PREDICTING THE BEST AREA FOR A NEW CONSTRUCTION BUILDING IN NEW YORK

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- Generally, New York is a city that has a significant impact on marketing, economy, information, art, fashion, research, technology, education and entertainment.

- It is very important to finding areas for new buildings which can better accommodate the above assumptions and all these needs.

- Predicting the area for construction of new buildings improvement the estate has big value and covers human needs.

- Target on constructions companies.

- people who search for a new building which provides many benefits.

DATA ACQUISITION AND CLEANING

- The value for buildings in New York can be found from Kaggle dataset <u>here</u>.
- Dataset about the neighbourhoods and locations of New York from <u>here</u>.
- Foursquare API for the venues in neighbourhoods of Manhattan.
- In total from the first dataset, 27,312 rows and 8 features in the data.
- In total from the second dataset, 306 rows and 4 features in the data.

RELATIONSHIP BETWEEN BOROCODE AND ORIGINAL MARKET VALUE

Borough with the highest value
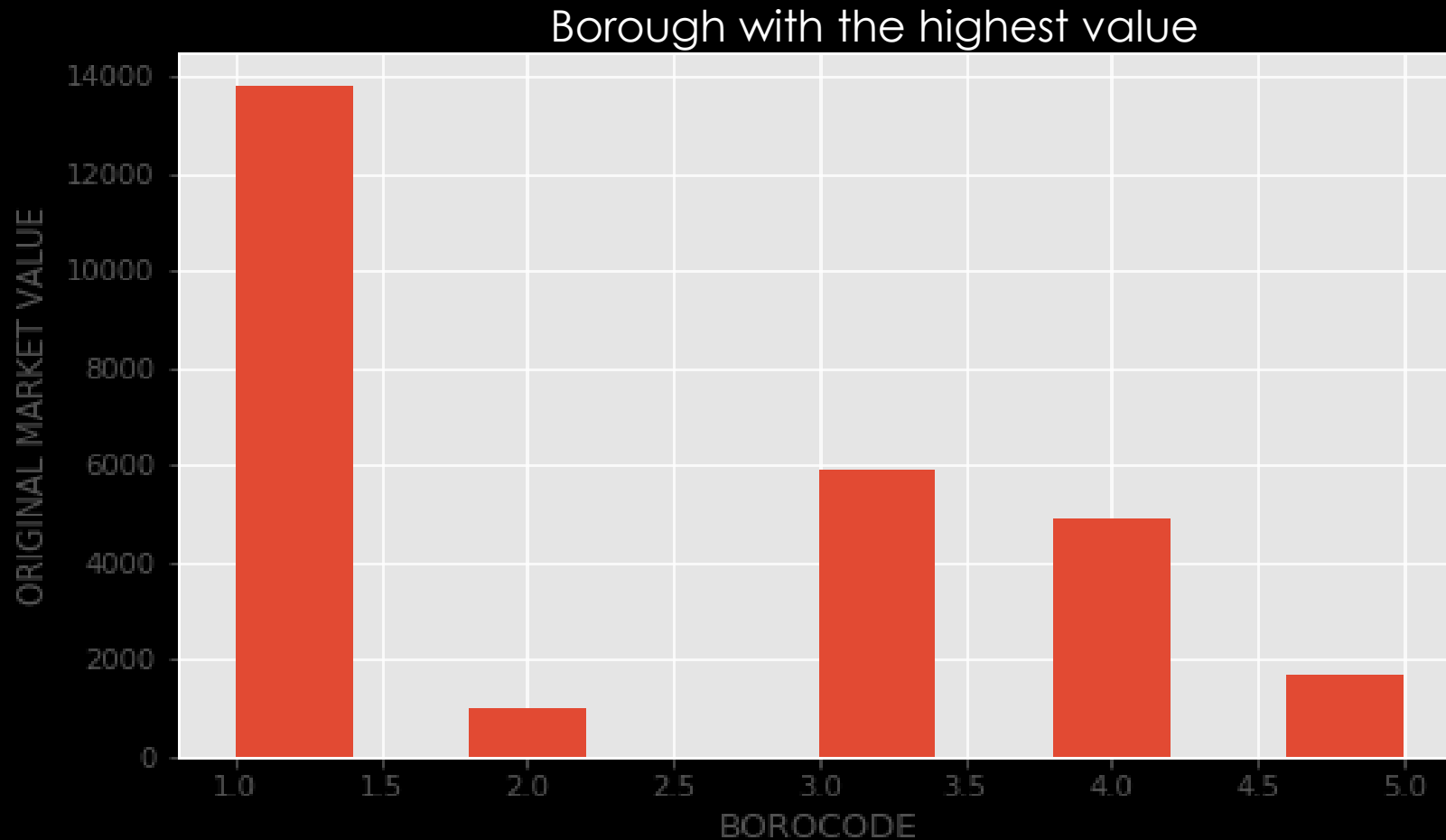
Manhattan has a big difference in the value of the other boroughs (Bronx, Brooklyn, Queens, and 5: Staten Island).

RELATIONSHIP BETWEEN POSTCODE AND ORIGINAL MARKET VALUE

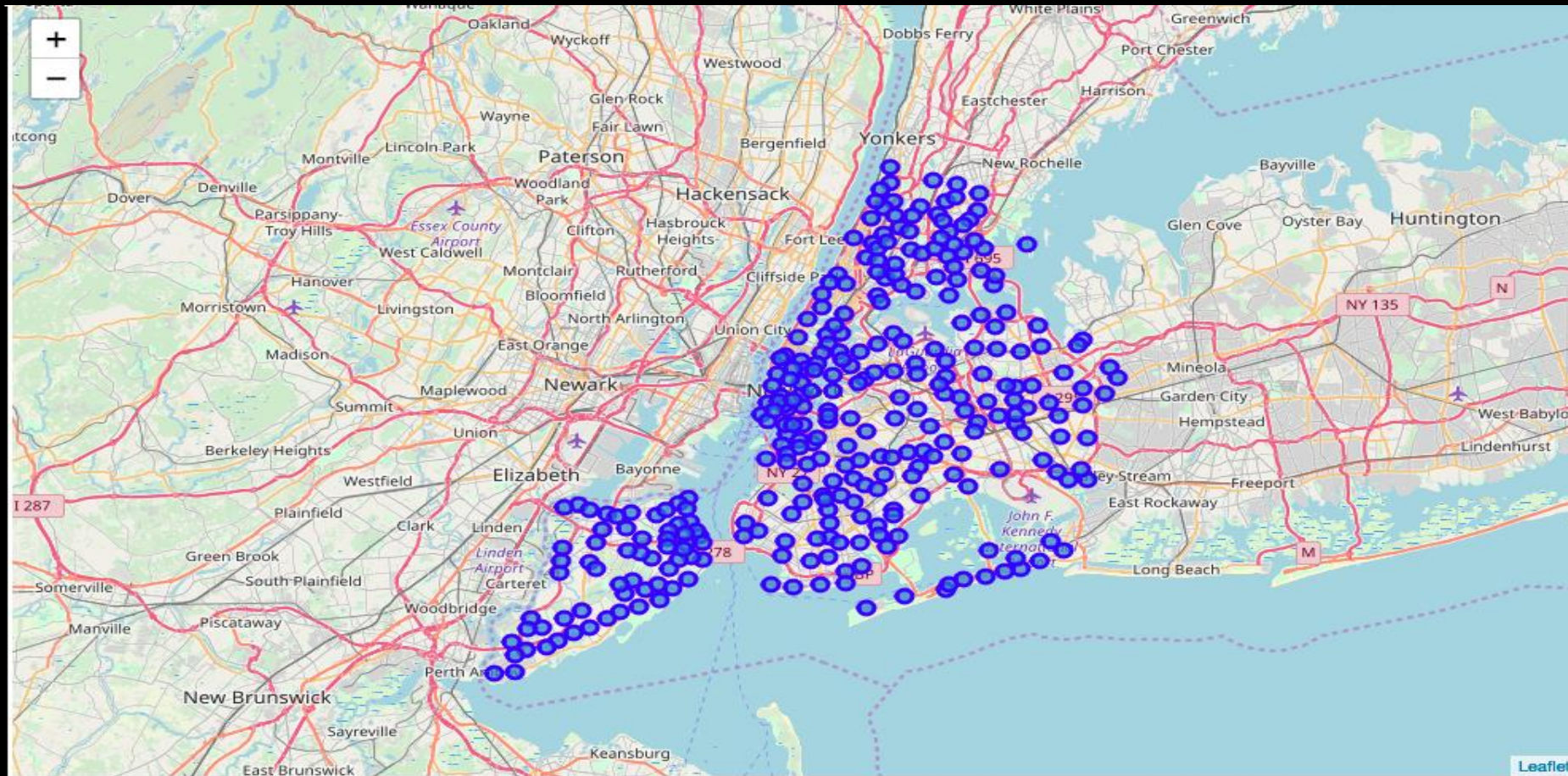Top 15 postcode with the highest mean values in Manhattan.
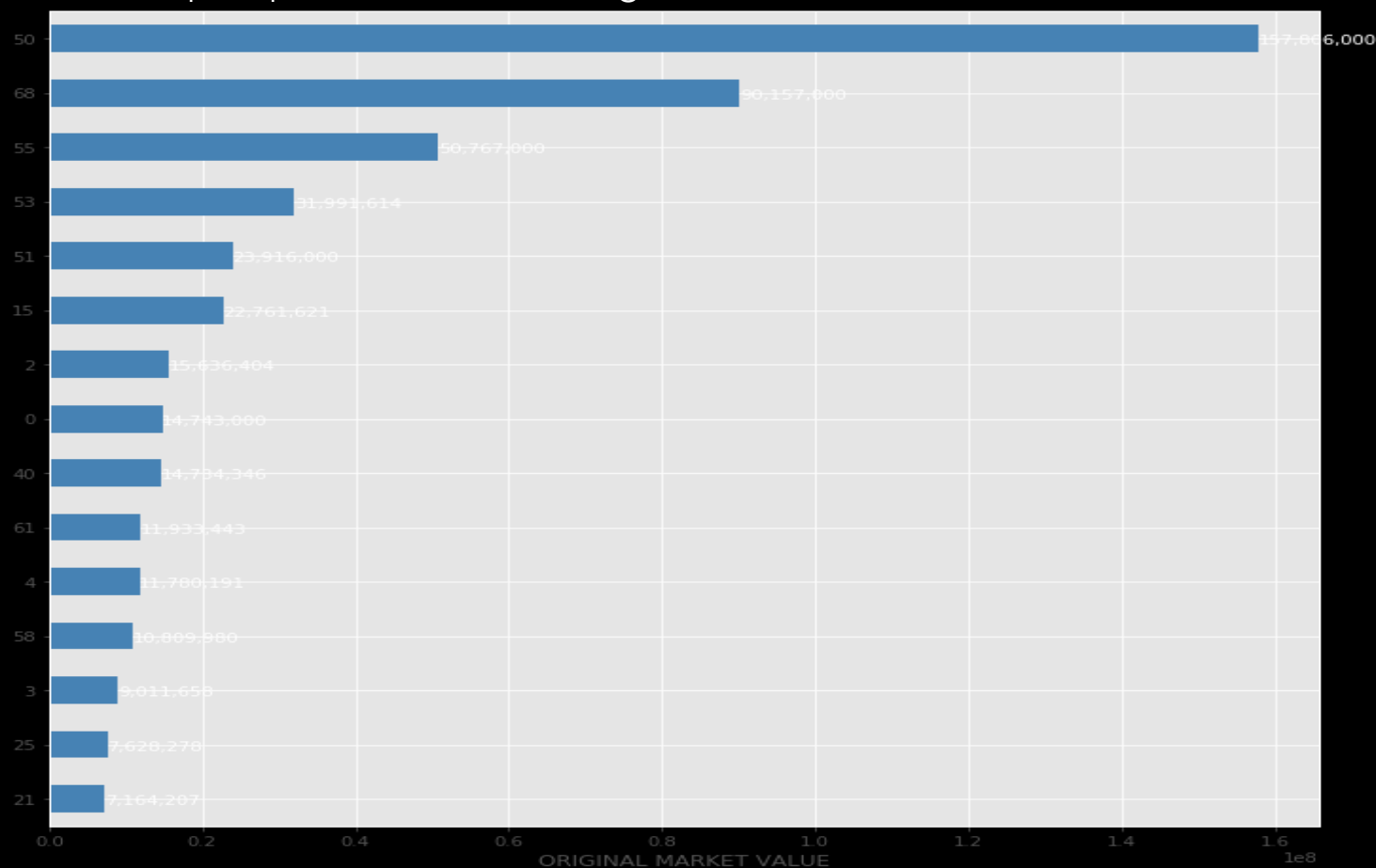
The postcode 10120.0 has the highest mean value of 158 million dollars and corresponds Midtown South neighbourhood of Manhattan.

MAPPING VISUALIZATION OF NEW YORK

New York map

MAPPING VISUALIZATION OF MANHATTAN

Manhattan map
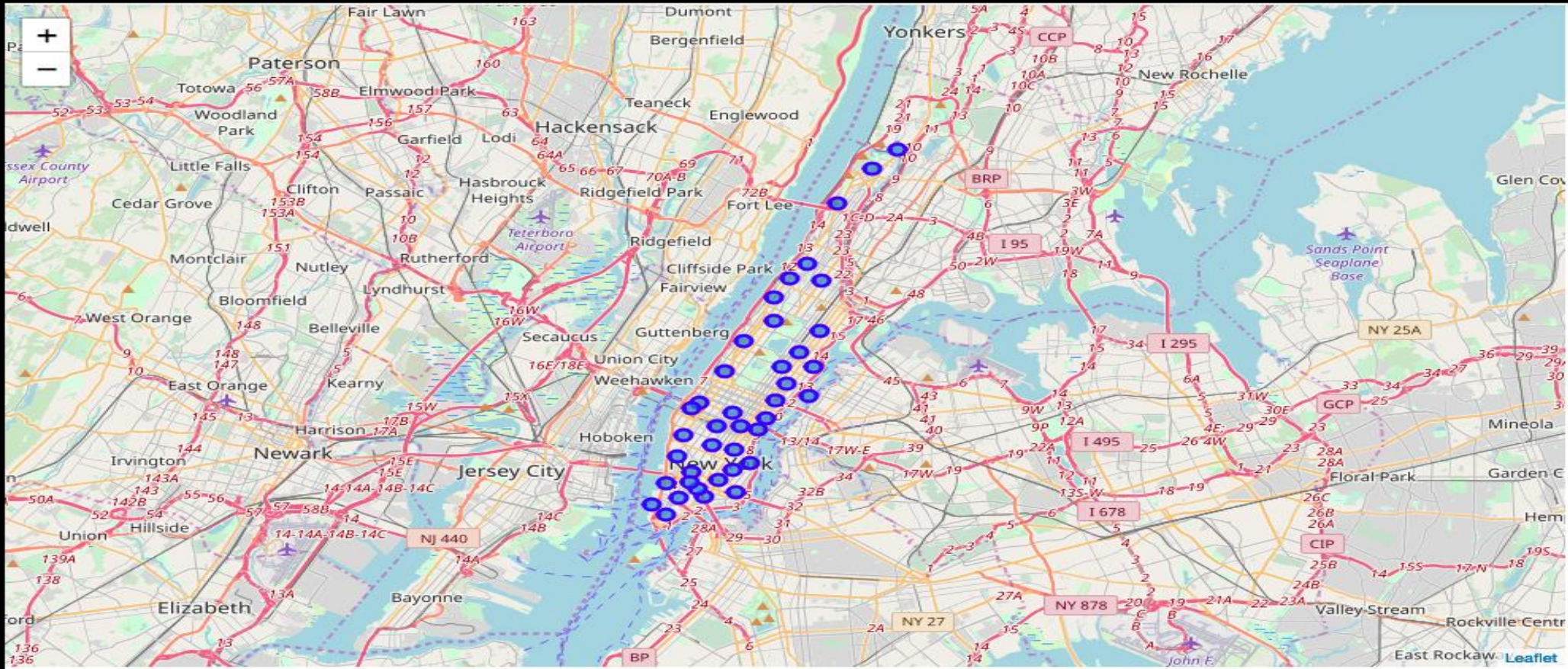
CLUSTERING MODEL

Clusters map

Five K-means Clustering which grouped the top 10 venues for each neighborhood into clusters and defines a cluster center for each cluster. These Clusters centers are the centroids of each cluster and are at a minimum distance from all the points of a particular cluster. Henceforth, the top ten venues will be at minimum distance from all the neighborhoods within a cluster.

RESULTS FOR EACH CLUSTER

Cluster 1

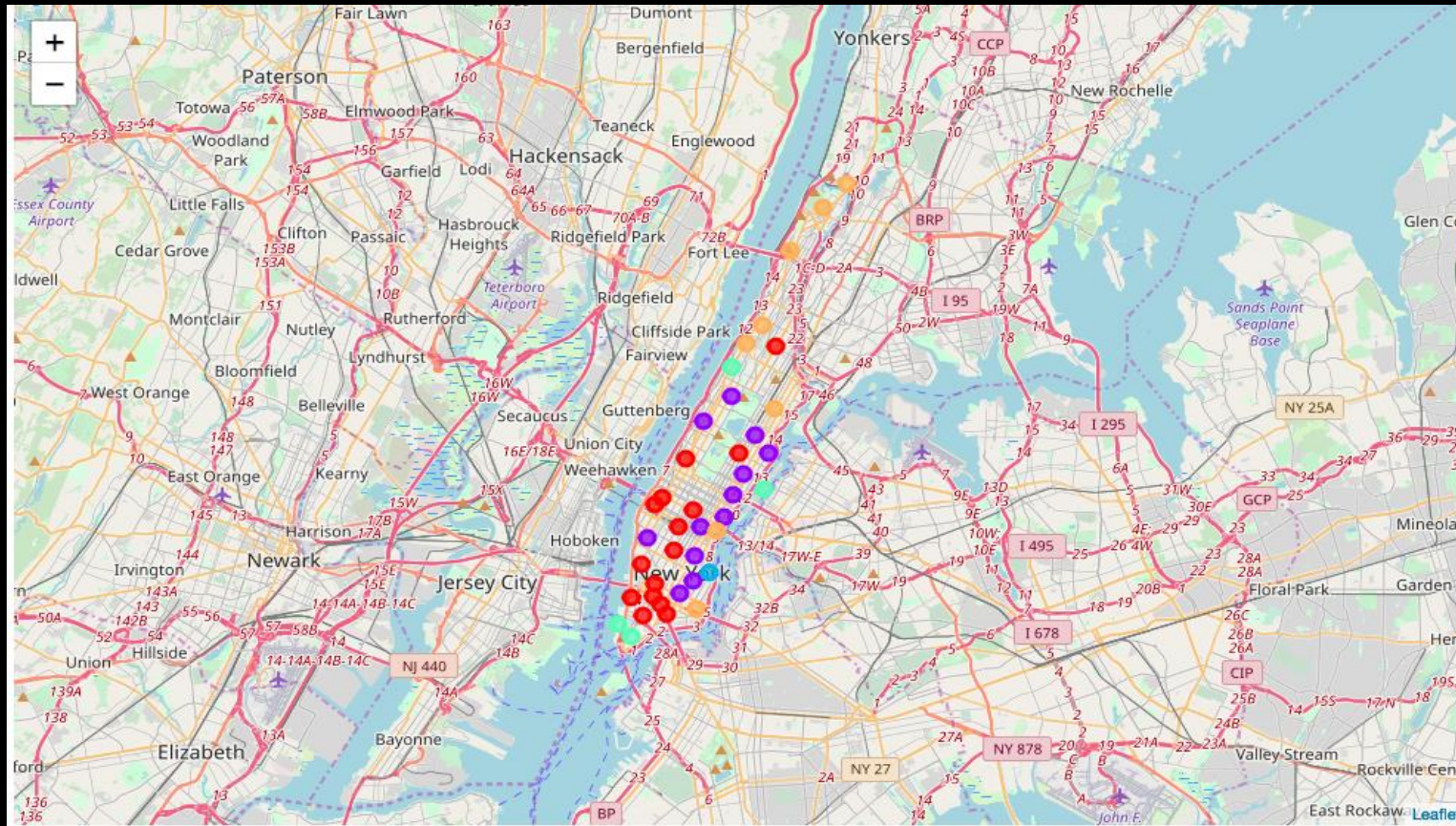|	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
1	Chinatown	Chinese Restaurant	Bubble Tea Shop	American Restaurant	Dim Sum Restaurant	Vietnamese Restaurant	Cocktail Bar	Hotpot Restaurant	Bakery	Noodle House	Salon / Barbershop
6	Central Harlem	African Restaurant	Seafood Restaurant	Fried Chicken Joint	American Restaurant	French Restaurant	Gym / Fitness Center	Chinese Restaurant	Cosmetics Shop	Bookstore	Library
8	Upper East Side	Italian Restaurant	Exhibit	Art Gallery	Bakery	Coffee Shop	Juice Bar	Boutique	French Restaurant	Gym / Fitness Center	Hotel
13	Lincoln Square	Gym / Fitness Center	Theater	Plaza	Italian Restaurant	Concert Hall	Café	French Restaurant	Indie Movie Theater	Opera House	Performing Arts Venue
14	Clinton	Theater	Italian Restaurant	American Restaurant	Gym / Fitness Center	Coffee Shop	Hotel	Wine Shop	Spa	Gym	Indie Theater
15	Midtown	Clothing Store	Hotel	Theater	Coffee Shop	Steakhouse	Bakery	Spa	Cocktail Bar	Bookstore	American Restaurant
18	Greenwich Village	Italian Restaurant	French Restaurant	Sushi Restaurant	Clothing Store	Chinese Restaurant	Indian Restaurant	Seafood Restaurant	Café	Boutique	Caribbean Restaurant
21	Tribeca	Italian Restaurant	American Restaurant	Park	Café	Spa	Gym	Boutique	Coffee Shop	Wine Bar	Greek Restaurant
22	Little Italy	Bakery	Café	Yoga Studio	Ice Cream Shop	Sandwich Place	Salon / Barbershop	Seafood Restaurant	Chinese Restaurant	Bubble Tea Shop	Clothing Store
23	Soho	Clothing Store	Boutique	Women's Store	Shoe Store	Men's Store	Italian Restaurant	Art Gallery	Coffee Shop	Mediterranean Restaurant	Seafood Restaurant
24	West Village	Italian Restaurant	Cosmetics Shop	New American Restaurant	Wine Bar	Jazz Club	Gastropub	Park	French Restaurant	Bakery	American Restaurant
32	Civic Center	Gym / Fitness Center	Italian Restaurant	Bakery	Cocktail Bar	French Restaurant	Sporting Goods Shop	Coffee Shop	Gym	Park	Sandwich Place
33	Midtown South	Korean Restaurant	Coffee Shop	Cosmetics Shop	Japanese Restaurant	Hotel Bar	Hotel	Italian Restaurant	Gym / Fitness Center	Bakery	Boutique
38	Flatiron	Italian Restaurant	Gym / Fitness Center	American Restaurant	Gym	Yoga Studio	Clothing Store	Cycle Studio	Japanese Restaurant	Dessert Shop	Cosmetics Shop
39	Hudson Yards	Italian Restaurant	Coffee Shop	Theater	Gym / Fitness Center	Restaurant	Café	Hotel	American Restaurant	Art Gallery	Gym

From cluster one we observe fifteen different neighborhoods with the top 10 common venues.

Cluster 2

	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
9	Yorkville	Italian Restaurant	Coffee Shop	Bar	Gym	Pizza Place	Deli / Bodega	Japanese Restaurant	Mexican Restaurant	Sushi Restaurant	Park
10	Lenox Hill	Italian Restaurant	Sushi Restaurant	Coffee Shop	Gym / Fitness Center	Pizza Place	Burger Joint	Gym	Sporting Goods Shop	Mexican Restaurant	Café
12	Upper West Side	Italian Restaurant	Bar	Indian Restaurant	Vegetarian / Vegan Restaurant	Burger Joint	Coffee Shop	Bakery	Wine Bar	Mediterranean Restaurant	Sushi Restaurant
16	Murray Hill	Coffee Shop	Hotel	Italian Restaurant	Salon / Barbershop	Sandwich Place	Spa	Bar	Japanese Restaurant	Gym	French Restaurant
17	Chelsea	Coffee Shop	Italian Restaurant	Ice Cream Shop	American Restaurant	Nightclub	Bakery	Seafood Restaurant	Theater	Hotel	Tapas Restaurant
19	East Village	Bar	Ice Cream Shop	Wine Bar	Cocktail Bar	Mexican Restaurant	Ramen Restaurant	Chinese Restaurant	Coffee Shop	Pizza Place	Speakeasy
25	Manhattan Valley	Coffee Shop	Pizza Place	Mexican Restaurant	Spa	Thai Restaurant	French Restaurant	Indian Restaurant	Deli / Bodega	Yoga Studio	Café
27	Gramercy	Italian Restaurant	Cocktail Bar	American Restaurant	Wine Shop	Bagel Shop	Coffee Shop	Restaurant	Pizza Place	Mexican Restaurant	Thrift / Vintage Store
30	Carnegie Hill	Pizza Place	Coffee Shop	Cosmetics Shop	Café	Yoga Studio	Wine Shop	Bar	Bookstore	French Restaurant	Spa
31	Noho	Italian Restaurant	French Restaurant	Cocktail Bar	Bookstore	Grocery Store	Gift Shop	Mexican Restaurant	Sushi Restaurant	Hotel	Coffee Shop
34	Sutton Place	Gym / Fitness Center	Italian Restaurant	Furniture / Home Store	Juice Bar	Indian Restaurant	Dessert Shop	Bakery	American Restaurant	Boutique	Coffee Shop
35	Turtle Bay	Italian Restaurant	Sushi Restaurant	Hotel	Wine Bar	Coffee Shop	Japanese Restaurant	Café	Steakhouse	Park	French Restaurant

From cluster two we observe twelve different neighborhoods with the top 10 common venues.

Cluster 3

	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	Stuyvesant Town	Bar	Playground	Park	Basketball Court	Farmers Market	Coffee Shop	German Restaurant	Cocktail Bar	Boat or Ferry	Pet Service

From cluster three we observe one neighborhoods with the top 10 common venues.

Cluster 4

	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
11	Roosevelt Island	Sandwich Place	Park	Liquor Store	Athletics & Sports	Bus Station	Supermarket	Farmers Market	Metro Station	Outdoors & Recreation	School
26	Morningside Heights	Coffee Shop	Park	Bookstore	Food Truck	American Restaurant	Burger Joint	Sandwich Place	Deli / Bodega	Tennis Court	College Cafeteria
28	Battery Park City	Coffee Shop	Park	Hotel	Italian Restaurant	Wine Shop	Cupcake Shop	Food Truck	BBQ Joint	Food Court	Department Store
29	Financial District	Coffee Shop	Hotel	Wine Shop	Steakhouse	Gym	Bar	Café	Pizza Place	Food Truck	Italian Restaurant

From cluster four we observe four different neighborhoods with the top 10 common venues.

Cluster 5

	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	Marble Hill	Discount Store	Coffee Shop	Diner	Seafood Restaurant	Tennis Stadium	Gym	Bank	Sandwich Place	Donut Shop	Supplement Shop
2	Washington Heights	Café	Bakery	Mobile Phone Shop	Shoe Store	Pizza Place	Deli / Bodega	Sandwich Place	Supermarket	Park	Tapas Restaurant
3	Inwood	Mexican Restaurant	Café	Lounge	Pizza Place	Bakery	Deli / Bodega	Wine Bar	Pharmacy	American Restaurant	Park
4	Hamilton Heights	Mexican Restaurant	Coffee Shop	Café	Deli / Bodega	Pizza Place	Liquor Store	Indian Restaurant	Sushi Restaurant	Park	Sandwich Place
5	Manhattanville	Deli / Bodega	Italian Restaurant	Mexican Restaurant	Seafood Restaurant	Fried Chicken Joint	Beer Garden	Bike Trail	Sushi Restaurant	Supermarket	Burger Joint
7	East Harlem	Mexican Restaurant	Bakery	Deli / Bodega	Latin American Restaurant	Thai Restaurant	Seafood Restaurant	Taco Place	Street Art	Steakhouse	Pizza Place
20	Lower East Side	Coffee Shop	Chinese Restaurant	Café	Shoe Store	Bakery	Cocktail Bar	Latin American Restaurant	Pizza Place	Ramen Restaurant	Art Gallery
36	Tudor City	Mexican Restaurant	Park	Greek Restaurant	Café	Pizza Place	Dog Run	Diner	Hotel	Deli / Bodega	Spanish Restaurant

From cluster five we observe eight different neighborhoods with the top 10 common.

RESULTS

From the analysis, I conclude that the best borough of Manhattan for new construction is the neighborhoods from the cluster one. Cluster 1 gives us information for those neighborhoods which have the most benefits and in combination with the high market value of Manhattan, the new buildings will be extremely competitive in the real estate market.

CONCLUSION AND FUTURE DIRECTIONS

- Built a useful model to predict appropriate neighborhoods for new construction.

- Accuracy of the model has room for improvement.

- Capture more of venues of Manhattan.

- Ideas include:
  - Financial data (original market value)
  - location data (latitude, longitude, etc.)
  - venues data (API Foursquare)