the model. It represents how close the data are to the fitted regression line. The higher the R-squared, the better the model fits the data. Based on evaluation results below, it is pretty good R squared = 0.85.

Prediction to ~70MM visitors by 2025

	year	pred_visitors
0	2019	61.346120
1	2020	62.683539
2	2021	64.020957
3	2022	65.358376
4	2023	66.695795
5	2024	68.033213
6	2025	69.370632

- Plus ~8MM New York City population
- ~78MM target visitors to the tourism office/center

Clinton and Lincoln Square – the optimal neighborhoods

- Set 1 - Top 5 neighborhoods having the most attractions based on foursquare data
- Set 2 - 6 neighborhoods on cluster 4 tested similarity/dissimilarity from k-mean clustering method
- Clinton and Lincoln Square - on both - set 1 & set 2 – results
- Clinton, known as Hell's Kitchen, is a neighborhood on west of Midtown Manhattan, by 34th Street to the south, 59th Street to the north, Eighth Avenue to the Hudson River, adjacent to top5 attractions. Also perfect place to find Airbnb with the right price and enjoy bars and clubs at night.
- Lincoln Square is the home of Lincoln Center, a performing-arts venue with 30 indoor and outdoor performance facilities. Lincoln Square doesn't have popular venues among top 19 attractions having more than 2MM visitors, however, it has different venues in Lincoln Center complex and more art and cultural tourist destination.

Conclusion

- Two recommended neighborhoods - Clinton and Lincoln
- Additional factors like attractiveness of each location - real estate availability, prices, social and economic dynamics of neighborhood etc.
- Promote Korea tourism and culture to ~70MM by 2025 and ~8MM New Yorkers
- ~78MM target visitors to tourism office/center
- Resiliency of New York City after 9/11 and financial crisis