

APPLIED DATA SCIENCE CAPSTONE PROJECT (COURSERA) STORE LOCATION ANALYSIS

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1. INTRODUCTION

Background

A family owned furniture business is facing challenges due to sudden lockdown initiated to control COVID-19 spread. Being a brick and mortar store based out Vinings, Atlanta it is vital to keep costs down to ensure sufficient cash flow. Their primary suppliers and vendors are based out of New York and the uneven lockdowns have disrupted their supply chain

Business Challenge

Unfortunately the store fell victim to ongoing unrest and incurred significant damage due to rioting and looting. The management has hereby decided to move the store due following reasons:

1. Lack of timely state aid to deal with damage
2. Closer to suppliers helps to reduce shipping costs
3. Current lease is about to expire

The store is quite popular among older demographic with families who have high household income. They have also launched a new brand to attract Millennials and is just getting noticed and are scouting locations in Brooklyn, New York City to find ideal location to establish their store. They also intend to have a clear picture of their competitors in each neighborhood

2. DATA SOURCES

S.No	Analysis	Data Source	Comment
1.	Competitor Locations	Foursquare	Plotting competitor locations around prospective site
2.	Venue Profile	Foursquare	Venue Profile in Neighborhoods
3.	Demographic <ul style="list-style-type: none">• Population• Age• HH Income	Statisticalatlas.com	Detailed view on Brooklyn Demographics
4.	Demographic-Vinings	niche.com/places-to-live worldpopulationreview.com/us-cities/	Vinings Profile

3. METHODOLOGY

1. Profile Venues in Current Store Location

- Obtain detailed view on various types of Retail Stores in and around current store location in Vinings, GA

2. Neighborhood Clustering

- In Brooklyn, Cluster Neighborhoods based on venue profile from Foursquare Data
- Compare and Contrast with Vinings, GA

3. Selection of Final Neighborhood

- Population
- Age
- HH Income
- Competitor Presence (1000m radius)

3.1 VININGS, GA

Foursquare Data

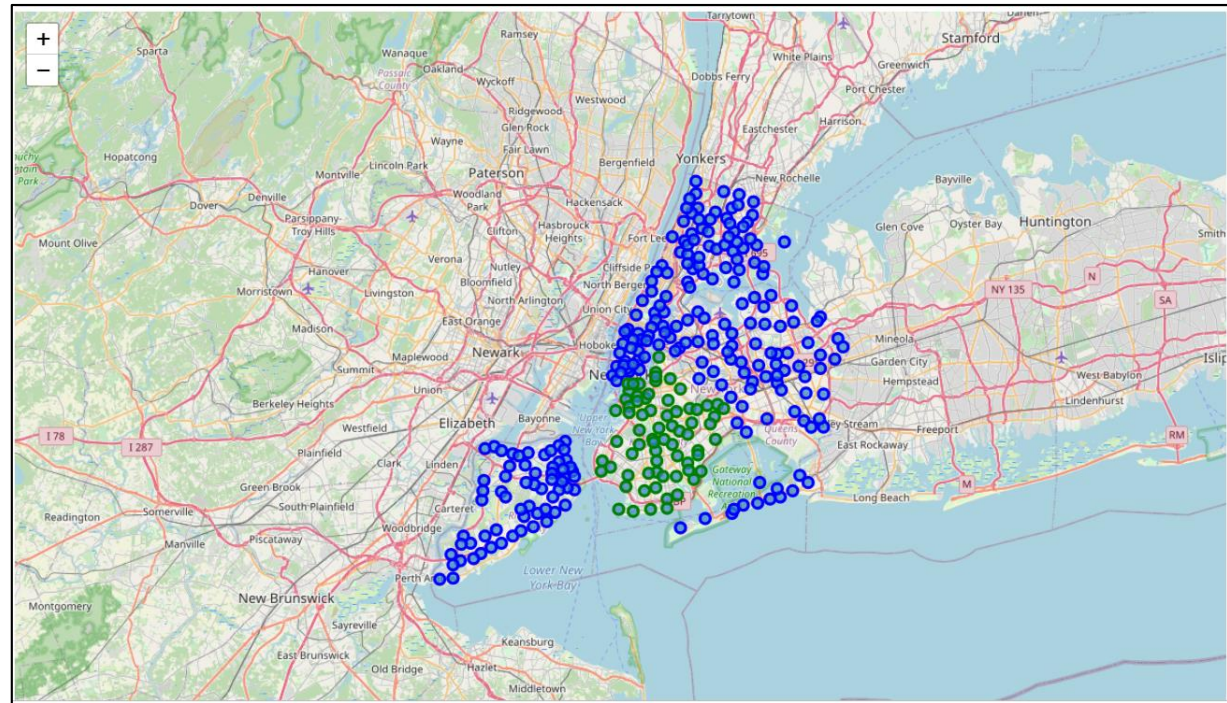
- Our Furniture Store is located at **'2860 Cumberland Mall SE, Atlanta, GA 30339, United States'**
- Vinings has population with Median Age of 34.3 years
- Neighborhood is dominated by presence of Clothing Stores, Hotels, American and Italian Restaurants, Cosmetics, Jewelry and Shoe Stores
- 76 venues exist within a radius of 500m of our store

	Measure
Population	13086.00
Growth Rate (%)	34.44
Median Age	34.30
Median HH Income (\$)	46201.00
Unemployment Rate(%)	2.40
Homeownership Rate(%)	34.40
Marriage Rate(%)	40.60

categories	
Clothing Store	8
Hotel	5
American Restaurant	5
Cosmetics Shop	5
Jewelry Store	3
Shoe Store	3
Italian Restaurant	2
Kids Store	2
Lingerie Store	2
Men's Store	2
Sandwich Place	2
Wings Joint	2
Bakery	2
Restaurant	2
Chinese Restaurant	1
Grocery Store	1
Coffee Shop	1
Convention Center	1
Bus Station	1
Deli / Bodega	1
Department Store	1
Breakfast Spot	1
Boutique	1
Bank	1
Electronics Store	1
Asian Restaurant	1
Food Court	1
Juice Bar	1
Intersection	1
Smoke Shop	1
Video Game Store	1
Theme Restaurant	1
Supplement Shop	1
Spa	1
Snack Place	1
Smoothie Shop	1
Shopping Mall	1
Warehouse Store	1
Seafood Restaurant	1
Pizza Place	1

3.2 NEIGHBORHOOD CLUSTERING

- New York City has a total 306 Neighborhoods and 5 Boroughs
- Store Management have decided to move to Brooklyn (Green)
- Choose best neighborhood in Brooklyn based on Foursquare Data and other factors like Population, Age, HH Income and Competitors

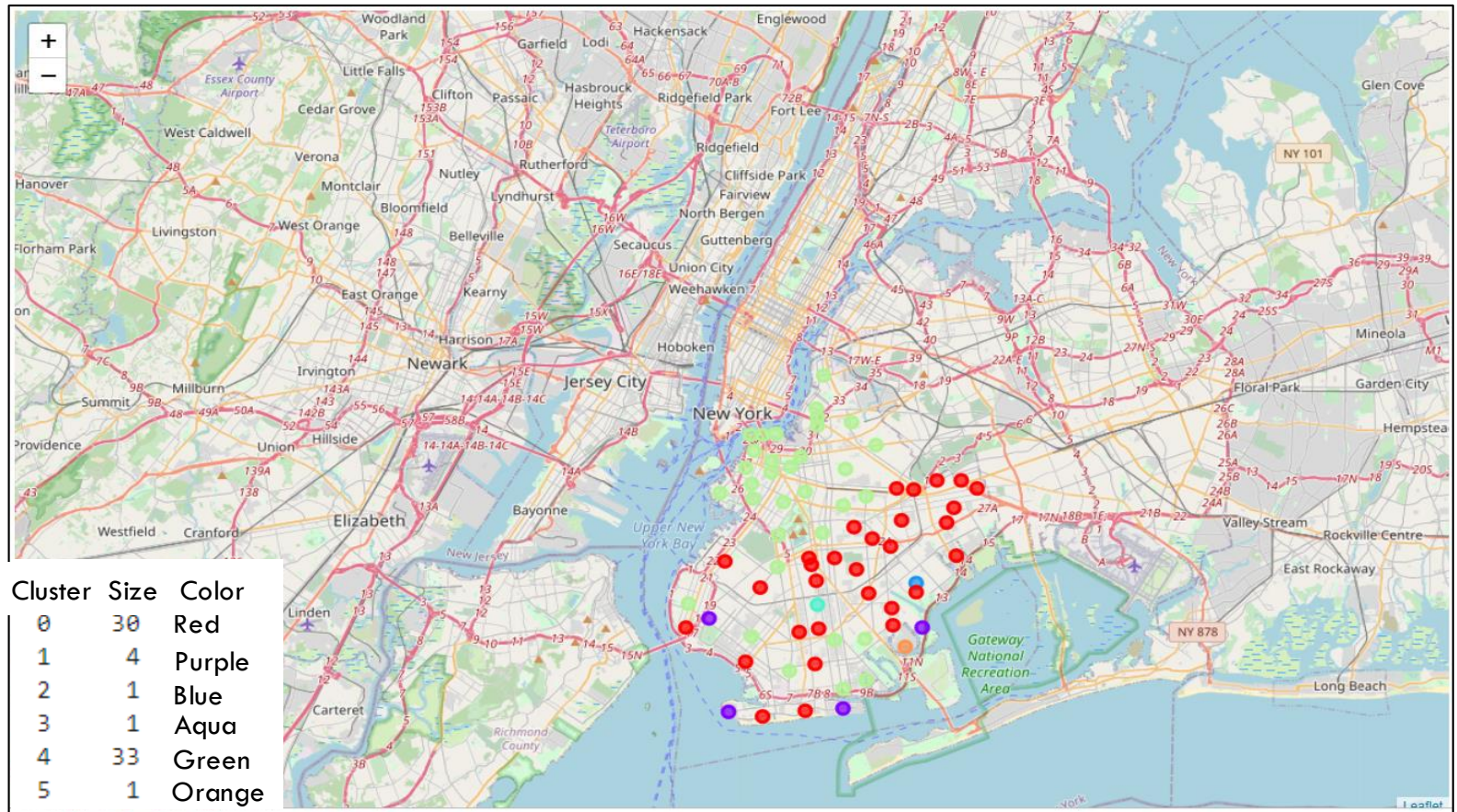


3.3 FINAL SELECTION

- Need to understand how similar or dissimilar are the neighborhoods w.r.t to each other and Vinings location
- After selecting best cluster, identify top neighborhood in it based on Population, Age, HH Income
- Analyzing Furniture Competitors presence is also crucial before making final decision

1

Division of 70 Brooklyn Neighborhoods into 6 different Clusters based on Elbow Plot and feasibility of study



4. RESULTS —INDIVIDUAL CLUSTER VIEW

Cluster-0 (Red)

```
Brooklyn_merged.loc[Brooklyn_merged['Cluster Labels'] == 0, Brooklyn_merged.columns[[1] + list(range(5, Brooklyn_merged.shape[1]))]].head(10)
```

	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	Sunset Park	Pizza Place	Mobile Phone Shop	Latin American Restaurant	Bank	Bakery	Mexican Restaurant	Fried Chicken Joint	Deli / Bodega	Gym	Video Game Store
5	Brighton Beach	Restaurant	Russian Restaurant	Beach	Eastern European Restaurant	Bank	Gourmet Shop	Sushi Restaurant	Mobile Phone Shop	Mediterranean Restaurant	Bakery
7	Manhattan Terrace	Pizza Place	Ice Cream Shop	Donut Shop	Cosmetics Shop	Spa	Jazz Club	Bakery	Bagel Shop	Grocery Store	Steakhouse
8	Flatbush	Coffee Shop	Chinese Restaurant	Mexican Restaurant	Juice Bar	Caribbean Restaurant	Bank	Lounge	Bagel Shop	Donut Shop	Grocery Store
10	East Flatbush	Moving Target	Supermarket	Liquor Store	Caribbean Restaurant	Park	Chinese Restaurant	Fast Food Restaurant	Pharmacy	Department Store	Food & Drink Shop
14	Brownsville	Chinese Restaurant	Moving Target	Spanish Restaurant	Fried Chicken Joint	Playground	Pizza Place	Convenience Store	Pharmacy	Restaurant	Performing Arts Venue
25	Cypress Hills	Fried Chicken Joint	Spanish Restaurant	Latin American Restaurant	Pizza Place	Ice Cream Shop	Donut Shop	Fast Food Restaurant	Metro Station	Coffee Shop	Discount Store
26	East New York	Deli / Bodega	Asian Restaurant	Fried Chicken Joint	Metro Station	Bus Station	Fast Food Restaurant	Caribbean Restaurant	Latin American Restaurant	Music Venue	Plaza
27	Starrett City	Supermarket	Pharmacy	Liquor Store	Caribbean Restaurant	Pizza Place	American Restaurant	Convenience Store	Bus Stop	Bus Station	River
29	Flatlands	Pharmacy	Caribbean Restaurant	Fried Chicken Joint	Fast Food Restaurant	Nightclub	Lounge	Bar	Paper / Office Supplies Store	Park	Chinese Restaurant

Cluster-0 is dominated by Pizza, Various restaurant types like Chinese, Spanish, Caribbean, Russian. We also have Cosmetics shop, American Restaurant

4. RESULTS —INDIVIDUAL CLUSTER VIEW

Cluster-1 (Purple)

```
Brooklyn_merged.loc[Brooklyn_merged['Cluster Labels'] == 1, Brooklyn_merged.columns[[1] + list(range(5, Brooklyn_merged.shape[1]))]].head(10)
```

	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
31	Manhattan Beach	Café	Sandwich Place	Bus Stop	Food	Ice Cream Shop	Playground	Beach	Harbor / Marina	Factory	Falafel Restaurant
35	Dyker Heights	Dance Studio	Park	Golf Course	Burger Joint	Bagel Shop	Bus Station	Fast Food Restaurant	Factory	Falafel Restaurant	Farm
39	Sea Gate	Spa	Sports Club	American Restaurant	Beach	Bus Station	Field	Factory	Falafel Restaurant	Farm	Farmers Market
45	Bergen Beach	Harbor / Marina	Park	Baseball Field	Playground	Athletics & Sports	Farmers Market	Event Space	Factory	Falafel Restaurant	Farm

Cluster-1 has total of 4 neighborhoods only and is made up Open spaces like Park, Sports Club, Marina, Playground

Cluster-2 (Blue)

```
Brooklyn_merged.loc[Brooklyn_merged['Cluster Labels'] == 2, Brooklyn_merged.columns[[1] + list(range(5, Brooklyn_merged.shape[1]))]].head(10)
```

	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
28	Canarsie	Caribbean Restaurant	Asian Restaurant	Grocery Store	Gym	Thai Restaurant	Food	Fish Market	Fish & Chips Shop	Filipino Restaurant	Field

There is only 1 neighborhood in this cluster and top venues are Fish Market, Caribbean Restaurant, Grocery Store, Farm and Fields

4. RESULTS —INDIVIDUAL CLUSTER VIEW

Cluster-3 (Aqua)

```
Brooklyn_merged.loc[Brooklyn_merged['Cluster Labels'] == 3, Brooklyn_merged.columns[[1] + list(range(5, Brooklyn_merged.shape[1]))]].head(15)
```

	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
46	Midwood	Pizza Place	Ice Cream Shop	Pharmacy	Bakery	Video Game Store	Candy Store	Convenience Store	Fish Market	Fish & Chips Shop	Flower Shop

The key distinguishing features include presence of Pizza Place, Ice Cream shop, Bakery and Pharmacy

Cluster-5 (Orange)

```
Brooklyn_merged.loc[Brooklyn_merged['Cluster Labels'] == 5, Brooklyn_merged.columns[[1] + list(range(5, Brooklyn_merged.shape[1]))]].head(15)
```

	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
30	Mill Island	Pool	Other Repair Shop	Yoga Studio	Fast Food Restaurant	Event Space	Factory	Falafel Restaurant	Farm	Farmers Market	Field

Last Cluster is made of only 1 neighborhood consisting of Pool, Yoga Studio, Factory

4. RESULTS —INDIVIDUAL CLUSTER VIEW

Cluster-4 (Green)

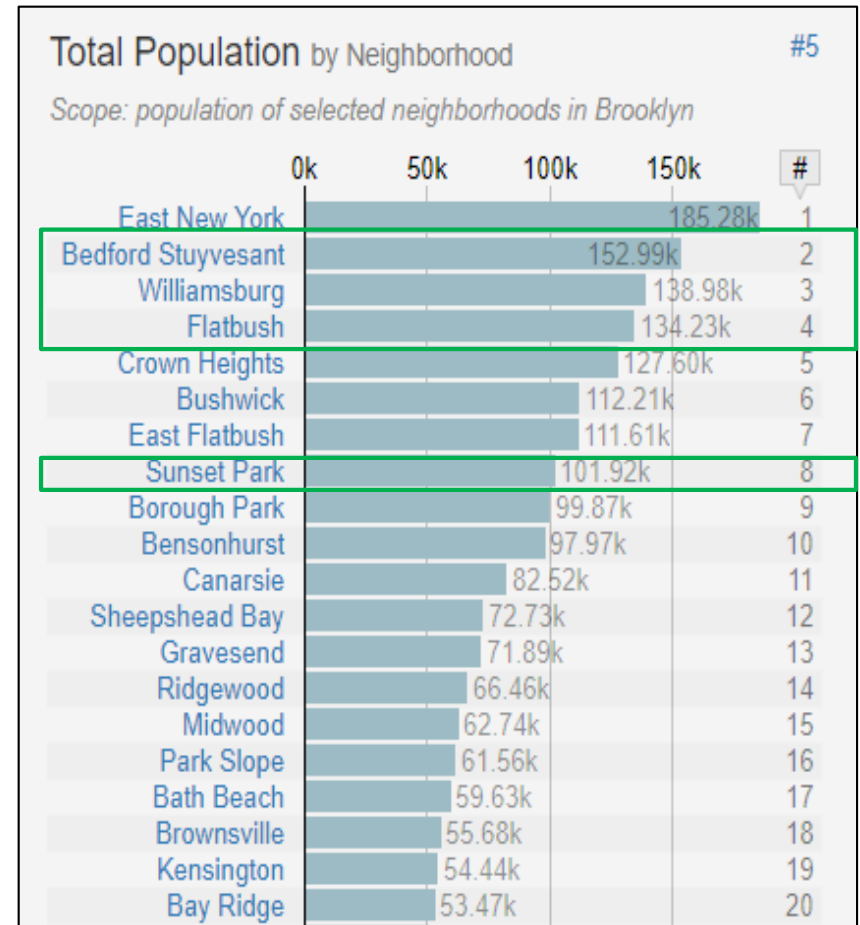
```
Brooklyn_merged.loc[Brooklyn_merged['Cluster Labels'] == 4, Brooklyn_merged.columns[[1] + list(range(5, Brooklyn_merged.shape[1]))]].head(15)
```

	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	Pizza Place	Spa	Italian Restaurant	Bagel Shop	Greek Restaurant	American Restaurant	Bar	Pharmacy	Thai Restaurant	Sushi Restaurant
1	Bensonhurst	Italian Restaurant	Ice Cream Shop	Sushi Restaurant	Chinese Restaurant	Bakery	Donut Shop	Cosmetics Shop	Bagel Shop	Pizza Place	Shabu-Shabu Restaurant
3	Greenpoint	Bar	Pizza Place	Coffee Shop	Cocktail Bar	Sushi Restaurant	French Restaurant	Mexican Restaurant	Yoga Studio	Grocery Store	New American Restaurant
4	Gravesend	Pizza Place	Music Venue	Lounge	Bakery	Gym	Spa	Deli / Bodega	Furniture / Home Store	Martial Arts Dojo	Baseball Field
6	Sheepshead Bay	Dessert Shop	Turkish Restaurant	Sandwich Place	Yoga Studio	Grocery Store	Creperie	Pizza Place	Diner	Restaurant	Russian Restaurant
9	Crown Heights	Pizza Place	Café	Museum	Bakery	Deli / Bodega	Bagel Shop	Burger Joint	Bus Station	Fried Chicken Joint	Supermarket
11	Kensington	Grocery Store	Thai Restaurant	Ice Cream Shop	Pizza Place	Bakery	Gas Station	Restaurant	Outdoors & Recreation	Furniture / Home Store	Mexican Restaurant
12	Windsor Terrace	Park	Plaza	Diner	Grocery Store	Café	Butcher	Chinese Restaurant	Sushi Restaurant	Bookstore	Bakery
13	Prospect Heights	Bar	Mexican Restaurant	Café	Cocktail Bar	Bakery	Thai Restaurant	Wine Shop	Gourmet Shop	Ice Cream Shop	Japanese Restaurant
15	Williamsburg	Coffee Shop	Bar	Bagel Shop	Middle Eastern Restaurant	Korean Restaurant	Tapas Restaurant	Latin American Restaurant	Taco Place	Liquor Store	Lounge
16	Bushwick	Bar	Coffee Shop	Mexican Restaurant	Deli / Bodega	Pizza Place	Discount Store	Bakery	Thrift / Vintage Store	Pet Store	Café
17	Bedford Stuyvesant	Coffee Shop	Pizza Place	Café	Bar	Juice Bar	Boutique	New American Restaurant	Deli / Bodega	Fried Chicken Joint	Gift Shop
18	Brooklyn Heights	Yoga Studio	Deli / Bodega	Park	Mexican Restaurant	Italian Restaurant	Gym	Bakery	Juice Bar	Plaza	Pizza Place
19	Cobble Hill	Bar	Pizza Place	Playground	Coffee Shop	Yoga Studio	Cocktail Bar	Deli / Bodega	Italian Restaurant	French Restaurant	Bookstore
20	Carroll Gardens	Italian Restaurant	Coffee Shop	Pizza Place	Cocktail Bar	Bakery	Wine Shop	Spa	Bar	Gourmet Shop	Thai Restaurant

‘Cluster-0’ and ‘Cluster-4’ have similar profile as Vinings. Next we select top neighborhoods based on population from both the clusters

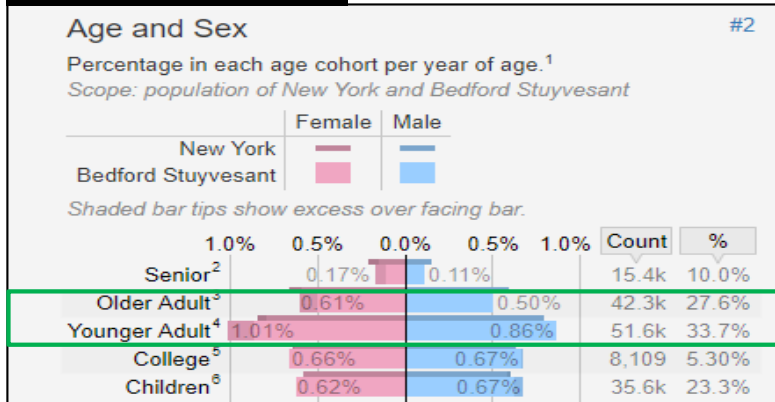
5. DISCUSSION-POPULATION

- Top Neighborhoods in 'Cluster-0' based on population are '**Sunset Park**' and '**Flatbush**'
- Top Neighborhoods in 'Cluster-4' based on population are '**Bedford Stuyvesant**', '**Williamsburg**'

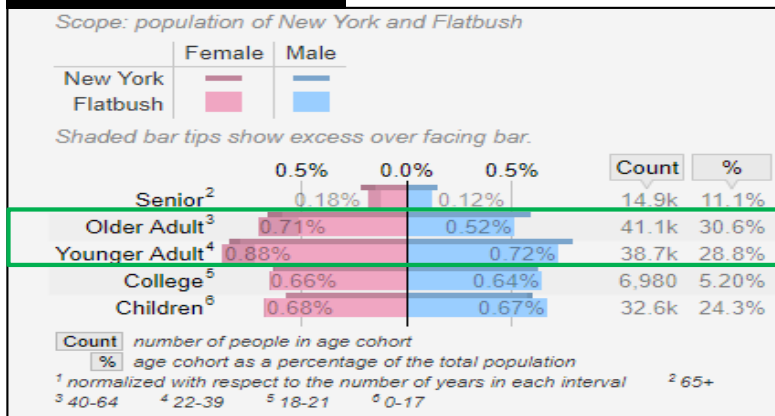


5. DISCUSSION-AGE

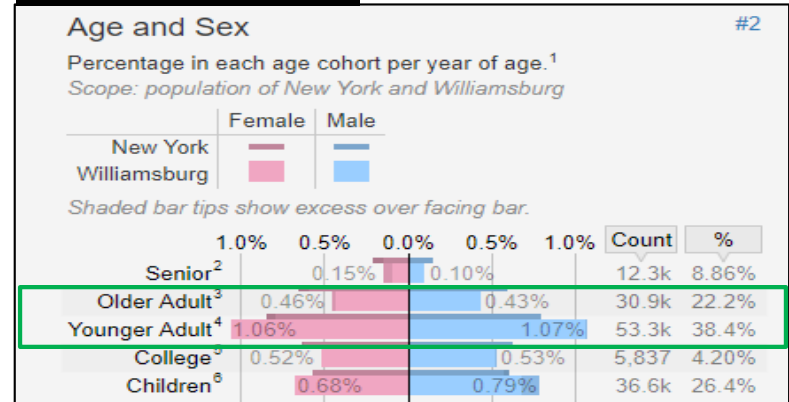
BEDFORD STUYVESANT



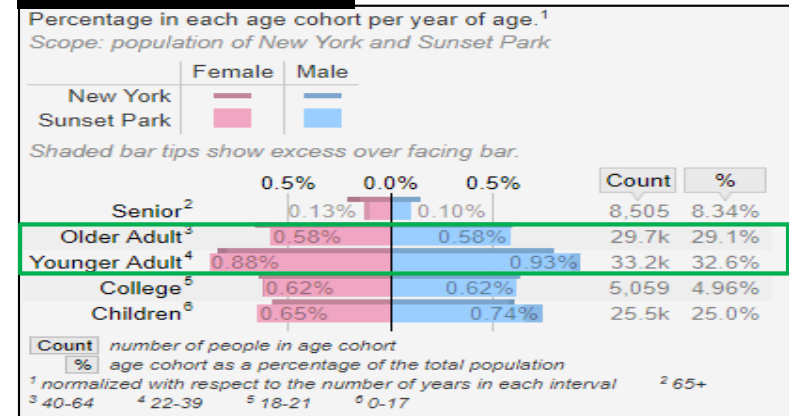
FLATBUSH



WILLIAMSBURG



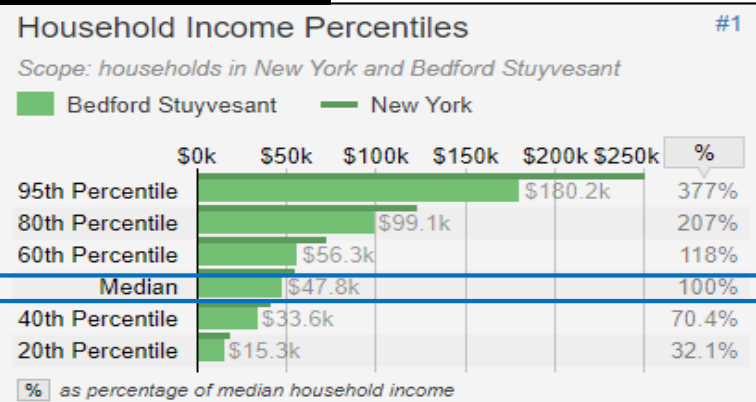
SUNSET PARK



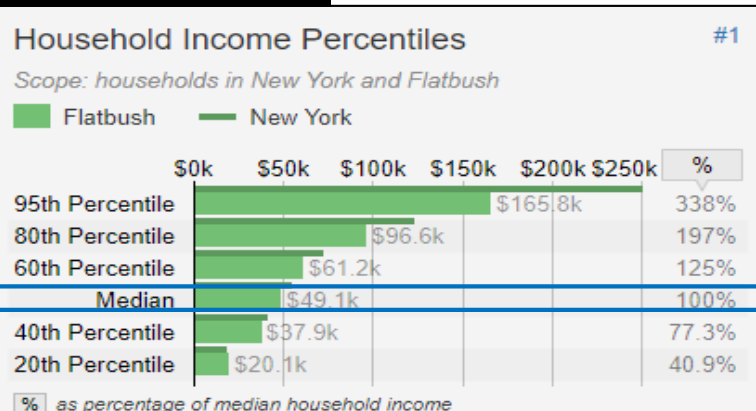
‘Flatbush’ and ‘Sunset Park’ have higher concentration of Older Adults while ‘Williamsburg’ has a lot of Younger population (32.6%)

5. DISCUSSION-HH INCOME

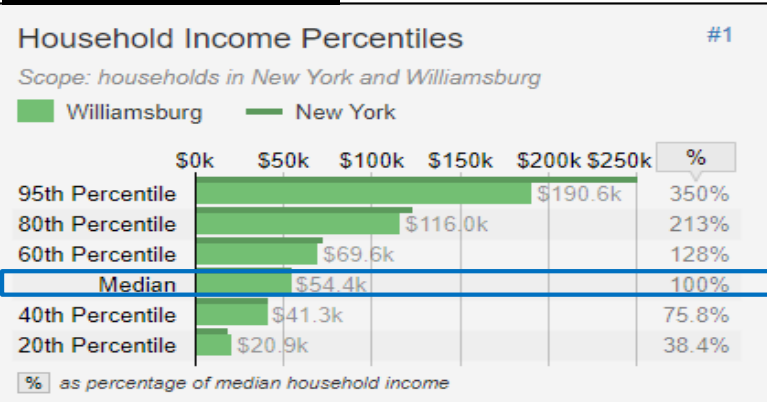
BEDFORD STUYVESANT



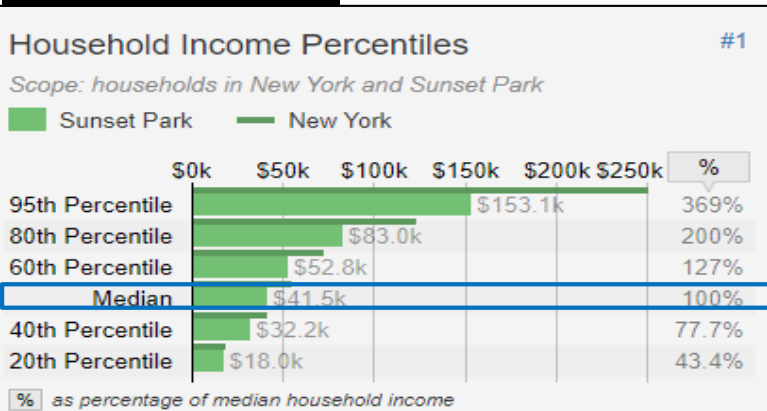
FLATBUSH



WILLIAMSBURG



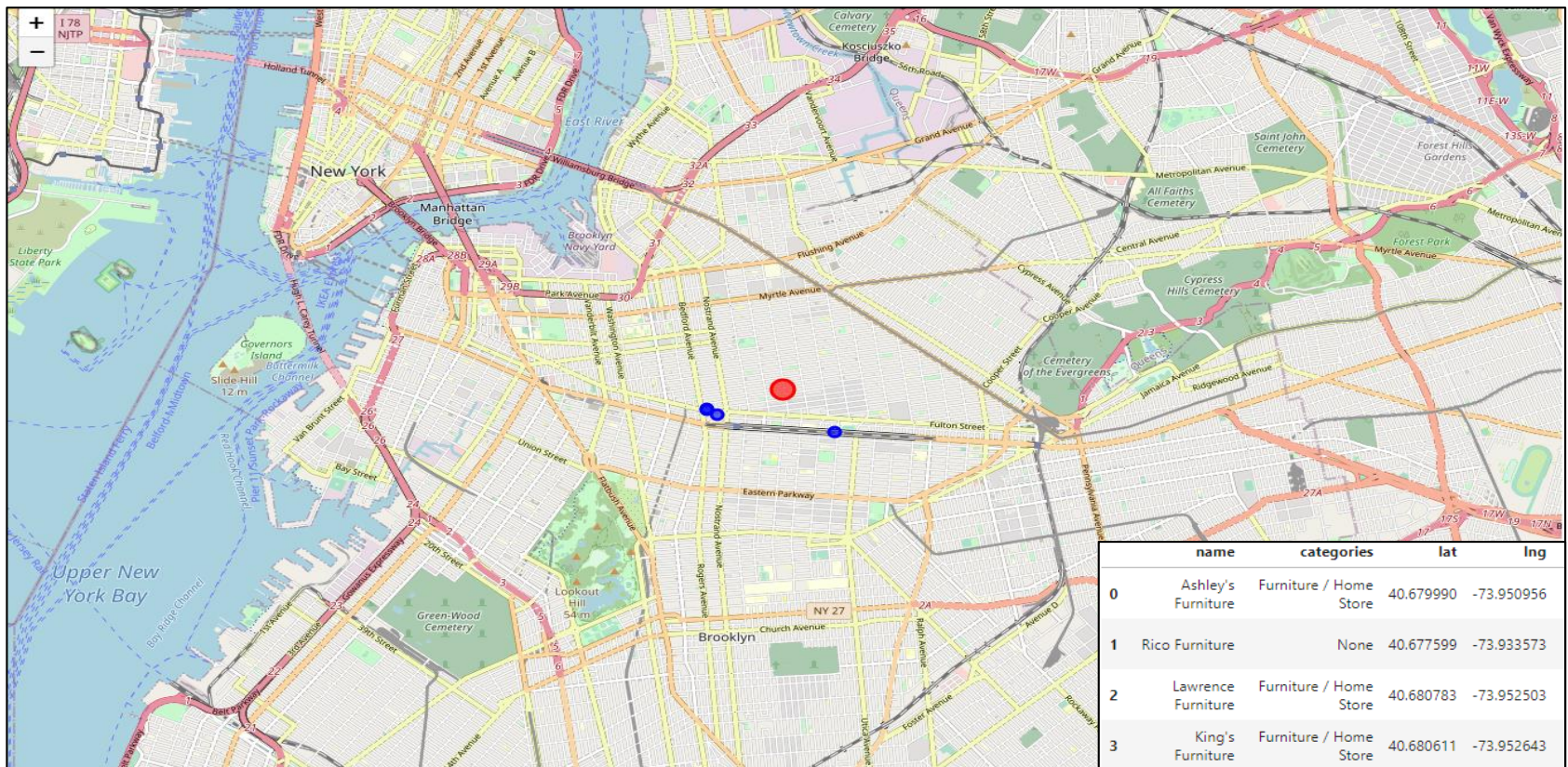
SUNSET PARK



Median Income is highest in 'Williamsburg' at \$54.4k followed by 'Flatbush' at \$49.1k

5. DISCUSSION-COMPETITOR PROFILE

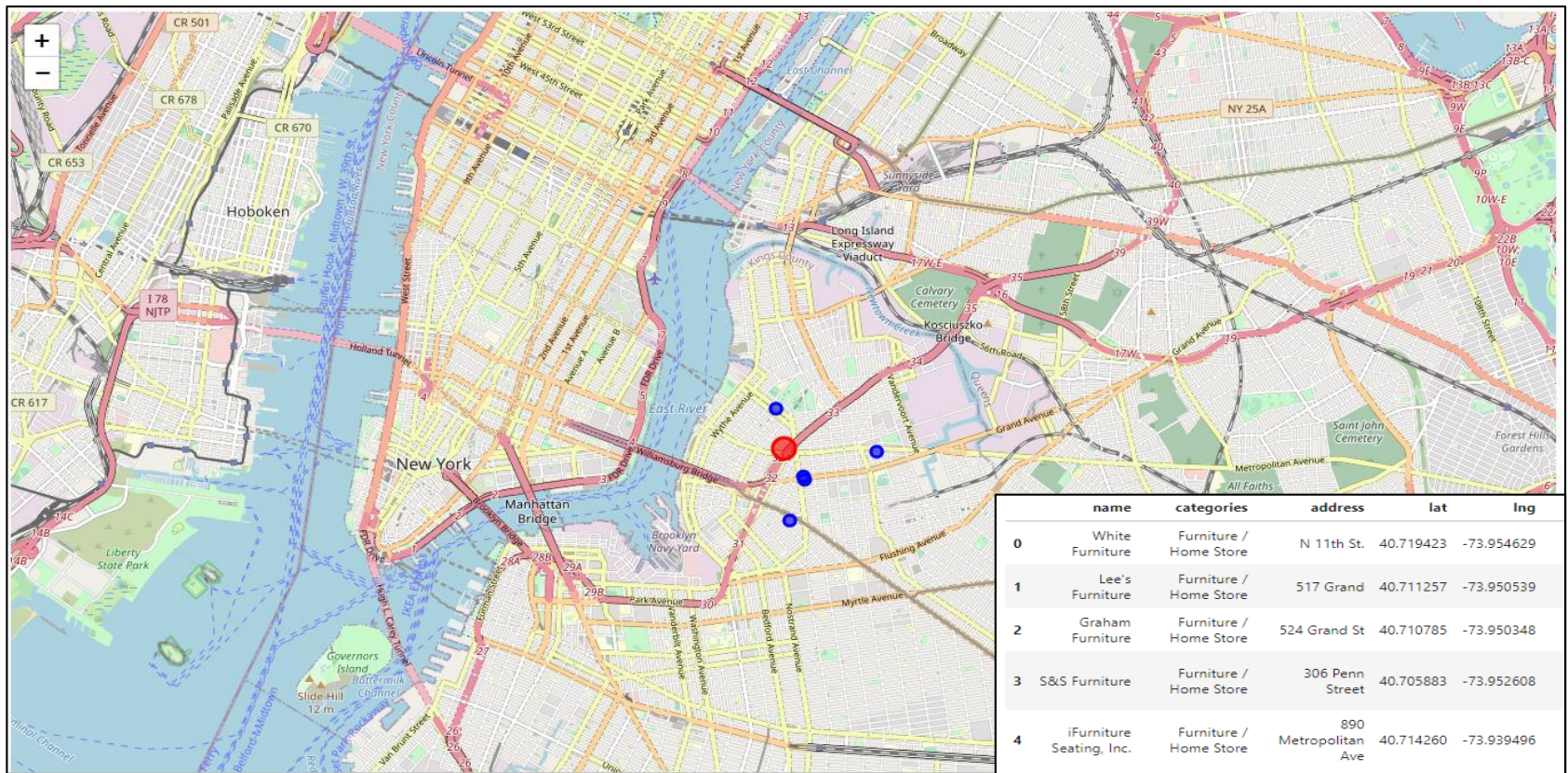
'Bedford Stuyvesant'-Cluster-4



4 Furniture Competitors located within 1000m radius

5. DISCUSSION-COMPETITOR PROFILE

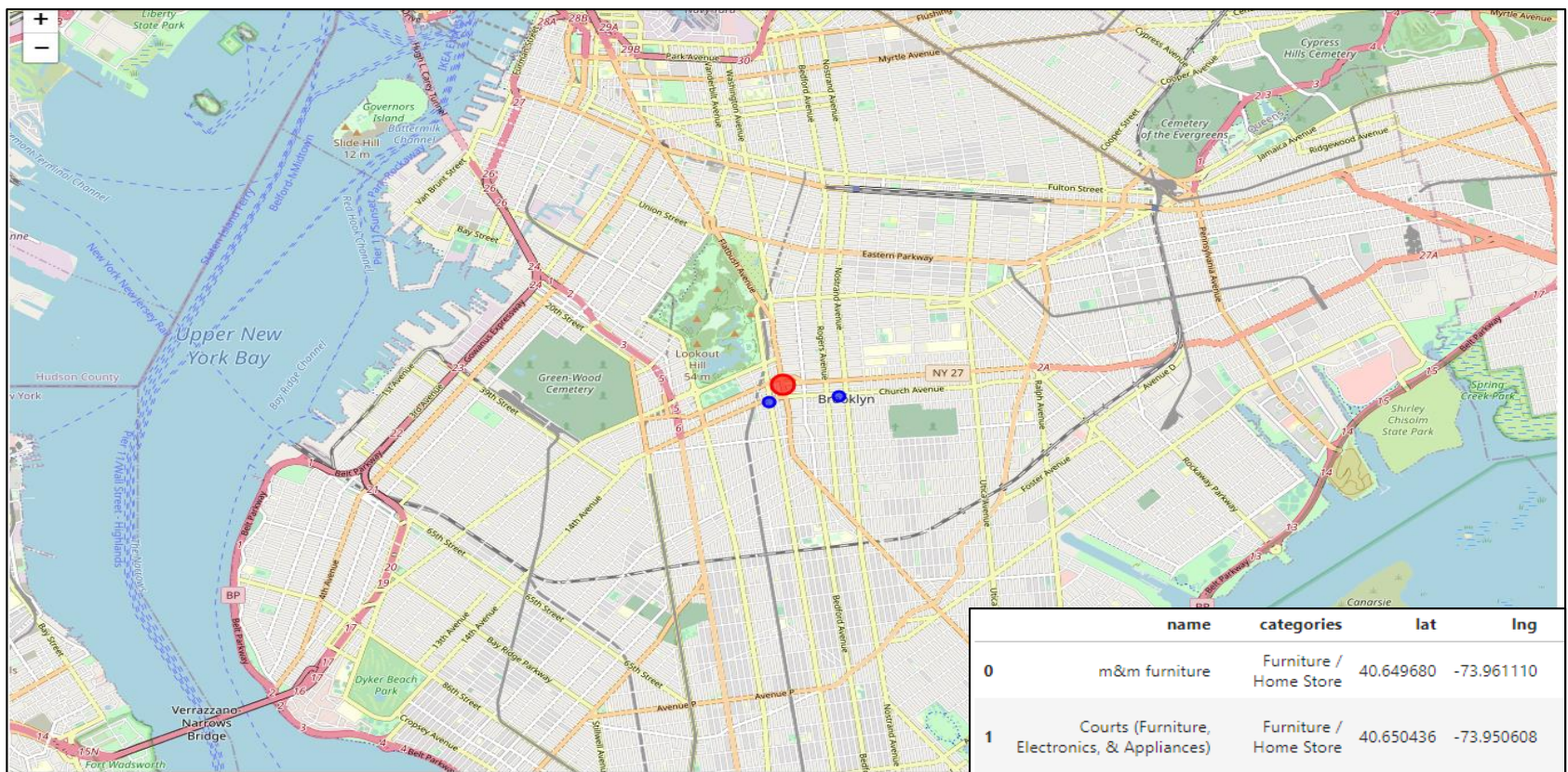
'Williamsburg'- Cluster-4



5 Furniture Competitors located within 1000m radius

5. DISCUSSION-COMPETITOR PROFILE

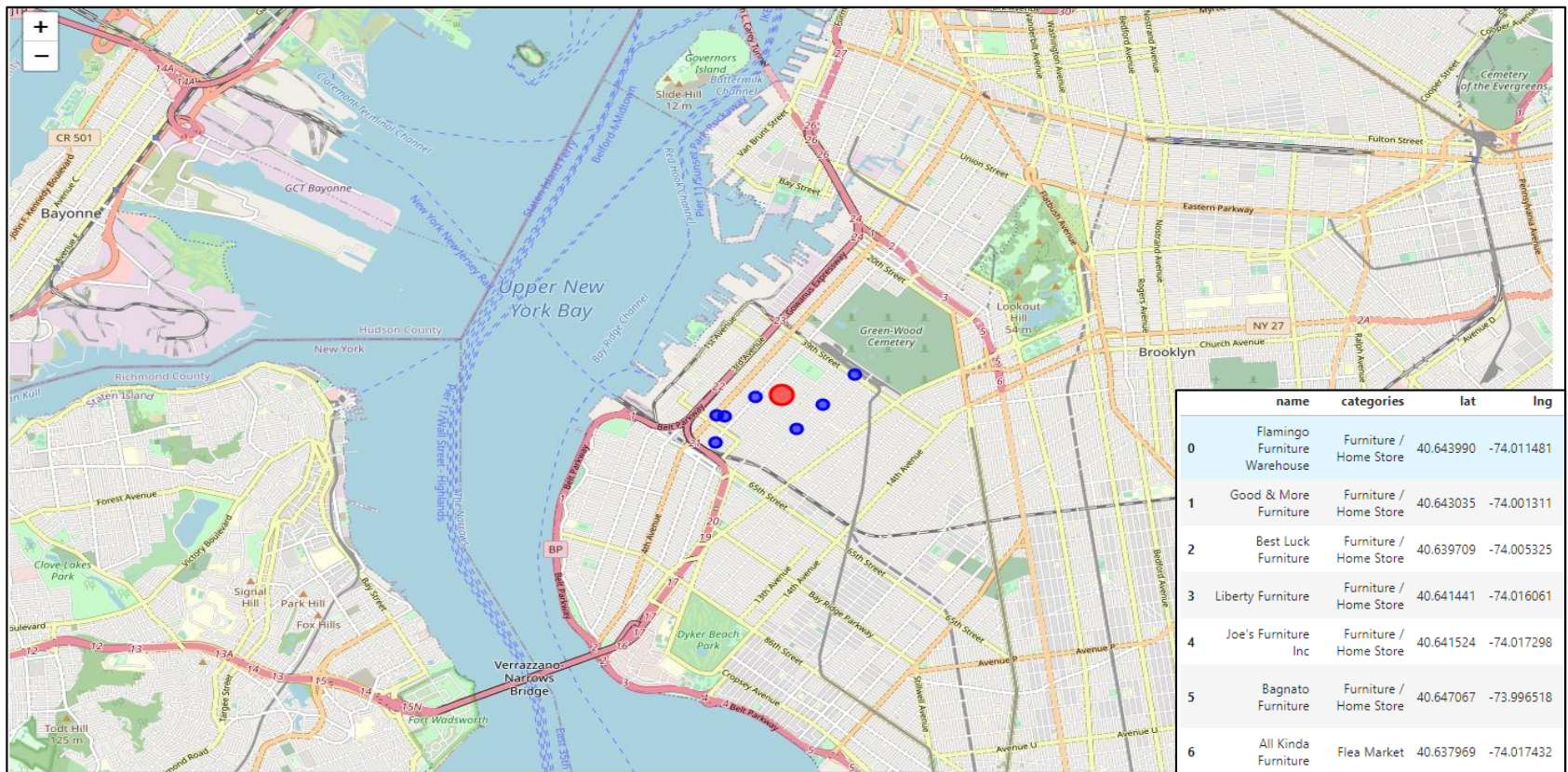
'Flatbush'- Cluster-0



Only 2 Furniture Competitors located within 1000m radius

5. DISCUSSION-COMPETITOR PROFILE

'Sunset Park'- Cluster-0



7 Furniture Competitors located within 1000m radius

6. CONCLUSION

- 'Flatbush' is the best place due to few competitors in vicinity and high population
- Concentration of Older Population and Median HH Incomes are also highest in Flatbush among others making it an ideal market for our Store
- Locations around 'Sunset Park', 'Williamsburg' have significant competitive presence and can hurt our margins if operating in same market
- Analyze Previous Store Closures in the neighborhood
- Carryout out more comprehensive analysis of your competitors based on Value Proposition, Products and Target Customers for final site location