

Capstone Project

Battle of the

Neighborhoods:

Moving from Cambridge, MA to Manhattan, NY

By Arturo Avila-Lares

Introduction

Due to the COVID-19 pandemic, a lot of people around the world have been forced to work from home. However, seeing as a lot of companies have determined that having employees work remotely is a feasible long-term option, a lot of people have moved from more expensive cities like New York—while saving in rent and maintaining their same jobs. Due to the decreased demand for real estate, rent prices have reduced substantially so for a lot of people now would be a good opportunity to move to a city that they couldn't afford pre-pandemic.

According to Forbes, rent in New York City has dropped to 10-year lows. Rent in Manhattan has dropped 12.7%, which is more than the 10% drop that happened during the 2008 recession. This decrease has been propelled by an overall increase of 37,000 rentals.

Business Problem

Using K-means clustering, identify neighborhoods in Manhattan, NY that are similar to the neighborhood I currently live in Cambridge, MA, which is called “The Port”, and take advantage of the decreased rent prices in Manhattan due to COVID-19.

Target Audience

Although this project is specific to Cambridge, MA and Manhattan, NY, it could be useful to:

- People wanting to move to similar neighborhoods in another city.
- People wanting to move to similar neighborhoods in the same city.
- People wanting to learn more about the neighborhood they live.
- People evaluating whether it's worth moving to another neighborhood.
- People trying to figure out where to stay in another city if they are visiting and they a number of things they want to have nearby.

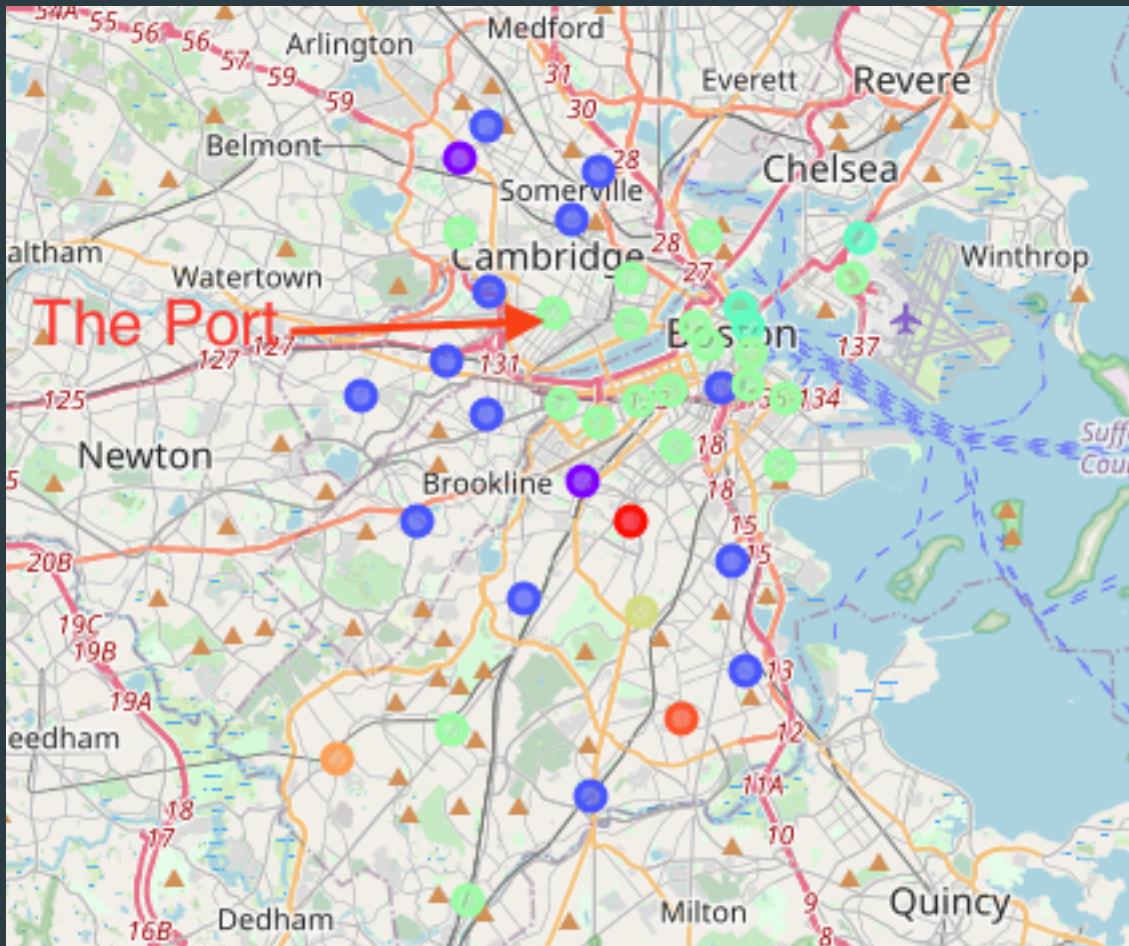
Methodology

- ▶ Extract and prepare neighborhood data, including name and coordinates, for all neighborhoods in Cambridge/Boston, MA and Manhattan, NY.
- ▶ Perform four different K-means clustering
 1. Perform K-means clustering analysis in neighborhoods in the Cambridge and Boston area to understand what sort of neighborhood The Port is.
 2. Perform K-means clustering analysis in neighborhoods in Manhattan, NY to understand to learn more about this area.
 3. Perform K-means analysis with all neighborhoods in all locations.
 4. Take the cluster from step 4 in which The Port was labeled in and perform another K-means clustering analysis using only The Port and the neighborhoods in Manhattan that are part of the same cluster.
- ▶ Draw conclusions and provide recommendations about which neighborhoods are similar and I could potentially move to in Manhattan, NY.

Results



K-means Clustering No.1: Neighborhoods in the Cambridge/Boston



Out of the 10 clusters, The Port was placed in Cluster 7, which is depicted in light green in the map.

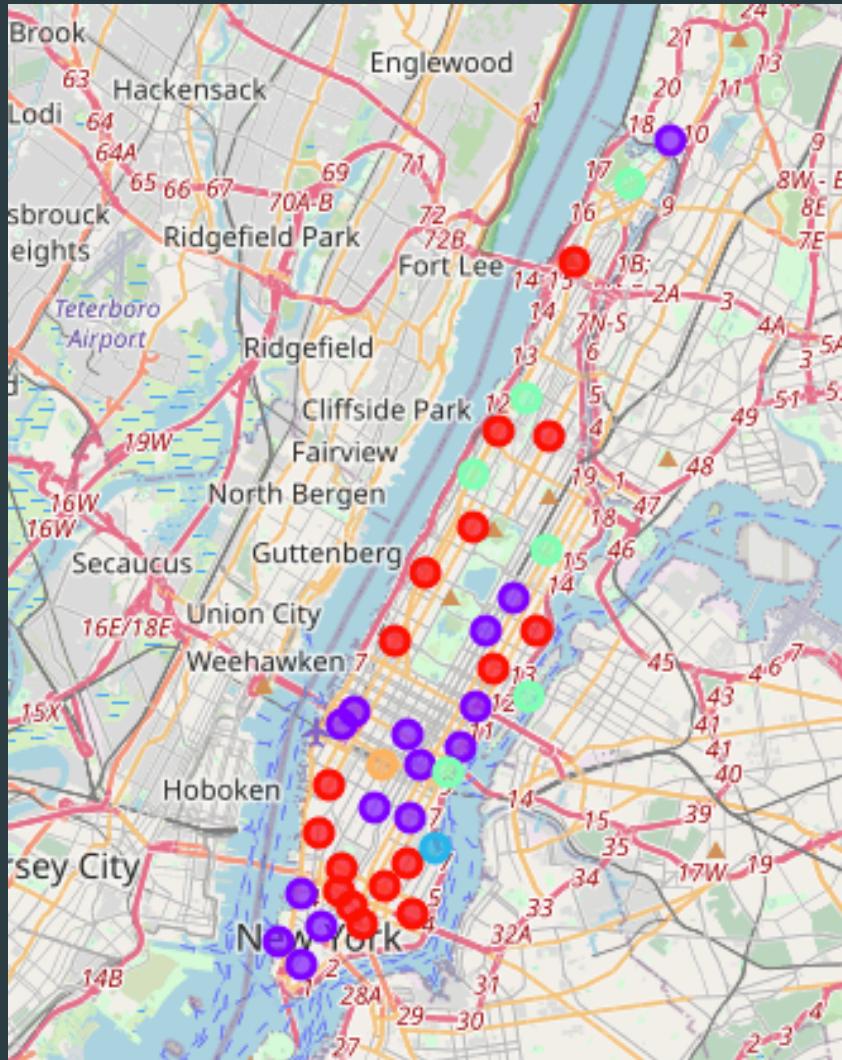
Cluster 7 is characterized by having a lot of restaurants (from a wide array of cuisines) and fitness centers/gyms. It's a cluster that is likely to often receive out-of-town visitors as evidenced by the number of hotels and car rentals in the area, and the wide array of restaurants.

K-means Clustering No.1: Neighborhoods in the Cambridge/Boston

Sample of Cluster 7, which includes The Port											
	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	Downtown Boston	Business Service	Rental Car Location	Hotel	American Restaurant	Coffee Shop	Italian Restaurant	Food Truck	French Restaurant	Sandwich Place	Bakery
1	Beacon Hill	Italian Restaurant	American Restaurant	Steakhouse	Restaurant	Historic Site	Pizza Place	Gym / Fitness Center	Coffee Shop	New American Restaurant	French Restaurant
3	Financial District / Wharves	Boat or Ferry	Harbor / Marina	Hotel	Historic Site	Aquarium	Seafood Restaurant	Salad Place	Park	American Restaurant	Coffee Shop
31	Mid Cambridge	American Restaurant	Italian Restaurant	Hotel	Grocery Store	Historic Site	Park	Pizza Place	Bakery	Restaurant	Flea Market
32	The Port, Cambridge	Vegetarian / Vegan Restaurant	Coffee Shop	Cocktail Bar	Bar	Yoga Studio	New American Restaurant	Supermarket	Gift Shop	Martial Arts School	Massage Studio

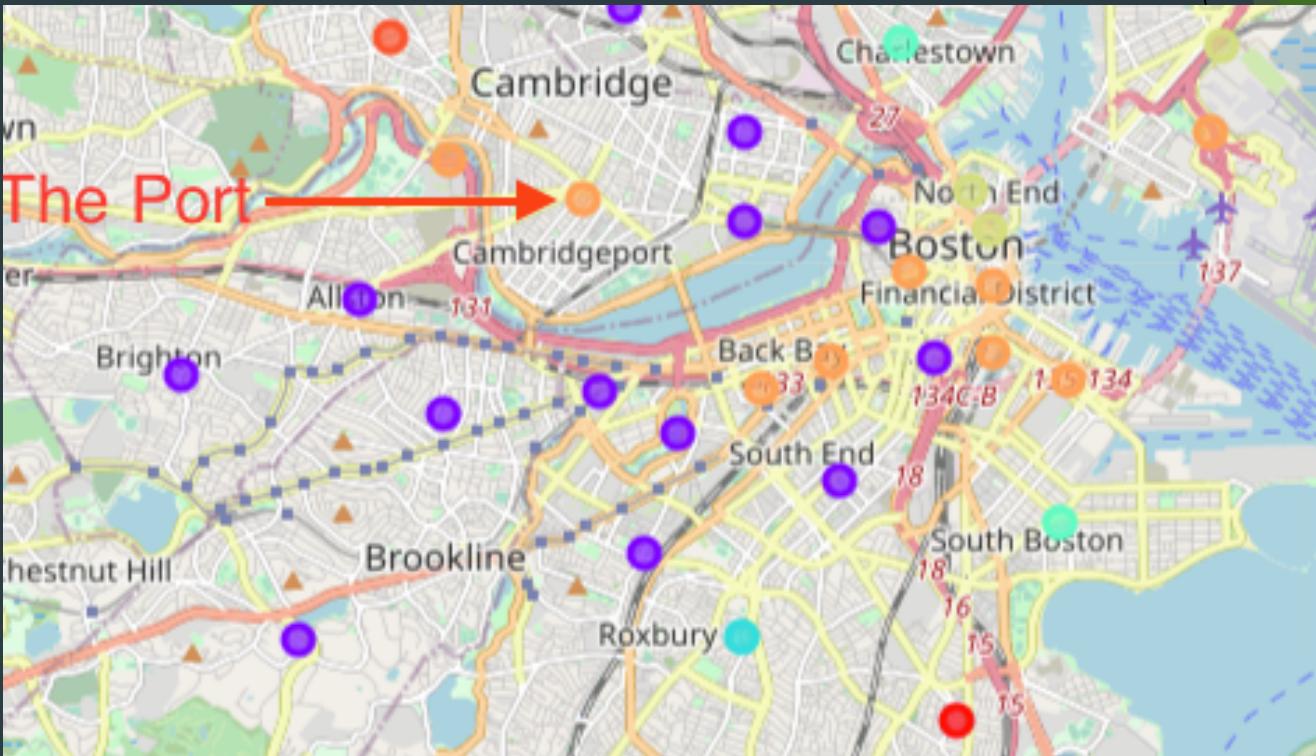
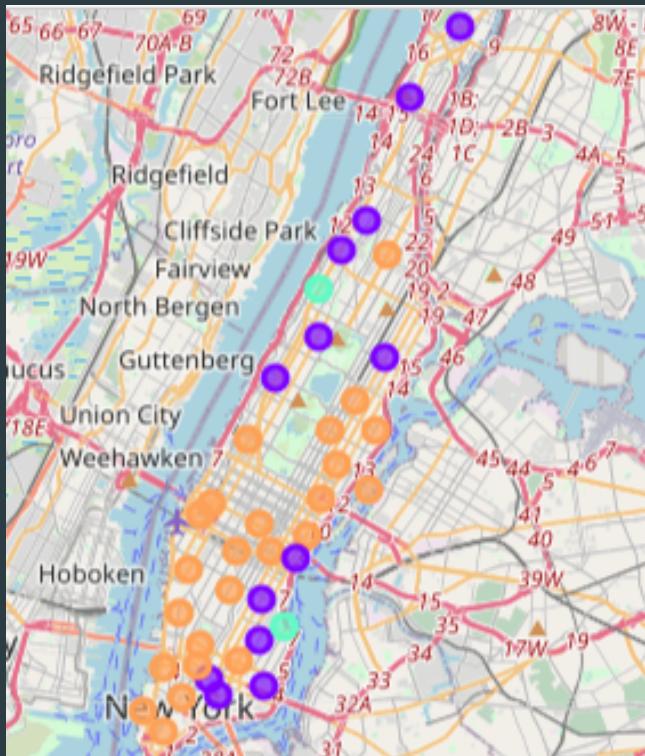
A number of these neighborhoods have a considerable number of business centers, which may indicate the presence of offices, which can also be a reason for the number of restaurants, especially the many coffee shops.

K-means Clustering No.2: Neighborhoods in Manhattan, NY



For this K-means clustering analysis, I decided to follow the example given in the lab and did 5 clusters. Below, I included a map depicting the 5 clusters in Manhattan. If I were to move here, this analysis would be useful if I ever wanted to move to another similar neighborhood in the area.

K-means Clustering No.3: Neighborhoods in both Cambridge/Boston area and Manhattan, NY



The analysis has 10 clusters and The Port was placed in Cluster 9 (light orange color), along with other neighborhoods in both locations.

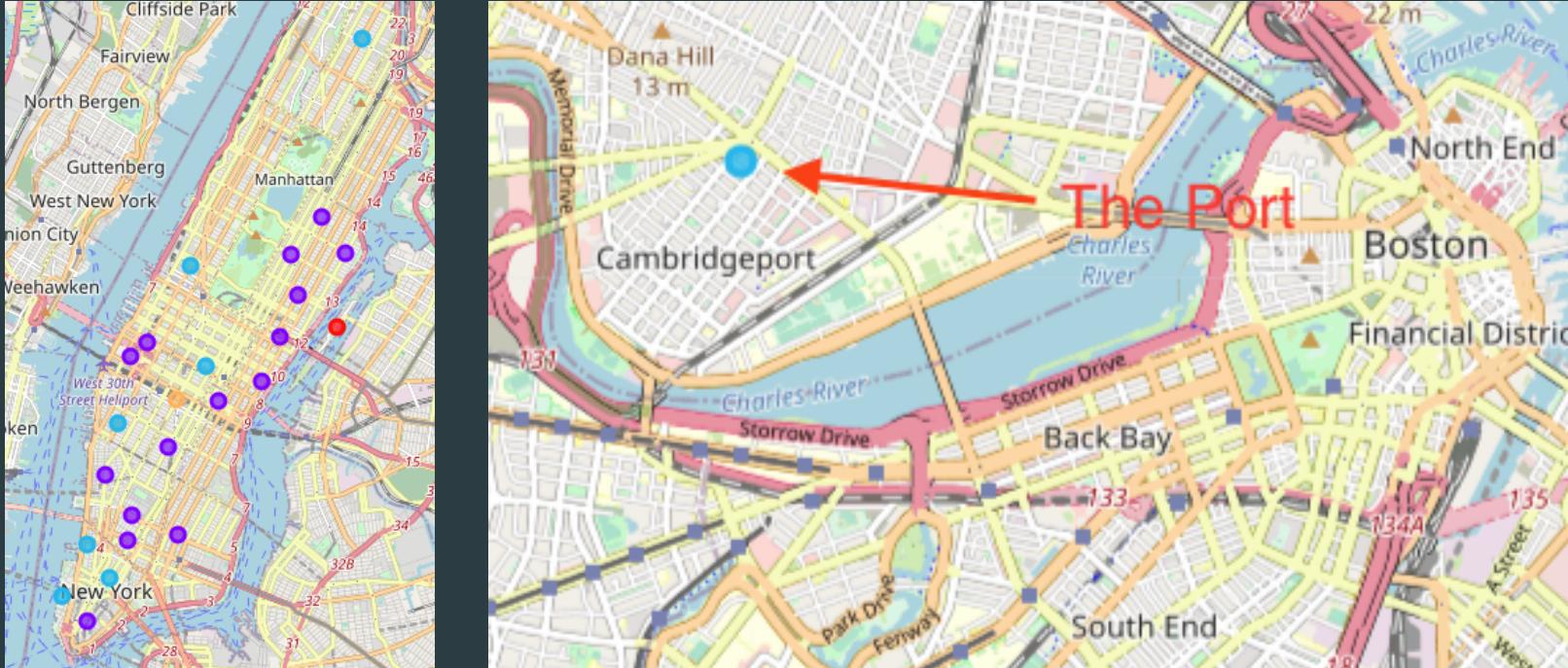
K-means Clustering No.3: Neighborhoods in both Cambridge/Boston area and Manhattan, NY

Sample of Cluster 9, which includes The Port												
	Neighborhood	State	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	Downtown Boston	MA	Business Service	Rental Car Location	Coffee Shop	American Restaurant	Hotel	Food Truck	Italian Restaurant	Bakery	Sandwich Place	French Restaurant
1	Beacon Hill	MA	American Restaurant	Gym / Fitness Center	Steakhouse	New American Restaurant	Historic Site	Pizza Place	Italian Restaurant	Restaurant	Coffee Shop	Falafel Restaurant
3	Financial District / Wharves	MA	Boat or Ferry	Harbor / Marina	Hotel	Aquarium	Historic Site	Salad Place	Seafood Restaurant	Park	Bakery	Coffee Shop
5	Downtown Boston	MA	Business Service	Rental Car Location	Coffee Shop	American Restaurant	Hotel	Food Truck	Italian Restaurant	Bakery	Sandwich Place	French Restaurant
32	The Port, Cambridge	MA	Vegetarian / Vegan Restaurant	Coffee Shop	Bar	Cocktail Bar	Plaza	Massage Studio	Mediterranean Restaurant	New American Restaurant	Nightclub	Playground

Similar to my clustering analysis for only the Boston/Cambridge area, this cluster is also categorized by having lots of restaurants, shops, and fitness centers/gyms. Thus, these are neighborhoods that often receive visitors, where people work, and where people live to be in close proximity to gyms and a wide variety of restaurants.

However, seeing as this cluster has a considerable number of members, I did an additional clustering analysis to narrow down this list.

K-means Clustering No.4: The Port Cambridge and Manhattan neighborhoods in same cluster



I performed the final K-means clustering analysis using only the Manhattan neighborhoods, included in Cluster 9 from the analysis before, and The Port. The analysis consisted of 5 clusters. The Port is part of Cluster 3 (light blue color).

K-means Clustering No.4: The Port Cambridge and Manhattan neighborhoods in same cluster

Cluster 3 Table												
	Neighborhood	State	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	The Port, Cambridge	MA	Vegetarian / Vegan Restaurant	Bar	Cocktail Bar	Coffee Shop	Yoga Studio	Dance Studio	Bookstore	Breakfast Spot	Shanghai Restaurant	Sandwich Place
2	Central Harlem	NY	African Restaurant	Chinese Restaurant	Bar	French Restaurant	American Restaurant	Seafood Restaurant	Cosmetics Shop	Boutique	Gym	Library
7	Lincoln Square	NY	Plaza	Café	Theater	Concert Hall	Performing Arts Venue	Gym / Fitness Center	Italian Restaurant	Wine Shop	French Restaurant	Indie Movie Theater
9	Midtown	NY	Hotel	Clothing Store	Theater	Sporting Goods Shop	Sandwich Place	American Restaurant	Steakhouse	Coffee Shop	Spa	Bakery
11	Chelsea	NY	Art Gallery	Coffee Shop	Bakery	American Restaurant	Ice Cream Shop	Hotel	Seafood Restaurant	Sushi Restaurant	Cosmetics Shop	Bar
13	Tribeca	NY	Park	American Restaurant	Italian Restaurant	Coffee Shop	Spa	Café	Wine Bar	Poke Place	Skate Park	Playground
16	Battery Park City	NY	Coffee Shop	Park	Hotel	Gym	Clothing Store	Boat or Ferry	Memorial Site	Burger Joint	Food Court	Gourmet Shop
20	Civic Center	NY	Coffee Shop	Cocktail Bar	American Restaurant	Hotel	Spa	Gym / Fitness Center	Yoga Studio	French Restaurant	Park	Bakery

The Port is part of Cluster 3, which indicates that the other 7 neighborhoods in this cluster are neighborhoods where I could potentially move to. I will discuss more about this in the discussion section.

Discussion

Looking at the 4th K-means clustering analysis, we can see that The Port is in Cluster 3, which means the other neighborhoods in this cluster are deemed as similar neighborhoods to The Port and, hence, potential neighborhood I could move to. Given that I know these two cities, I can see that these are actually good recommendations, which is validating to see.

As we have seen throughout this project, The Port is a neighborhood with a wide range of restaurants, gyms/fitness centers, hotels, and car rentals. All of these are common trends along the other neighborhoods in this cluster and confirm my analysis. These neighborhoods are good for people, like me, who like going out to eat, work out, live close to their place of work, and have places nearby where friends or family can stay when visiting. Thus, based on this project, I could move to any of the other 7 neighborhoods in this cluster, like Midtown and Tribeca, and they would offer similar venues as the ones I currently have in my neighborhood The Port.

Recommendations

Ideally, I would like to expand this analysis to include other features such as median rent, crime rate, etc. and come up with a better choice of neighborhood. However, this project in its current state is flexible if someone wanted to do look at venues to find similar neighborhoods. It could be used if someone wanted to move within the same city or move to a different city that New York within the US. Given that I have all the coordinates for all zip codes in the US, the only data source missing would be the list of neighborhoods to be able to run this analysis.

Conclusion

- ▶ This project allowed me to explore different facets of what it means to be a Data Scientist. I had to extract and wrangle data and run an unsupervised algorithm like K-means clustering, but, more importantly, it gave me an idea of how to use Data Science to solve real-life scenarios. I'm looking to use this experience to embark in other Data Science project and have the opportunity to work with stakeholders to solve business problems through data.
- ▶ Through this project, I was able to find neighborhoods in Manhattan, NY that are similar to my current neighborhood The Port in Cambridge, MA where I could potentially move to and take advantage of the decrease in rent prices in Manhattan due to COVID-19.