

FINDING BEST LOCATION TO BUILD A PHARMACEUTICAL FACTORY IN NEW YORK



BACKGROUND

- Pharmaceuticals are crucial for well being and surviving pandemics.
- Recent Covid19 pandemic highlighted cruciality of effective supply of pharmaceuticals.
- New York City (NYC) has a large diverse population which requires effective pharmaceutical supply and job creation.
- Pharmaceutical factory in NYC will be good for economy and the well being of life.

DATA SCIENCE



Techniques will be used for exploring New York City's data to find the best location to build the pharmaceutical factory.



TARGET AUDIENCE OF THE STUDY

1. Investors who are looking to open a startup or medium pharmaceutical/medicine production company.

2. Doctors looking to open up a practice next to the area that has many pharmacies within a smaller radius.

1. Government officials or private companies looking to open a hospital, entrepreneur opening pharmacies.



NEW YORK CITY'S DATA

Demographic and Population Data:

- Data source 1: https://en.wikipedia.org/wiki/New_York_City
- Data source 2:
https://en.wikipedia.org/wiki/Demographics_of_New_York_City
- Used to scrape and clean New York's population statistics.

New York City's FourSquare API Pharmacy's Data

- Used to obtain borough, neighborhoods, pharmacy locations and information.



A person with short brown hair, wearing a grey and black striped sweater, is seen from behind, looking at a wall covered in various design sketches, photos, and documents. The wall is cluttered with these items, some pinned with clips. The text "New York City's Exploratory Data Analysis Will Give Business Location Insights For Investors." is overlaid in white on the person's head and shoulders.

New York City's Exploratory Data Analysis Will Give Business Location Insights For Investors.



EXPLORED DATA

- Land area
- population density

- Population size
- Population diversity

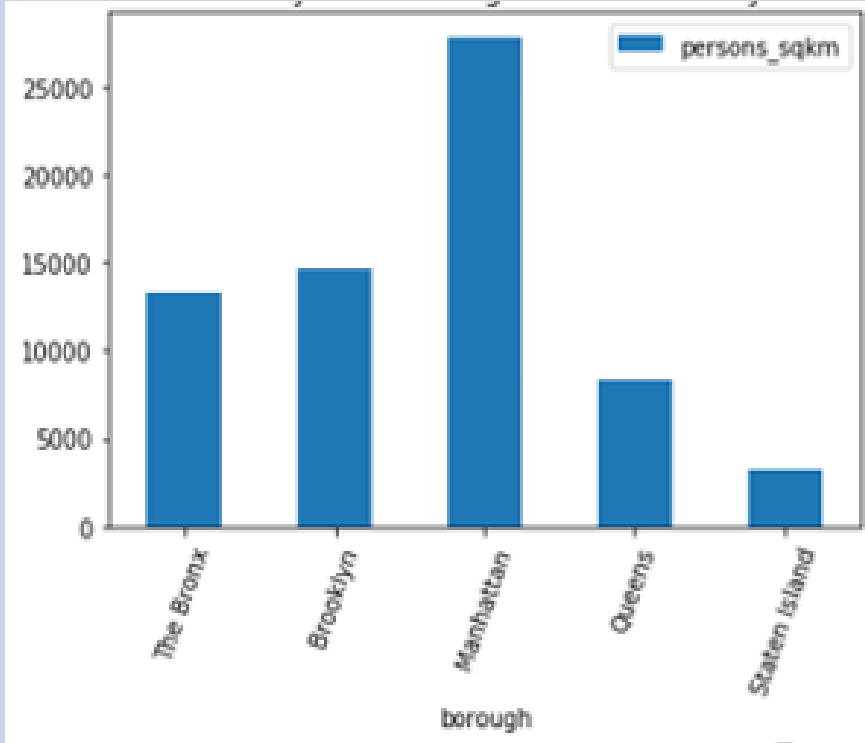
- Pharmacy location
- Pharmacy Numbers

- K-Means Pharmacy clusters

Population Number:

Brooklyn and Queens have the highest population which is an indicator of good customer base.

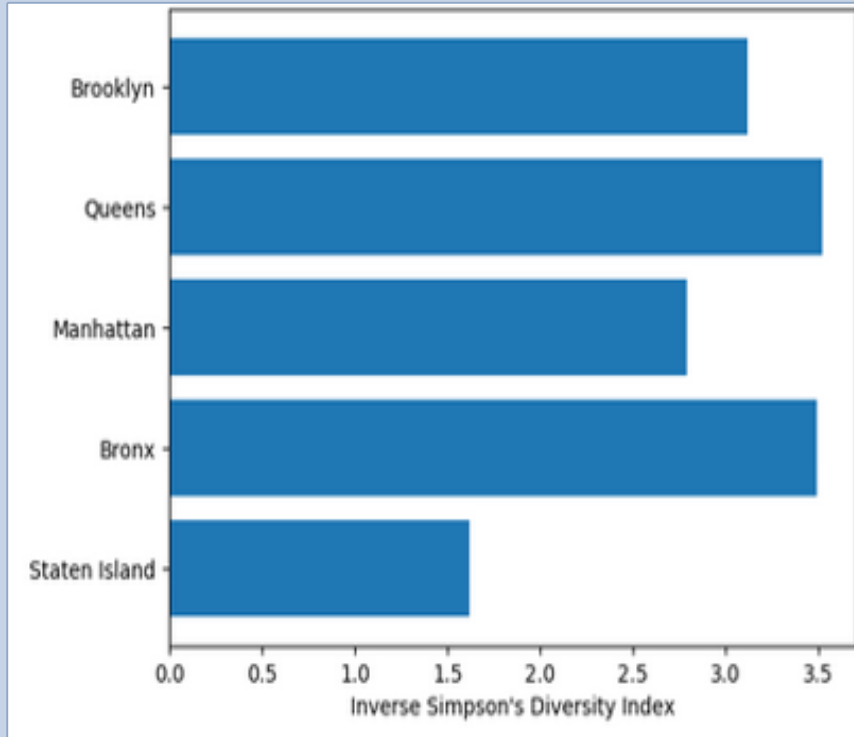




Population Density:

Manhattan is highly dense while Bronx and Brooklyn have second highest comparable density.

Staten Island has lowest density which is typical for an island.



Inverse Simpson's Diversity Index:

The higher the index the more diverse is the population.

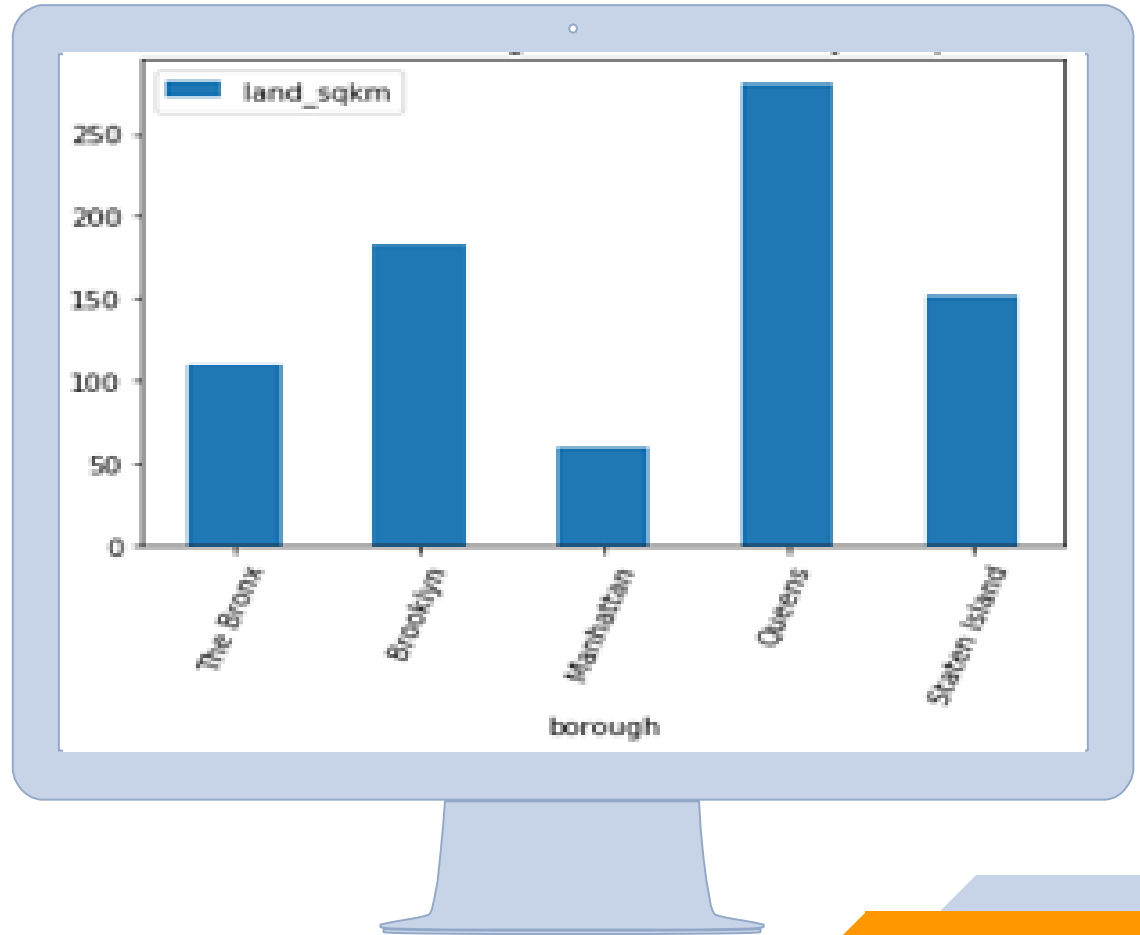
Bronx and Queens are more diverse and with comparable diversity. Brooklyn also has good diversity.

This is good for having diverse employees.

Area of Boroughs:

Queens has the highest area followed by Brooklyn.

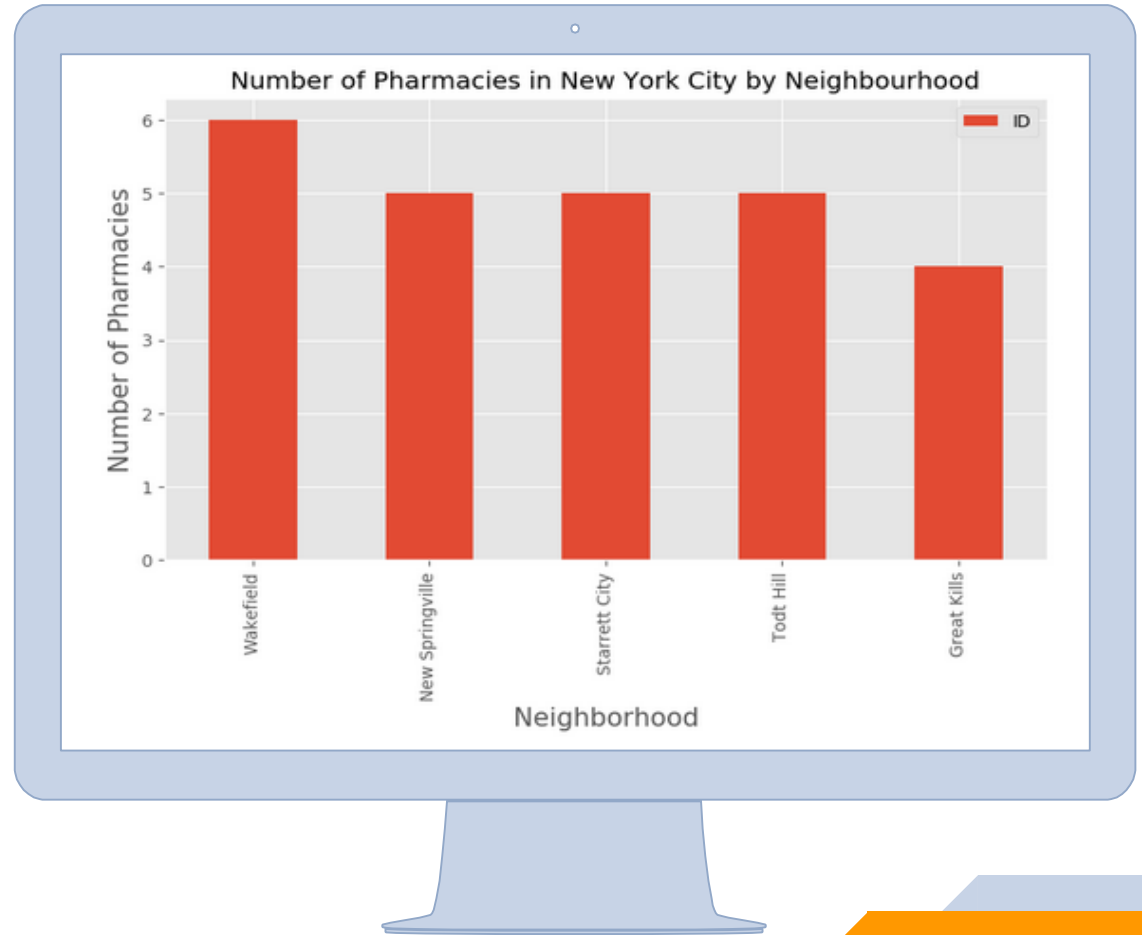
This favors future factory expansion.



Top 5 neighborhoods:

Wake field has the highest pharmacies which are 6.

The following map shows the distribution of these neighborhoods.



MAP OF TOP FIVE NEIGHBORHOODS



Scattered neighborhoods:

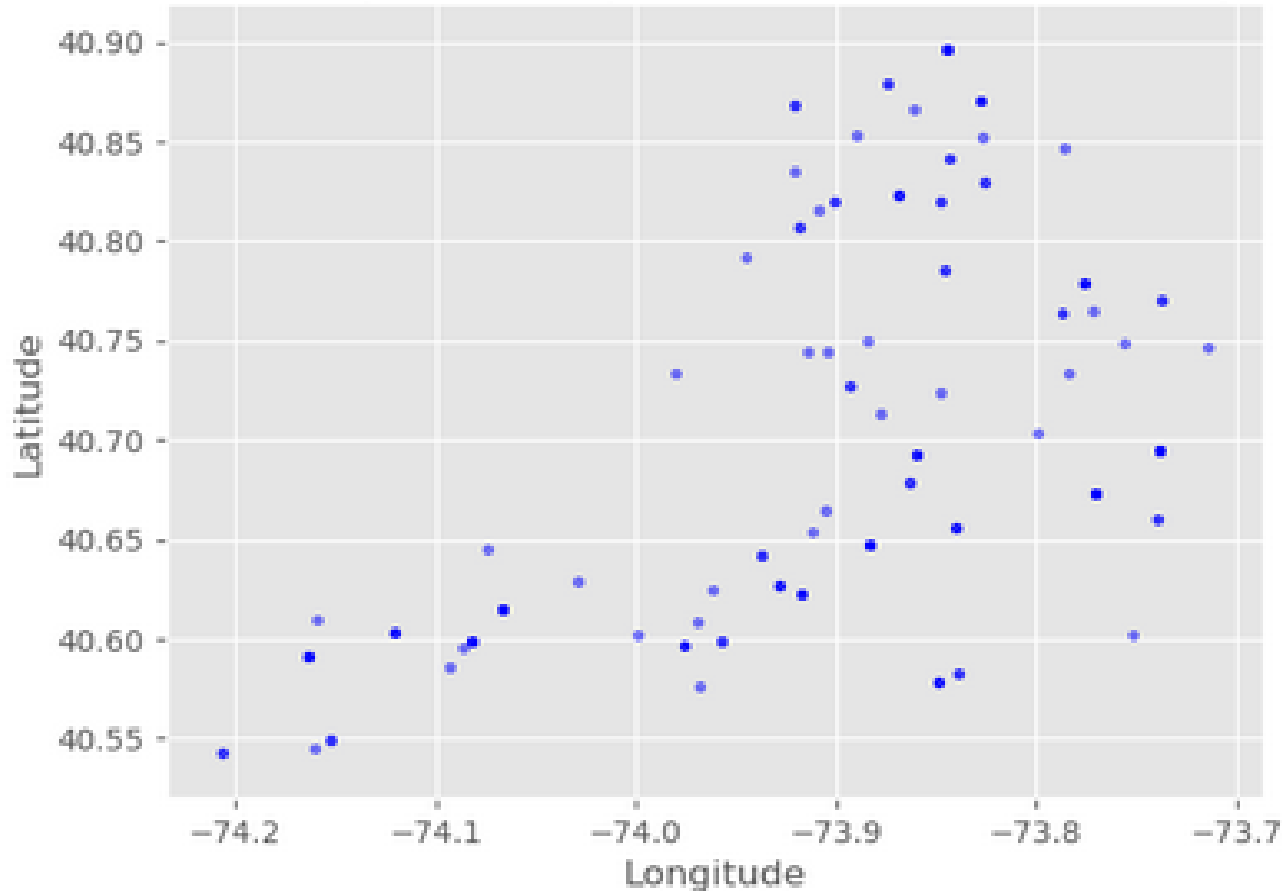
The neighborhoods are too scattered to be used for factory location decision.

K-means clustering of all pharmacies will be employed.

K-Means

Clustering the Pharmacies

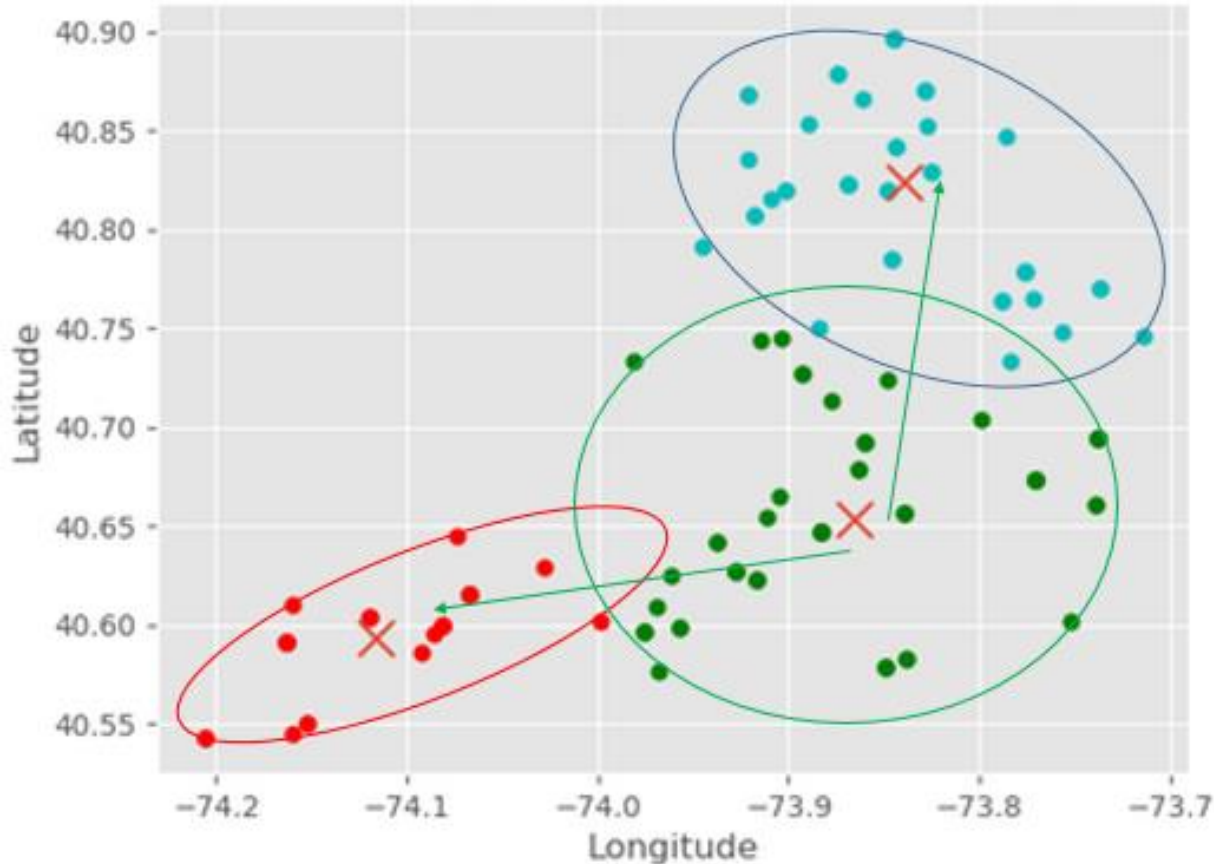
SCATTER PLOT OF THE PHARMACIES



K-Means:

K-Means clustering will be used to find the clusters and the best possible location of the factory.

Clustered pharmacies of New York City



Clusters:

Green has more pharmacies and can expand to red and blue clusters in future. Green cluster is the best location for the factory.

Green cluster's customer base can easily expand as shown by green arrows.

Location = Centroid(X) of green.

FACTORY LOCATIONS



Best Factory Locations:

Blue points represent pharmacies.

The blue and white pop ups represent the best locations of the factory based on K-Means.

Seaview in Brooklyn is the number 1 best location represented by green cluster in clusters map.



SUMMING UP EXPLORATORY DATA ANALYSIS

	Boroughs					
Study	The Bronx	Brooklyn	Manhattan	Staten Island	Queens	Winning Borough
Land Area	Small	2 nd Highest	Small	3 rd Highest	Highest	Queens, Brooklyn
Population Density	3 rd Highest	2 nd Highest	Very High	Low	Low	Manhattan, Brooklyn
Population Number	4 th Highest	Highest	3 rd Highest	Low	2 nd Highest	Brooklyn, Queens
Diversity	High	2 nd Highest	3 rd Highest	Low	High	Bronx, Queens, Brooklyn
Number of Neighborhoods	Highest	4 th Highest	Low	3 rd Highest	2 nd Highest	Bronx, Queens
Cluster Centroid Location	Blue: Wetchester Ave	Green: Seaview Ave	-	Red: Yellow Trail	-	Brooklyn Seaview Ave
Borough Score	2	5	1	0	4	-

Conclusion:

Brooklyn has highest score of 5 making it best location at Seaview Avenue.

It has highest population number meaning high customer base, it has enough area for expansion.

It has good diversity for having diverse employees.



THANK YOU!