

FINDING OPTIMAL LOCATIONS FOR AN ADULT DAY CARE CENTER IN QUEENS

According to a 2018 [U.S. Census Bureau](#) report, in 2035 “there will be 78 million people 65 years and older compared to 76.4 million under the age of 18.” With the growing aging population, the need for adult day care is also growing.

People who attend adult day care live at home and can take care of themselves. They are looking for a place to go where they can spend their time and meet other people. It has been known that recreational activities and social stimulation improve or maintain physical and cognitive functions, so this will help them stay active and healthier longer, both physically and mentally.

Problem: Find an optimal location for an adult day care center in the Queens Borough of New York City whose main focus will be on recreational activities and social stimulation for the elderly population who would otherwise stay at home alone.

We want to be as close to parks as possible so our problem is to identify parks in Queens satisfying the following 2 conditions:

1. No existing adult day care center within 1 km of the park latitude and longitude coordinates.
2. At least one pharmacy within 2 km of the park latitude and longitude coordinates.

Data – we need locations of parks, pharmacies and adult day care centers in Queens, New York City

- ❖ To limit neighborhoods to Queens we use New York City Neighborhood dataset (https://geo.nyu.edu/catalog/nyu_2451_34572).
- ❖ Foursquare location data is used to get locations of parks and pharmacies venues in Queens
- ❖ Locations of adult day care centers in Queens are obtained from this <https://data.cityofnewyork.us/Social-Services/Department-for-the-Aging-DFTA-Social-Adult-Day-Car/32cj-z7va> dataset on the NYC OpenData website

Methodology

Cluster pharmacies and parks

- using k-means clustering methodology

Calculate distance for each park

- between the park and each pharmacy
- and the park and each adult day care center

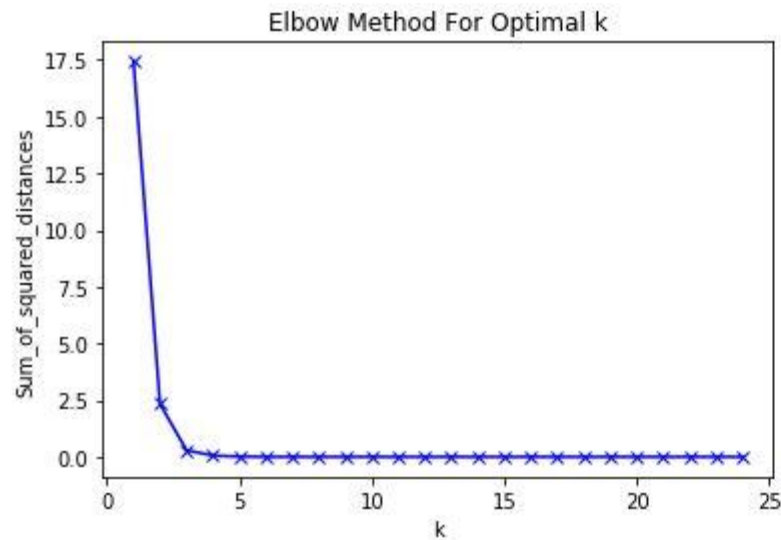
Produce Heat Map

- based on the count of respective pharmacies to graphically display promising locations

Basic explanatory analysis

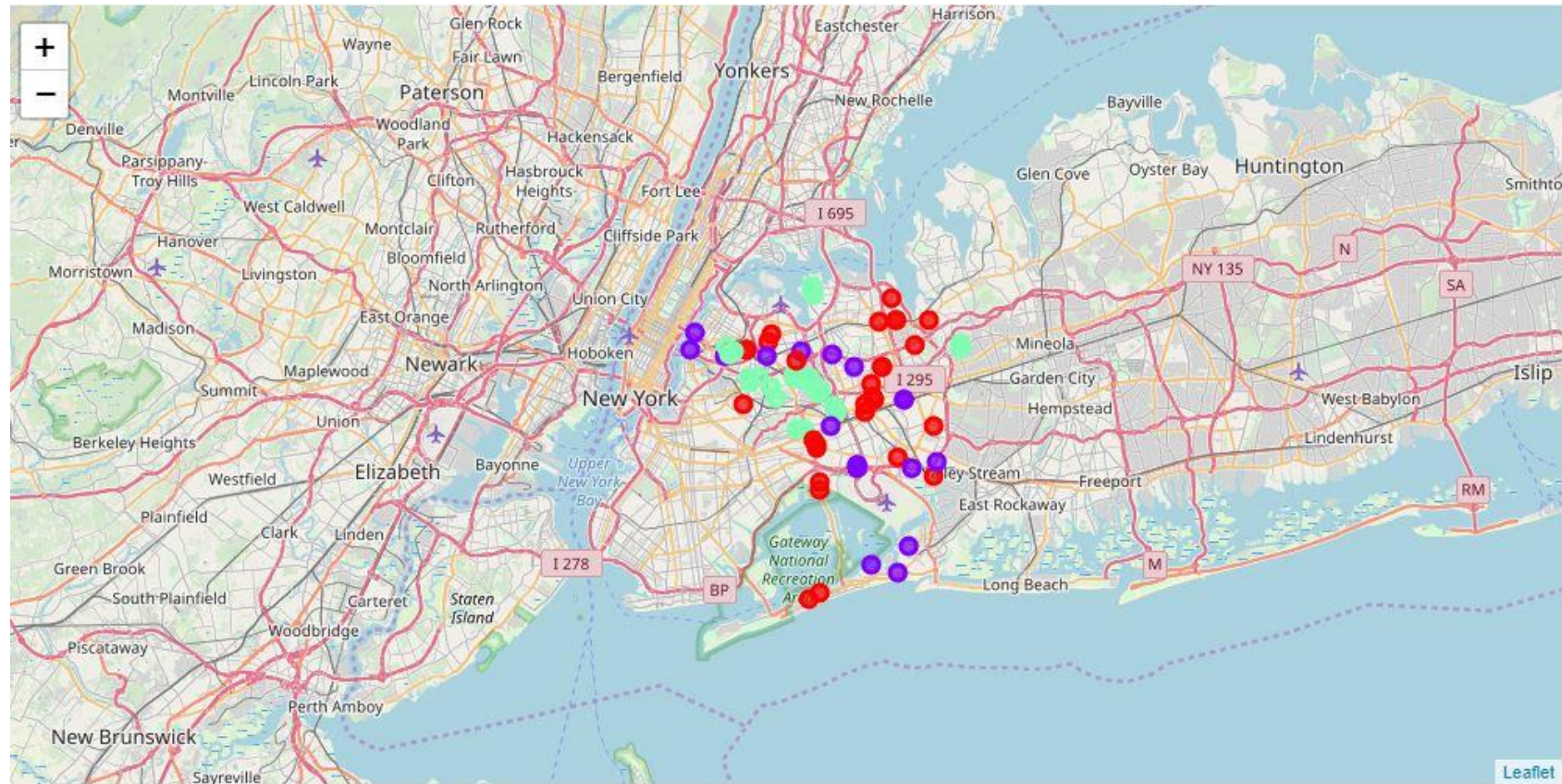
- ❖ No null or NaN values in our datasets
- ❖ 81 neighborhoods in Queens, 78 pharmacies and parks, and quite a lot of adult day care service centers (121)
- ❖ **For all 3 datasets** mean values of Latitude and Longitude are almost equal to the geographical coordinates of Queens: 40.6524927, -73.7914214158161.
- ❖ Top 3 venues in Queens are **Pizza Place, Deli/Bodega, and Chinese Restaurant.**

K-means Clustering



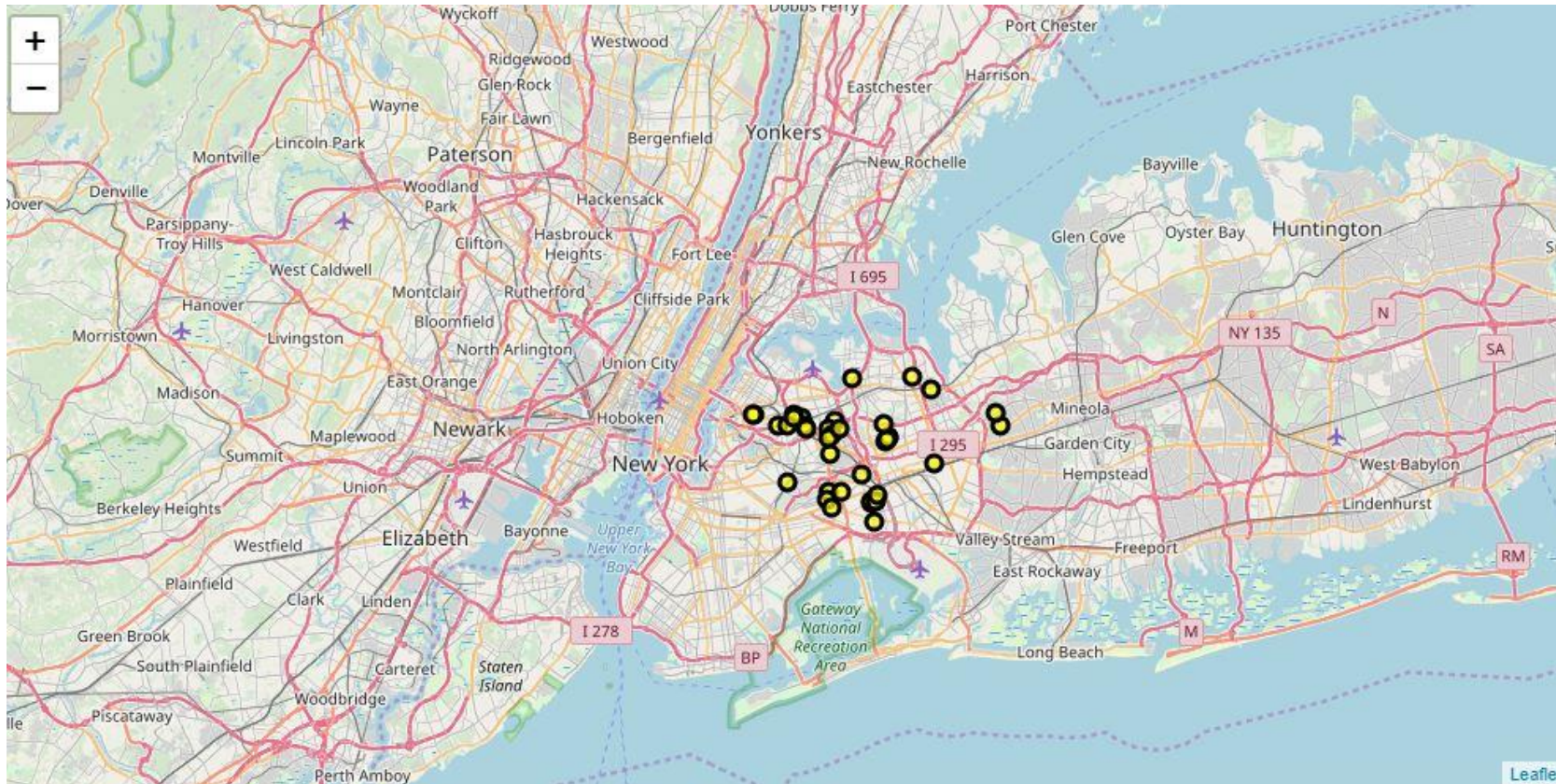
In the plot above the elbow is at $k=3$ indicating that the optimal k for the `queens_pharmacies_and_parks_grouped` dataset is 3

3 clusters: one with parks only (violet color), one with pharmacies only (red color), and one with pharmacies and parks mixed together (green color)



Distribution of adult day care centers in Queens across clusters

Majority of them is located in the Parks only cluster and Pharmacies and Parks mixed together cluster



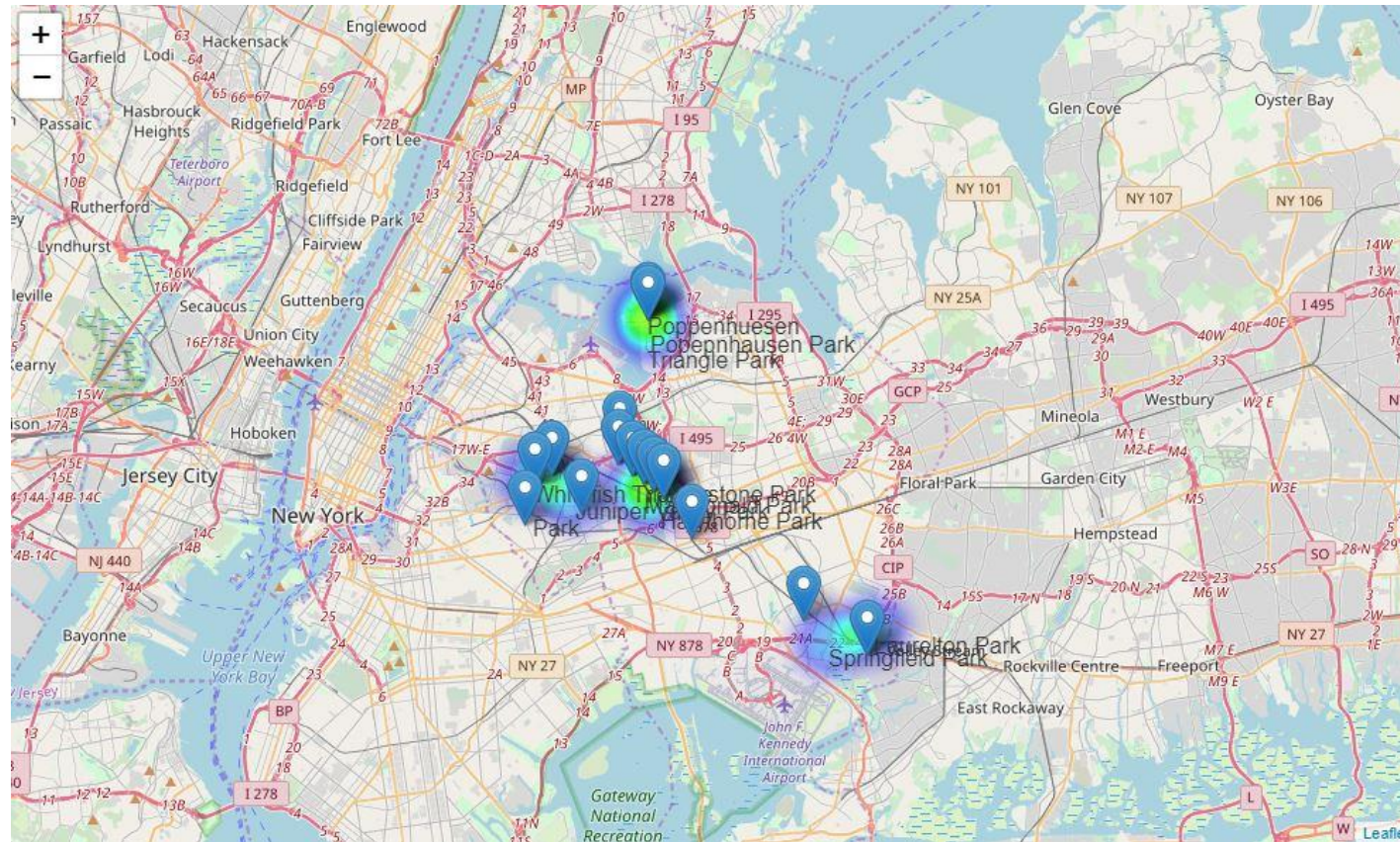
Solution: 9 parks with Adult Service Count = 0 and Pharmacy Count > 0

optimal location for an adult day care center is around a park that belongs to a cluster where parks and pharmacies are mixed together (Cluster Labels = 2).

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In [112]: queens_final_parks_pharm_adult_serv_candidates = queens_final_parks_pharm_adult_serv_info[(queens_final_parks_pharm_adult_serv_info["AdultService Count"] == 0) & (queens_final_parks_pharm_adult_serv_info["Pharmacy Count"] > 0)]
queens_final_parks_pharm_adult_serv_candidates_potential = queens_final_parks_pharm_adult_serv_candidates.sort_values(by=["Cluster Labels", "Pharmacy Count"], ascending=False)
queens_final_parks_pharm_adult_serv_candidates_potential.reset_index(drop=True, inplace=True)
queens_final_parks_pharm_adult_serv_candidates_potential
```

	Neighborhood	Venue	Park Latitude	Park Longitude	Venue Category	Cluster Labels	AdultService Count	Pharmacy Count
0	Forest Hills	Yellowstone Park	40.726251	-73.847759	Park	2	0	6
1	Forest Hills	MacDonald Park	40.722239	-73.847141	Park	2	0	5
2	Forest Hills Gardens	Hawthorne Park	40.716422	-73.840083	Park	2	0	5
3	Maspeth	Whitefish Triangle Park	40.726517	-73.901752	Park	2	0	3
4	Middle Village	Juniper Valley Park	40.720281	-73.881258	Park	2	0	3
5	College Point	Popepnhansen Park	40.781653	-73.844672	Park	2	0	2
6	College Point	Poppenhuesen Triangle Park	40.788130	-73.845970	Park	2	0	2
7	Springfield Gardens	Springfield Park	40.665932	-73.758064	Park	1	0	2
8	Laurelton	Laurelton Park	40.670598	-73.735900	Park	1	0	1

Heat map based on the count of respective pharmacies to graphically display promising locations. Popups mark pharmacies locations.



Conclusion and future directions

- ❖ The k-means clustering can provide a quick way to identify most of the potential candidate parks.
- ❖ These park locations are a starting point for stakeholders final 'street level' exploration to determine the optimal adult day care center location.
- ❖ Stakeholders would also need to take into consideration additional factors such as federal and state requirements, medical and insurance requirements, zoning laws and real estate availability information and prices around the parks.
- ❖ Distance limits of the adult day care centers and pharmacies used in this project for the optimal location are not set in stone and can be customized based on the stakeholders interest.
- ❖ Future directions include researching how to incorporate real estate availability information and prices data around the parks to produce more focused locations.