Finding Optimal Location to open new Drugstore in Brooklyn

(Coursera Capstone)

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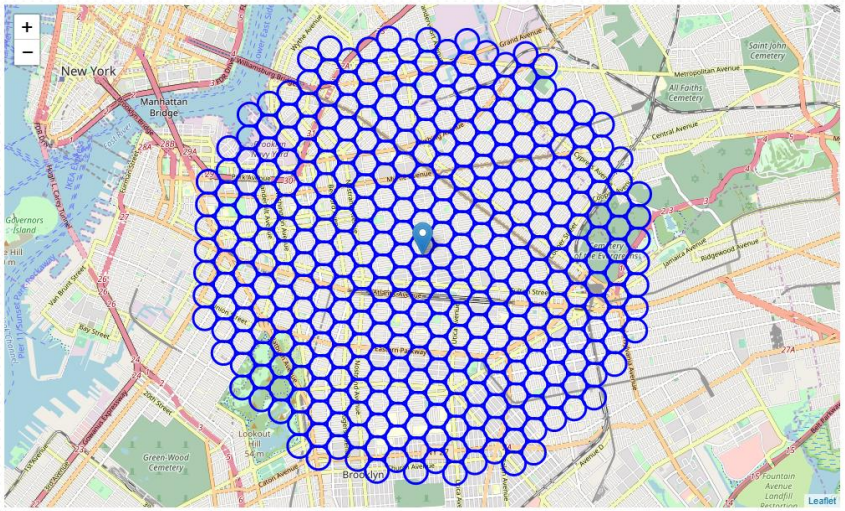
- Brooklyn is the most populous borough of New York City, with an estimated 2,648,771 residents in 2017
- Drugstore is one of the most important utilities in an area so densely populated
- Finding an optimal location for a Drugstore in such area can be really challenging
- We will use Data Science to find solution to this problem

Data Collection

Data Collection will be done in 2 phases

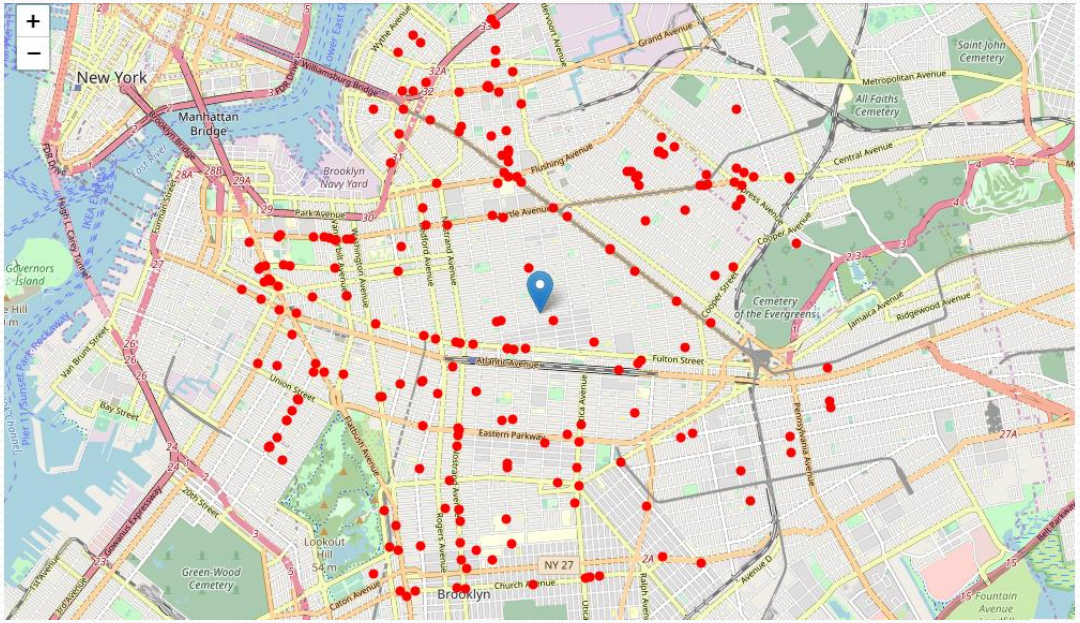
1. Getting coordinates of neighborhoods

- Firstly we will get coordinates of Brooklyn, New York using Bing Maps API
- Create grid of area candidates, equally spaced, centered around city center and within ~8km from Brooklyn.
- define neighborhoods as circular areas with a radius of 300 meters, so the neighborhood centers would be 600 meters apart



2. Getting Drugstore in each neighborhood

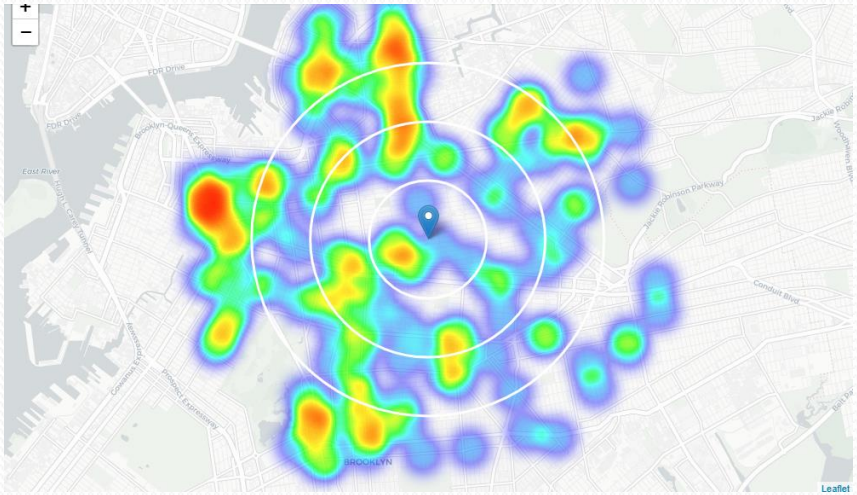
- Firstly we will get coordinates and address of drugstores in Brooklyn, New York using Foursquare API
- Plot these coordinates on map to get insights

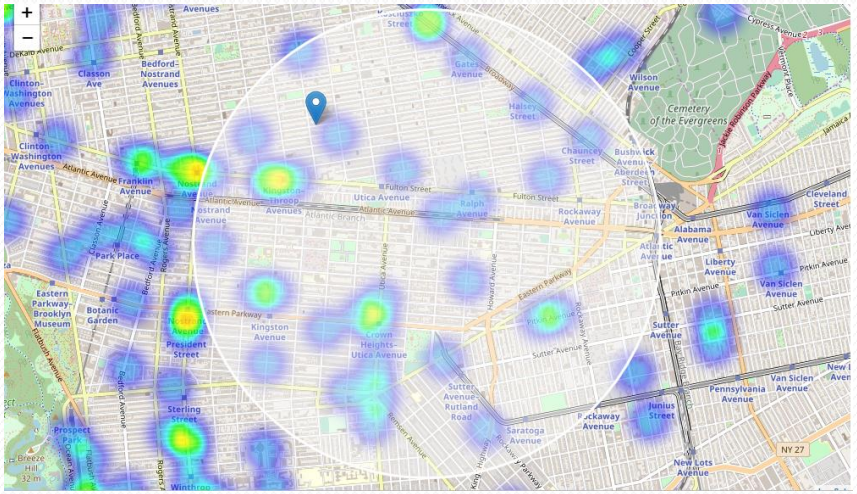


Data Cleaning

Based on observation we will find area with low drug store density using heat map analysis

Concentrate on areas with low drugstore density for further





Potential locations

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Locations with no more than two drugstore nearby: 230
Locations with no Drugstore within 400m: 138
Locations with both conditions met: 135
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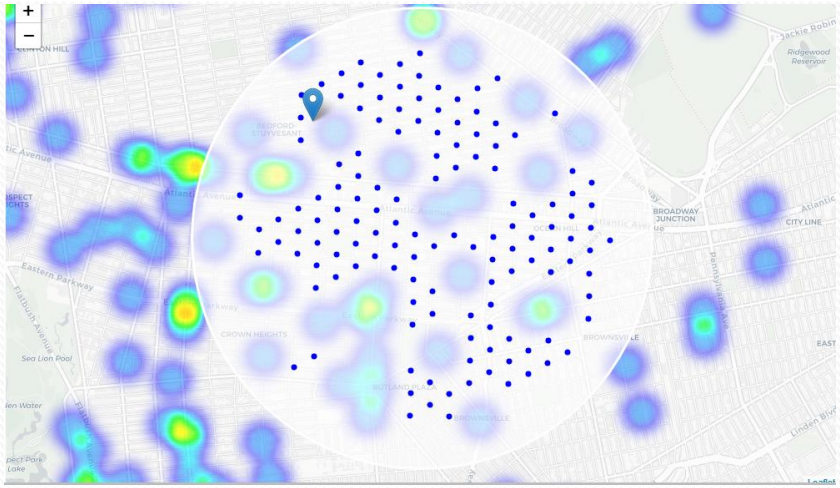
	Latitude	Longitude	X	Y	Drugstores nearby	Distance to Drugstore
0	40.674806	-73.906925	-5.828370e+06	9.856627e+06	0	1176.207451
1	40.668671	-73.909169	-5.829420e+06	9.856886e+06	0	506.845300
2	40.670436	-73.909102	-5.829120e+06	9.856886e+06	0	512.067463
3	40.672202	-73.909034	-5.828820e+06	9.856886e+06	0	668.979832
4	40.673968	-73.908967	-5.828520e+06	9.856886e+06	0	901.584685

A denser grid of location candidates restricted to our new region of interest was created with location candidates 300m apart

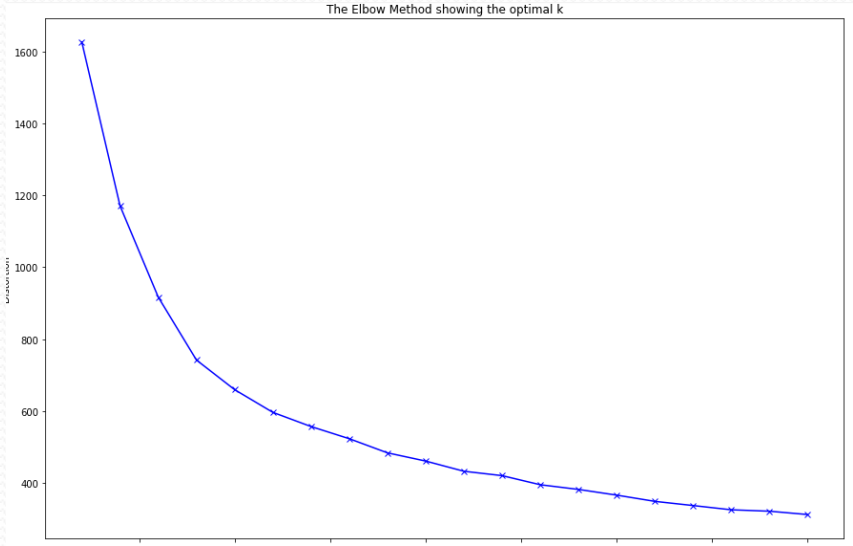
Calculating number of drugstore in vicinity and distance to closest Drugstore



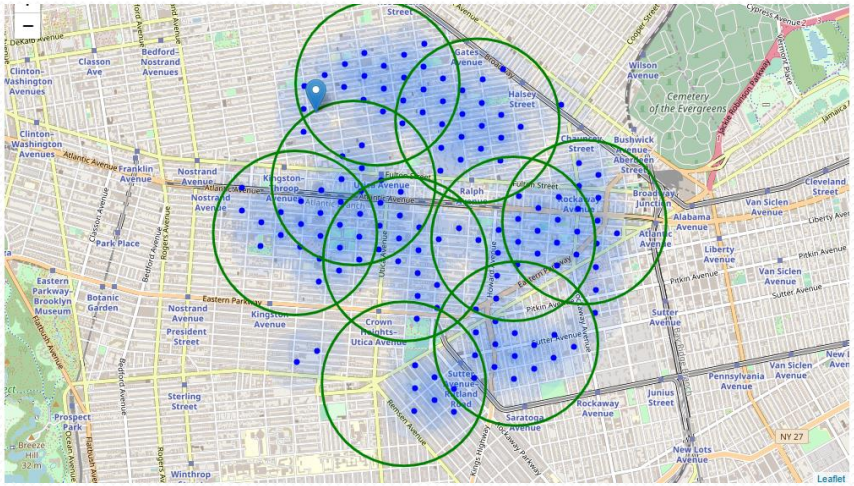
Potential candidate for a new Drugstore we found based on nearby competition and were plot on map

K-means clustering

Using k-mean clustering we will find best k



Create cluster using best value of k



Results

Using reverse geocode addresses of center of cluster were found and presented to stakeholder

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Addresses of centers of areas recommended for further analysis
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1923 Bergen St, New York, NY 11233--11233          => 3.1km from Brooklyn
1 Jewel McCoy Ln, New York, NY 11213--11213        => 1.0km from Brooklyn
125 Sutter Ave, New York, NY 11212--11212          => 4.0km from Brooklyn
757 Putnam Ave, New York, NY 11221--11221          => 0.9km from Brooklyn
1474 Prospect Pl, New York, NY 11213--11213        => 2.2km from Brooklyn
632 Macdonough St, New York, NY 11233--11233       => 2.1km from Brooklyn
959 St Marks Ave, New York, NY 11213--11213        => 1.6km from Brooklyn
49 E 92nd St, New York, NY 11212--11212            => 3.7km from Brooklyn
2277 Pacific St, New York, NY 11233--11233         => 3.8km from Brooklyn
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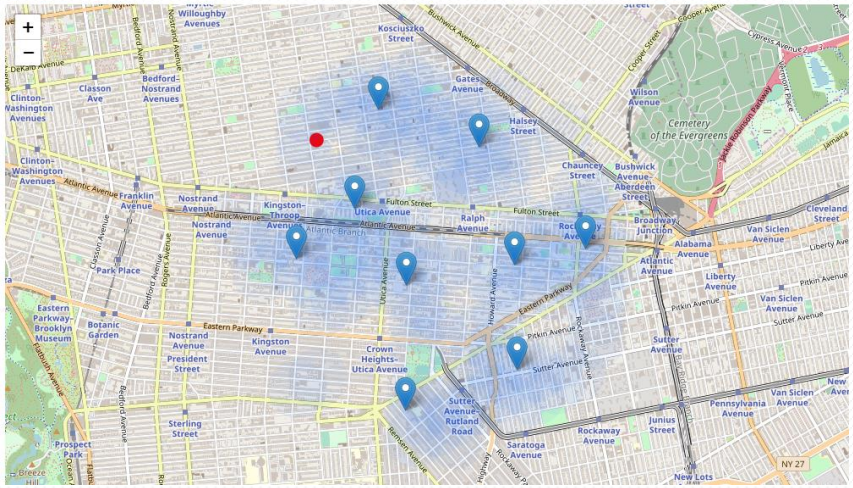
These locations were plotted on map to get better insights



Conclusion

- Recommended zones should be considered as a starting point for more detailed analysis as factors like population, levels of noise / proximity to major roads, real estate availability, prices, social and economic dynamics of every neighborhood etc. can affect location
- 9 potential location in Brooklyn to start drugstore were found