Data Visualization and Dashboards with Tableau

GOAL : THE PURPOSE OF THIS PROJECT WAS TO PREPARE IMPACTFUL VISUALIZATION USING TABLEAU FOR A GIVEN DATASET AND MAKE A MEANINGFUL DASHBOARD TO COMMUNICATE BUSINESS INSIGHTS ABOUT AIRBNB DATASET.

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Processes :

Data Connection : Collect/download the dataset to be analyzed and connect in Tableau using Datasource

Detect data types : Review data and check if all datatypes are appropriate according to column names.

- Host Id :Number
-Host Since :Date
-Name :String
-Neighbourhood :String
-Property Type:String
-Review Scores Rating (bin) :Number
-Room Type :String
-Zipcode :Number (Geographic Role)
-Beds :Number
-Number of Records: Number
-Number Of Reviews :Number
-Price :Number
-Review Scores Rating : Number

Check for null values, duplicate data, invalid or incorrect data. Such data can be easily filtered out in Tableau.

Categorical Features :

- Room Type
- Beds
- Price
- Neighborhood
- Host Since

Build Visualization for EDA :

Following slides consist all the visualization.

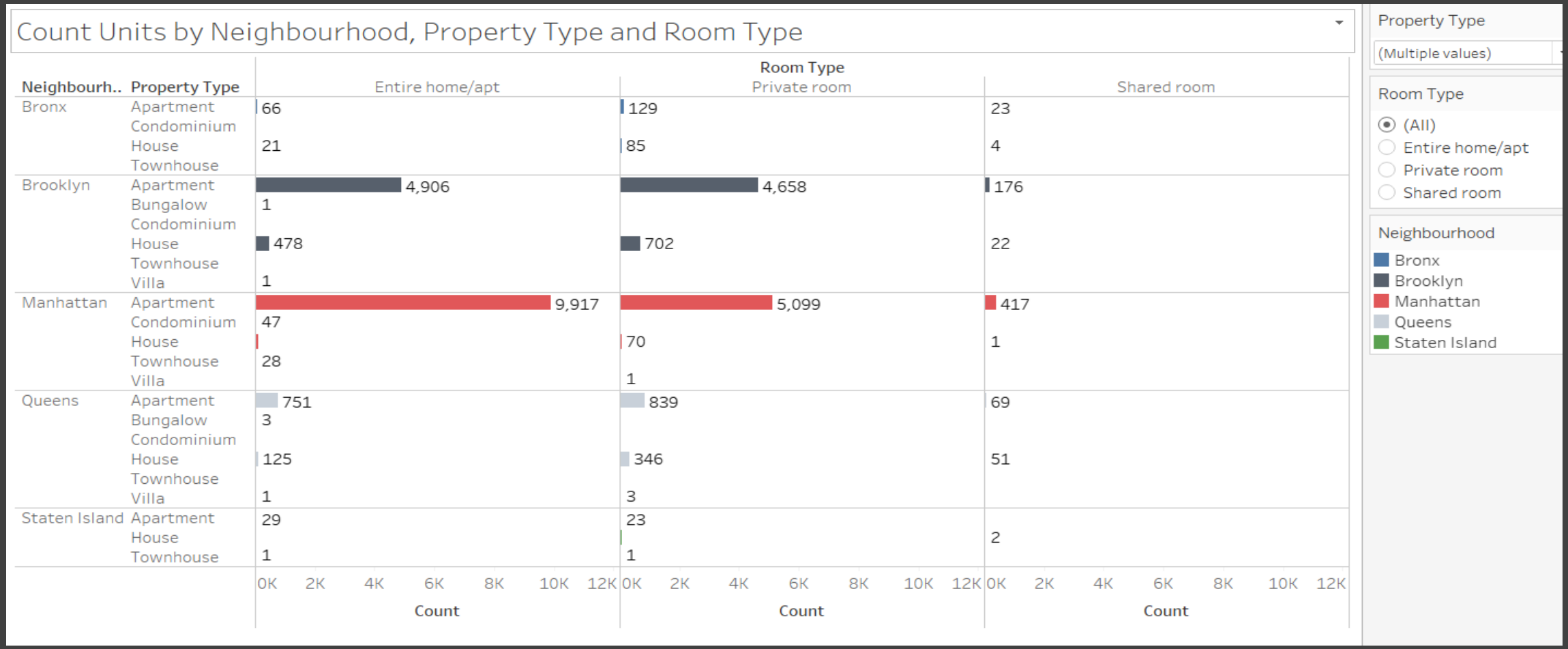
Find an interesting pattern, trend, outlier, etc. from the data used in the above steps.

Create dashboard

Data Interpretation:

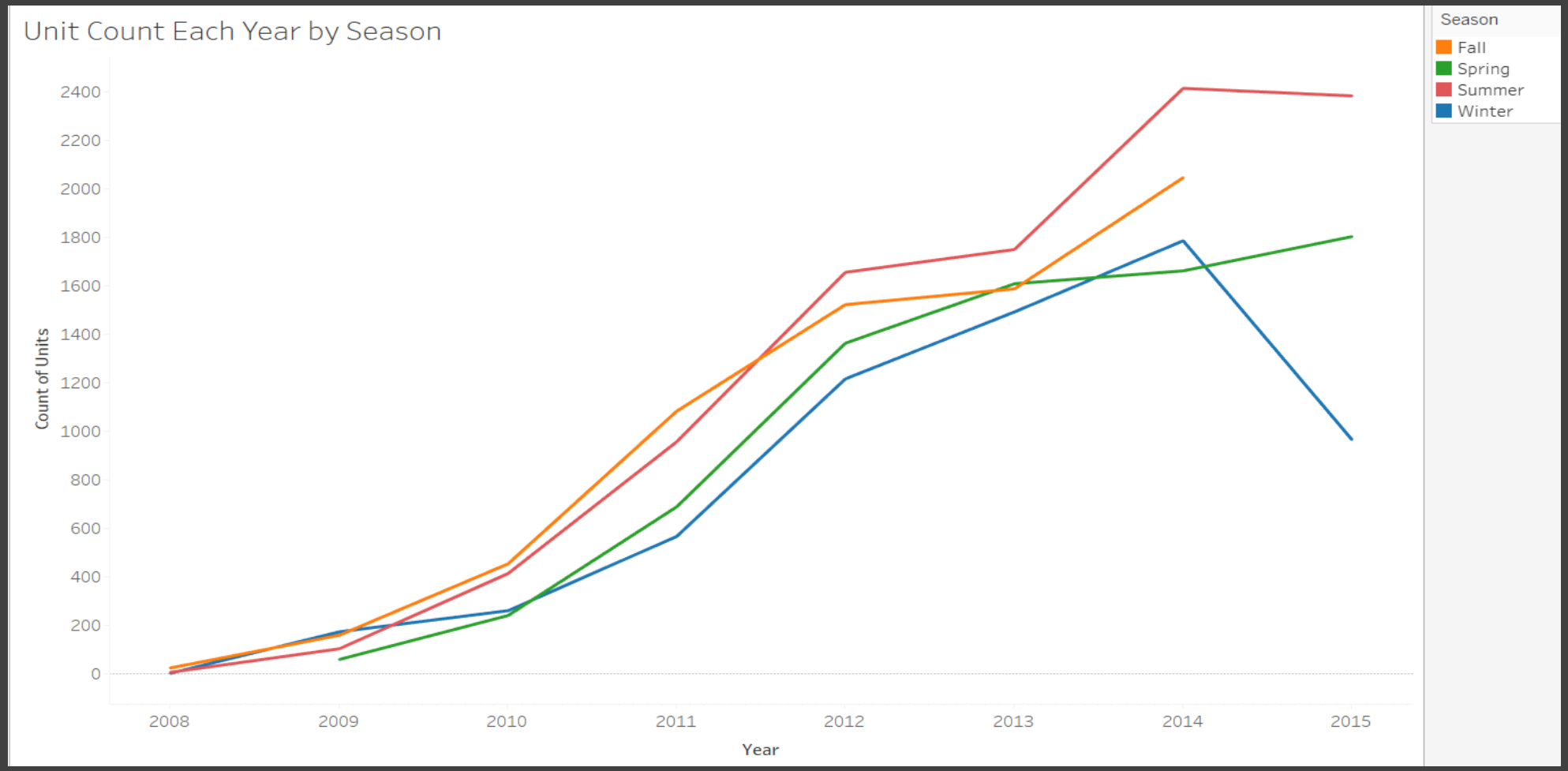
Detect Meaningful keypoints and answer relevant questions observed from visualization.

Visualizations for EDA



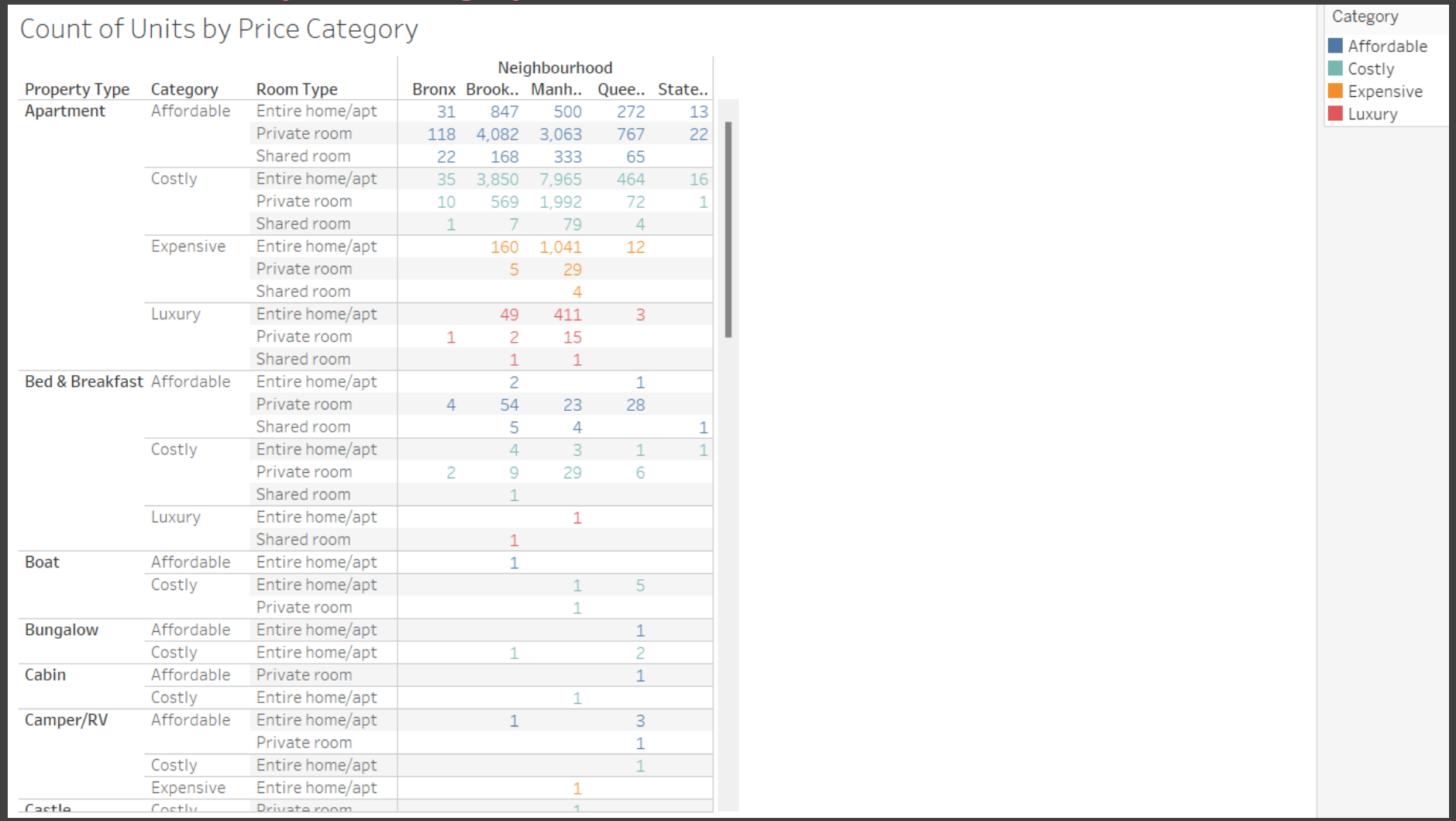
Above graph is to count units according to Neighborhood, Property type and Room type. Here I have used two filters to search for specific Property type and room type. E.g. in Brooklyn there are 478 Houses as ‘Entire home’, 702 Houses has ‘Private Room’ and in 22 Houses ‘Shared Room’ has been put as Airbnb unit.

Unit Count Each Year by Season



This graph shows the trend as how many units were added as Airbnb units during each season over the years. Mostly people add their property as Airbnb during Summer when holiday season is on the peak. Here I have used ‘Season’ Calculated field on Year column.

Count of Units by Price Category

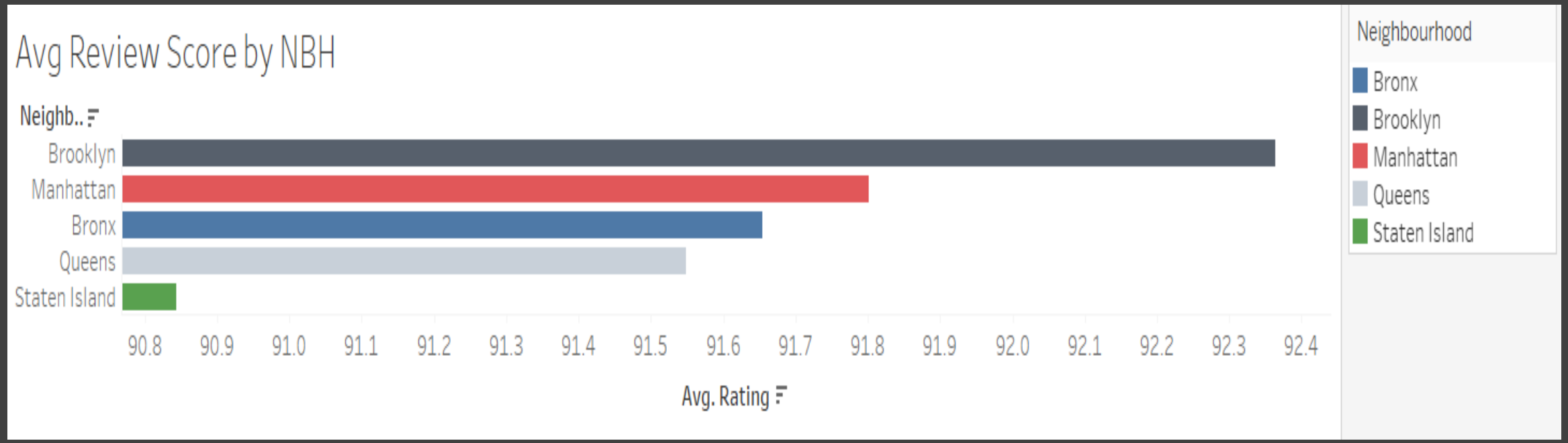


Property Type	Category	Room Type	Neighbourhood				
			Bronx	Brook..	Manh..	Quee..	State..
Apartment	Affordable	Entire home/apt	31	847	500	272	13
		Private room	118	4,082	3,063	767	22
		Shared room	22	168	333	65	
	Costly	Entire home/apt	35	3,850	7,965	464	16
		Private room	10	569	1,992	72	1
		Shared room	1	7	79	4	
	Expensive	Entire home/apt		160	1,041	12	
		Private room		5	29		
		Shared room			4		
	Luxury	Entire home/apt		49	411	3	
		Private room	1	2	15		
		Shared room		1	1		
Bed & Breakfast	Affordable	Entire home/apt		2		1	
		Private room	4	54	23	28	
		Shared room		5	4		1
	Costly	Entire home/apt		4	3	1	1
		Private room	2	9	29	6	
		Shared room		1			
	Luxury	Entire home/apt			1		
		Shared room		1			
Boat	Affordable	Entire home/apt		1			
	Costly	Entire home/apt			1	5	
		Private room			1		
Bungalow	Affordable	Entire home/apt				1	
	Costly	Entire home/apt		1		2	
Cabin	Affordable	Private room				1	
	Costly	Entire home/apt			1		
Camper/RV	Affordable	Entire home/apt		1		3	
		Private room				1	
	Costly	Entire home/apt				1	
	Expensive	Entire home/apt			1		
Castle	Costly	Private room			1		

This graph shows count of units according to price. E.g. in Brooklyn the count of affordable apartment (entire house) is 31. Here I have created ‘Category’ as calculated field based on price column.

Average Review Score rating by Neighborhood

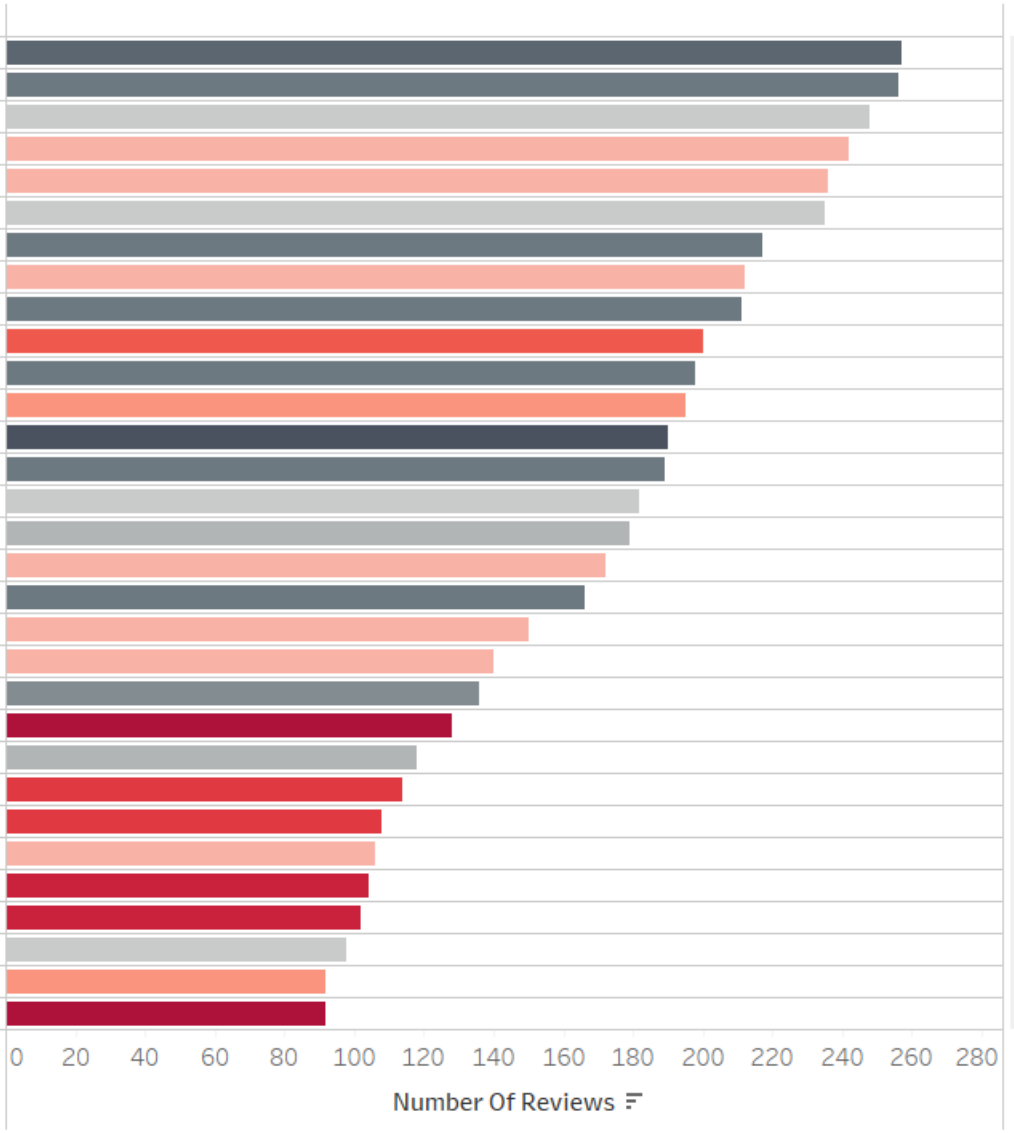
As per average Review Score Rating, Brooklyn has the highest rating than other neighborhoods

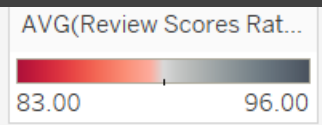


Top 10 Airbnb by Reviews

Top 10 by Reviews

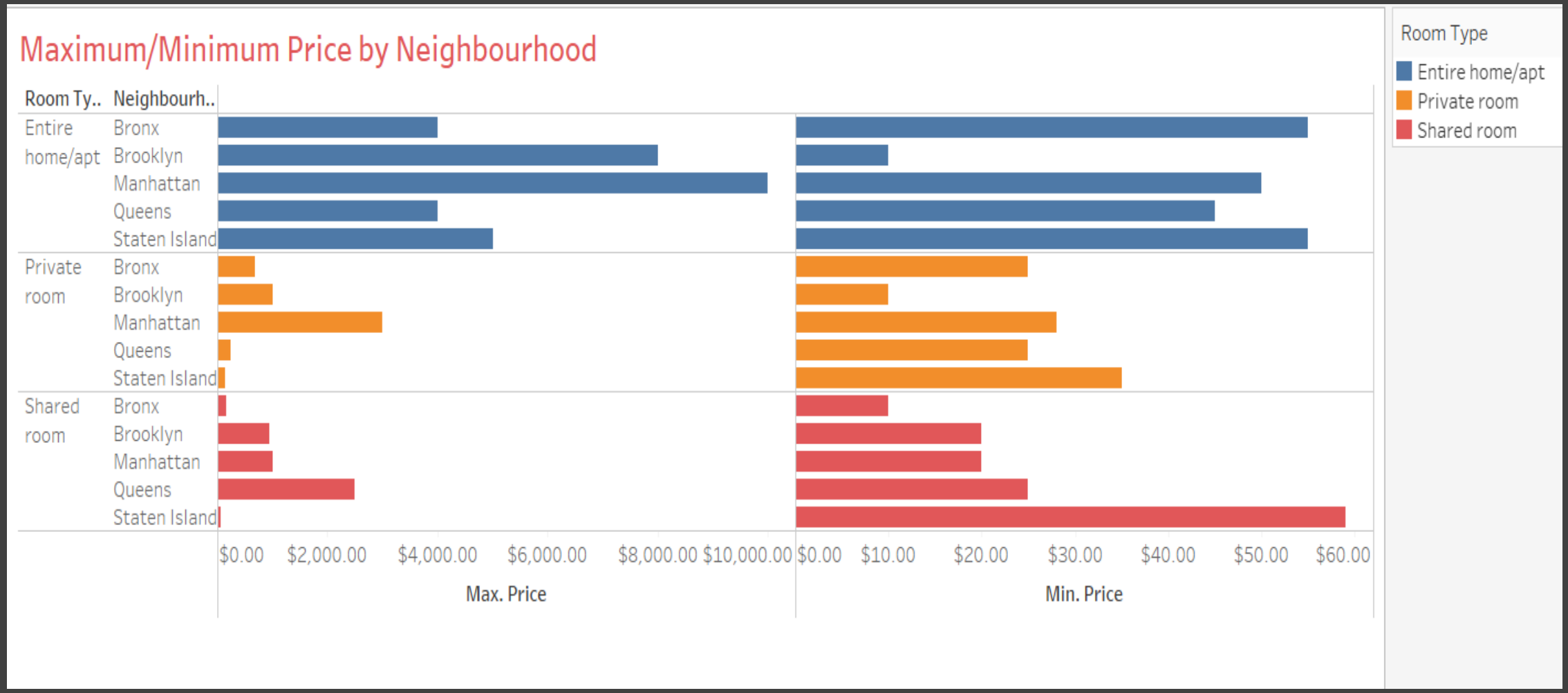
Name	Neighbourh..	Property Ty..	Room Type	Avg. Price
Roof-Top Room in W..	Brooklyn	Apartment	Entire home/apt	$140.00
Clean&Serene in Sce..	Brooklyn	Apartment	Private room	$99.00
Fabulous Bklyn priv..	Brooklyn	House	Private room	$99.00
Room with En Suite ..	Brooklyn	Apartment	Private room	$85.00
Great Bedroom Man..	Manhattan	Apartment	Private room	$50.00
Private Bedroom Ma..	Manhattan	Apartment	Private room	$50.00
Charming Carriage H..	Brooklyn	House	Entire home/apt	$165.00
Beautiful Bedroom ..	Manhattan	Apartment	Private room	$50.00
Private Bedroom in ..	Manhattan	Apartment	Private room	$65.00
Luxury 1BR 5 min wa..	Manhattan	Apartment	Entire home/apt	$150.00
Great Bedroom in H..	Manhattan	Apartment	Private room	$70.00
LG 1 BR APT IN MIDT..	Manhattan	Apartment	Entire home/apt	$145.00
Gorgeous Williamsb..	Brooklyn	Apartment	Entire home/apt	$238.00
Amazing Williamsbu..	Brooklyn	Apartment	Entire home/apt	$150.00
GREAT 1BR-TIMES S..	Manhattan	Apartment	Entire home/apt	$145.00
Your Sunny Private ..	Queens	Apartment	Private room	$43.00
So Easy To Get to Th..	Queens	Apartment	Private room	$35.00
Quiet Room in Chels..	Manhattan	Apartment	Private room	$70.00
Bedroom with Garde..	Brooklyn	Apartment	Private room	$70.00
1 BR loft 5 min walk ..	Manhattan	Apartment	Entire home/apt	$150.00
Budget Private Room!	Queens	Apartment	Private room	$33.00
Brooklyn Budget Wil..	Brooklyn	Loft	Private room	$50.00
AMAZING 1 BR- TIM..	Manhattan	Apartment	Entire home/apt	$145.00
Brooklyn Budget Wil..	Brooklyn	Loft	Private room	$50.00
NYC-Brooklyn #5 18 ..	Brooklyn	Apartment	Private room	$35.00
Parlor Room In Victo..	Brooklyn	Apartment	Private room	$70.00
A Private Bedroom T..	Manhattan	Apartment	Private room	$109.00
Brooklyn Budget Wil..	Brooklyn	Loft	Private room	$50.00
NYC-Brooklyn #3 18 ..	Brooklyn	Apartment	Private room	$39.00
NYC-Brooklyn #2 18 ..	Brooklyn	Apartment	Private room	$39.00
NYC Special Occasio..	Brooklyn	Apartment	Private room	$29.00





There are more than 10 in the list because some units have same Price

Maximum and Minimum Price based on Room Type in each Neighborhood



Clustering :

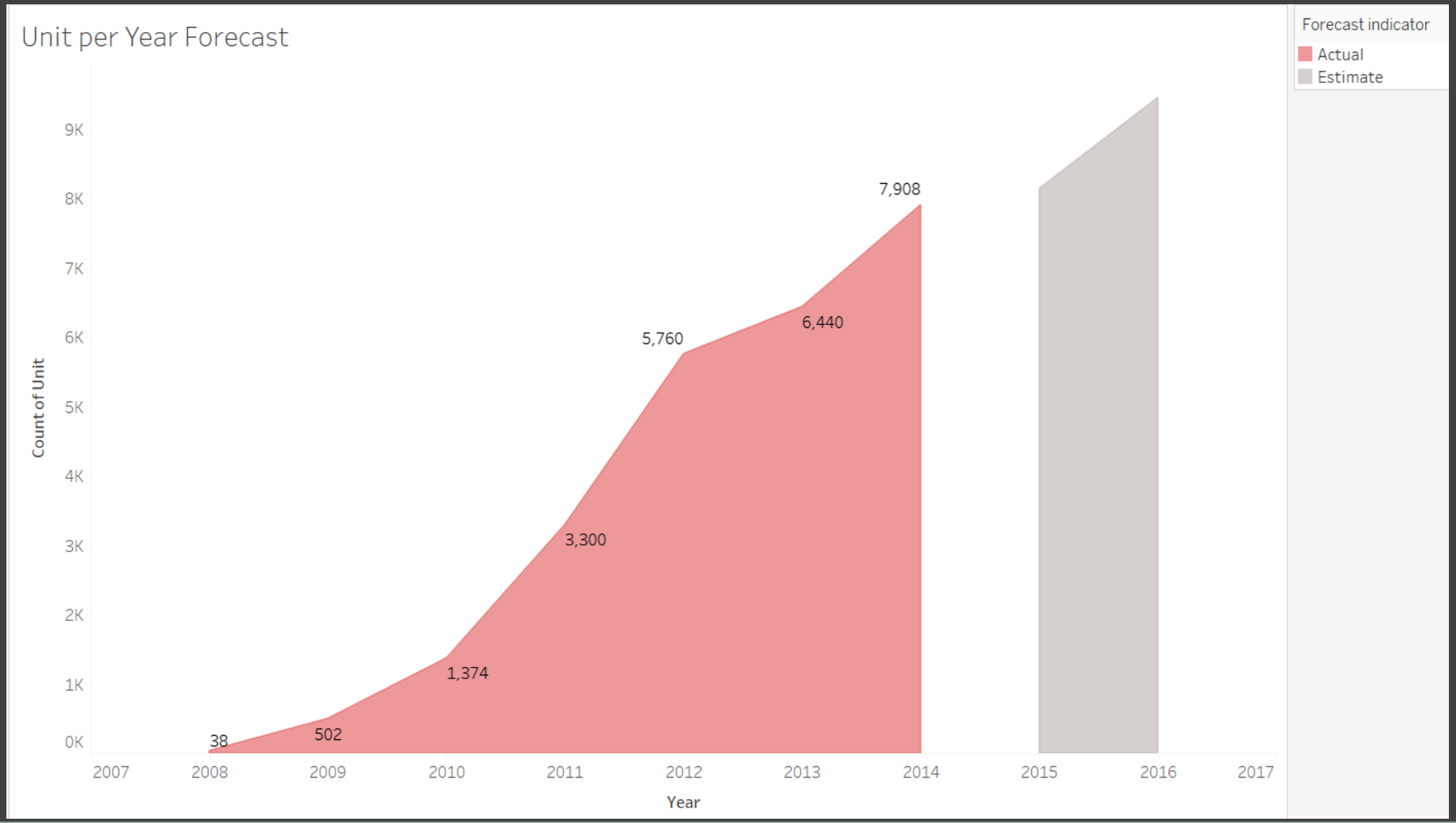
Inputs for Clustering
Variables: Count of Beds, Avg. Review Scores Rating, Count of Number of Records, Count of Review Scores Rating (bin)
Level of Detail: Neighbourhood, Property Type, Room Type
Scaling: Normalized

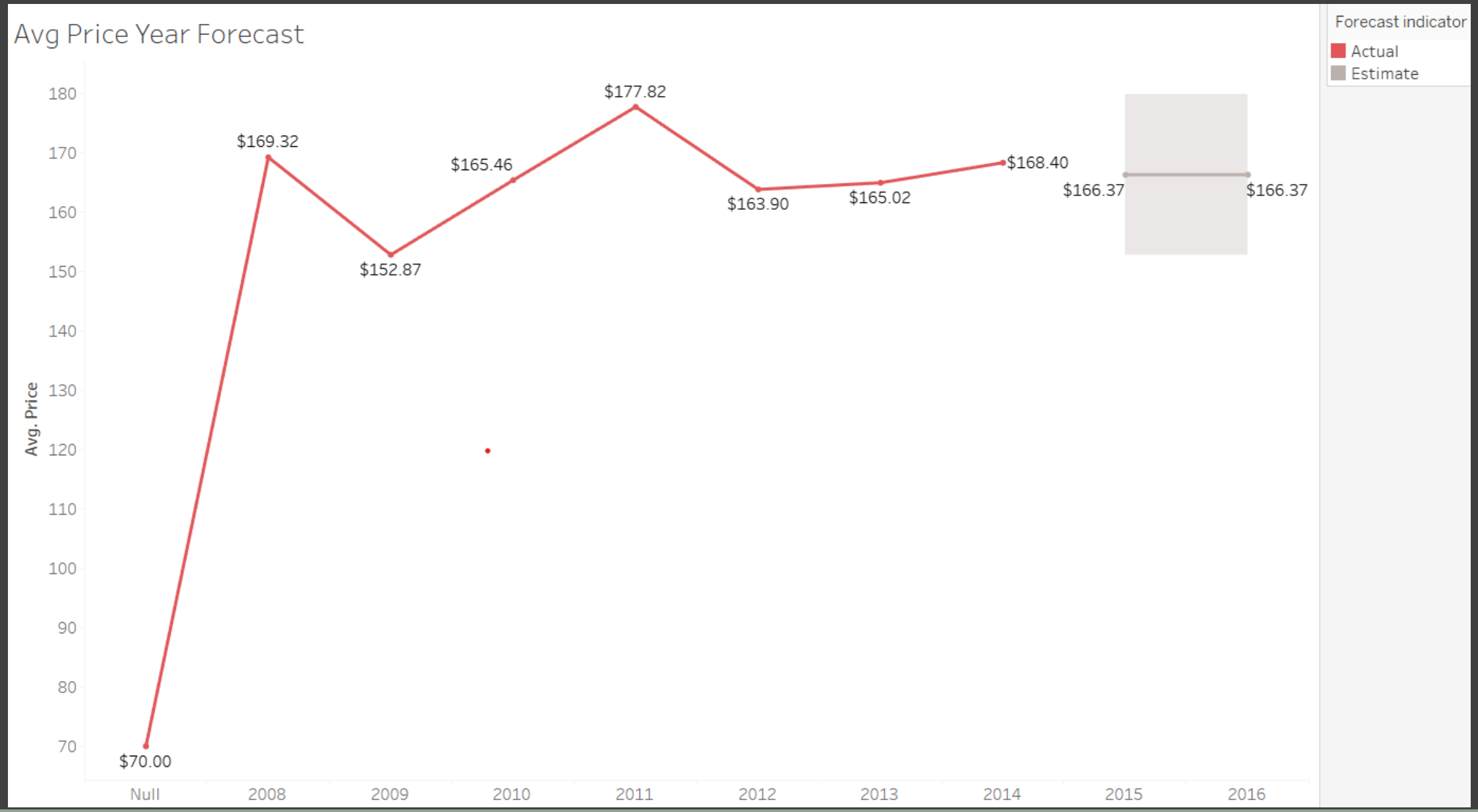
		Centers			
Clusters	Number of Items	Count of Beds	Avg. Review Scores Rating	Count of Number of Records	Count of Review Scores Rating (bin)
Cluster 1	52	100.81	90.802	101.08	71.558
Cluster 2	23	23.087	96.59	23.087	17.478
Cluster 3	14	5.7857	82.833	5.8571	4.1429
Cluster 4	3	4870.3	92.006	4887.7	3516.3
Cluster 5	1	9899.0	92.167	9917.0	7422.0
Cluster 6	3	1.3333	70.667	1.3333	1.0

Analysis of Variance:

			Model		Error	
Variable	F-statistic	p-value	Sum of Squares	DF	Sum of Squares	DF
Count of Beds	17.77	3.251e-12	1.634	5	1.655	90
Count of Number of Records	17.77	3.251e-12	1.636	5	1.658	90
Count of Review Scores Rating (bin)	17.73	3.393e-12	1.586	5	1.61	90
Avg. Review Scores Rating	15.91	3.305e-11	2.636	5	2.982	90

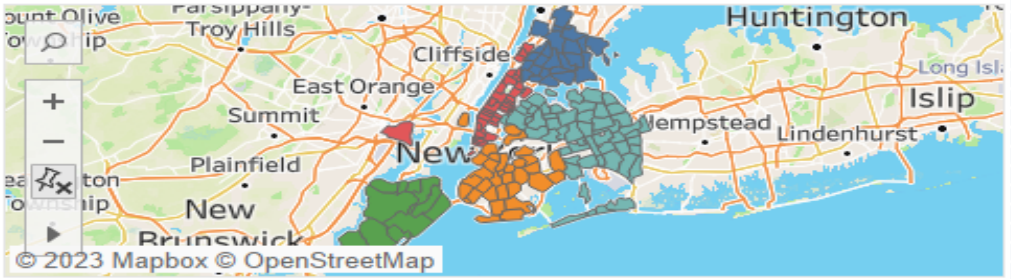
Forecast:


Unit per Year Forecast
Forecast indicator
Actual
Estimate
Count of Unit
9K
8K
7K
6K
5K
4K
3K
2K
1K
0K
38
502
1,374
3,300
5,760
6,440
7,908
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year

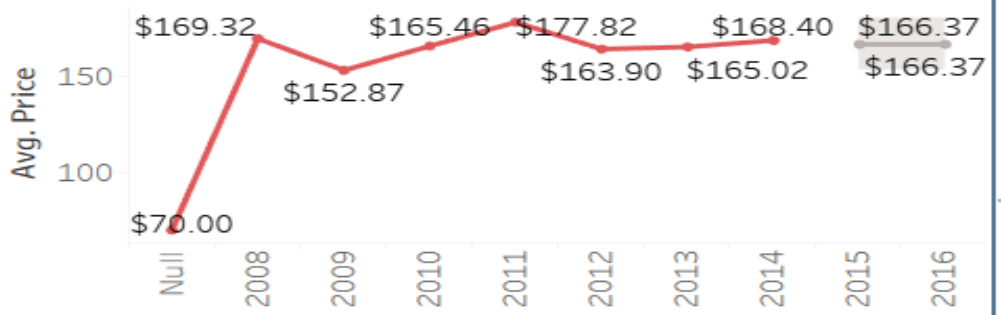

Avg Price Year Forecast
Forecast indicator
Actual
Estimate
Avg. Price
180
170
160
150
140
130
120
110
100
90
80
70
$70.00
$169.32
$152.87
$165.46
$177.82
$163.90
$165.02
$168.40
$166.37
$166.37
Null
2008
2009
2010
2011
2012
2013
2014
2015
2016

PERFORMANCE DASHBOARD

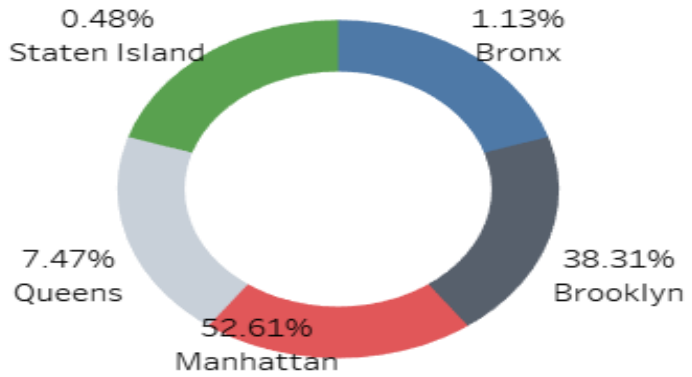
Avg Price by Zipcode in each Neighbourhood



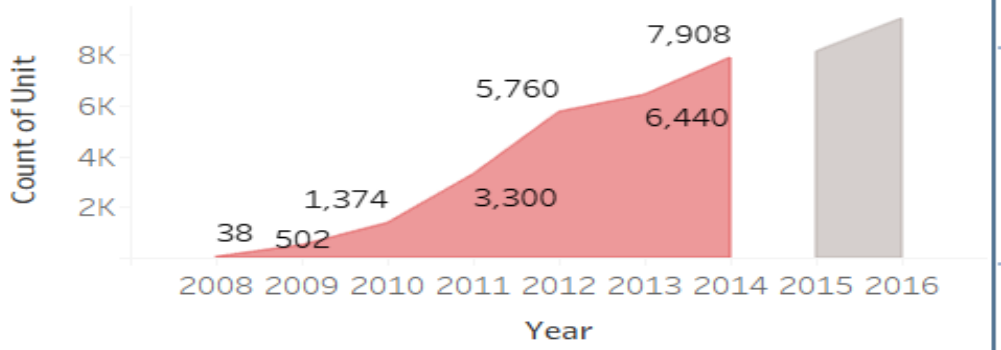
Avg Price Year Forecast



Percentage of Units by Neighbourhood



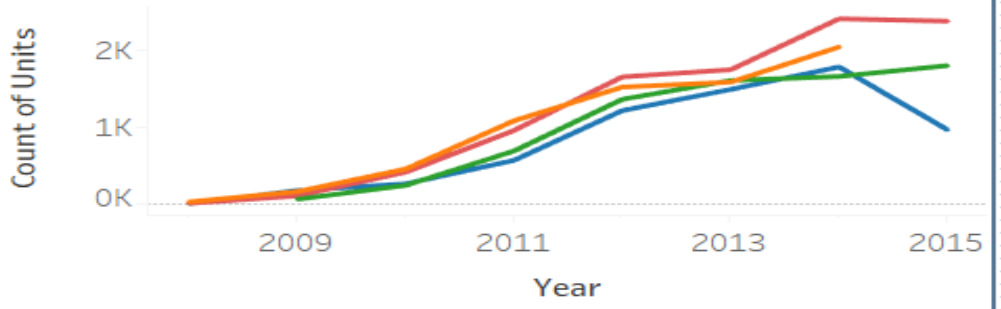
Unit per Year Forecast



Unit Count by Year/Quarter/Month

Neighbo..			2008	2009	2010	2011	2012	2013	2014	2015
Bronx	Co. Co. Co. Co.	5K		2	32	27	29	59	106	90
Brooklyn		5K	11	229	619	1,518	2,401	2,340	2,798	1,757
Manhatt..		5K	22	245	674	1,581	2,909	3,595	4,257	2,749
Queens		5K	5	24	40	162	388	418	713	528
Staten Is..		5K		2	9	12	33	28	34	29
			2008	2009	2010	2011	2012	2013	2014	2015

Unit Count Each Year by Season



Neighbourhood
- (All)
- Bronx
- Brooklyn
- Manhattan
- Queens
- Staten Island

Season
- Fall
- Spring
- Summer
- Winter

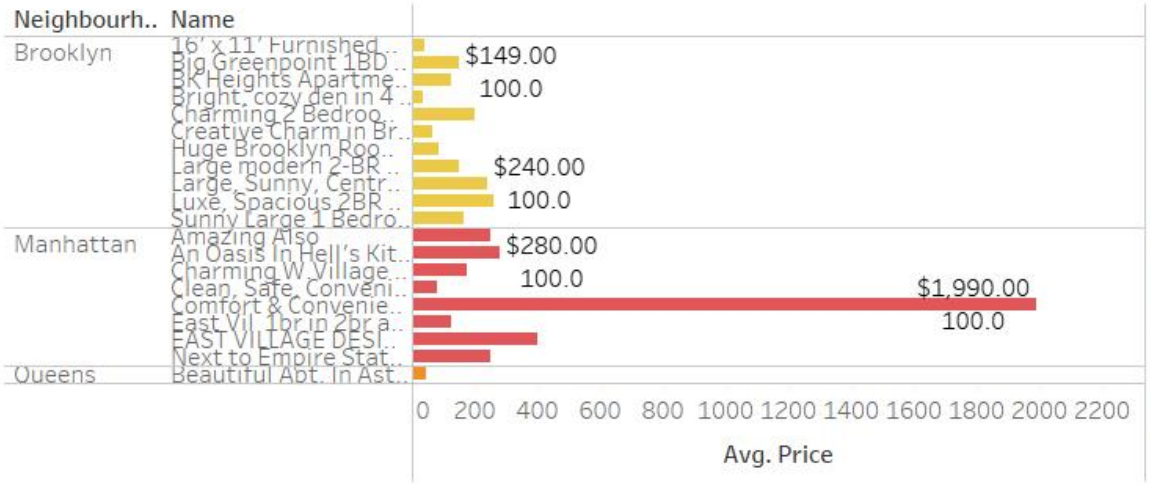
Date Parameter
Year

Neighbourhood
- Bronx
- Brooklyn
- Manhattan
- Queens
- Staten Island

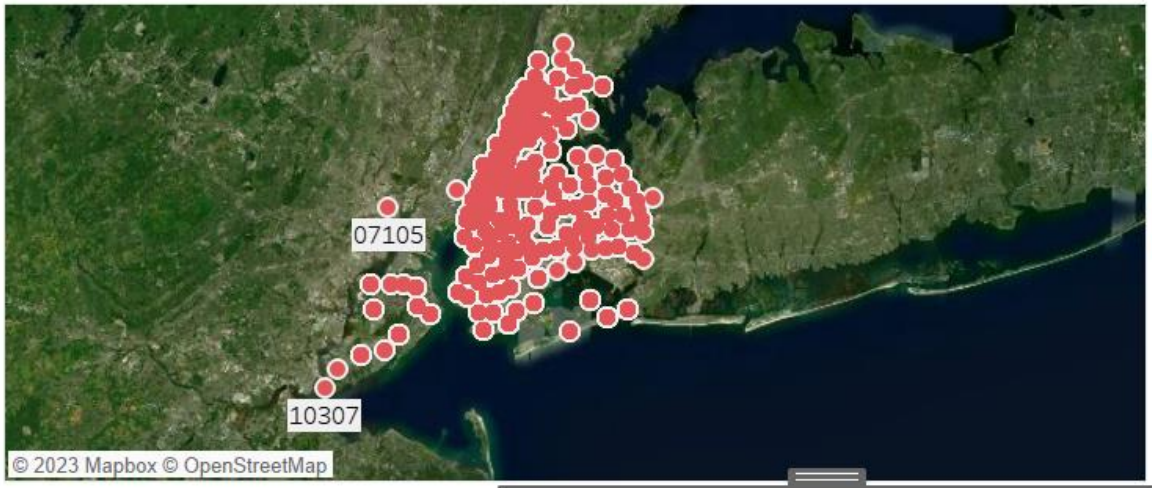
Forecast indicator
- Actual
- Estimate

CUSTOMER DASHBOARD

Top Airbnb



General Information



Top Airbnb

Top 20

Avg. Price

$50.56 $295.68

Neighbourhood

Brooklyn

Manhattan

Queens

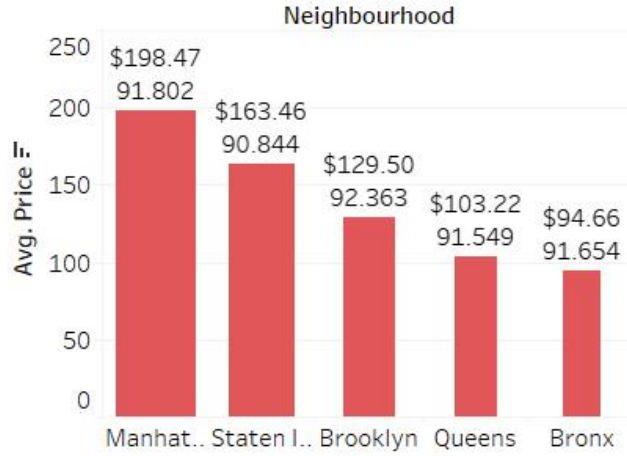
Avg Price by Property Type

Property Type	Bronx	Brooklyn	Manhattan	Queens	Staten Isl..
		Neighbourhood			
Apartment	$82.47	$124.20	$193.85	$100.82	$99.29
Bed & Breakfast	$94.17	$99.29	$135.02	$77.28	$94.50
Boat		$100.00	$154.50	$164.00	
Bungalow		$172.00		$143.67	
Cabin			$250.00	$80.00	
Camper/RV		$45.00	$325.00	$71.00	
Castle			$150.00		
Chalet		$99.00			
Condominium	$114.67	$174.17	$317.30	$156.20	
Dorm		$64.74	$110.00	$79.50	
House	$117.57	$159.58	$303.34	$102.64	$207.45
Hut			$50.00	$100.00	
Lighthouse		$39.00			
Loft	$103.83	$151.21	$385.64	$172.35	$135.00
Other		$246.38	$437.35	$730.83	$81.50
Tent		$118.33	$150.00		
Townhouse	$107.50	$174.66	$286.11	$90.50	$61.50
Treehouse		$197.50	$101.50		
Villa		$1,500.00	$231.33	$107.50	

Avg Price by Room Type

Room Type	Bronx	Brooklyn	Manhat..	Queens	Staten I..
		Neighbourhood			
Entire home/apt	$172.13	$182.33	$248.42	$149.41	$295.68
Private room	$68.39	$79.76	$110.95	$72.46	$64.47
Shared room	$50.56	$66.39	$92.39	$74.77	$59.67

Avg Price by Neighbourhood



Results:

I have chosen the Airbnb dataset as I was familiar with the information provided in this and could conclude below observations:

- Manhattan is the most expensive neighbourhood and Bronx is cheapest
- Manhattan has the major share of airbnbs of total Airbnb units available in New York.
-Airbnb gained significant popularity over the years starting from 2008 to 2014.
- Most units were added during Summer season and least during winter season
- Property type ‘Apartment’ has the maximum count in all units added as Airbnb.

Challenges:

- Tableau automatically does certain aggregations which are not required
- It is a bit difficult to connect each viz and create meaningful interpretation
- Data needs to be formatted for each column
- Tooltip needs to be updated carefully so that it shows correct data with understandable names

Future Goals:

If given more time I will explore more ways to improve visualization and add more insights to the current analysis.
I would like to learn more about animation which can be added in this scenario.

Thank You!!