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Coursera Capstone Project

Introduction where you discuss the business problem and who would be interested in this project.

The idea of this study is to help my cousins plan a vacation in New York and choose an Airbnb listing based on a criterion of preferences for entertainment, food and other factors which I will define later in this report. My cousins are curious about Manhattan and Brooklyn, so I will scope into these areas for listings that best suits their interests while considering price and location data. My mission is to pinpoint the most happening venues around Airbnb listings to understand what locals from that area are into and what possible events they can attend to get a taste of the culture and vibes in a potential vacation spot. This will allow me to gain a better understanding of Manhattan and Brooklyn and recommend a few listings that meet my cousins needs and wants.

Some of my cousin's requirements include interests around coffee shops, different cuisines of foods, in the Brooklyn and Manhattan area. I will analyze these neighborhoods to recommend a few locations that might be interesting to book an Airbnb around.

Data where you describe the data that will be used to solve the problem and the source of the data.

The two data sources I used to conduct my research and analysis were a Kaggle Airbnb dataset as well as the foursquare API to extract venues in the Brooklyn and Manhattan area. These are the two main data sources I will be using to conduct this locational analysis.

The Airbnb dataset from Kaggle includes important data points such as price, latitude, longitude, borough and neighborhood. I will use this information to extract venues in the locations mentioned above from Foursquare and cross reference the top 10 venues. These will allow me to understand what types of popular venues are in these areas and specific neighborhoods. The kaggle data set can be found here:

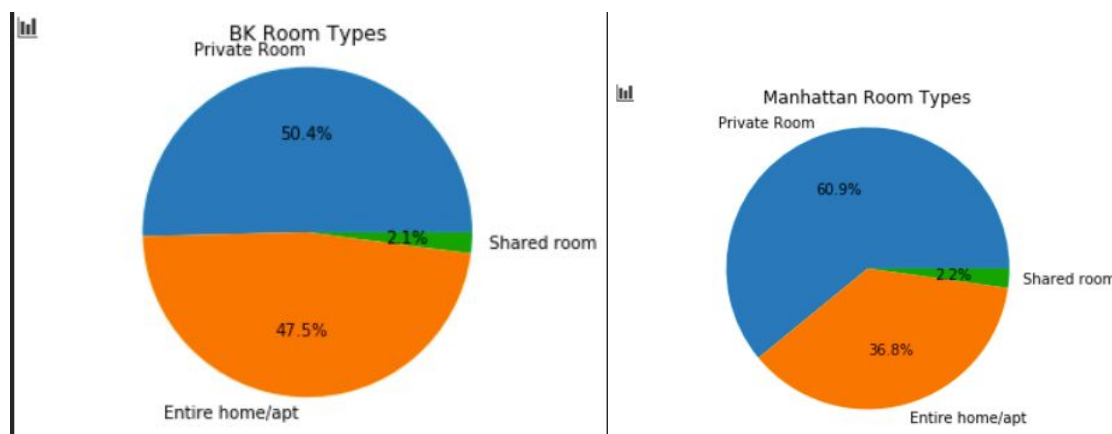
<https://www.kaggle.com/dgomonov/new-york-city-airbnb-open-data>

Methodology section which represents the main component of the report where you discuss and describe any exploratory data analysis that you did, any inferential statistical testing that you performed, if any, and what machine learnings were used and why.

My first step was to perform exploratory data analysis on the Airbnb dataset as well as the venue information from Foursquare. I found out that the average Airbnb in Manhattan is approximately \$70 more expensive than Brooklyn.

neighbourhood_group	
Brooklyn	124.38
Manhattan	196.88

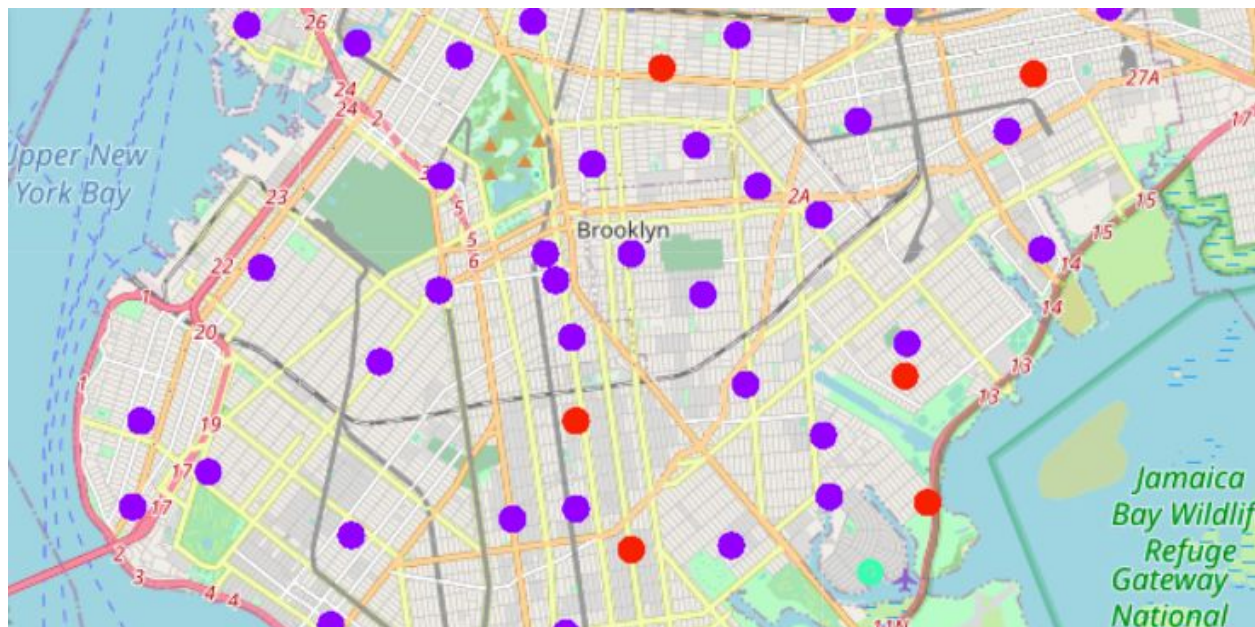
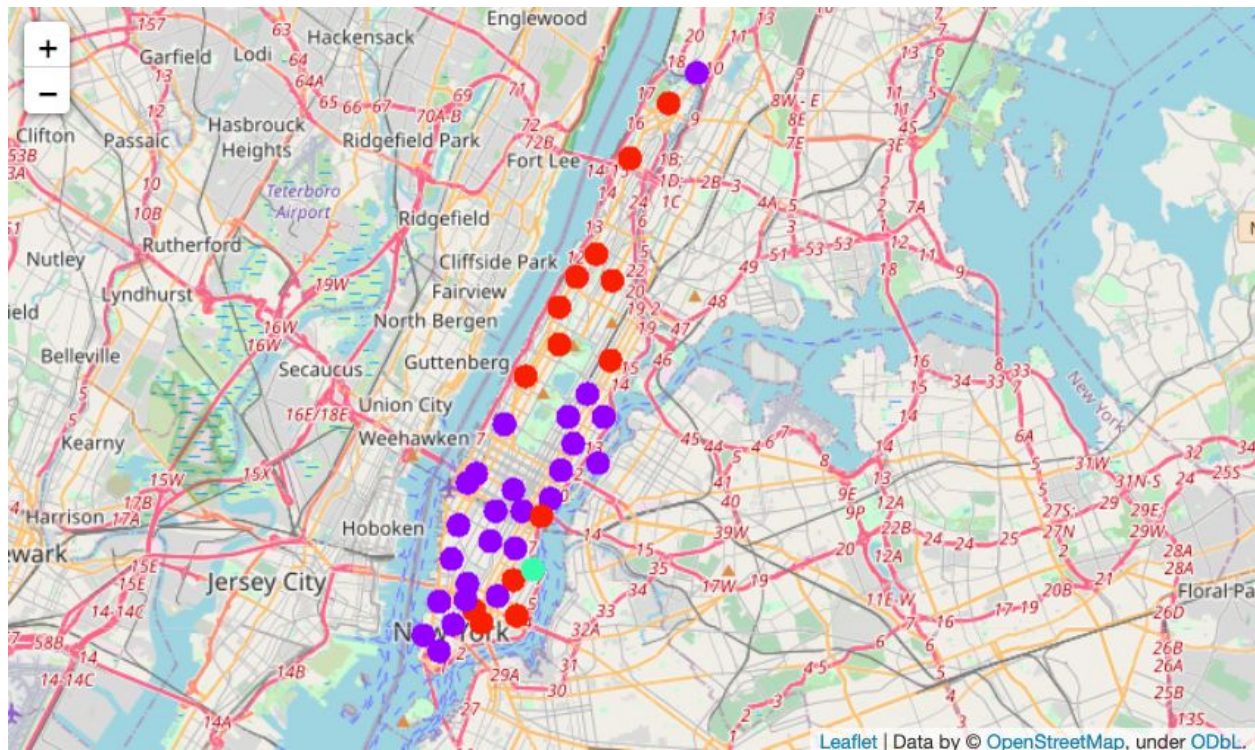
The breakdown of room types are shown below for Brooklyn and Manhattan respectively.



As seen in the two pie charts, there are slightly more private rooms in Manhattan. My cousins mentioned that they are looking for a private room (hotel and apartment) or an entire home/apartment. Basically they are not looking to share any rooms with other parties. I inferred that I will have an abundance of airbnbs to choose from as 90% of the Airbnb listings are private rooms or an entire home in Brooklyn and Manhattan.

After this basic exploratory data analysis, I performed a K-means clustering algorithm model in order to cluster the neighborhoods in both Manhattan and Brooklyn to understand the types of venues in each neighborhood of the cities. I clustered the airbnb listings into 3 clusters for Manhattan and Brooklyn based on distance and the top 10 venue categories that were in the

neighborhoods. The cluster analysis map is shown below for the listings in Brooklyn and Manhattan.



Results section where you discuss the results.

In this section I will dive into two neighborhoods in each Manhattan and Brooklyn that have the most frequent venues of coffee shops, diverse restaurants and shopping. In Manhattan, I have scoped into Chelsea and Greenwich Village neighborhoods. In Brooklyn, I have scoped into the neighborhoods of Williamsburg and Kensington. The top 10 most common venues in Chelsea, Greenwich Village, Williamsburg and Kensington are shown below in dataframes.

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
Greenwich Village	Italian Restaurant	Clothing Store	Sushi Restaurant	Café	American Restaurant	Coffee Shop	Indian Restaurant	Boutique	Cosmetics Shop	Chinese Restaurant

Cluster Labels	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	
3	1	Chelsea	Coffee Shop	Bakery	American Restaurant	Art Gallery	Italian Restaurant	Seafood Restaurant	French Restaurant	Ice Cream Shop	Wine Shop	Hotel

	Cluster Labels	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
40	1	Kensington	Thai Restaurant	Grocery Store	Ice Cream Shop	Pizza Place	Sandwich Place	Donut Shop	Gas Station	Japanese Restaurant	Deli / Bodega	Furniture / Home Store

	Cluster Labels	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
67	1	Williamsburg	Bagel Shop	Coffee Shop	Pizza Place	Pet Store	Event Space	Japanese Restaurant	Tapas Restaurant	Clothing Store	Steakhouse	Latin American Restaurant

The top 10 most common venues in Chelsea are shown above which includes coffee shops, bakery, american restaurant, art gallery, Italian restaurant, seafood restaurant, French restaurant, Ice Cream shop, wine shop and hotel. The top 10 most common venues in Greenwich are Italian, Clothing store, Sushi, Cafe, American Restaurant, Coffee Shop, Indian Restaurant, Boutique, cosmetics shop and Chinese restaurant. The top 10 most common venues in Kensington are Thai restaurant, grocery store, ice cream shop, pizza place, sandwich shop, donut shop, gas station, Japanese restaurant, Deli/Bodega, and Home stores. The top 10 most common venues in Williamsburg are bagel shop, coffee shop, pizza place, pet store, event space, Japanese restaurant, Tapas restaurant, clothing store, steakhouse and Latin American restaurant. After conversations with my cousins, atleast 75% of these venues are of interest to them. There is a variety of cuisines in these neighborhoods as well as a bunch of dessert places, cafes and shopping venues. After applying the clustering algorithm I was able to group listings based on location and recommend ten Airbnbs based on a price range of 100-200\$ and number of reviews being greater than 10. This constraint is to ensure that the listings have been used before by other individuals and are safe to purchase. In the next section, I will dig into the recommendations made per neighborhood.

Discussion section where you discuss any observations you noted and any recommendations you can make based on the results.

As displayed in the last section of my Jupyter notebook, I have created a list of recommendations for each neighborhood based on the requirements:

1. price is between \$100 - \$200
2. Number of reviews is greater than 10 reviews

	name	neighbourhood_group	neighbourhood	room_type	price	minimum_nights	number_of_reviews	r
3960	New, spacious 1BD in Williamsburg	Brooklyn	Williamsburg	Entire home/apt	102	7	26	
9225	HUGE Entire Flr. Private Entry/Bath	Brooklyn	Williamsburg	Private room	103	100	128	
17247	Luxe & Spacious Williamsburg Studio	Brooklyn	Williamsburg	Entire home/apt	105	5	11	
8441	Wburg 1 bedroom - Spacious & Sunny	Brooklyn	Williamsburg	Entire home/apt	105	5	33	
16903	Sunny Williamsburg w Balcony - Long Term Rental	Brooklyn	Williamsburg	Entire home/apt	105	15	30	
14755	Apartment in Williamsburg - Long term lease	Brooklyn	Williamsburg	Entire home/apt	105	180	10	
27357	Sun Drenched Williamsburg 1 BR Prime Location	Brooklyn	Williamsburg	Entire home/apt	107	4	17	
21971	*PRIVATE APARTMENT L TRAIN LORIMER STOP	Brooklyn	Williamsburg	Entire home/apt	108	28	17	
33946	Charming Room with 2 Beds+ Laundry in Williams...	Brooklyn	Williamsburg	Private room	109	30	43	
19762	Apartment with backyard in East Williamsburg	Brooklyn	Williamsburg	Entire home/apt	109	4	91	

	name	neighbourhood_group	neighbourhood	room_type	price	minimum_nights	number_of_reviews	rev
24305	Large, Queen Bedroom in heart of Greenwich Vil...	Manhattan	Greenwich Village	Private room	106	8	25	
5305	Sunny, Charming Boho Apt Near all in the Village!	Manhattan	Greenwich Village	Private room	115	25	70	
18277	♥ of Greenwich Village ~ Walk/Transit Score 100	Manhattan	Greenwich Village	Private room	115	5	65	
1856	Clean cozy room central historic gay best area	Manhattan	Greenwich Village	Private room	120	21	79	
1943	Cute Studio Greenwich Village NYC	Manhattan	Greenwich Village	Entire home/apt	120	30	17	
6835	Stylish Apartment with Spacious Private Room	Manhattan	Greenwich Village	Private room	120	4	19	
7364	CHARMING NYC Studio Loft NEAR SOHO!	Manhattan	Greenwich Village	Entire home/apt	136	30	43	
14735	Luxurious SOHO Apartment	Manhattan	Greenwich Village	Entire home/apt	142	30	10	
2512	Dream Apartment - Greenwich Village	Manhattan	Greenwich Village	Entire home/apt	150	12	16	
26492	SOHO / GREENWICH VILLAGE\nPrime location- 1 Be...	Manhattan	Greenwich Village	Entire home/apt	150	80	18	

	name	neighbourhood_group	neighbourhood	room_type	price	minimum_nights	number_of_reviews	re
21449	Modern, Spacious Hideaway in Historic Brooklyn	Brooklyn	Kensington	Entire home/apt	110	6	12	

	name	neighbourhood_group	neighbourhood	room_type	price	minimum_nights	number_of_reviews
21623	Relaxing Stylish Room near Train and Attractions	Manhattan	Chelsea	Private room	103	5	77
5921	Spacious room with view in Chelsea	Manhattan	Chelsea	Private room	110	6	20
11226	Perfect 8th Avenue Apt in Chelsea	Manhattan	Chelsea	Private room	112	5	31
34171	Cozy & Private Bedroom near Highline-CHelsea	Manhattan	Chelsea	Private room	115	55	11
2515	Room in Great Loft - Fun/Convenient	Manhattan	Chelsea	Private room	119	4	106
42887	Unique & Stylish Apartment in Chelsea	Manhattan	Chelsea	Entire home/apt	120	5	13
1057	Lovely Chelsea 1 Bedroom	Manhattan	Chelsea	Entire home/apt	125	9	10
30051	Sunny Chelsea Studio + Balcony (Central Location)	Manhattan	Chelsea	Entire home/apt	127	5	30
24406	1 Bedroom/1 Livingroom on 21st and 8th in Chelsea	Manhattan	Chelsea	Entire home/apt	130	26	39
16371	Convenient & comfortable studio near Penn Station	Manhattan	Chelsea	Entire home/apt	130	6	63

I have listed the 10 cheapest Airbnbs in Chelsea, Greenwich Village, Kensington and Williamsburg. These lists include information about listing description, price, room type, price and number of reviews. Kensington location only included 1 listing according to the requirements mentioned above, but I believe the other neighborhoods are more suitable for my cousins' interests.

Conclusion section where you conclude the report.

In conclusion, this project has allowed me to perform a cluster analysis to understand two specific cities in New York and recommend Airbnb's in these cities that best meet my cousins' needs and requirements. I conducted initial research through conversation to understand what type of entertainment and requirements they have while looking for when travelling somewhere. After understanding their needs and wants, I dove deeper into the neighborhoods and used the Kaggle Airbnb data set to recommend listings based on price and other factors that I mentioned above in the report.

