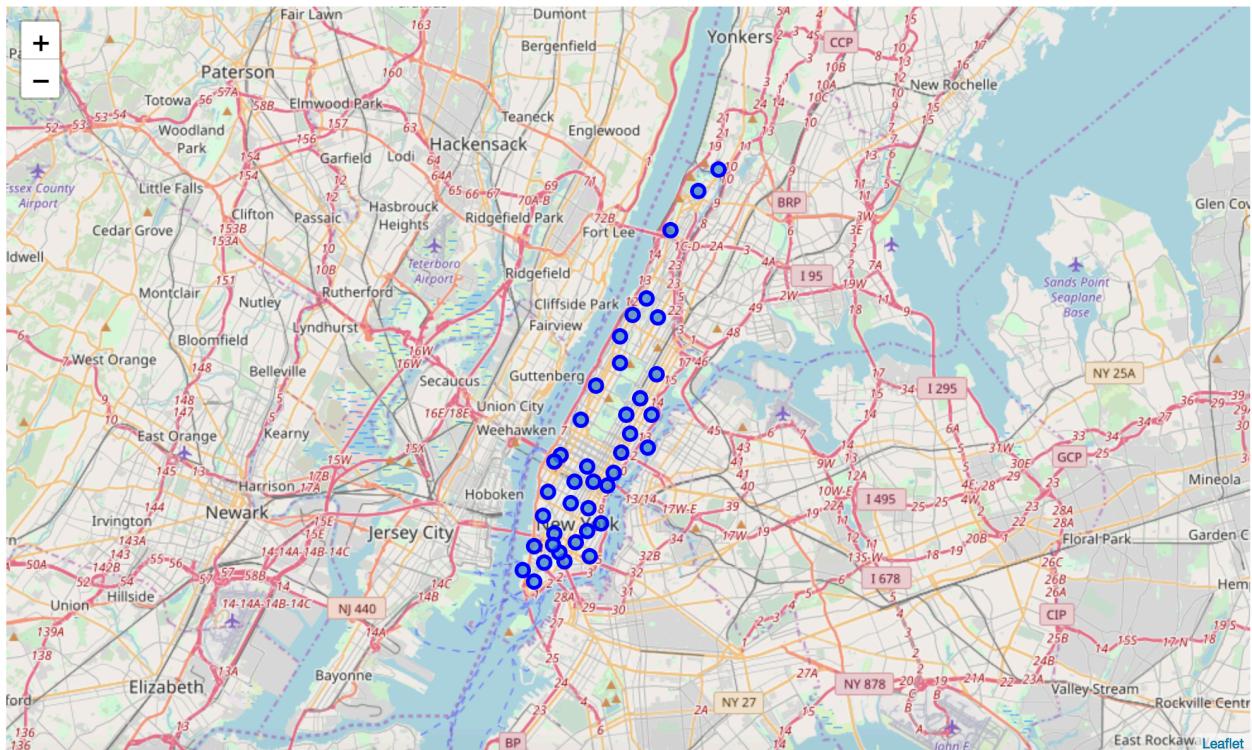


The Hotel Problem

In this presentation I will illustrate the steps to find the top 3 candidate neighborhoods to open a Hotel in Manhattan, New York.

- First step is to explore all neighborhoods in Manhattan, New York:



- Next we take a look at number of the Venues in each neighborhood (below is an example of a few):

	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Neighborhood						
Battery Park City	100	100	100	100	100	100
Carnegie Hill	100	100	100	100	100	100
Central Harlem	42	42	42	42	42	42
Chelsea	100	100	100	100	100	100
Chinatown	100	100	100	100	100	100
Civic Center	100	100	100	100	100	100
Clinton	100	100	100	100	100	100
East Harlem	43	43	43	43	43	43

- We further analyze each neighborhood with top 10 common venues for each:

	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	Battery Park City	Coffee Shop	Park	Hotel	Wine Shop	Italian Restaurant	Department Store	Clothing Store	Market	Burger Joint	Memorial Site
1	Carnegie Hill	Pizza Place	Coffee Shop	Cosmetics Shop	Café	Yoga Studio	Spa	Wine Shop	Bookstore	Japanese Restaurant	French Restaurant
2	Central Harlem	African Restaurant	Cosmetics Shop	French Restaurant	American Restaurant	Gym / Fitness Center	Chinese Restaurant	Seafood Restaurant	Pizza Place	Bookstore	Market
3	Chelsea	Coffee Shop	Italian Restaurant	Ice Cream Shop	Bakery	Nightclub	American Restaurant	Art Gallery	Theater	Hotel	Seafood Restaurant
4	Chinatown	Chinese Restaurant	Bubble Tea Shop	American Restaurant	Cocktail Bar	Vietnamese Restaurant	Dim Sum Restaurant	Hotpot Restaurant	Salon / Barbershop	Noodle House	Bakery
5	Civic Center	Gym / Fitness Center	Italian Restaurant	Bakery	French Restaurant	Yoga Studio	Sandwich Place	Spa	Park	Sporting Goods Shop	Cocktail Bar
6	Clinton	Theater	Coffee Shop	Italian Restaurant	American Restaurant	Gym / Fitness Center	Wine Shop	Gym	Hotel	Spa	French Restaurant
7	East Harlem	Mexican Restaurant	Bakery	Deli / Bodega	Latin American Restaurant	Thai Restaurant	Café	Beer Bar	Taco Place	Street Art	Dance Studio
8	East Village	Bar	Ice Cream Shop	Wine Bar	Mexican Restaurant	Cocktail Bar	Speakeasy	Ramen Restaurant	Chinese Restaurant	Pizza Place	Korean Restaurant

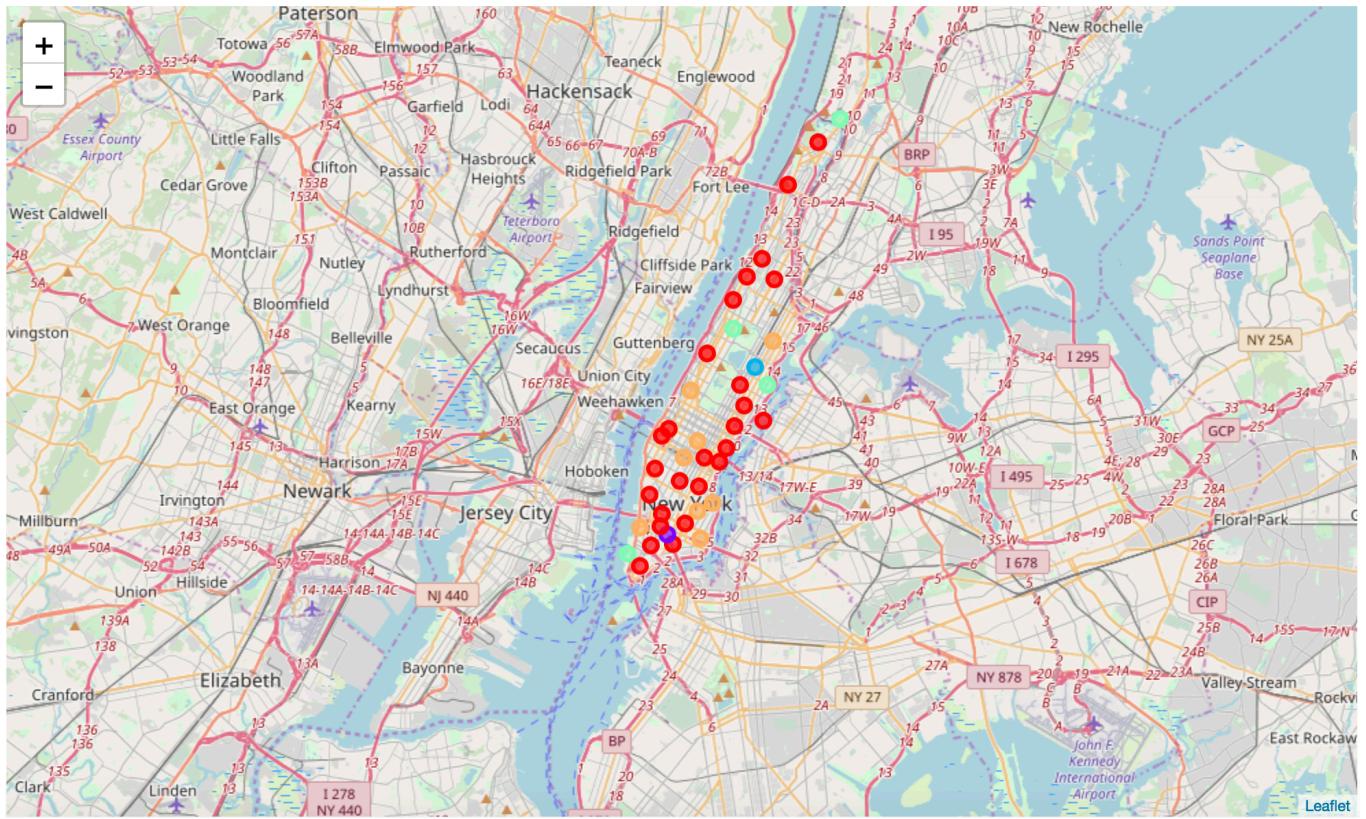
Later we eliminate neighborhoods with top common venue of “Hotel”

- Next we cluster neighborhoods (5 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
0	Manhattan	Marble Hill	40.876551	-73.910660	3	Discount Store	Coffee Shop	Yoga Studio	Pizza Place	Supplement Shop	Steakhouse	Shopping Mall
1	Manhattan	Chinatown	40.715618	-73.994279	0	Chinese Restaurant	Bubble Tea Shop	American Restaurant	Cocktail Bar	Vietnamese Restaurant	Dim Sum Restaurant	Hotpot Restaurant
2	Manhattan	Washington Heights	40.851903	-73.936900	0	Café	Bakery	Mobile Phone Shop	Sandwich Place	Pizza Place	Park	Mexican Restaurant
3	Manhattan	Inwood	40.867684	-73.921210	0	Café	Mexican Restaurant	Pizza Place	Lounge	Bakery	Deli / Bodega	Park
4	Manhattan	Hamilton Heights	40.823604	-73.949688	0	Mexican Restaurant	Coffee Shop	Café	Deli / Bodega	Pizza Place	Bakery	Cocktail Bar

Notice the “Cluster Labels”. There should be five clusters (0,1,2,3,4)

- Visualize the clusters on a map:



- After examining the clusters and eliminating neighborhoods without the “Park” as their common venue, we are left with 8 candidate neighborhoods for our hotel location.

	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
2	Washington Heights	Café	Bakery	Mobile Phone Shop	Sandwich Place	Pizza Place	Park	Mexican Restaurant	Shoe Store	Supermarket	Caribbean Restaurant
3	Inwood	Café	Mexican Restaurant	Pizza Place	Lounge	Bakery	Deli / Bodega	Park	Restaurant	Chinese Restaurant	Frozen Yogurt Shop
11	Roosevelt Island	Park	Sandwich Place	Greek Restaurant	Coffee Shop	Dry Cleaner	Liquor Store	Bus Station	Baseball Field	Plaza	Kosher Restaurant
24	West Village	Italian Restaurant	Cosmetics Shop	New American Restaurant	Gastropub	Wine Bar	Jazz Club	Park	American Restaurant	French Restaurant	Bakery
26	Morningside Heights	Coffee Shop	Park	Bookstore	American Restaurant	Deli / Bodega	Food Truck	Burger Joint	Sandwich Place	Tennis Court	Pizza Place
32	Civic Center	Gym / Fitness Center	Italian Restaurant	Bakery	French Restaurant	Yoga Studio	Sandwich Place	Spa	Park	Sporting Goods Shop	Cocktail Bar
21	Tribeca	Italian Restaurant	American Restaurant	Spa	Park	Café	Coffee Shop	Wine Bar	Boutique	Gym	Greek Restaurant
37	Stuyvesant Town	Bar	Park	Playground	Baseball Field	Pet Service	Gas Station	Harbor / Marina	Beer Garden	Cocktail Bar	Coffee Shop

- We then take a look at the frequency of the venues for each of our neighborhoods:

----West Village----

	venue	freq
0	Italian Restaurant	0.10
1	Cosmetics Shop	0.05
2	New American Restaurant	0.05
3	Jazz Club	0.04
4	Wine Bar	0.04
5	Gastropub	0.04
6	Bakery	0.03
7	Park	0.03
8	French Restaurant	0.03
9	American Restaurant	0.03

----Inwood----

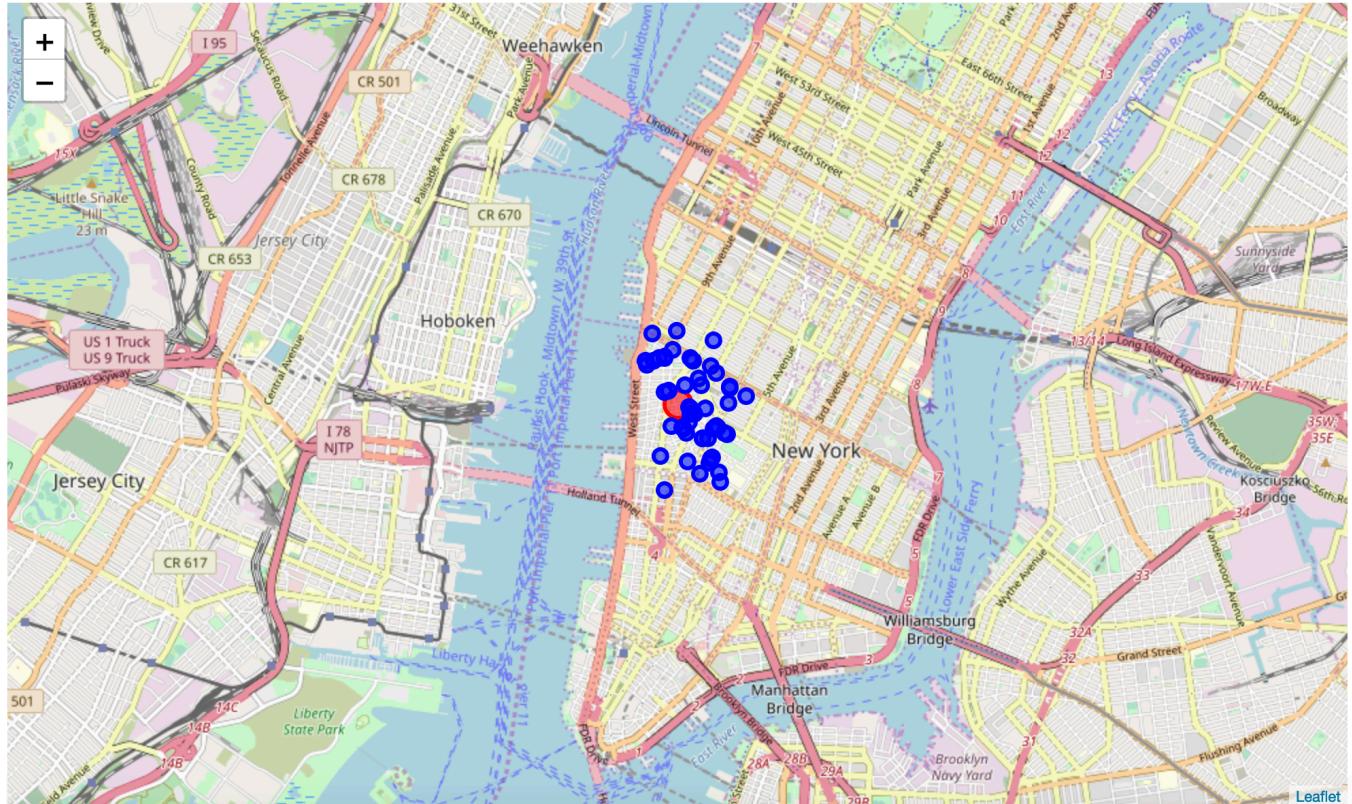
	venue	freq
0	Mexican Restaurant	0.07
1	Café	0.07
2	Deli / Bodega	0.05
3	Lounge	0.05
4	Pizza Place	0.05
5	Bakery	0.04
6	Frozen Yogurt Shop	0.04
7	Restaurant	0.04
8	American Restaurant	0.04
9	Wine Bar	0.04

----Tribeca----

	venue	freq
0	Italian Restaurant	0.06
1	American Restaurant	0.05
2	Spa	0.04
3	Café	0.04
4	Park	0.04
5	Wine Bar	0.03
6	Greek Restaurant	0.03
7	Gym	0.03
8	Coffee Shop	0.03
9	Boutique	0.03

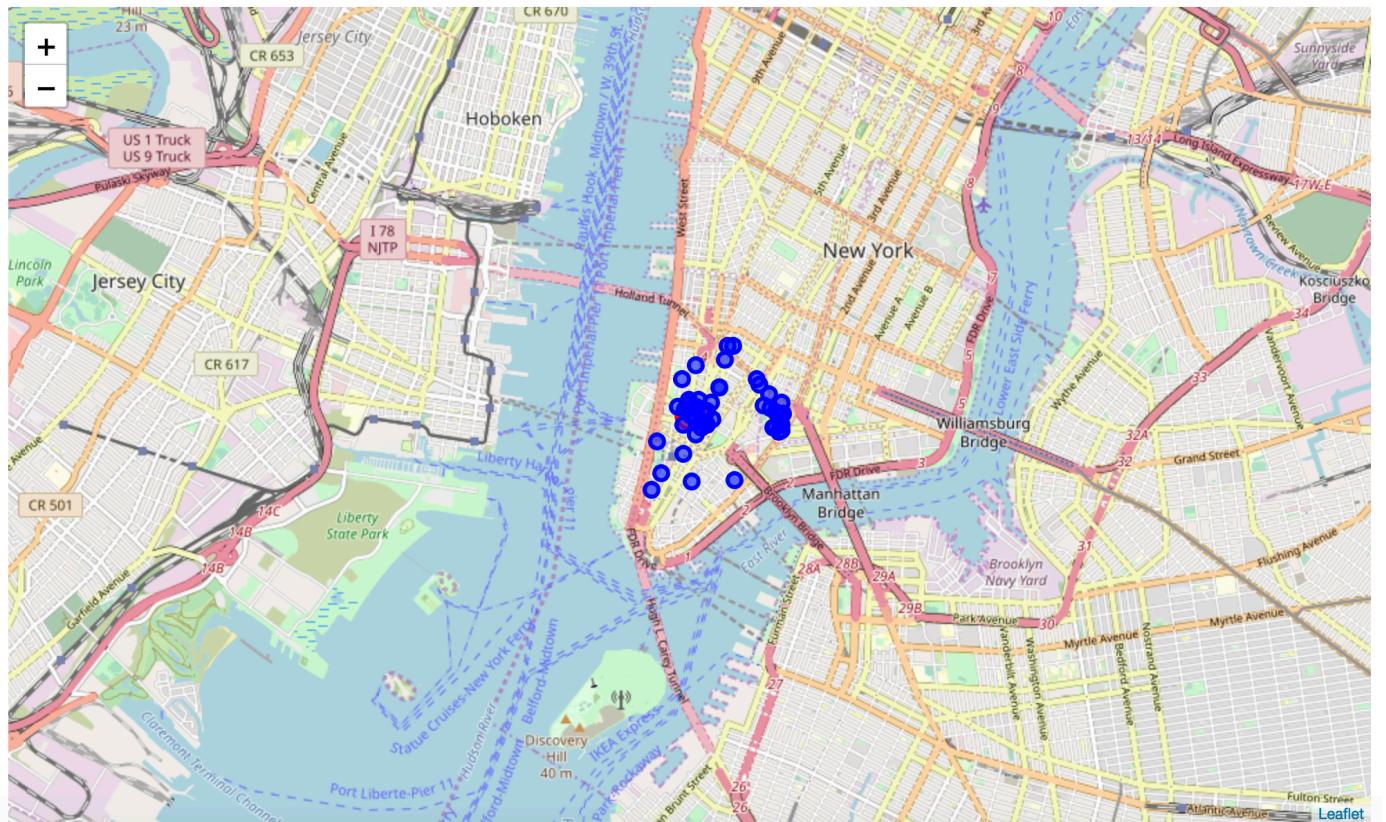
- After detailed analysis using foursquare API we narrowed down our candidates for neighborhoods to 3, based on the concentration/density of restaurants and shops.

- Here is a look at “West Village” restaurant concentration:



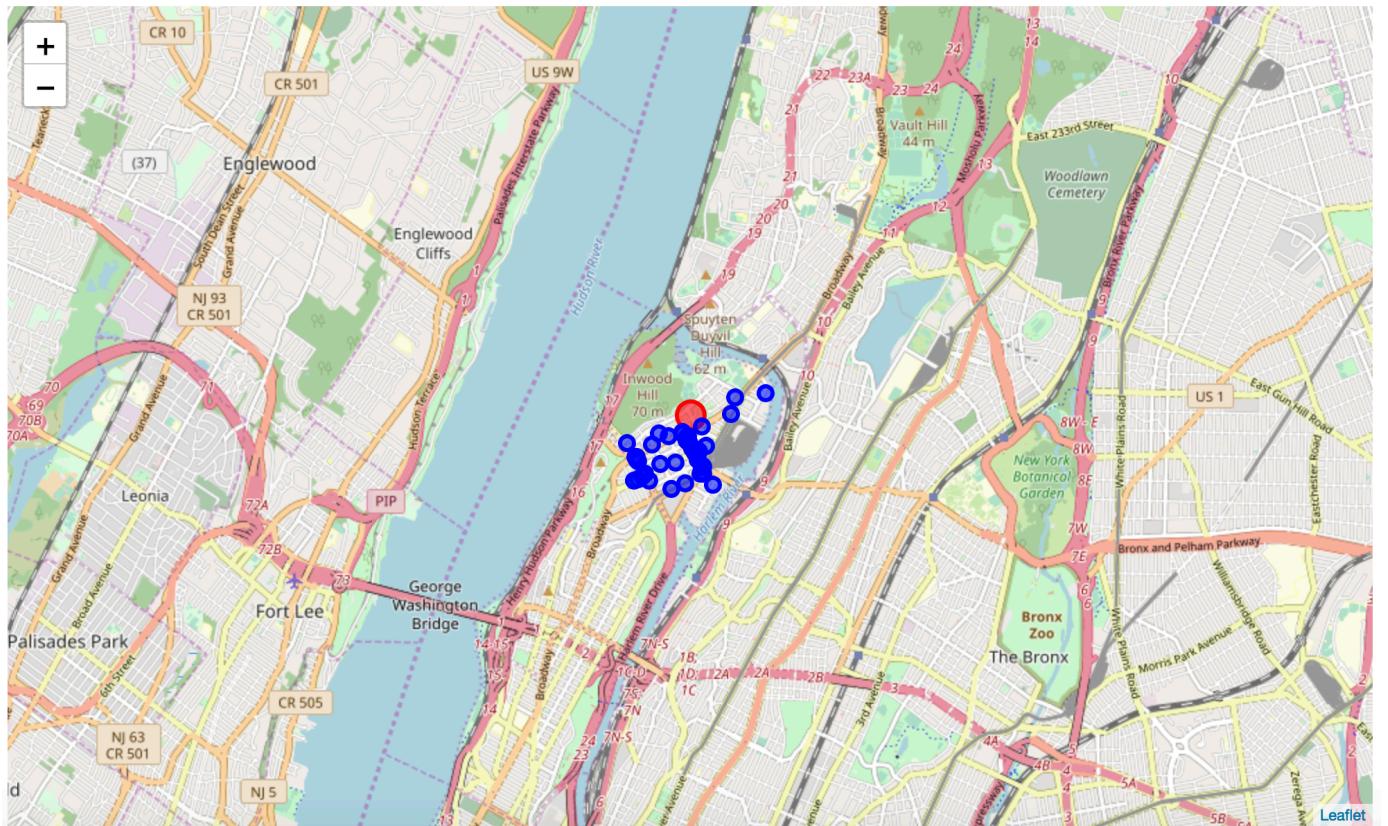
The red circle represents “West Village” and the blue circles represent the restaurants.

- Here is a look at “Tribeca” restaurant concentration:



The red Circle represents “Tribeca” and blue circles represent the restaurants.

- Here is a look at “Inwoods” restaurant concentration:



- Same analysis is carried out for the shops concentration.
- As a result of our analysis these are the top 3 candidates for our hotel location. Less hotels in these 3 neighborhoods (1 major hotel in Inwoods area and only handful in the other 2), closeness to parks, landmarks and having a high density per area for restaurants and shops, make these neighborhoods a perfect candidate for a hotel location.