EDA ON AIRBNB BOOKING

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Abstract:

Airbnb is a global online marketplace that connects travellers seeking accommodations with hosts offering unique stays or experiences. Founded in 2008, the platform operates as a peer-to-peer network, enabling individuals to rent out their spaces or provide tourism experiences. Its business model is built on fostering trust through user reviews, secure payments, and verification systems. By leveraging the principles of the sharing economy, Airbnb has disrupted traditional hospitality, providing cost-effective and personalized alternatives to hotels. The platform's innovative approach has redefined travel, though it faces challenges such as regulatory compliance, market saturation, and competition. Despite these hurdles, Airbnb continues to expand, offering innovative features and partnerships to enhance the user experience.

Problem Statement:

Since its launch in 2008, Airbnb has transformed the travel industry by offering unique and personalized lodging experiences that cater to diverse traveller needs. Central to Airbnb's success is its ability to leverage data insights drawn from millions of listings worldwide. These insights play a pivotal role in shaping the platform's operational strategies and enhancing user satisfaction. For instance, the analysis of a dataset comprising approximately 49,000 observations provides valuable information about host behaviour, customer preferences, and emerging market trends. By interpreting this data, Airbnb gains a deeper understanding of the factors that drive user engagement, enabling the company to make informed strategic decisions and remain competitive in the ever-evolving hospitality sector. This data-driven approach has not only optimized Airbnb's platform but has also contributed to redefining modern travel experiences.

Data Summary:

id: Unique listing id.

name: Name of the property.

Host_id: Unique identifier for each listed host.

Host_name: Name of the host.

neighbourhood_group: Location

neighbourhood: Area

latitude: Latitude coordinates

longitude: Longitude coordinates

room_type: Type of room being rented (e.g., Entire home/apt, Private room).

price: Price per night for renting the property.

minimum_nights: Minimum number of nights required for a booking or stay

number_of_reviews: Number of reviews written for the listing

last_review: Date of the most recent review.

reviews_per_month: Average number of reviews per month.

calculated_host_listings_count: Total no of listings against the host id

availability_365: Number of days when listing is available for booking

The goal of this project is to perform Exploratory Data Analysis (EDA) on the Airbnb NYC 2019 dataset. EDA involves examining the dataset to find useful insights and patterns. By analysing this data, we aim to discover how different factors affect property prices, understand which neighbourhoods are more popular, and identify trends that can be useful for Airbnb hosts and potential guests.

Data Analysis: Price Distribution: We examined how prices are distributed across different listings. This analysis showed that most properties are priced between 75 dollars and 500 dollars per night. There are fewer properties with very high or very low prices.

Room Type Analysis: We explored the different types of rooms available. We found that entire apartments or homes are the most common, followed by private rooms. Shared rooms are less common.

Neighbourhood Insights: By analysing the locations of the properties, we discovered which neighbourhoods are most popular and which have the highest prices. Manhattan generally has higher prices compared to other boroughs, while some neighbourhoods in Brooklyn and Queens offer more affordable options.

Correlation Analysis: We looked at how different factors like price, number of reviews, and availability relate to each other. For example, properties with higher prices tend to have fewer reviews, possibly indicating that high-end properties are booked less frequently but at a higher rate.

The exploratory data analysis of the Airbnb NYC 2019 dataset provided valuable insights into the rental market in New York City. We learned about the distribution of prices, the popularity of different room types, and the variation in property prices across neighbourhoods. These insights can help Airbnb hosts price their properties more effectively and guide guests in choosing accommodations based on their budget and preferences. Overall, this analysis helps in understanding the dynamics of the Airbnb market in NYC and can inform future decisions for both hosts and guests.

Introduction:

Airbnb is a global online marketplace that connects travellers seeking accommodations with hosts offering unique stays or experiences. Founded in 2008, the platform operates as a peer-to-peer network, enabling individuals to rent out their spaces or provide tourism experiences. Its business model is built on fostering trust through user reviews, secure payments, and verification systems. By leveraging the principles of the sharing economy, Airbnb has disrupted traditional hospitality, providing cost-effective and personalized alternatives to hotels. The platform's innovative approach has redefined travel, though it faces challenges such as regulatory compliance, market saturation, and competition. Despite these hurdles, Airbnb continues to expand, offering innovative features and partnerships to enhance the user experience.

Reason for Analysis

Analysing Airbnb's dataset serves several important purposes that contribute to the company's growth, operational efficiency, and user satisfaction. These include:

- **Understanding Host Behaviour:**
  Insights into host practices, such as pricing strategies, response times, and listing quality, allow Airbnb to provide better guidance to hosts and maintain high standards across the platform.

- **Identifying Customer Preferences:**
  Analysing data on customer bookings, preferences, and reviews helps uncover trends in traveller needs, such as preferred locations, amenities, or pricing levels. This enables Airbnb to tailor its recommendations and improve user experience.

- **Tracking Market Trends:**
  The data reveals patterns in demand, such as seasonality, peak travel periods, and popular destinations. This information is crucial for forecasting and adapting to changes in the market.

- **Enhancing Decision-Making:**
  Data-driven insights empower Airbnb to make informed strategic decisions, from optimizing algorithms for search and recommendations to launching new features and services.

- **Improving Competitiveness:**
  In a highly competitive hospitality industry, data analysis helps Airbnb identify opportunities to stay ahead, such as addressing underserved markets or improving customer retention strategies.

Steps involved

- **Data Wrangling**

  The dataset was loaded from the drive, and basic commands such as head, tail, info, and describe were used to understand its structure and characteristics. The shape command was employed to determine the total number of rows and columns, providing a clear overview of the dataset's dimensions. This initial step ensured that the dataset's overall structure was well understood before moving to further processing.

- **Null Values Treatment**

The dataset contained significant null values in the reviews_per_month and host_name columns, rather than deleting these Columns, all missing values in these columns were replaced with Unknown. This approach was chosen to prevent unnecessary loss of data, as these columns did not contribute significantly to the analysis. Imputing missing values with unknown maintained the dataset's consistency while ensuring it was prepared for analysis.

- **Exploratory Data Analysis (EDA)**

Exploratory data analysis started by examining the distribution of numerical variables using histograms and box plots, which helped identify outliers and variations in the data. Relationships between different variables were explored using scatter plots and correlation matrices to uncover meaningful insights, such as how price and availability are affected by factors like location or reviews.

Bar plots and cross-tabulations were employed to analyse categorical variables and their impact on customer behaviour. Seasonal trends and booking frequencies over time were also studied to identify patterns, such as peak travel periods. Heatmaps were utilized to visualize correlations among multiple variables, providing a comprehensive understanding of the dataset. These analyses laid the foundation for deriving actionable insights and informed decision-making.

Data Visualization:

It deals with the graphical representation of data, from which we can draw conclusions and take different business decisions.

Most Common Room Types
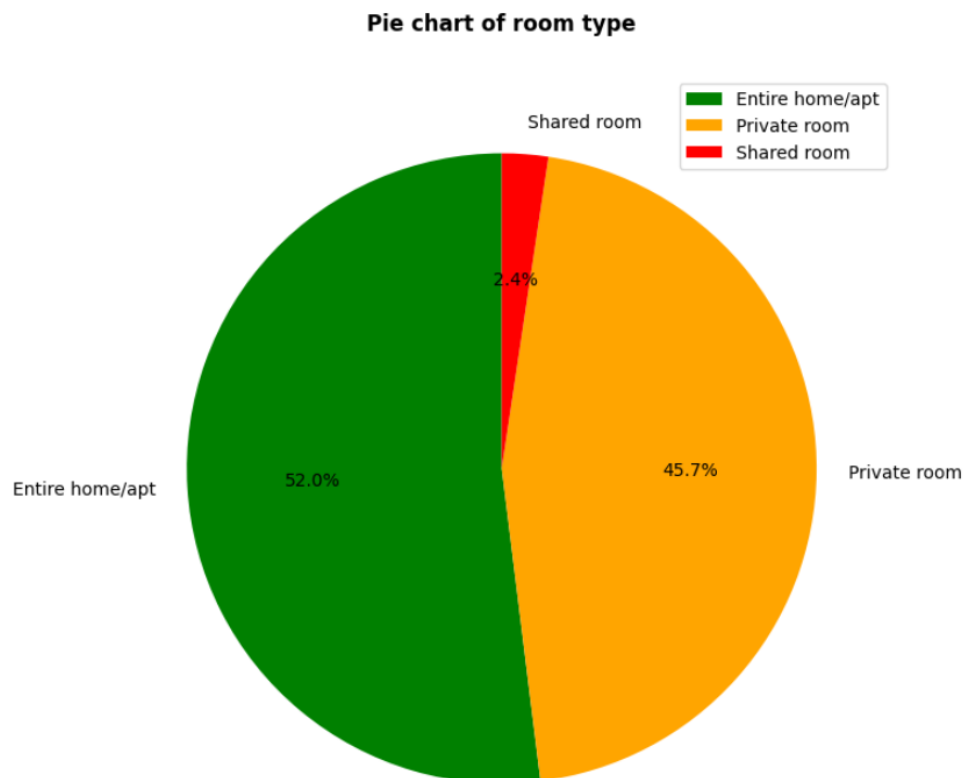
- "Entire home/apt" is the most common room type, accounting for 52.0% of the listings.
- "Private room" follows closely, with a share of 45.7%.
- "Shared room" represents only 2.4% of the listings.
- 52.0% of customers prefer "Entire home/apt" for their stays.
- 45.7% of customers opt for "Private room" accommodations.
- Only 2.4% of customers are open to "Shared room" options.
- These insights suggest that hosts and investors should prioritize "Entire home/apt" and "Private room" listings.

- A focus on customer preferences can lead to better business decisions and increased returns.

The Most Common Neighbourhood Group

Pie chart of neighbourhood_group types
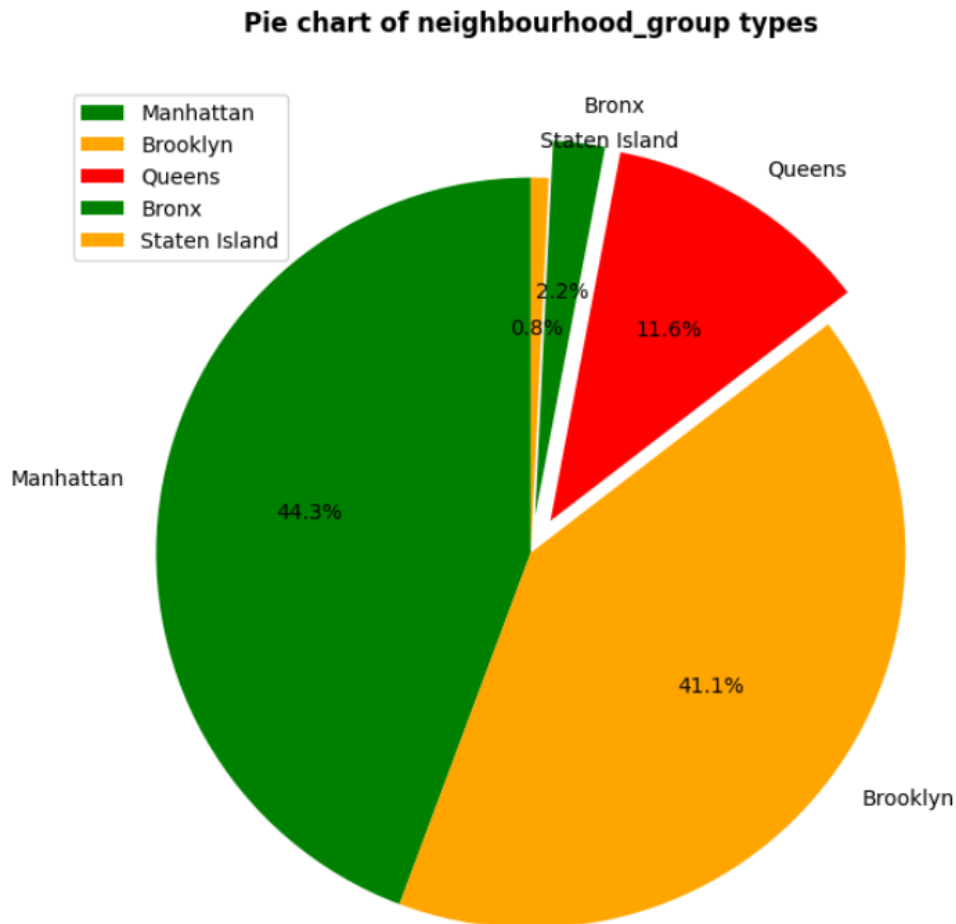
- Manhattan holds the largest share of Airbnb listings at 44.3%.
- Brooklyn follows closely with a share of 41.1%.
- Queens accounts for 11.6% of the listings.
- The Bronx and Staten Island have significantly lower shares compared to other neighborhoods.
- Insights suggest that Manhattan and Brooklyn are prime locations for customers (tourists).
- Queens has moderate demand, while the Bronx and Staten Island attract fewer customers.
- Investors and hosts are advised to focus on high-demand areas for better returns.
- Less popular areas might require unique strategies to attract customers.

- This visualization highlights growth opportunities in popular neighborhoods.

Top 10 Host Id's
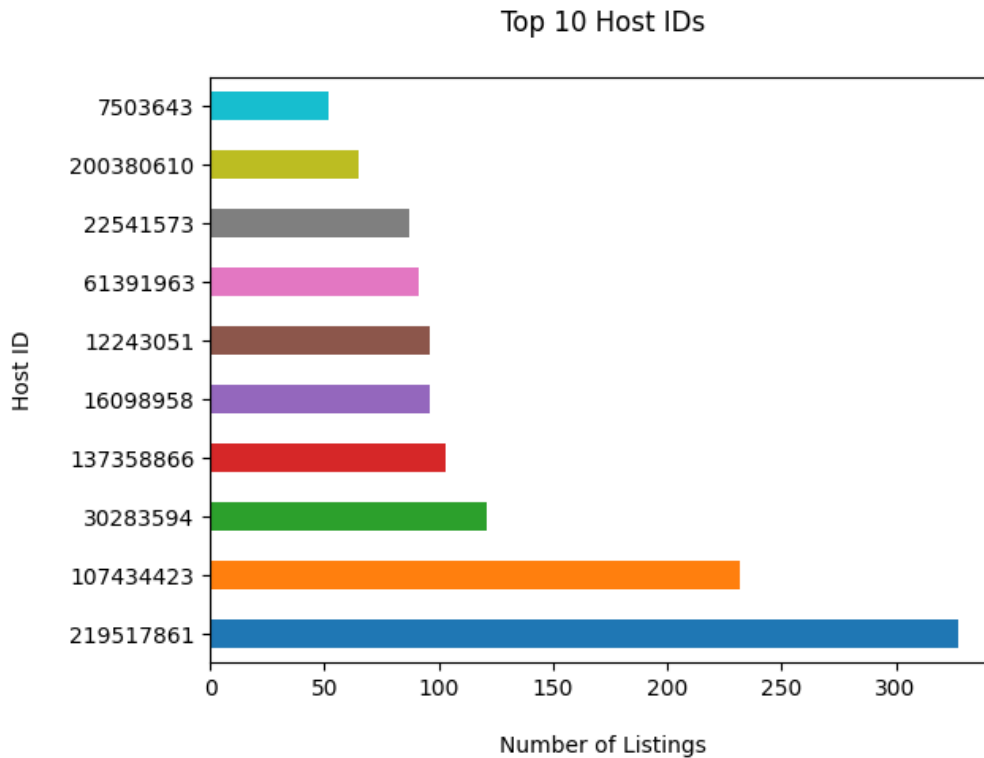
Top 10 Host IDs

- The chart highlights the top 10 hosts with the most listings, demonstrating their significant influence on the platform.
- A few hosts control a large share of listings, indicating a concentrated market.
- The visual representation makes it easy to compare the relative dominance of each host.
- Variations in listing counts can reveal disparities in market presence.
- Insights from the chart can aid in identifying key hosts for potential collaborations or partnerships.
- Engaging with these top hosts could lead to strategic marketing opportunities or operational synergies.
- A highly concentrated market poses a potential risk if top hosts decide to leave the platform.

- The departure of these hosts could significantly impact listing availability, particularly in popular or high-demand areas.

- Hosts with substantial listings may have the ability to influence pricing trends and availability patterns on the platform.

- This dominance could shape market dynamics, affecting both customers and competitors. The chart highlights areas where host concentration is high, offering clues for diversifying the host base.

- Reducing dependence on top hosts could enhance platform resilience and listing diversity.

## Distribution Of Airbnb Listings Based on Neighbourhood Group

Distribution of Airbnb Listings based on Neighbourhood group
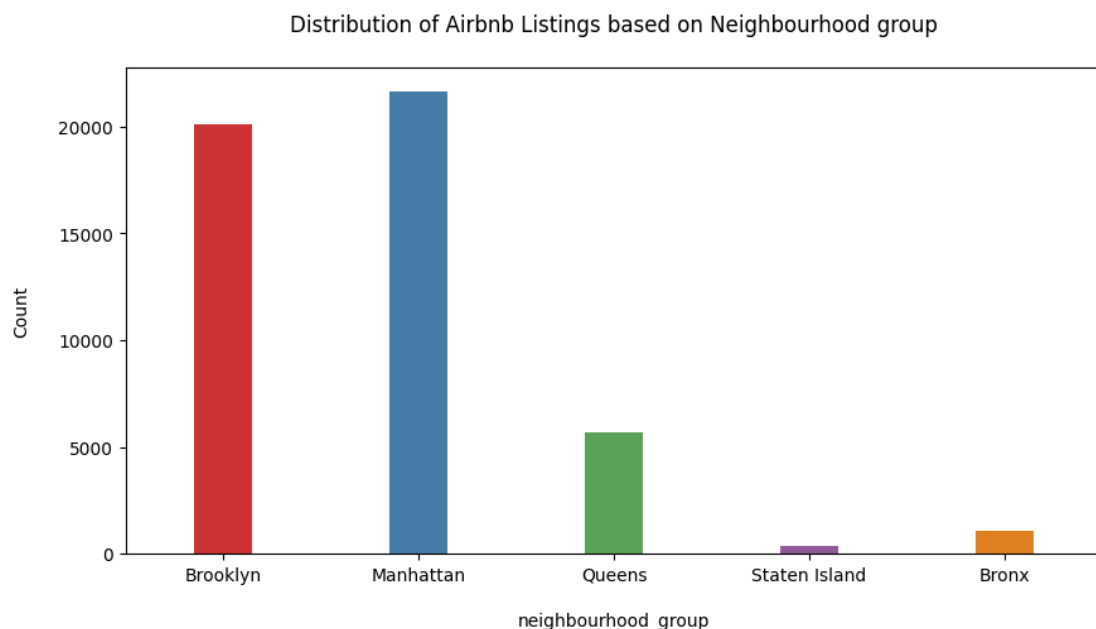
- The count plot illustrates the distribution of Airbnb listings across various neighborhood groups, providing a clear comparison of listing density.

- Neighborhood groups such as Manhattan and Brooklyn exhibit significantly higher concentrations of listings, showcasing their popularity among hosts and guests.

- The chart helps identify areas with high host activity, which are likely to attract more guest bookings.

- It highlights potential hotspots for investment and property management based on demand patterns.

- Areas with fewer listings might present opportunities for market expansion or targeting underserved segments.

- The concentration in certain neighborhoods suggests a competitive environment where hosts might need to differentiate their offerings.

- Insights from the distribution can assist in planning marketing strategies tailored to specific neighborhoods.

- The chart reveals patterns that can inform pricing strategies, as higher demand areas may support premium rates.

- Understanding listing density can help policymakers assess the impact of Airbnb on different neighborhoods.

- Investors can use this data to identify areas with potential for growth or to avoid overly saturated markets.

- The distribution highlights trends in guest preferences, pointing to areas with greater appeal for short-term stays.

# Distribution Of Airbnb Listings Based on Room Type

Distribution of Airbnb Listings based on room type
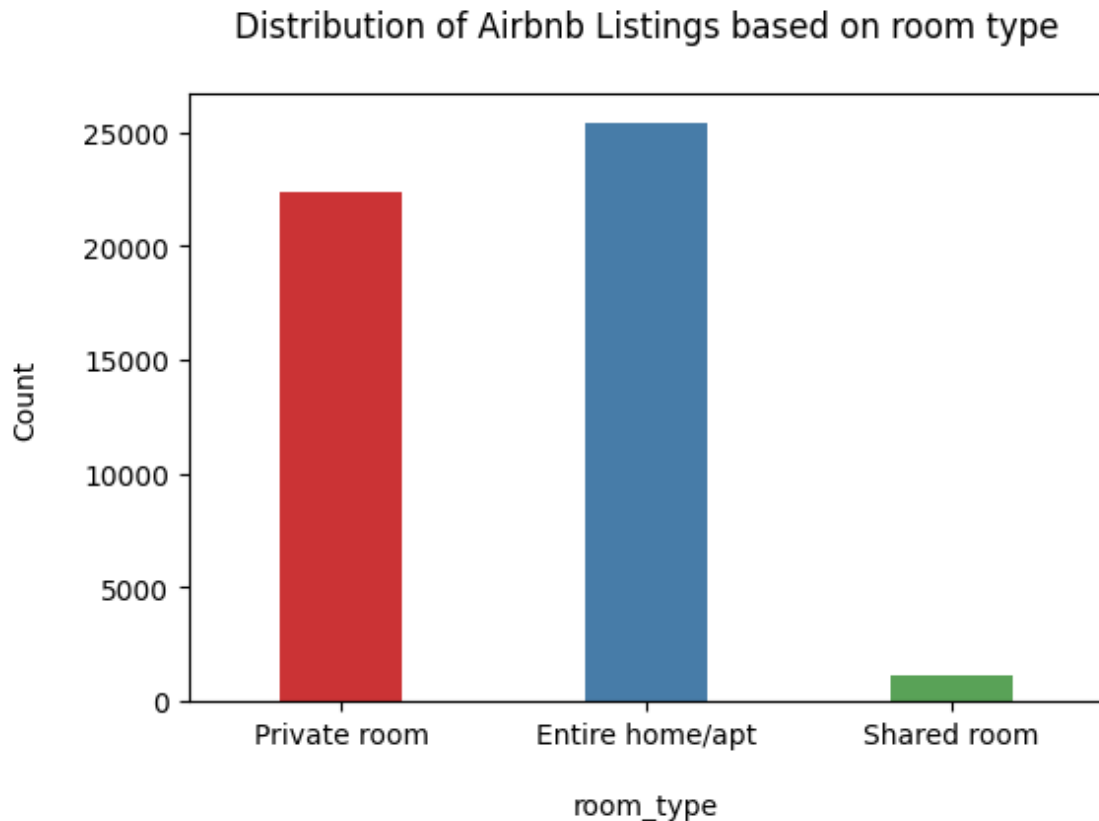
- The count plot shows the distribution of room types, making it easy to identify the most and least common options among Airbnb listings.

- "Entire home/apt" being the most common room type highlights a significant demand for private accommodations.

- The chart indicates that privacy and space are key considerations for many tourists, reflected in the popularity of "Entire home/apt" and "Private room."

- Less frequent room types like "Shared room" may cater to niche markets or budget-conscious travelers.

- Understanding the preference for entire homes or apartments can help hosts optimize their offerings to align with market demand.

- Investors can use these insights to focus on properties that meet the high demand for private accommodations.

- The distribution of room types suggests varying guest preferences, which can guide tailored marketing strategies.

- Hosts can diversify their portfolios by considering less common room types to attract different customer segments.

- The chart provides data-driven insights into room type trends, aiding in competitive analysis and pricing strategies.

- The preference for "Entire home/apt" underscores the potential for higher revenue generation from such listings.

- Insights from the distribution can help property managers design listings that better align with guest expectations.

- The data offers clues for new entrants to the Airbnb market about which room types are likely to succeed.

Top 10 Host Names


Top 10 Hosts by Number of Listings
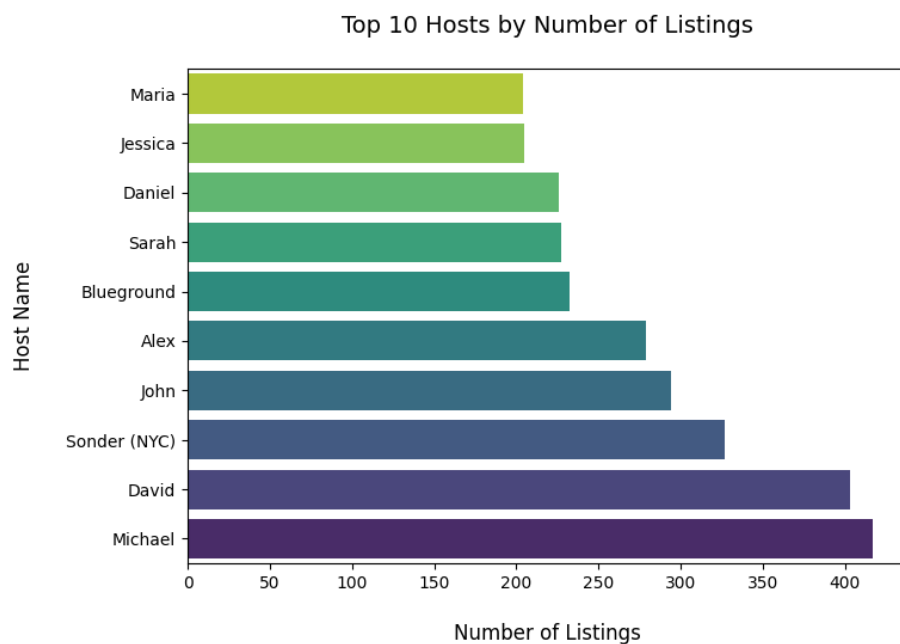
- Michael leads the Airbnb market with over 400 listings, making him the most active host.
- David is the second most active host, with slightly fewer listings than Michael.
- Sonder (NYC), a professional hosting organization, ranks third, highlighting its role as a large-scale operator.
- Other significant hosts, like John, Alex, and Blueground, manage substantial property portfolios, indicating they might be property management companies or professional operators.
- Jessica and Maria, while lower in rank, still manage around 150-200 listings each, contributing significantly to the market.
- The top hosts dominate a large portion of the market, showcasing a concentration of listings under a few operators.
- The presence of professional operators, such as property management companies, is strong in Airbnb's ecosystem.
- The market remains competitive, with large-scale operators and individual hosts coexisting and exerting varying levels of influence.

Top 10 Host Names by Revenue
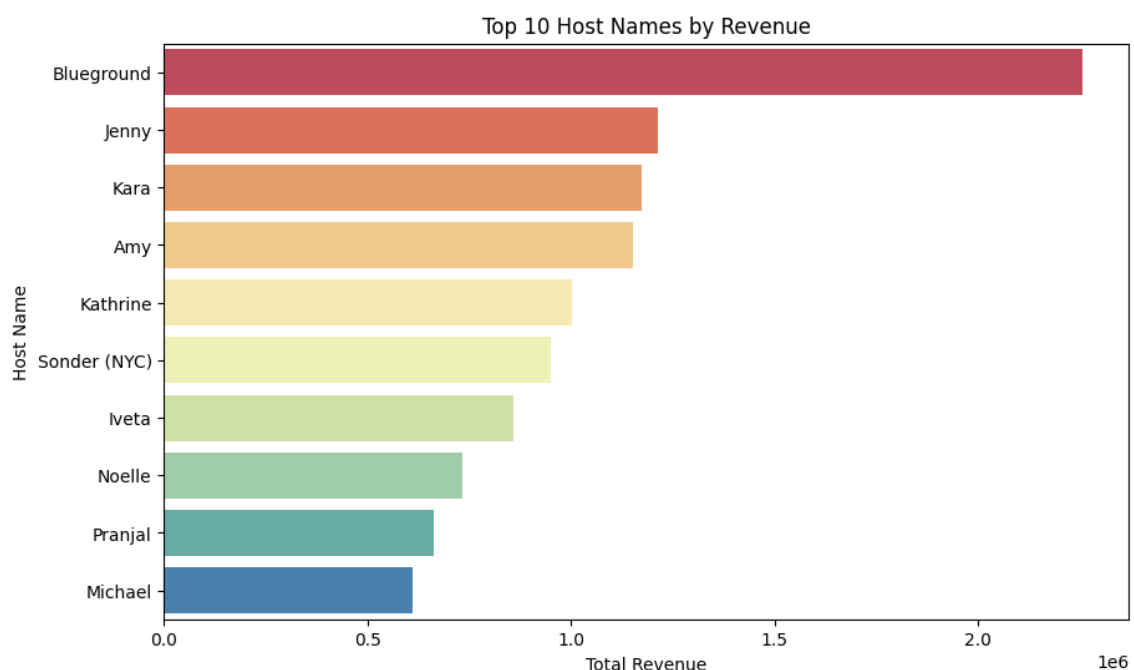
- **Title**: Top 10 Host Names by Revenue.
- **X-axis**: Represents the total revenue (in dollars).
- **Y-axis**: Represents the names of the top 10 hosts.
- **Top Host**:
- **Blueground**: Leads with the highest revenue, exceeding 2 million.
- **Other Hosts** (in descending order of revenue):

  Jenny,Kara,Amy,

  Kathrine,Sonder (NYC),Iveta,

  Noelle,Pranjal,Michael

- **Observation**: There is a significant gap between Blueground and the other hosts in terms of revenue.

## Top 10 Neighbourhoods

Top 10 Neighborhoods
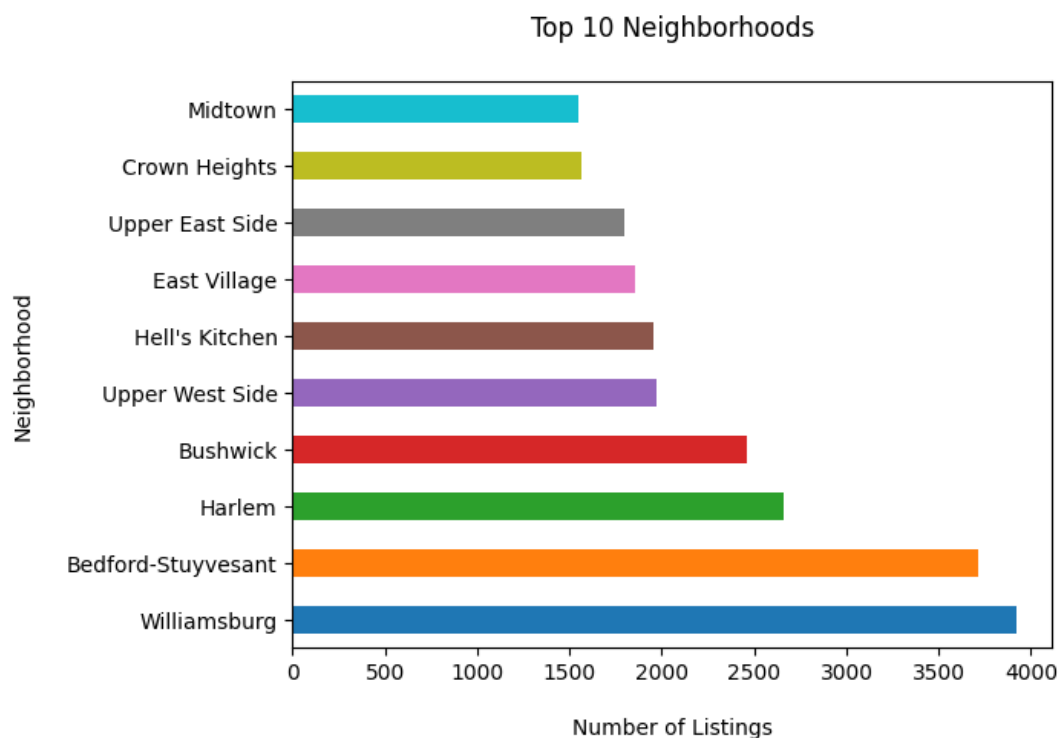
- The horizontal bar chart effectively ranks the top 10 neighborhoods by listing volume, making comparisons straightforward.

- Williamsburg, with close to 4,000 listings, clearly dominates as the neighborhood with the highest Airbnb activity.

- Bedford-Stuyvesant, with around 3,500 listings, also demonstrates significant host activity, placing it second.

- Neighborhoods like Harlem and Bushwick show a moderate concentration of listings, each exceeding 2,000, indicating steady demand.

- The distribution highlights the popularity of certain neighborhoods, offering insights into guest preferences and hosting opportunities.

- The chart provides a clear visual representation of neighborhood trends, aiding strategic decision-making for marketing and pricing.

- Understanding neighborhood-specific listing volumes can help optimize the allocation of resources and marketing efforts.

- The concentration of listings in Williamsburg and Bedford-Stuyvesant suggests these neighborhoods are hotspots for Airbnb activity and likely attract significant tourist

Average Revenue by Neighbourhood Group
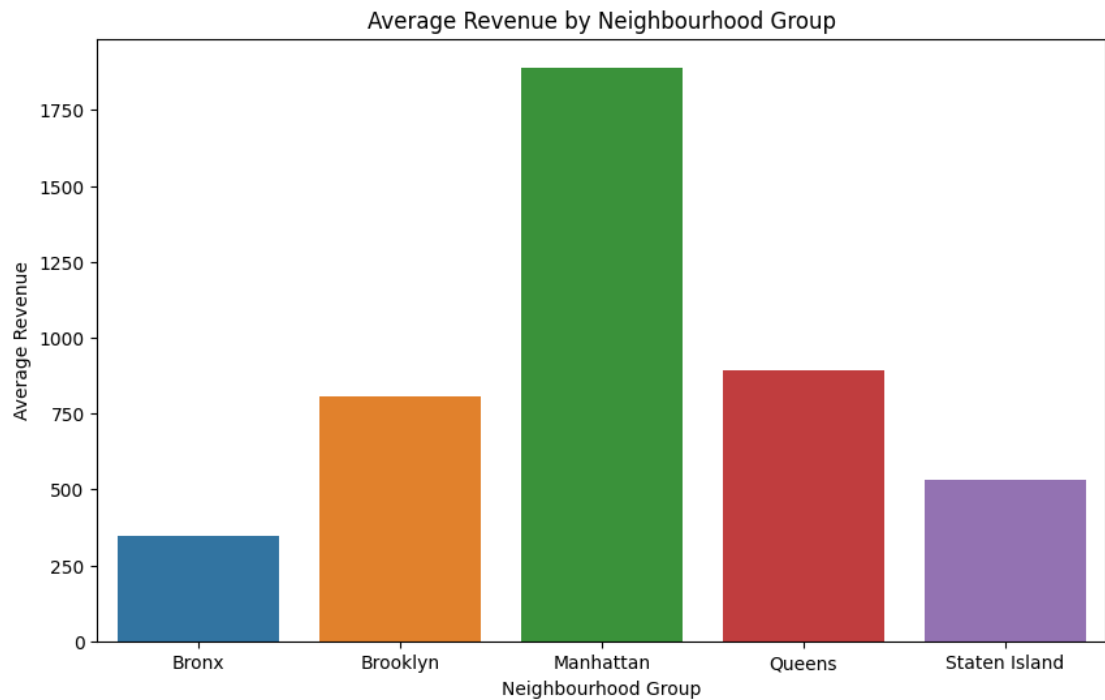
- Manhattan generates the highest average revenue, significantly surpassing other neighborhoods, with a value around 1750.
- Brooklyn ranks second, with an average revenue approximately around 1000.
- Queens comes next, with an average revenue close to 750.
- Staten Island and Bronx generate the least average revenue, both under 500, with Staten Island slightly higher than the Bronx.
- There is a substantial gap in average revenue between Manhattan and the other neighborhoods, indicating Manhattan's dominant position in revenue generation.

# Category Count Plot Between Room Type and Neighbourhood Group

Category count plot between room type and neighbourhood group
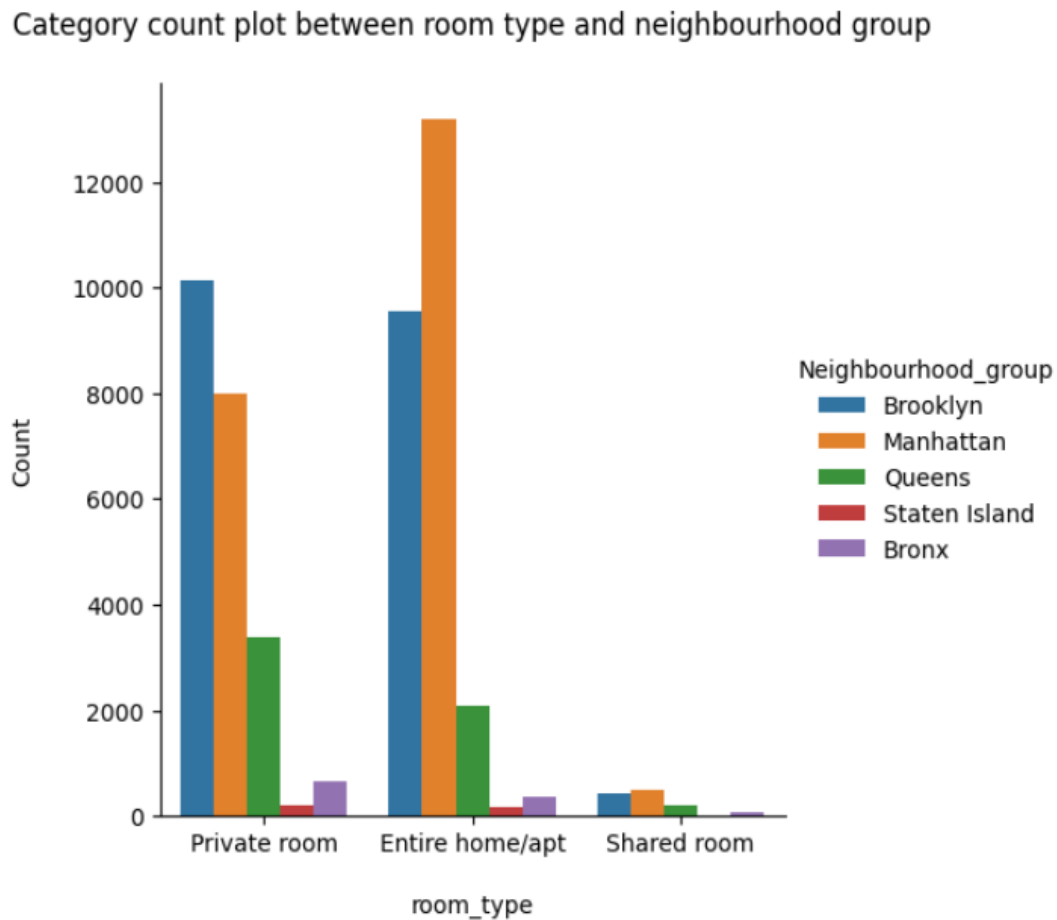
- The catplot visually compares room type distributions across different neighborhood groups, highlighting preferences in each area.
- Central neighborhoods like Manhattan and Brooklyn show a higher prevalence of "Entire home/apt" and "Private room" listings, indicating a preference for privacy and convenience.
- Suburban neighborhoods may feature a more diverse mix of room types, including "Shared room" or other niche options, catering to budget-conscious travelers or groups.
- The chart reveals clear patterns in room type popularity, helping hosts align their offerings with neighborhood-specific demand.
- By understanding these variations, hosts can strategically design listings that resonate with the preferences of potential guests in each neighborhood.

- The data can guide investment decisions, suggesting which room types are likely to yield better returns in specific areas.

- Insights from the chart can support targeted marketing efforts by emphasizing room types that appeal to the primary audience in a neighborhood.

- Hosts looking to expand their portfolios can use this data to identify opportunities for offering underrepresented room types in certain areas.

- The distribution of room types also highlights guest expectations, such as the demand for entire homes in urban settings or shared spaces in suburban or less central locations.

- These trends can inform competitive pricing strategies, ensuring hosts optimize revenue based on room type demand and neighborhood popularity.

- Policymakers can use this information to assess the impact of Airbnb on housing availability and neighborhood dynamics.

- The visualization offers a comprehensive view of how room type preferences interact with location, enabling data-driven decisions for both hosts and investors.

Correlation Among Features of Airbnb Bookings

Correlation Heatmap of features of Airbnb Bookings
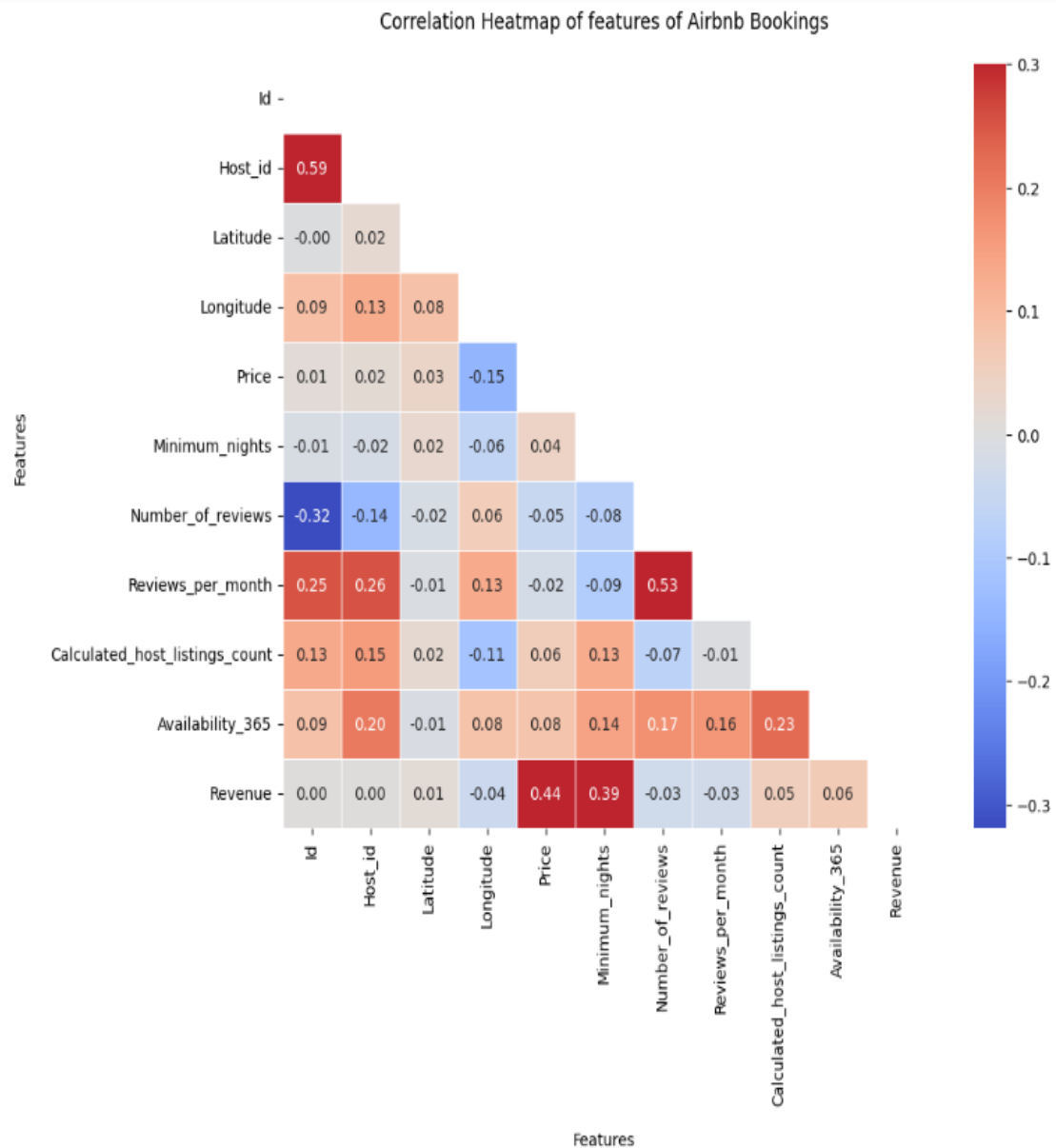
- The heatmap highlights the relationships between numeric variables, making it easy to identify strong correlations or independence between features.

- Variables like price, number of reviews, and availability can be assessed for their impact on one another.

- A high correlation between the number of reviews and reviews per month suggests that listings with more reviews are consistently attracting guests.

- Weak correlations between some variables may indicate areas where changes in one feature have little to no impact on others.

- Understanding these correlations can help hosts set competitive prices by identifying factors that influence guest interest and bookings.

- Insights from the heatmap can guide efforts to optimize listings by focusing on features that are most strongly tied to performance metrics like reviews or occupancy rates.

- A high correlation between certain features may indicate a cause-and-effect relationship that can be leveraged for strategic decisions.

- The visualization helps pinpoint which variables to prioritize in predictive models for pricing, demand forecasting, or guest preferences.

- Hosts can use these insights to adjust strategies, such as improving listing features that drive higher review counts or better occupancy.

- Correlations between numeric variables also offer guidance for improving guest experiences by emphasizing highly rated or frequently mentioned aspects.

- Investors can use the data to identify key performance indicators that strongly influence returns on Airbnb properties.

- Weak or inverse correlations might highlight areas for improvement, such as listings with high prices but low review counts, signaling potential overpricing or quality issues.

# Relation Between Neighbourhood Group and Availability

Relation between neighbourhood group and availability
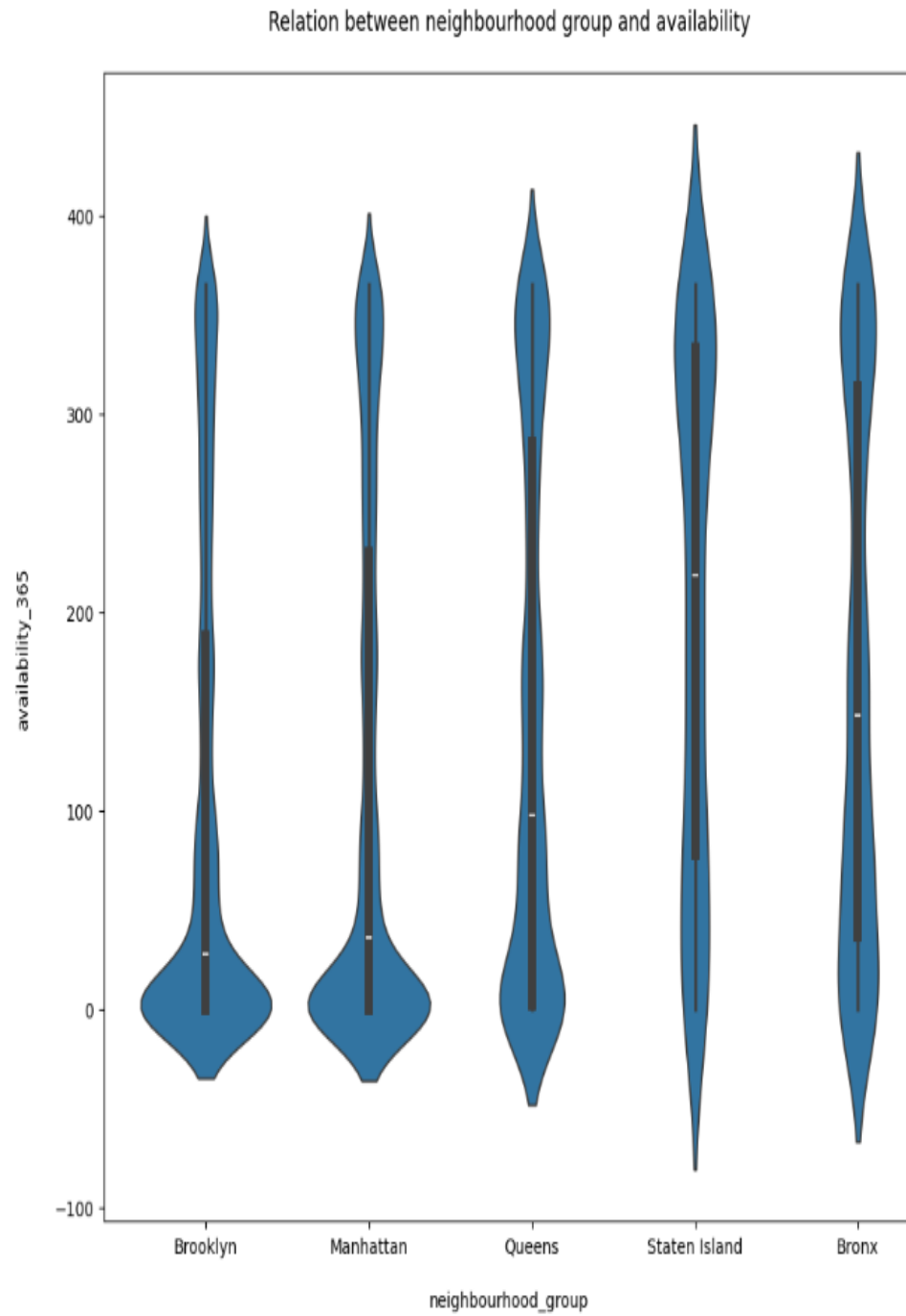
- The violin plot visually represents the spread and density of "availability_365" across neighborhood groups, showing how room availability varies throughout the year.

- It highlights differences in availability patterns, with some neighborhoods having more listings available year-round than others.

- Staten Island stands out with the highest mean availability of around 220–250 days, suggesting a significant number of year-round listings in this area.

- The plot provides insights into both the central tendency (mean or median) and the distribution spread, showing areas with consistent or varied availability.

- Neighborhoods with lower mean availability may indicate seasonal demand or hosts opting for limited rental periods.

- The density within each neighborhood group highlights whether listings are concentrated around specific availability ranges or spread out across the year.

- These patterns can help hosts and investors identify neighborhoods with consistent year-round demand versus those with seasonal fluctuations.

- Understanding availability trends can guide pricing strategies, with year-round availability potentially supporting higher annual revenue.

- The data offers clues about guest preferences, with neighborhoods showing higher availability potentially attracting more bookings.

- Investors can use this information to focus on areas with steady availability, ensuring better occupancy and returns.

- The visualization can inform hosts about competitive dynamics, such as whether they should adjust their availability to align with market trends.

- For neighborhoods with lower availability, there may be opportunities to cater to unmet demand during off-peak periods.

- The violin plot highlights neighborhoods where market entry could be advantageous based on consistent or underserved availability trends.

# Relation Between Neighbourhood Group and Price

Relation between Neighbourhood Group and Price
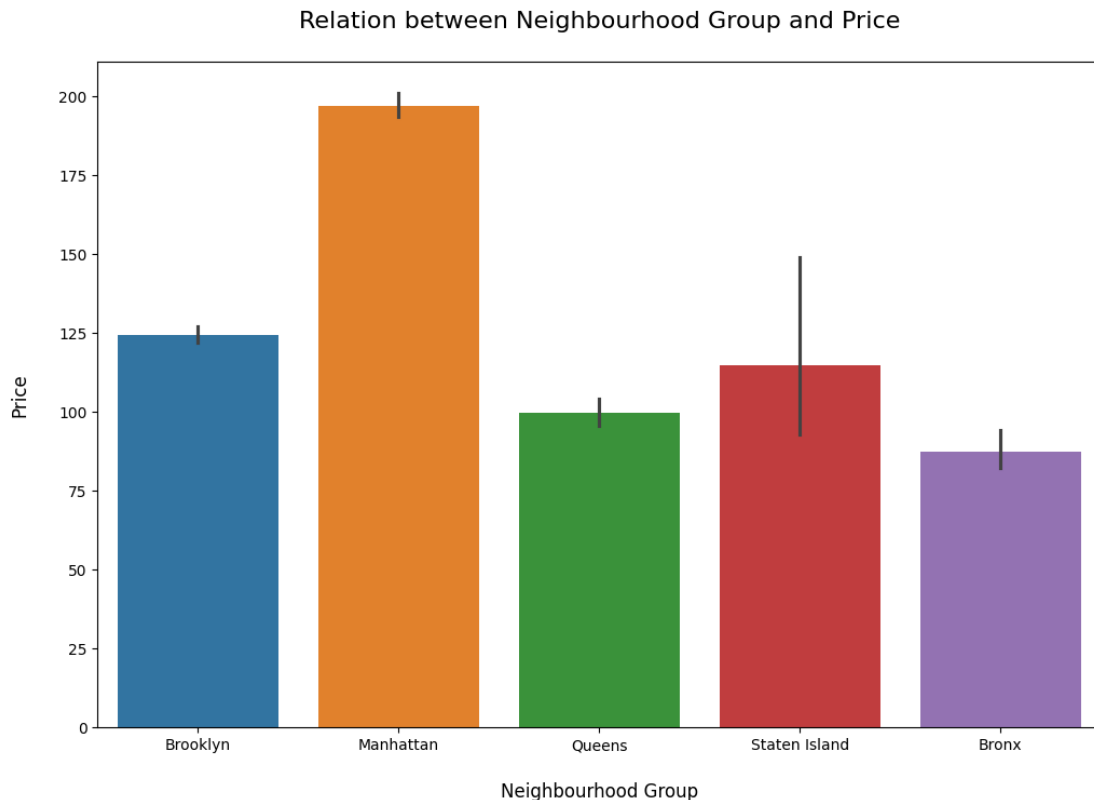
- The bar plot visually compares the average prices of Airbnb listings across various neighborhoods, making it easy to identify price differences between areas.
- It highlights which neighborhoods have higher or lower average rental costs, providing valuable insights into pricing trends.
- Neighborhoods like Manhattan are likely to have higher average prices, reflecting the demand for more expensive or premium accommodations in these areas.
- The chart allows for a quick comparison, showing which neighborhoods offer more affordable listings versus those with premium pricing.
- Understanding these price variations helps hosts set competitive pricing strategies, ensuring they remain attractive in their specific market while maximizing revenue.
- The plot can also help investors identify high-demand areas where premium pricing may be justified based on neighborhood reputation and guest expectations.
- By recognizing pricing patterns, hosts can adjust their pricing models to be competitive within specific neighborhoods while also targeting higher-value listings in more expensive areas.

- The insights into price distribution can guide property owners in choosing the right neighborhood to list properties based on their target demographic (budget travelers vs. luxury seekers).
- Identifying affordable areas through this chart may open opportunities for hosts to cater to more price-sensitive guests.
- For neighborhoods with higher average prices, there might be opportunities for upselling additional services or unique features to justify the premium cost.
- The chart offers a clear visual representation of market trends, helping hosts stay informed about local competition and adjusting their pricing strategies accordingly.
- This data can be used to forecast potential revenue, particularly for high-price areas, by aligning pricing with local demand and market conditions.

Airbnb Listing by Neighbourhood Group

Scatter Plot between latitude and longitude of each Airbnb listing
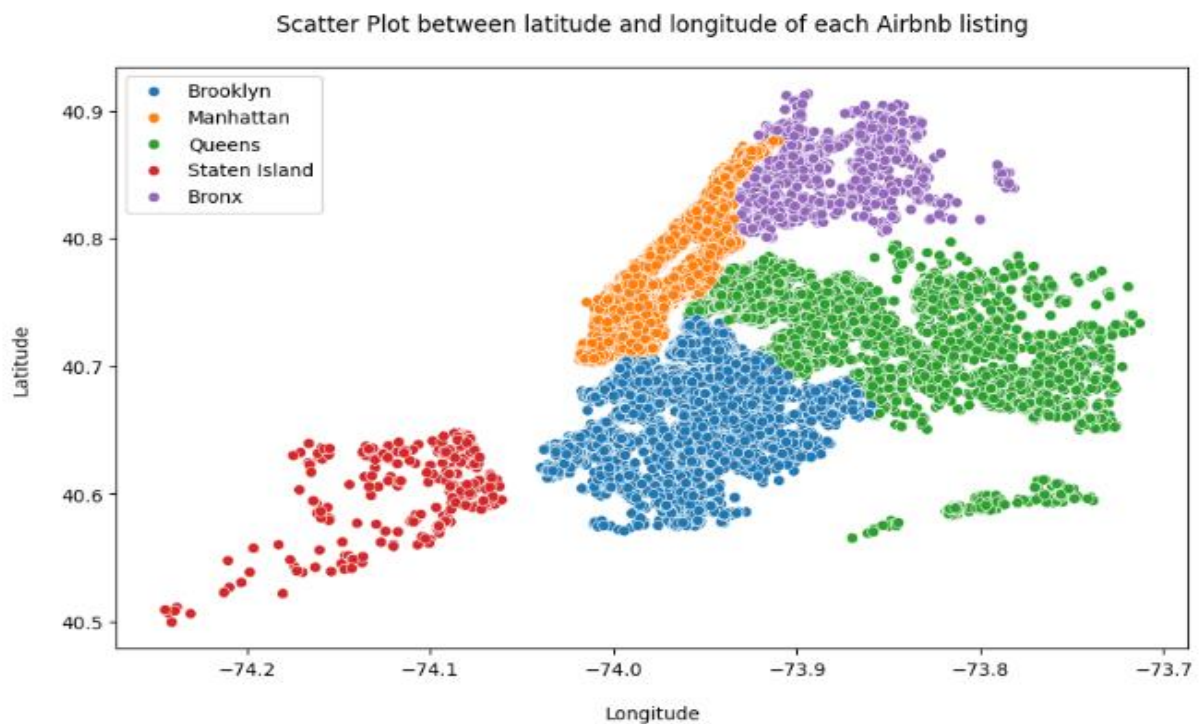
- The scatter plot provides a clear view of the geographic distribution of Airbnb listings, highlighting how they are spread and grouped across neighbourhoods.
- Dense clusters of listings in areas like Manhattan and Brooklyn indicate these neighbourhoods are popular hotspots for Airbnb rentals.
- The chart reveals spatial patterns that can help identify areas of high activity and demand for short-term rentals.

- Neighbourhoods with sparse listings may represent opportunities for growth or targeting underserved areas.

- Insights from the scatter plot can help hosts and investors identify high-demand locations for potential property acquisitions.

- The geographic clustering of listings can inform pricing strategies by reflecting neighbourhood-specific demand and competition levels.

- High-density areas might suggest oversaturation, prompting hosts to consider more competitive pricing or unique features to stand out.

- The spatial distribution of listings can guide marketing strategies, helping focus efforts on areas where listings are less prominent.

- Understanding the spread of listings can also assist in optimizing logistics, such as cleaning or maintenance services for hosts managing multiple properties.

- The plot provides visual evidence of guest preferences for certain neighbourhoods, which can be useful for tailoring offerings to match demand.

- Geographic patterns may highlight areas influenced by tourist attractions or business districts, offering insights into what drives demand in specific locations.

- Hosts can use the data to diversify their portfolio by investing in less concentrated areas, reducing risk associated with market saturation in popular neighbourhoods.

Classification Of Rooms Based on Price

Classification of Rooms Based on Price
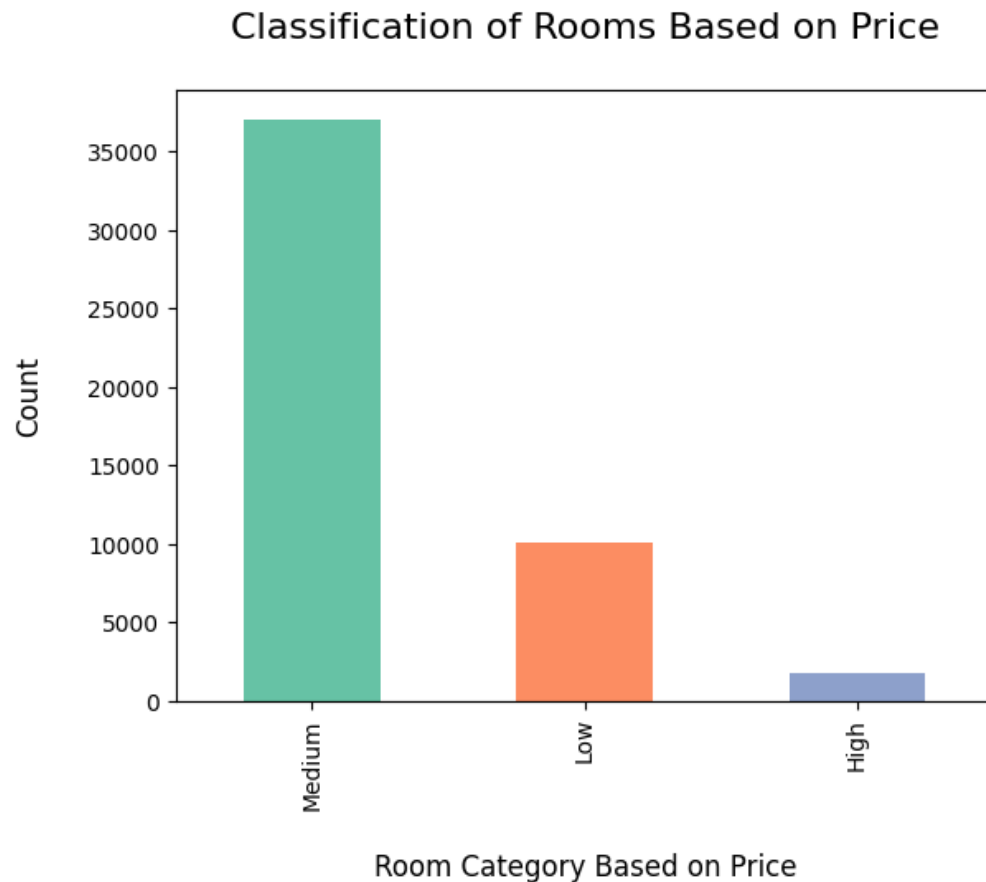
- The bar chart provides a clear visualization of the distribution of Airbnb listings across different price ranges, highlighting the number of listings in each category.
- The frequency of listings in categories such as Low, Medium, and High helps identify the predominant market segment in the dataset.
- If most listings fall into the budget-friendly (Low) category, it suggests a competitive market catering to price-sensitive travellers.
- A significant number of listings in the mid-range (Medium) category indicates balanced demand, appealing to a broad audience.
- High-end (High) listings, though fewer, may represent premium offerings targeting luxury travellers or niche markets.
- Insights from the chart can guide pricing strategies, helping hosts position their listings effectively within the most common price range.

- Hosts offering properties in less represented categories could capitalize on niche markets, either by upgrading budget listings or offering unique experiences in the high-end segment.
- The distribution also reflects guest affordability preferences, helping investors align their property investments with expected demand.
- Marketing efforts can be tailored based on the predominant price range, such as emphasizing affordability for Low categories or exclusivity for High categories.
- The data highlights opportunities to address imbalances, such as a lack of listings in a particular price range, potentially filling gaps in the market.
- Price range distribution aids in forecasting revenue potential by identifying where the majority of bookings are likely to occur.
- Hosts can use this information to adjust features or amenities to justify their listing's position in a specific price range, enhancing appeal and profitability.

PROJECT SUMMARY

Project Overview

Dataset: Contains 49,000 entries with 16 attributes related to Airbnb listings in New York City.

Objective: Perform Exploratory Data Analysis (EDA) to uncover insights for optimizing listings, investment decisions, and urban planning.

Key Findings

Price Distribution:

Most properties are priced between 75and500 per night. Outliers exist at both high and low ends of the price spectrum.

Room Type Insights:

Entire homes/apartments dominate (52%), followed by private rooms (45.7%). Shared rooms are the least common (2.4%).

Neighbourhood Analysis:

Manhattan and Brooklyn are the most popular neighbourhoods, accounting for 85.4% of listings. Listings in Manhattan generally have higher prices.

Correlation Analysis:

Higher-priced properties have fewer reviews, suggesting high-end properties may be less frequently booked.

Availability Trends:

Staten Island has the highest average availability, while other boroughs show varied patterns.

Host Concentration:

A few hosts dominate the market with multiple listings, indicating a concentrated host presence.

Visual Insights

Pie Charts: Show distribution of room types and neighbourhood popularity.

Bar Charts: Highlight top hosts, neighbourhoods, and room categories by price.

Scatter Plots: Display geographic distribution of listings.

Heatmaps: Show correlations between numeric features.

Business Recommendations

For Hosts:

Focus on offering entire homes/apartments in popular neighbourhoods. Competitive pricing is essential for high-demand areas like Manhattan. Consider unique offerings in underrepresented room types or areas.

For Airbnb:

Optimize platform features to highlight high-demand locations and room types. Develop promotional strategies during low-demand periods. Collaborate with top-performing hosts for marketing opportunities.

Conclusion

- The analysis of the Airbnb NYC 2019 data uncovered significant patterns in pricing, room types, and popular neighbourhoods, which are critical for understanding market dynamics.
- It highlighted areas and room types with the highest demand, providing insights for hosts and Airbnb to optimize offerings based on customer preferences.
- Pricing trends identified through the analysis allow hosts to set competitive rates that attract more guests while ensuring profitability.
- The data on room preferences, such as the demand for entire homes versus shared spaces, helps hosts tailor their listings to meet specific guest needs and preferences.
- Popular neighbourhoods emerged as key areas for focusing efforts on improving services, amenities, and guest experiences to maintain a strong presence.
- Seasonal trends identified when demand is higher or lower, providing valuable guidance for planning promotions, pricing adjustments, and marketing strategies.
- This information can help Airbnb and hosts better align their offerings with market demand, increasing bookings and customer satisfaction.
- The insights support strategic decision-making, such as where to invest in property expansion or where to adjust pricing models based on neighbourhood and seasonal trends.
- The data-driven insights help Airbnb stay competitive in New York City by ensuring that the platform meets customer expectations while capitalizing on demand fluctuations.
- Understanding these trends allows Airbnb to maintain its leadership in the market, adapting to evolving guest preferences and competitive pressures.

References:

- GeeksforGeeks
- w3 schools
- ChatGPT

Link:

https://medium.com/@ugursavci/complete-exploratory-data-analysis-using-python-9f685d67d1e4