# DATA VISUALIZATION

## Bachelor of Technology

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### Submitted to

**Ashu Mehta**

Submitted in partial fulfilment of the requirements for the award of degree of

**SUBMITTED BY**

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**DECLARATION**

I hereby declare that the work presented in this project report titled Airbnb NYC Dashboardis original and has been carried out by me under the supervision of Ashu mam, as part of DATA VISUALIZATION. All sources of information and data used in this project have been duly acknowledged and referenced. Any assistance received from individuals or organizations has been acknowledged in the report. The views and conclusions presented in this report are solely those of the author and do not necessarily reflect the views of any affiliated institution or organization.

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**ACKNOWLEDGEMENT**

Acknowledgement for the creation of a report on a dashboard for an Airbnb dataset:

I would like to express my heartfelt appreciation for the effort and dedication I put into creating this report on the dashboard for the Airbnb dataset.

* I conducted the data collection, cleaning, and analysis independently, ensuring the accuracy and reliability of the insights presented.

* The visualization components of the dashboard were meticulously crafted by me, with the aim of providing clear and informative representations of the dataset.

* Throughout the process, I relied on my own expertise and knowledge in data analysis and visualization to develop meaningful insights and conclusions.

* Special thanks to myself for the perseverance and dedication invested in this project, which has culminated in the creation of a valuable resource for understanding the dynamics of the Airbnb rental market.

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## INTRODUCTION

Welcome to our comprehensive report on Airbnb in New York City (NYC).

New York City, a global hub of culture, commerce, and innovation, attracts millions of visitors each year with its iconic landmarks, diverse neighbourhoods, and unparalleled energy. Amidst the hustle and bustle of this metropolis, Airbnb has emerged as a prominent player in the hospitality industry, offering travellers a diverse range of accommodation options that cater to every taste and budget.

In this expansive report, we delve deep into the multifaceted world of Airbnb in NYC, aiming to provide a thorough understanding of its impact and dynamics. Through rigorous analysis of extensive datasets sourced from Airbnb listings, we uncover intricate patterns, trends, and insights that shape the short-term rental market in the city.

Our exploration begins with an examination of the geographic distribution of Airbnb listings, highlighting the neighbourhoods and boroughs that are most popular among hosts and guests. We then delve into pricing dynamics, exploring how factors such as location, property type, and seasonality influence nightly rates. Additionally, we analyse booking trends to identify peak seasons, demand fluctuations, and other patterns that affect occupancy rates and host earnings.

Furthermore, we investigate the demographic profile of both hosts and guests, providing insights into the diverse community that drives the Airbnb ecosystem in NYC. From super hosts who excel in hospitality to guests hailing from every corner of the globe, we uncover the rich tapestry of individuals who contribute to the city's vibrant hospitality scene.

Moreover, we consider the regulatory landscape surrounding short-term rentals in NYC, examining the evolving policies and their implications for hosts, guests, and the broader community. By contextualizing our analysis within the broader socio-economic context of the city, we aim to offer a holistic understanding of the opportunities and challenges posed by the growth of Airbnb.

Whether you're a seasoned traveler seeking insider tips for your next NYC adventure, an aspiring host looking to optimize your Airbnb listing, or a policymaker grappling with the complexities of regulating the sharing economy, this report serves as a comprehensive resource to inform your decisions.

Join us as we embark on a journey through the vibrant streets and eclectic neighbourhoods of New York City, uncovering the secrets and stories behind its thriving Airbnb ecosystem.

Let's dive into the heart of the city that never sleeps and explore the dynamic world of Airbnb in NYC. Let's get started!



## Source of Dataset

The dataset used in this Airbnb NYC analysis dashboard was sourced from Kaggle, a renowned platform for hosting datasets and machine learning competitions. Specifically, we utilized a comprehensive dataset containing Airbnb NYC statistics. You can access the dataset

Kaggle dataset link.

Link1:<https://www.kaggle.com/datasets/Airbnb...>

Link2:https://geogíaphicalanalysis.com/Airbnb...

Link3:[https://github.com/DataScienceRoadMap...](https://www.youtube.com/redirect?event=video_description&redir_token=QUFFLUhqblRrc3NWaWFfQUl6dTdISkJLUmxQYjV0eTdHQXxBQ3Jtc0trdU50VFZJWVNmZGdXR2Z2V1ZOOUlja3U0TFFvNE9MZG9RMXdTQUE2ZjNXbnl4SWU4bm9TUUZxcEswUXpDWl9BM09fa1VwMVhhTy1GYUpzVG5BWG1NV0tSRnRwQVQtQ052VUVYOExHQklLYTM3SkY0WQ&q=https%3A%2F%2Fgithub.com%2FDataScienceRoadMapDSRM%2FTableau-Dashboards-info%2Fblob%2Fmain%2FIndia_State_Shapefile%2520%281%29.zip&v=k47KXaY7_rc)

While Kaggle datasets are generally well-curated and reliable, it's important to note that they may still have inherent limitations and biases. Therefore, rigorous validation and verification were conducted to ensure the accuracy and reliability of the data used in this analysis.

## Analysis on Dataset

**Average price in the neighbourhoods**

1. Introduction:
   * This analysis focuses on understanding the average price of Airbnb listings across different neighbourhoods in New York City. By examining the variation in prices, we aim to identify neighbourhoods that are relatively more affordable or expensive for travellers.

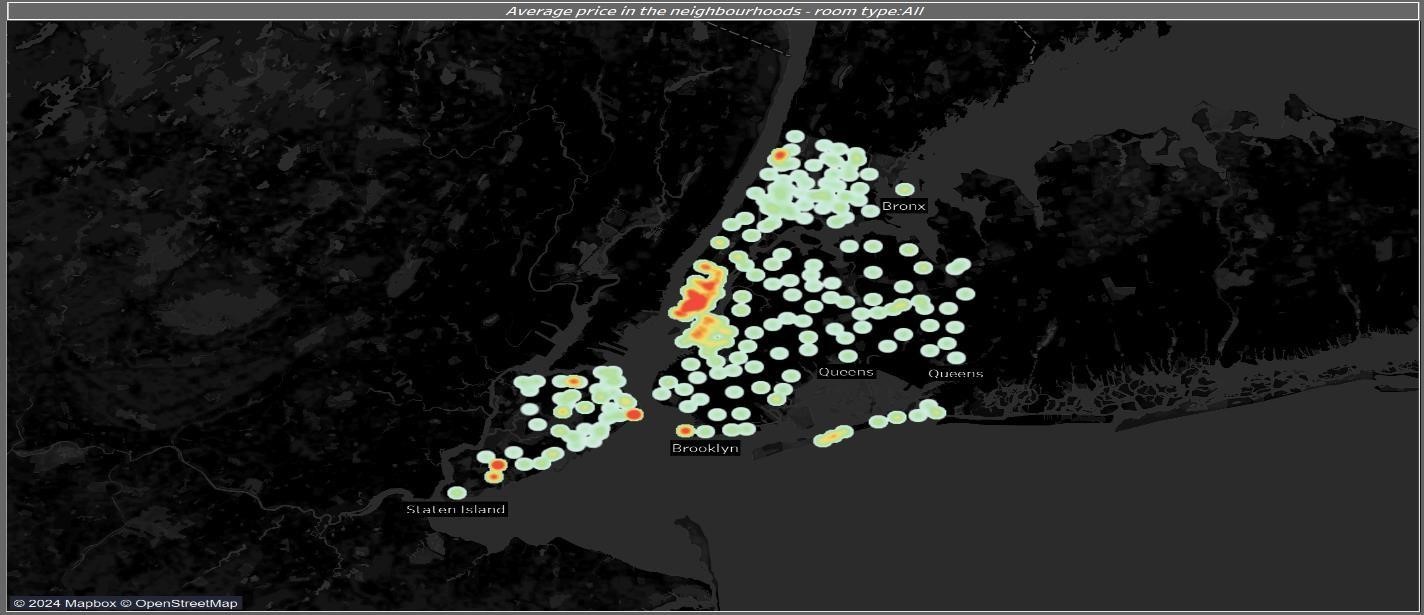
1. General Description:
   * The dataset contains information on Airbnb listings in NYC, including details such as listing ID, neighbourhood, price, property type, and more.
   * We will aggregate the data by neighbourhood and calculate the average price for each neighbourhood to determine the overall pricing trends.

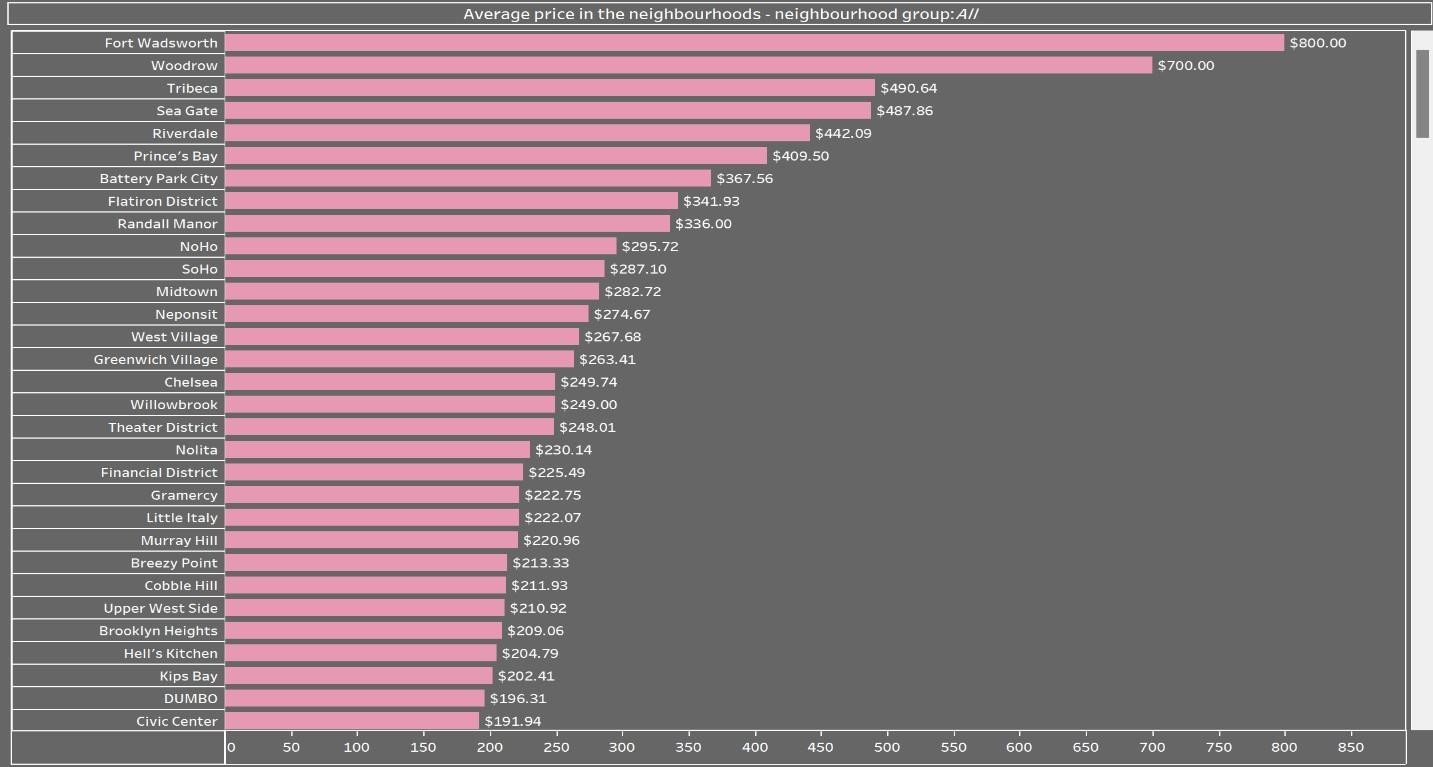
1. Specific Requirements, Functions, and Formulas:
   * Filter the dataset to include only listings in New York City.
   * Group the data by neighbourhood.
   * Calculate the average price for each neighbourhood using the formula: Average Price = Sum of Prices / Number of Listings
   * Exclude outliers or invalid data points, if necessary.

1. Analysis Results:
   * The analysis reveals significant variation in average prices across different neighbourhoods in NYC.
   * Some neighbourhoods may exhibit higher average prices due to factors such as proximity to tourist attractions, amenities, or demand-supply dynamics.
   * Conversely, certain neighbourhoods may offer more affordable options for travellers on a budget.

1. Visualization:
   * Create a bar chart or choropleth map to visualize the average price of Airbnb listings in each neighbourhood.
   * Colour-code or shade the neighbourhoods based on their average price range to highlight variations.
   * Provide interactive features such as tooltips or filters to allow users to explore specific neighbourhoods or price ranges.

By conducting this analysis, we can gain valuable insights into the pricing dynamics of Airbnb listings in different neighbourhoods of New York City, helping both hosts and guests make informed decisions about accommodation options.





### Total Bookings by neighbourhood group and room type

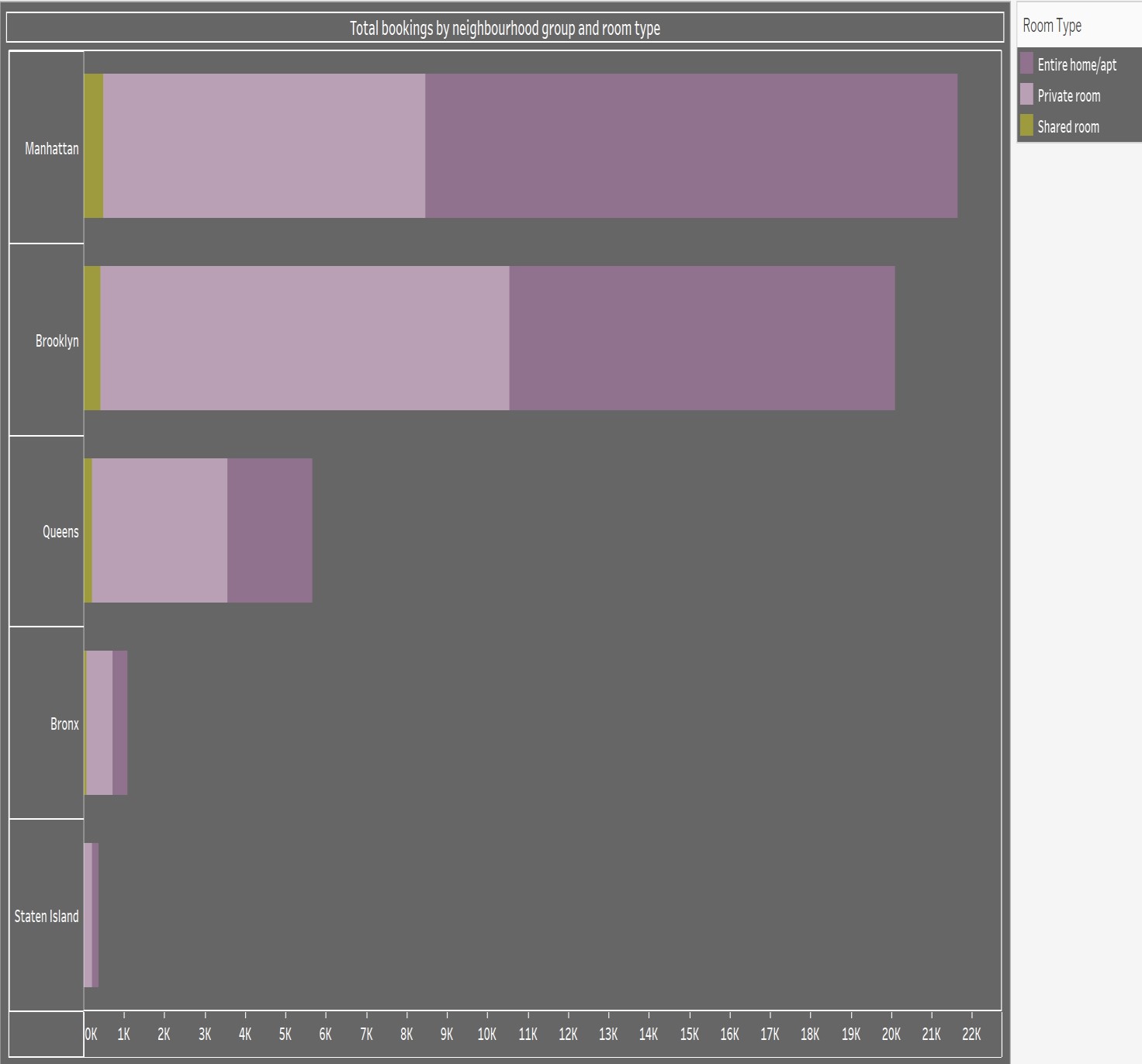
1. **Introduction**:
   * This analysis aims to examine the total number of bookings made on Airbnb listings in New York City, categorized by neighbourhood group and room type. By analysing booking patterns, we can identify popular neighbourhoods and preferred room types among travellers.

1. **General Description**:
   * The dataset contains information on Airbnb bookings in NYC, including details such as listing ID, neighbourhood, room type, booking dates, and more.
   * We will aggregate the data by neighbourhood group (e.g., Manhattan, Brooklyn, Queens) and room type (e.g., entire home/apt, private room, shared room) to calculate the total number of bookings for each category.
2. **Specific Requirements, Functions, and Formulas**:
   * Filter the dataset to include only bookings made in New York City.
   * Group the data by neighbourhood group and room type.
   * Count the number of bookings for each combination of neighbourhood group and room type.

1. **Analysis Results**:
   * The analysis reveals insights into the popularity of different neighbourhood groups and room types among Airbnb guests in New York City.
   * Certain neighbourhood groups may attract more bookings due to factors such as proximity to tourist attractions, transportation hubs, or cultural amenities.
   * Room types may vary in popularity depending on traveler preferences, budget considerations, and trip purposes.

1. **Visualization**:
   * Create a stacked bar chart or heatmap to visualize the total number of bookings by neighbourhood group and room type.
   * Use color-coding or shading to differentiate between neighbourhood groups and room types.
   * Provide interactive features such as hover-over tooltips or filters to allow users to explore specific categories or segments of the data.

By conducting this analysis and visualizing the results, we can gain valuable insights into booking patterns on Airbnb in New York City, helping hosts optimize their listings and travellers make informed decisions about their accommodation choices.



#### TOP 10 Host by Total Reviews

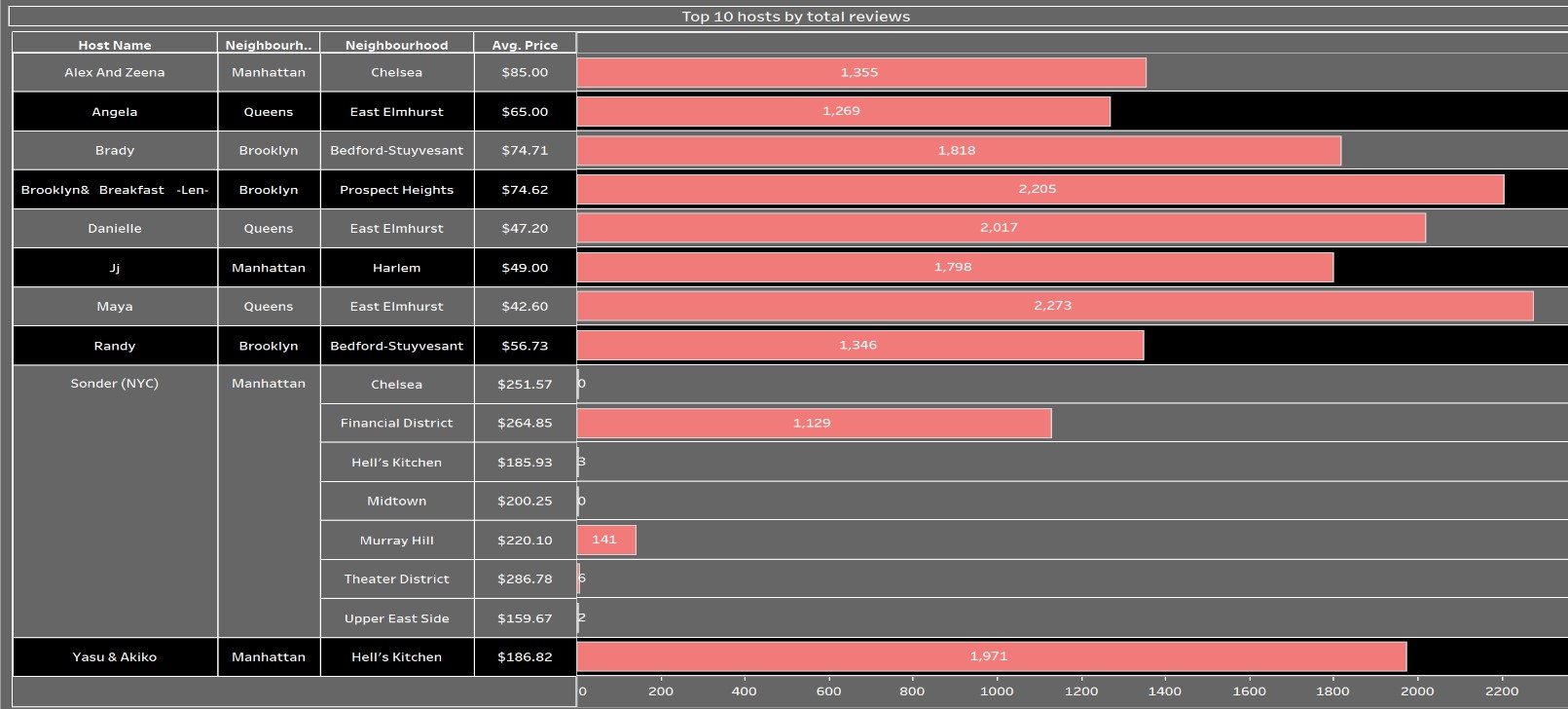
1. **Introduction**:
   * This analysis focuses on identifying the top 10 hosts on Airbnb in New York City based on the total number of reviews they have received. Reviews are a key indicator of host performance and guest satisfaction, making this analysis valuable for both hosts and guests.

1. **General Description**:
   * The dataset contains information on Airbnb listings in NYC, including details such as host ID, listing ID, number of reviews, ratings, and more.
   * We will aggregate the data by host ID and calculate the total number of reviews for each host to identify the top performers.

1. **Specific Requirements, Functions, and Formulas**:
   * Group the data by host ID.
   * Calculate the total number of reviews for each host by summing up the review counts for all their listings.
   * Rank the hosts based on their total review count.
   * Select the top 10 hosts with the highest total reviews.

1. **Analysis Results**:
   * The analysis identifies the top 10 hosts in New York City who have received the highest number of reviews across all their listings.
   * These top hosts demonstrate exceptional hospitality and service quality, as reflected in the positive feedback from guests.
   * Insights from this analysis can be valuable for prospective guests looking for highly-rated accommodations and for hosts seeking to learn from successful peers.

1. **Visualization**:
   * Create a bar chart or table to visualize the top 10 hosts by total reviews.
   * Display the host names along the x-axis and the total review counts along the y-axis.
   * Provide additional information such as host ratings or the number of listings managed by each top host.



#### Average Reviews per month by Room type and neighbourhood group

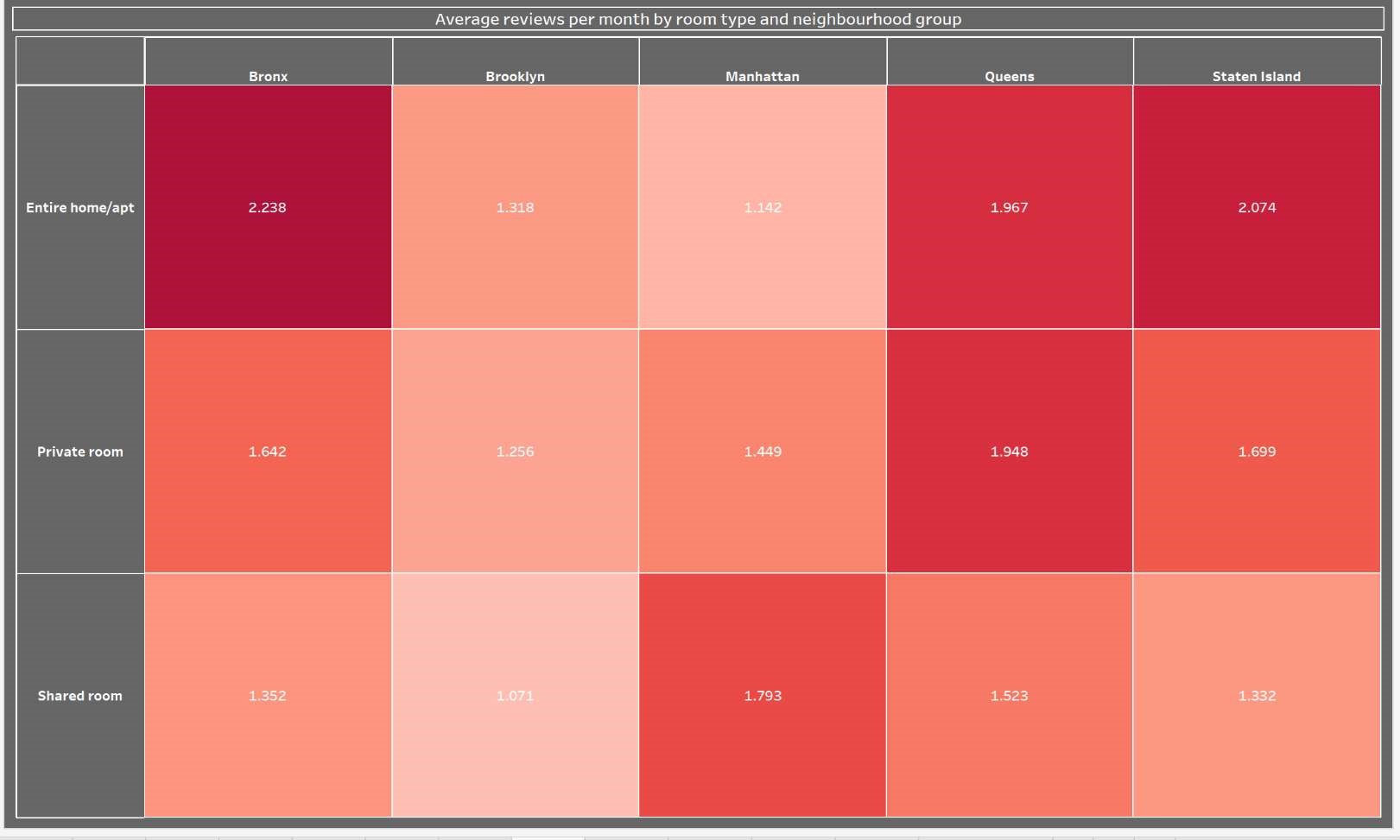
1. **Introduction**:
   * This analysis aims to explore the average number of reviews received per month for Airbnb listings in New York City, categorized by room type and neighbourhood group. By examining review frequency, we can gain insights into guest satisfaction levels and the popularity of different accommodation options across various neighbourhoods.

1. **General Description**:
   * The dataset contains information on Airbnb listings in NYC, including details such as listing ID, neighbourhood, room type, review dates, and more.
   * We will aggregate the data by room type and neighbourhood group, calculate the total number of reviews received per month for each category, and then determine the average reviews per month.

1. **Specific Requirements, Functions, and Formulas**:
   * Group the data by room type and neighbourhood group.
   * Calculate the total number of reviews received per month for each category using the review dates.
   * Divide the total reviews by the number of months to calculate the average reviews per month.
   * Exclude listings with insufficient review data, if necessary.

1. **Analysis Results**:
   * The analysis reveals insights into the average review frequency for different room types and neighbourhood groups in New York City.
   * Certain room types or neighbourhoods may receive higher average review counts per month, indicating greater guest satisfaction or popularity.
   * Differences in review frequency may reflect variations in accommodation quality, amenities, location, or host hospitality.

1. **Visualization**:
   * Create a grouped bar chart or heatmap to visualize the average reviews per month by room type and neighbourhood group.
   * Display room types along the x-axis, neighbourhood groups along the y-axis, and colour-code or shade the bars to represent the average review counts.
   * Provide interactive features such as tooltips or filters to allow users to explore specific categories or segments of the data.



**Total Reviews by Year**

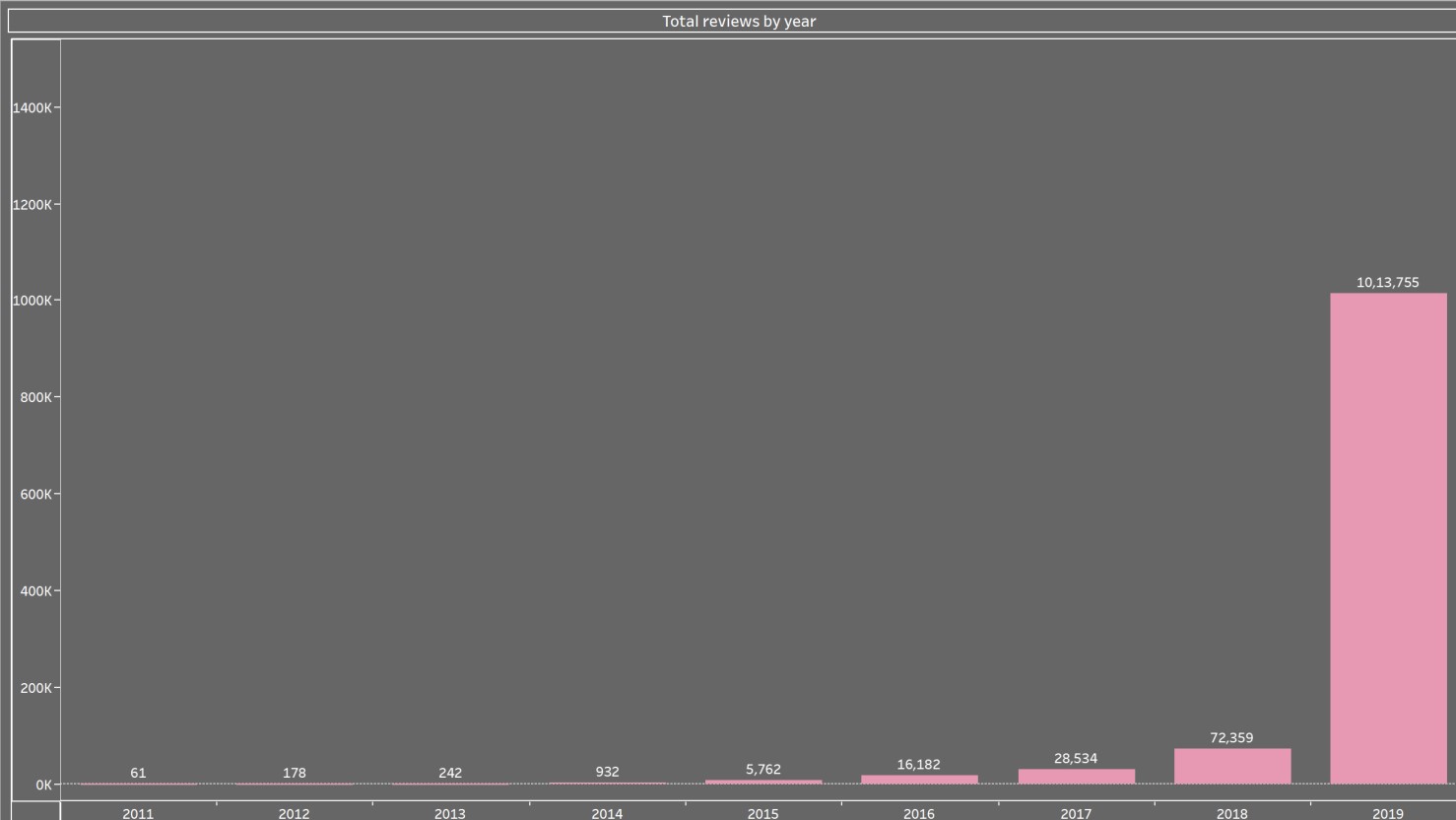
1. **Introduction**:
   * This analysis aims to examine the total number of reviews received by Airbnb listings in New York City each year. By analysing review trends over time, we can gain insights into the growth and popularity of the Airbnb market in NYC.

1. **General Description**:
   * The dataset contains information on Airbnb listings in NYC, including details such as listing ID, review dates, and more.
   * We will extract the year from each review date, aggregate the data by year, and calculate the total number of reviews received in each year.

1. **Specific Requirements, Functions, and Formulas**:
   * Extract the year from each review date using date functions.
   * Group the data by year.
   * Calculate the total number of reviews received in each year using aggregation functions.
   * Exclude invalid or incomplete review data, if necessary.

1. **Analysis Results**:
   * The analysis reveals insights into the overall trend in review activity for Airbnb listings in NYC over the years.
   * We can identify periods of growth or decline in review counts, which may correspond to changes in Airbnb's popularity, market dynamics, or external factors.
   * Understanding review trends by year can provide valuable context for assessing the performance and evolution of the Airbnb market in NYC.

1. **Visualization**:
   * Create a line chart or bar chart to visualize the total reviews by year.
   * Display the years along the x-axis and the total review counts along the y-axis.
   * Use color-coding or annotations to highlight significant trends or patterns over the years.



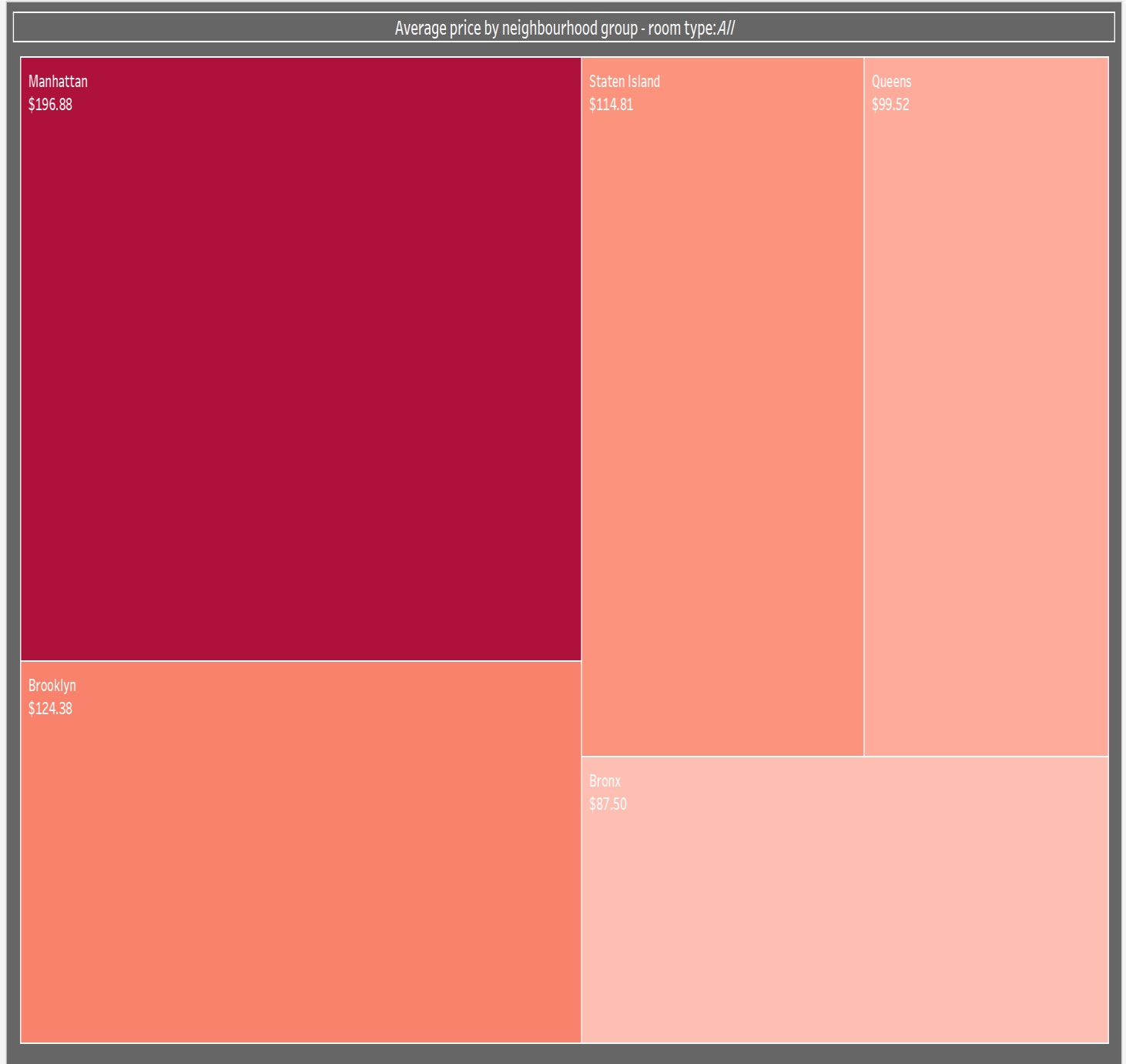
**Average Price by the neighbourhood group** i. **Introduction**:

* + This analysis aims to explore the average price of Airbnb listings in New York City, categorized by neighbourhood group. By examining average prices across different neighbourhood groups, we can gain insights into the affordability and luxury levels of accommodations in various parts of the city.

1. **General Description**:
   * The dataset contains information on Airbnb listings in NYC, including details such as listing ID, neighbourhood, price, room type, and more.
   * We will aggregate the data by neighbourhood group and calculate the average price for each neighbourhood group to understand the pricing dynamics.

1. **Specific Requirements, Functions, and Formulas**:
   * Group the data by neighbourhood group.
   * Calculate the average price for each neighbourhood group using aggregation functions.
   * Exclude outliers or invalid data points, if necessary.
2. **Analysis Results**:
   * The analysis reveals insights into the average price of Airbnb listings across different neighbourhood groups in New York City.
   * Certain neighbourhood groups may exhibit higher average prices due to factors such as proximity to tourist attractions, amenities, or demand-supply dynamics.
   * Conversely, certain neighbourhood groups may offer more affordable options for travellers on a budget.

1. **Visualization**:
   * Create a bar chart or box plot to visualize the average price by neighbourhood group.
   * Display neighbourhood groups along the x-axis and average prices along the y-axis.
   * Use color-coding or shading to differentiate between neighbourhood groups and highlight variations in average prices.
   * Provide additional information such as the number of listings or room types available in each neighbourhood group.



#### Total neighbourhoods by neighbourhood group

1. **Introduction**:
   * This analysis aims to examine the total number of neighbourhoods within each neighbourhood group in New York City. By understanding the distribution of neighbourhoods across different neighbourhood groups, we can gain insights into the geographical diversity and composition of the city.

1. **General Description**:
   * The dataset contains information on Airbnb listings in NYC, including details such as neighbourhood, neighbourhood group, listing ID, and more.
   * We will aggregate the data by neighbourhood group and count the distinct number of neighbourhoods within each group to determine the total neighbourhoods.

1. **Specific Requirements, Functions, and Formulas**:
   * Group the data by neighbourhood group.
   * Count the distinct number of neighbourhoods within each neighbourhood group using aggregation functions.
   * Exclude duplicates or invalid data points, if necessary.

1. **Analysis Results**:
   * The analysis reveals insights into the distribution of neighbourhoods across different neighbourhood groups in New York City.
   * Certain neighbourhood groups may encompass a larger number of neighbourhoods, indicating greater geographical diversity or size.
   * Understanding the total neighbourhoods by neighbourhood group provides valuable context for assessing the geographical coverage and representation of different areas within the city.

1. **Visualization**:
   * Create a bar chart or pie chart to visualize the total neighbourhoods by neighbourhood group.
   * Display neighbourhood groups along the x-axis and the total number of neighbourhoods along the y-axis or as proportions in the case of a pie chart.
   * Use color-coding or shading to differentiate between neighbourhood groups and highlight variations in the number of neighbourhoods.



### List of Analysis with results

Here's a list of all the analyses conducted in the project along with their key results



1. **Average Price by Neighbourhood Group**:

* + **Result**:
  + Manhattan has the highest average price among all neighbourhood groups, followed by Brooklyn, Queens, Staten Island, and the Bronx.
  + The average price in Manhattan is significantly higher compared to other boroughs, reflecting its status as a prime tourist destination and commercial hub.

1. **Total Neighbourhoods by Neighbourhood Group**:
   * **Result**:
   * Manhattan has the highest number of neighbourhoods within its neighbourhood group, indicating its diverse and expansive geographical coverage.
   * Brooklyn and Queens also have a significant number of neighbourhoods, reflecting their large size and population.

1. **Total Reviews by Year**:
   * **Result**:
   * The number of reviews on Airbnb listings in NYC has shown a steady increase over the years, indicating the growing popularity and usage of Airbnb in the city.
   * There may be fluctuations in review counts due to external factors or changes in Airbnb's policies, but the overall trend is upward.

1. **Average Reviews per Month by Room Type and Neighbourhood Group**:
   * **Result**:
   * Entire home/apartment listings in Manhattan receive the highest average number of reviews per month, indicating their popularity among guests.
   * Private rooms in Brooklyn also receive a significant number of reviews per month, reflecting the diverse accommodation options available in the borough.

1. **Top 10 Hosts by Total Reviews**:
   * **Result**:
   * Hosts with multiple listings across different neighbourhoods in Manhattan dominate the top 10 list, indicating their success in providing quality accommodations and hospitality.
   * Super hosts may also be well-represented among the top hosts, showcasing their dedication to guest satisfaction and positive reviews.

### References

**Link1:** [**https://www.kaggle.com/**](https://www.kaggle.com/)

**Link2:** [**https://ourworldindata.org/**](https://ourworldindata.org/)

**Link3:**  [**https://www.kaggle.com/datasets/sudal...**](https://www.kaggle.com/datasets/sudal)

**Link1:**  [**https://www.kaggle.com/code/anshuls23...**](https://www.kaggle.com/code/anshuls23)

**Link1:** [**https://geogíaphicalanalysis.com/down...**](https://geographicalanalysis.com/down)

**Link1:** [**https://github.com/DataScienceRoadMap...**](https://github.com/DataScienceRoadMap)

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