DATA VISUALIZATION PROJECT REPORT
(Project Semester January-May 2024)

AIRBNB NYC 2019 DASHBOARD AND STORYTELLING

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Program and Section: B. Tech in CSE / K21BS
Course Code: INTB233

Under the Guidance of
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Discipline of CSE/IT
Lovely School of Computer Science and Engineering
Lovely Professional University, Phagwara

Transforming Education Transforming India

This is to certify that **Abhishek Kumar** bearing Registration no. **12201101** has completed **INT-232** project titled, **"AIRBNB NYC 2019 DASHBOARD."** under my guidance and supervision. To the best of my knowledge, the present work is the result of his/her original development, effort, and study.

Signature and Name of the Supervisor

Designation of the Supervisor

School of Computer Science and Engineering

Lovely Professional University

Phagwara, Punjab**.**

Date: 20/04/2024

DECLARATION

I, Abhishek Kumar, student of Bachelor of Technology under CSE/IT Discipline at, Lovely Professional University, Punjab, hereby declare that all the information furnished in this project report is based on my own intensive work and is genuine.

Date: 20/04/2024

                                                    Signature

Registration No. 12201101   Abhishek Kumar

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to all those who have contributed to the completion of this project on the AIRBNB NYC 2019 DASHBOARD.

First and foremost, I extend my heartfelt appreciation to the mentors and Coursera, for their unwavering support, invaluable guidance, and insightful feedback throughout the course of this project. Their expertise and encouragement have been instrumental in shaping the direction and quality of this report.

Additionally, I would like to acknowledge the contributions of my colleagues and peers who have aided assistance and encouragement at various stages of this project. Their input and feedback have been immensely valuable in refining the analysis and presentation of findings.

Finally, I am deeply thankful to my family and friends for their unwavering support and understanding throughout this endeavour.

Their encouragement and belief in my abilities have been a constant source of motivation.

-Abhishek Kumar
 (12201101)

INTRODUCTION

In today's dynamic business landscape, data-driven decision-making has become imperative for organizations seeking to gain a competitive edge. The ability to harness and analyse vast amounts of data to derive actionable insights is key to driving strategic initiatives and achieving sustainable growth. With this in mind, the development of a comprehensive sales dashboard becomes essential for companies aiming to monitor and optimize their performance in the market.

This project report presents a detailed analysis of the Airbnb NYC 2019 Dashboard, a powerful tool designed to provide stakeholders with actionable insights into Airbnb performance in the New York City. Through the utilization of advanced data visualization techniques and analytics, this dashboard offers a comprehensive overview of key metrics and trends, enabling informed decision-making and strategic planning.

The objective of this project is twofold: firstly, to develop a user-friendly and intuitive dashboard interface that allows stakeholders to easily navigate and interact with the data; and secondly, to provide in-depth analysis and interpretation of the sales data to uncover meaningful insights and opportunities for optimization.

Throughout the course of this report, we will delve into the methodology employed in the development of the dashboard, the key features, and functionalities it offers, as well as a comprehensive analysis of the Airbnb Performance. By leveraging the insights derived from this analysis, stakeholders can gain a deeper understanding of market dynamics, identify areas of strength and improvement, and formulate data-driven strategies to drive business growth.

OBJECTIVES OF THE PROJECT

1. **Average Price in The Neighborhood based on Room Type:**

   The objective of the project "Average Price in The Neighborhood based on Room Type" is to analyze and determine the average prices of accommodations in a given neighborhood categorized by room type. This involves collecting data on various types of accommodations (such as entire homes, private rooms, and shared rooms) within the neighborhood and calculating their respective average prices. By doing so, the project aims to provide valuable insights into the pricing dynamics of different types of accommodations in the neighborhood, aiding in decision-making for both property owners and potential renters or buyers.

2. **Total Bookings per Month Grouped by Neighbourhood and Room Type:**

   The objective of the project "Total Bookings per Month Grouped by Neighbourhood and Room Type" is to analyze booking data to determine the total number of bookings made each month, categorized by both neighborhood group and room type. This involves aggregating booking information from various sources and organizing it based on the specified criteria. By doing so, the project aims to provide insights into the popularity and demand for different types of accommodations in different neighborhood groups, enabling stakeholders such as property owners, rental platforms, and local authorities to better understand booking trends and make informed decisions.

3. **Total neighnourhood by neighbourhood groups:**

   The objective of the project "Total Neighborhoods by Neighborhood Groups" is to categorize and quantify neighborhoods into distinct groups based on certain criteria, such as demographics, amenities, or location characteristics. This involves analyzing data related to various neighborhoods and clustering them into groups that share similar features or attributes. By doing so, the project aims to provide a clearer understanding of the diversity and distribution of neighborhoods within a particular area. This information can be valuable for urban planning, real estate development, community engagement, and targeted resource allocation.

4. **Top 10 Host Rating:**

   The objective of the project "Top 10 Host Reviews" is to identify and showcase the hosts with the highest-rated reviews based on certain criteria such as overall satisfaction, cleanliness, communication, and hospitality. This involves collecting and analyzing review data from guests who have stayed with various hosts on a hospitality platform. The project

aims to highlight exemplary hosts who consistently provide exceptional experiences to their guests, thereby helping other users make informed decisions when selecting accommodations. Additionally, it may incentivize hosts to maintain high standards of service and hospitality.

5. **Total Bookings by Neighbourhood Groups Based on Room Type:**

The objective of the project "Total Bookings by Neighbourhood Groups Based on Room Type" is to analyze booking data and categorize it according to both neighborhood groups and room types. This involves aggregating booking information from various sources and organizing it based on the specified criteria. By doing so, the project aims to provide insights into the distribution of bookings across different neighborhood groups and the popularity of various room types within each group. This information can be valuable for stakeholders such as property owners, rental platforms, and local authorities to understand booking trends, optimize pricing strategies, and allocate resources effectively.

6. **Average Price in neighbourhood:**

The objective of the project "Average Price in Neighborhood" is to determine and analyze the average prices of accommodations within specific neighborhoods. This involves collecting pricing data for various types of accommodations (such as entire homes, apartments, or rooms) located in different neighborhoods and calculating their respective average prices. By doing so, the project aims to provide valuable insights into the pricing dynamics of the real estate market within each neighborhood. This information can be useful for property buyers, renters, investors, and real estate professionals in making informed decisions regarding property transactions, rental rates, and investment opportunities.

SOURCE OF DATA

The dataset utilized for this project, focusing on Airbnb NYC 2019 analysis, originates from Kaggle, a prominent platform for sharing and discovering datasets, as well as for participating in data science competitions. Kaggle hosts a diverse array of datasets across various domains, contributed by researchers, data scientists, and enthusiasts worldwide.

The Airbnb NYC 2019 dataset available on Kaggle serves as a valuable resource for conducting in-depth analysis and deriving actionable insights into the sales performance of Airbnb NYC 2019. This dataset likely encompasses a wide range of relevant variables, including sales figures, geographic information, product details, and perhaps additional metadata such as customer demographics or purchase behavior.

ANALYSIS ON DATASET

1. **Average Price in The Neighborhood based on Room Type:**

Factors to Consider:

Room Type: The graph should show a breakdown of average prices by room type (entire home, private room, shared room). Look for color-coding or separate bars/lines for each type.

Neighborhoods: The x-axis or legend should indicate different neighborhoods within the area.

Price Scale: The y-axis should represent the average price, likely a monthly rent or nightly rate depending on the type of accommodation.
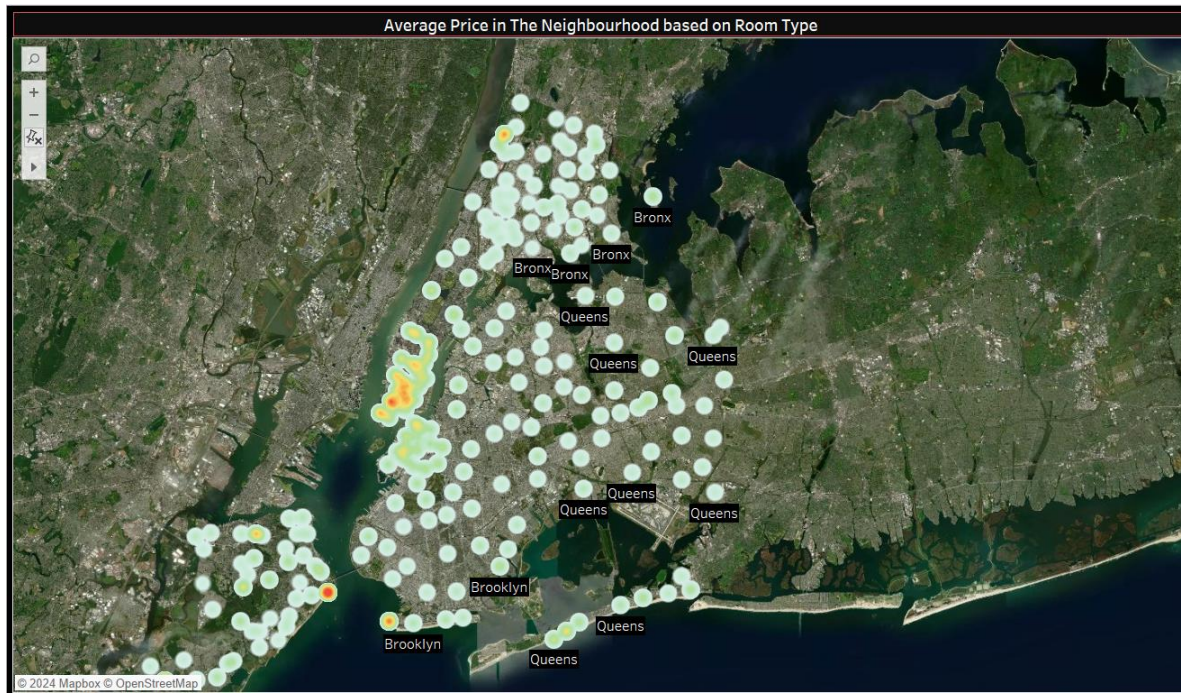
<u>Analysis Steps</u>:

Identify the Most Expensive Room Type: See which category (entire home, private room, shared room) has the highest average price across all neighborhoods.

Identify the Most Affordable Neighborhood: Find the neighborhood with the lowest average price for all room types.

Price Variation by Neighborhood: Analyze how prices change for each room type across different neighborhoods. Are there neighborhoods consistently more expensive or cheaper?

Price Variation by Room Type: Within each neighborhood, see how the average price differs between entire homes, private rooms, and shared rooms. Is the difference consistent across neighborhoods?

**2. Total Bookings per Month Grouped by Neighbourhood and Room Type:**

The graph shows the total number of bookings per month grouped by neighborhood group, based on room type. However there are some limitations to what we can glean from this specific graph:

Limited room types: The legend only shows Downtown and Suburban neighborhoods. There is no data for other neighborhood groups.

Months without data: There is no data for some months (June and September)

Downtown bookings: Throughout the year, there are more bookings in downtown neighborhoods compared to suburban neighborhoods. December has the most bookings in the downtown area, with over 13,500 bookings.

Suburban bookings: Suburban neighborhoods tend to have the fewest bookings each month. There are peaks in bookings in May (around 770) and August (around 1158)

Total bookings per month group by neighbourhood group based on room type
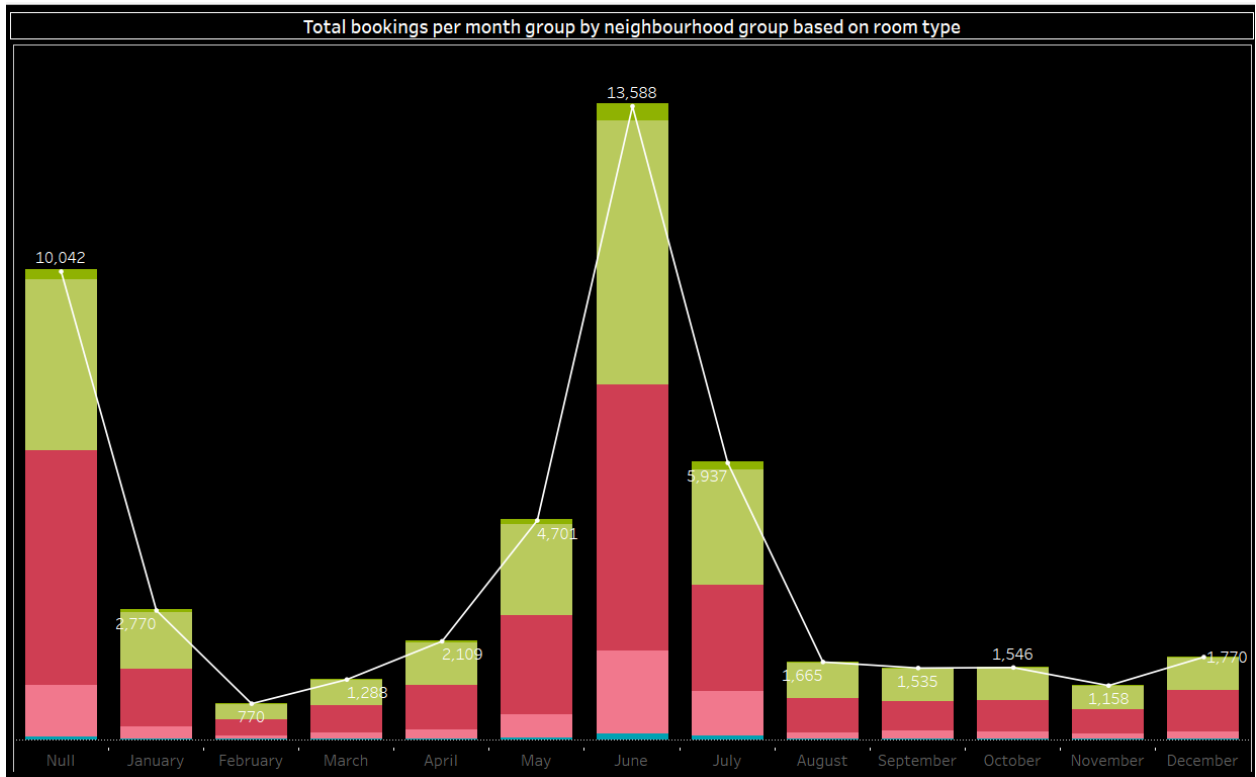
3. **Total neighnourhood by neighbourhood groups:**

Data Analysis

The donut chart shows the distribution of neighborhoods across four neighborhood groups: Staten Island Bronx (0.76%), Brooklyn (41.12%), Manhattan (44.30%), and an unnamed neighborhood group (13.82%).

Observations

Manhattan and Brooklyn have the most neighborhoods, with Manhattan having the highest percentage (44.30%) followed by Brooklyn (41.12%).

Staten Island and Bronx have a significantly lower percentage of neighborhoods (combined 2.99%).

There is another unnamed neighborhood group that comprises 13.82% of the total neighborhoods.

Total neighnourhood by neighbourhood groups
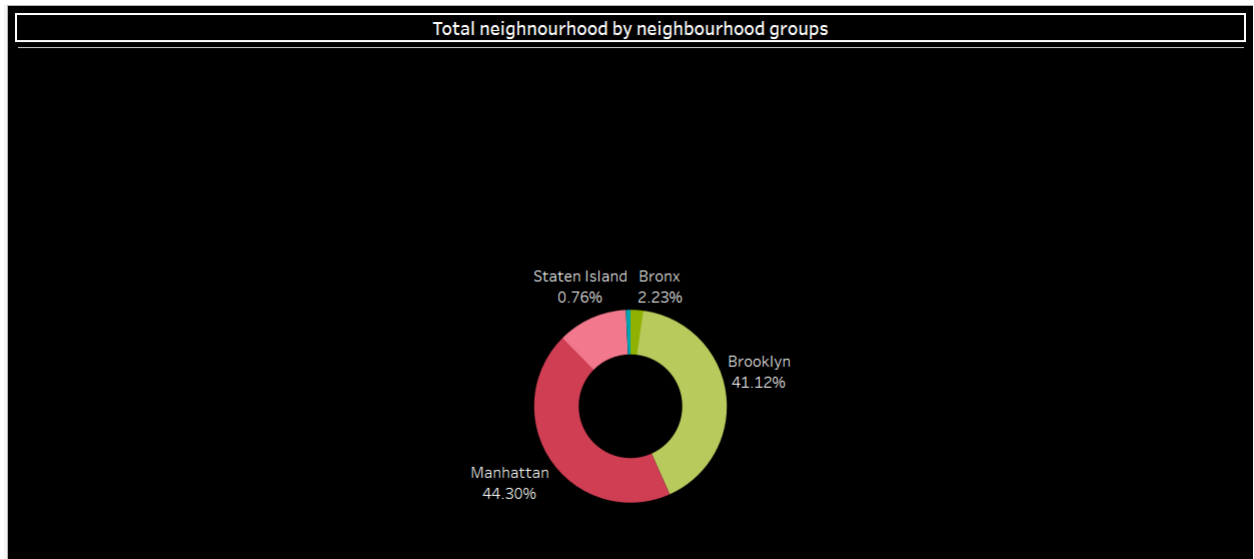
4. **Top 10 Host Rating:**

Top Hosts by Reviews in Manhattan

Sonder (NYC) is the host with the most reviews in Manhattan, with a total of 2,942 reviews. Their listings are spread across several Manhattan neighborhoods including Chelsea, Financial District, Hell's Kitchen, Midtown, Murray Hill, Theater District, and Upper East Side.

Following Sonder (NYC) are a group of individual hosts with significantly fewer reviews. Alex and Zeena (Chelsea) have 85 reviews, Angela (East Elmhurst, Queens) has 65 reviews, Brady (Bedford-Stuyvesant, Brooklyn) has 74.71 reviews, Breakfast Brooklyn & Danielle (East Elmhurst, Queens) have 74.62 reviews, Yasu & Akiko (Manhattan) have 186.82 reviews, and al (Harlem) has 49 reviews.

Additional Insights

Given that Sonder (NYC) has a significantly higher number of reviews than the other hosts, it's likely that they manage a larger number of properties. They might also be a professional property management company, whereas the other hosts might be individual property owners.

				Top 10 Host By Reviews
Host Name	**Neighbourh..**	**Neighbourhoo..**	**Avg. Price**	
Alex And Zeena	Chelsea	Manhattan	85	▬▬▬▬▬▬
Angela	East Elmhurst	Queens	65	▬▬▬▬▬
Brady	Bedford-St..	Brooklyn	74.7142..	▬▬▬▬▬▬▬
Brooklyn& Breakfast -..	Prospect Heights	Brooklyn	74.6153..	▬▬▬▬▬▬▬▬
Danielle	East Elmhurst	Queens	47.2	▬▬▬▬▬▬▬
Jj	Harlem	Manhattan	49	▬▬▬▬▬▬
Maya	East Elmhurst	Queens	42.6	▬▬▬▬▬▬▬▬▬
Randy	Bedford-St..	Brooklyn	56.7333..	▬▬▬▬▬▬
Sonder (NYC)	Chelsea	Manhattan	251.571..	
	Financial District	Manhattan	264.853..	▬▬▬▬▬
	Hell's Kitchen	Manhattan	185.933..	
	Midtown	Manhattan	200.25	
	Murray Hill	Manhattan	220.1	▬
	Theater District	Manhattan	286.777..	
	Upper East Side	Manhattan	159.666..	
Yasu & Akiko	Hell's Kitchen	Manhattan	186.818..	▬▬▬▬▬▬▬

5. **Total Bookings by Neighbourhood Groups Based on Room Type:**

Average Daily Rate (ADR) by Length of Stay in Seattle

Shorter Stays are More Expensive: The graph shows a clear negative correlation between the length of stay and the average daily rate. In other words, shorter stays are generally more expensive than longer stays. This is likely because short-term stays are more in demand and can command a higher price.

Long Stays Offer Steeper Discounts: The longer the stay, the steeper the discount on the average daily rate. For example, there's a significant drop in price between stays of 1 night and stays of 7 nights. Prices continue to decrease gradually for stays up to 28 days.

Additional Insights

Property owners and managers can use this information to optimize their pricing strategies for short-term rentals in Seattle. For example, they might offer discounts for longer stays to attract guests who are looking for a more affordable option.

Overall, the graph shows that length of stay has a significant impact on the average daily rate for short-term rentals in Seattle. Travelers looking to visit Seattle should consider booking longer stays to get the best possible rate.

Total Bookings by Neighbourhood Groups Based on Room Type
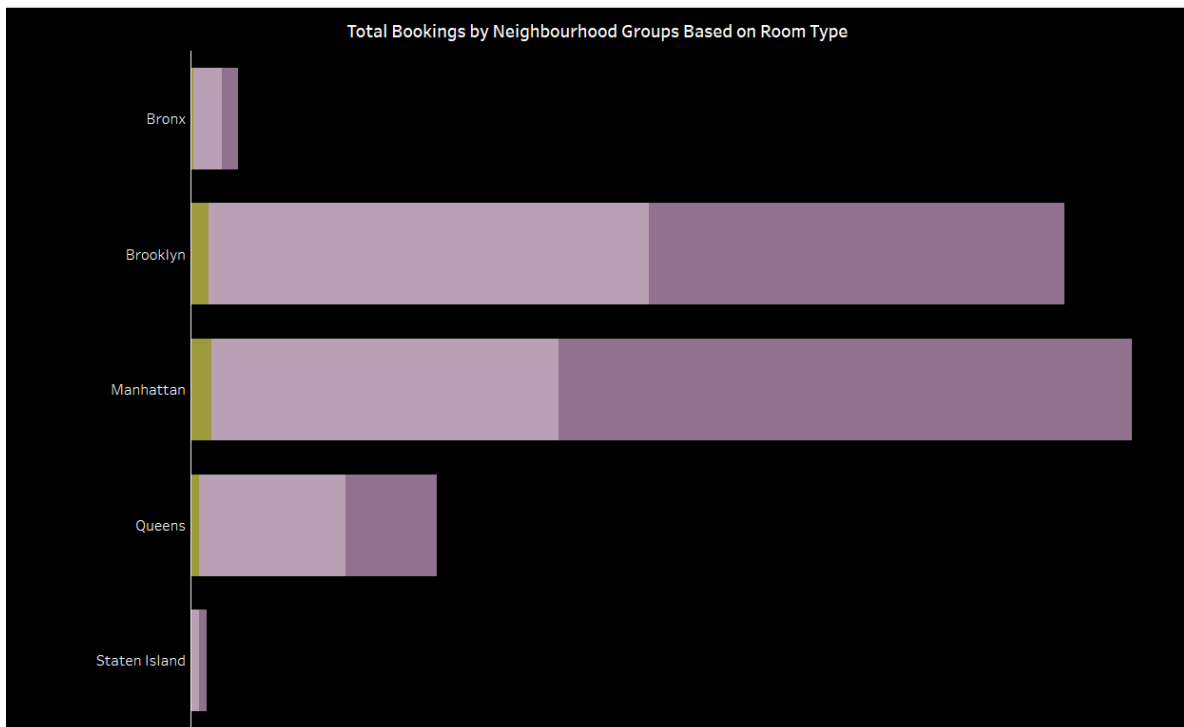
6. **Average Price in neighbourhood:**

Analysis Steps:

Identify the Most Expensive Room Type: See which category (entire home, private room, shared room) has the highest average price across all neighborhoods.

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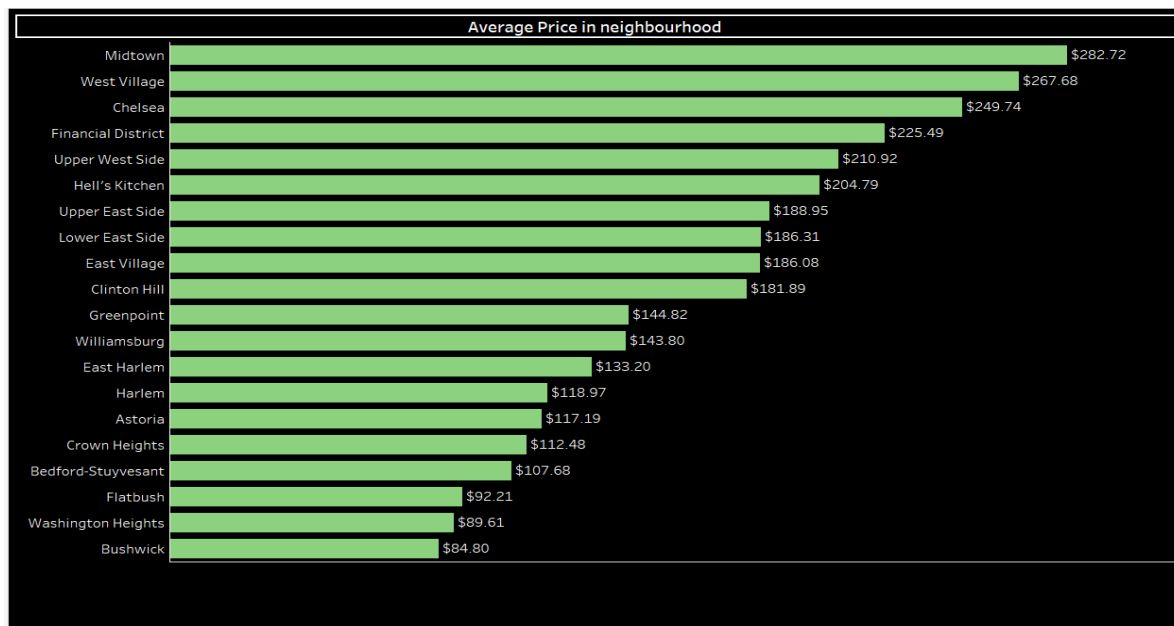
Additional Insights:

Look for patterns: Are there specific neighborhoods where entire homes are significantly more expensive than private rooms?

Are there neighborhoods catering more towards budget-friendly shared accommodations?

By applying this framework to the actual graph with data points, you can gain valuable insights into the pricing dynamics of different accommodation types in the neighborhood. This information can be helpful for both property owners who want to optimize their rental strategy and potential renters/buyers who are looking for the best value for their money.

Neighbourhood	Average Price in neighbourhood
Midtown	$282.72
West Village	$267.68
Chelsea	$249.74
Financial District	$225.49
Upper West Side	$210.92
Hell's Kitchen	$204.79
Upper East Side	$188.95
Lower East Side	$186.31
East Village	$186.08
Clinton Hill	$181.89
Greenpoint	$144.82
Williamsburg	$143.80
East Harlem	$133.20
Harlem	$118.97
Astoria	$117.19
Crown Heights	$112.48
Bedford-Stuyvesant	$107.68
Flatbush	$92.21
Washington Heights	$89.61
Bushwick	$84.80

FINAL DASHBOARD

The dashboard contains two main visualizations:

Chart: The chart seems to be a stacked bar chart. Unfortunately, the legend is missing, so it's difficult to say for sure what the different colored bars represent (likely room types) or which neighborhoods are on the x-axis.

Map: The map appears to show average prices in different neighborhoods, but there are no data labels making it impossible to determine the exact prices.

Possible Insights (assuming the data is present):

Seasonal Trends: By looking at the chart across all neighborhoods, we might be able to identify seasonal trends in bookings (e.g., spikes in bookings during summer or holidays).

Room Type Popularity: Depending on the colors in the chart legend, we might be able to see which room type (entire home/apartment, private room, shared room) is most popular across different neighborhood groups.

Geographic Price Differences: If the map had data labels, we could potentially identify neighborhoods that are more expensive or more affordable on average.