



Price Dynamics & Neighborhood Trends: A Python-Powered Analysis of NYC Airbnb Listings

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Project Overview



Dataset

NYC Airbnb Listings (2019)

- 49,000+ properties
- Key metrics: Price, location, reviews, room type

Objectives

- Identify pricing trends
- Analyze popularity factors
- Map geographic distribution

Key Questions

- Where are price extremes?
- How does room type affect cost?
- What drives listing popularity?

Tools Used

Python (Pandas, Seaborn, Folium)



Data Cleaning

Cleaned 49,000+ listings by:

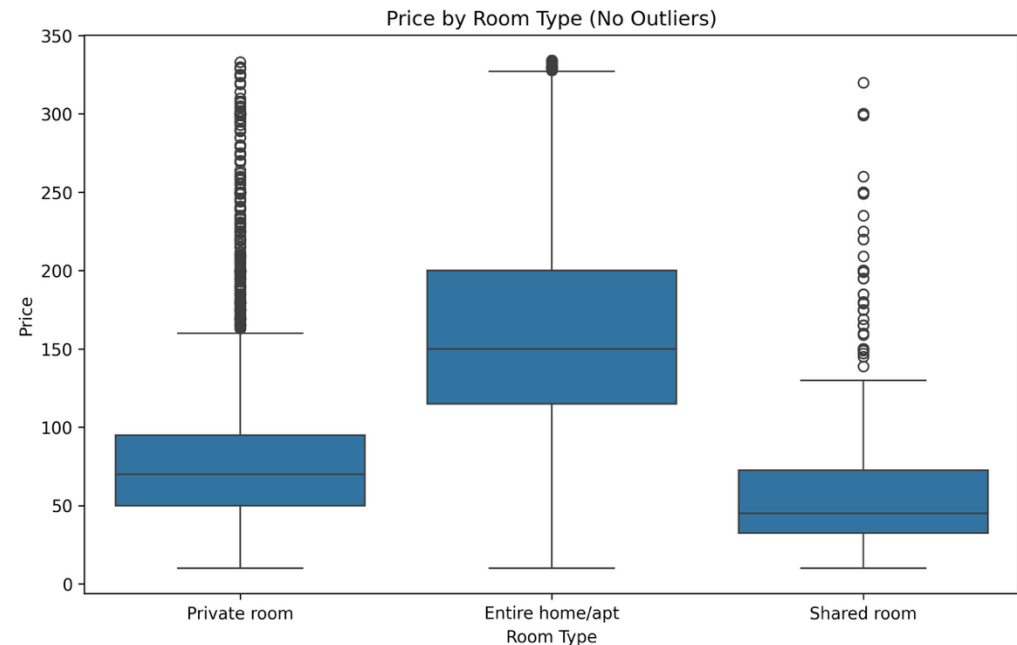
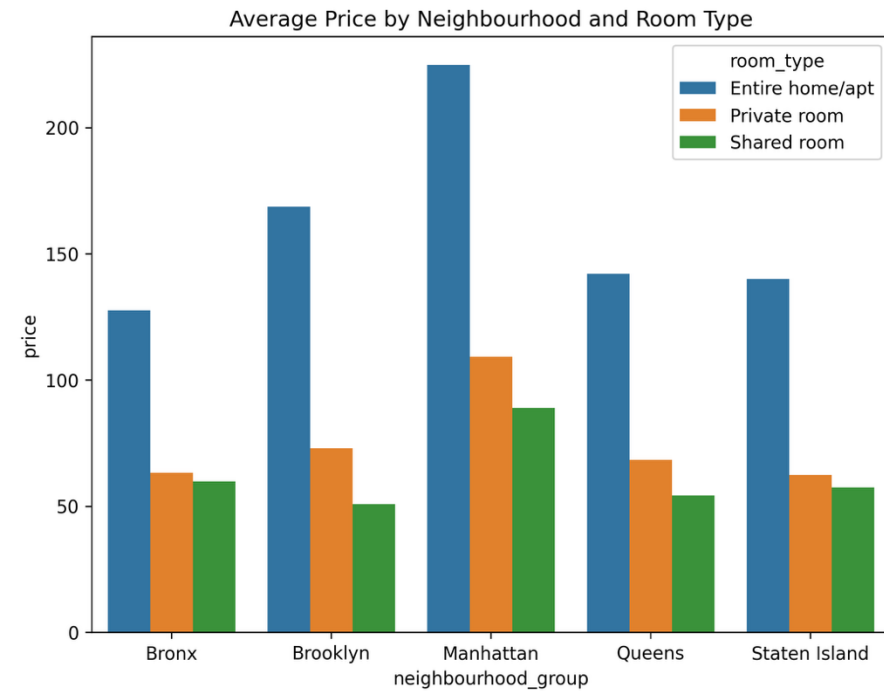
- Handling null values (20.6% in reviews/dates)
- *Removing 2,732 price outliers*
- *Confirming no duplicates*

Ensured reliable data for analysis.

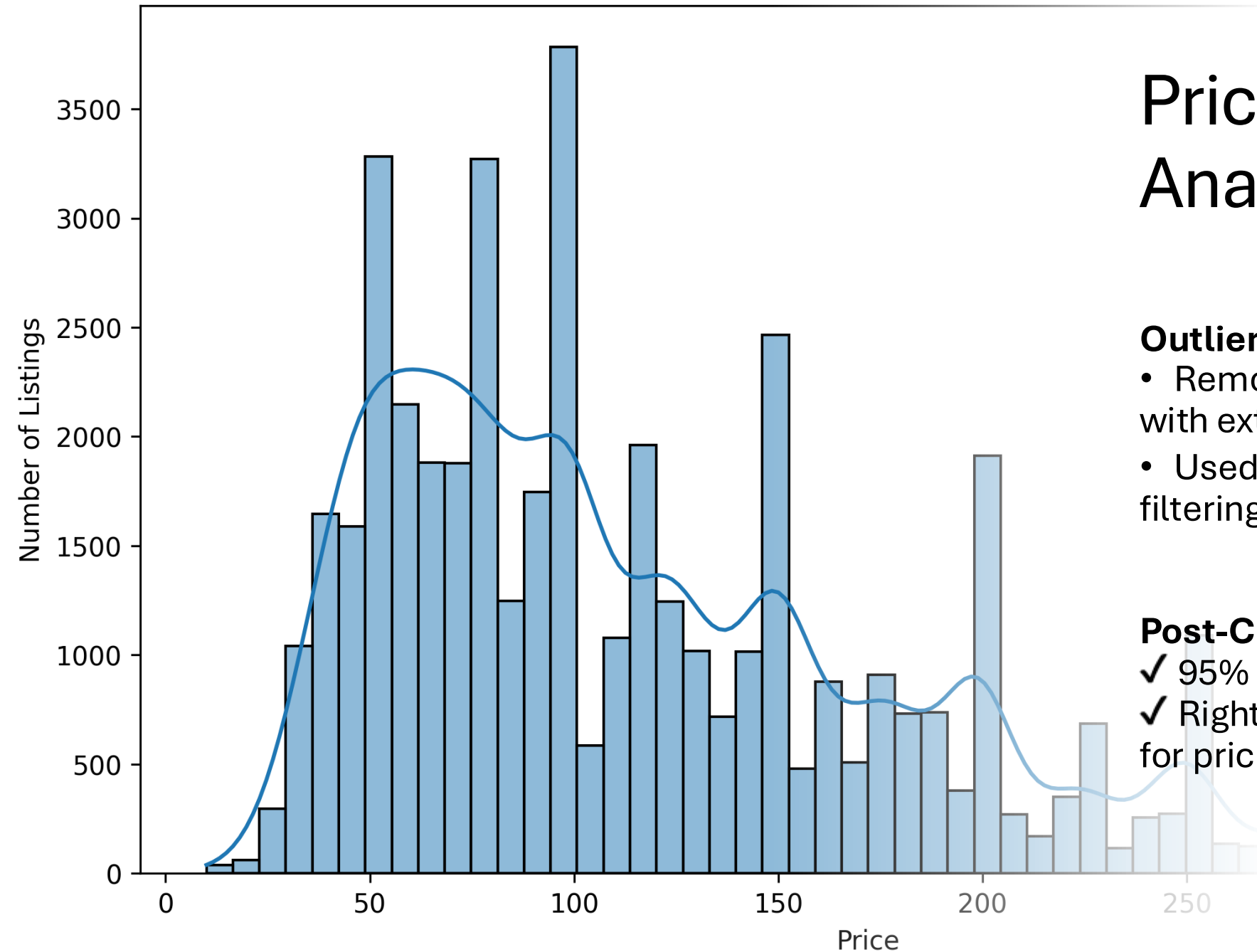
Pricing Trends by Neighborhood & Room Type

Key Findings

- **Most Expensive:**
 - Manhattan Entire Homes (\$196)
 - Brooklyn Entire Homes (\$124)
- **Most Affordable:**
 - Bronx Shared Rooms (\$44)
 - Staten Island Entire Homes (\$89)
- **Insight:**
 - *"Location impacts price 2-3X more than room type"



Price Distribution of Airbnb Listings (No Outliers)



Price Distribution Analysis

Outlier Treatment


- Removed 2,732 listings (5.6%) with extreme prices
- Used IQR method for robust filtering

Post-Cleaning Insights

- ✓ 95% of listings: \$50-\$150/night
- ✓ Right-skewed distribution (typical for pricing data)

Number of Reviews vs Price Relationship

Key Finding

 Pearson Correlation: $r = -0.028$
(*virtually no linear relationship*)

Insights

- Review count does not predict listing price
- Slight tendency: More reviews → 2.8% lower prices (*but negligible*)



Popularity by Neighborhood & Room Type

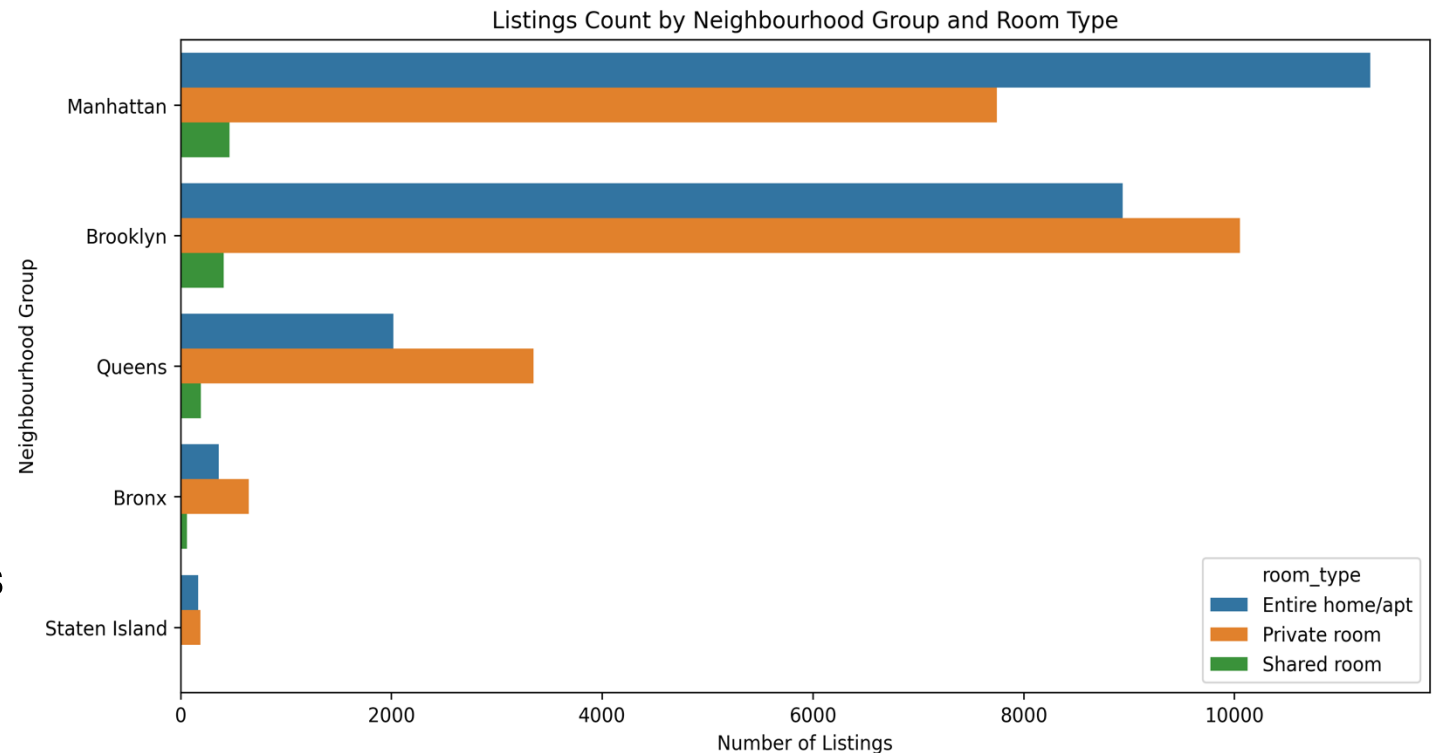
Key Trends

- ✓ Entire homes dominate Manhattan (58% of listings)
- ✓ Private rooms lead in Brooklyn (52% share)
- ✓ Shared rooms remain rare (<3% in all areas)

Market Insights

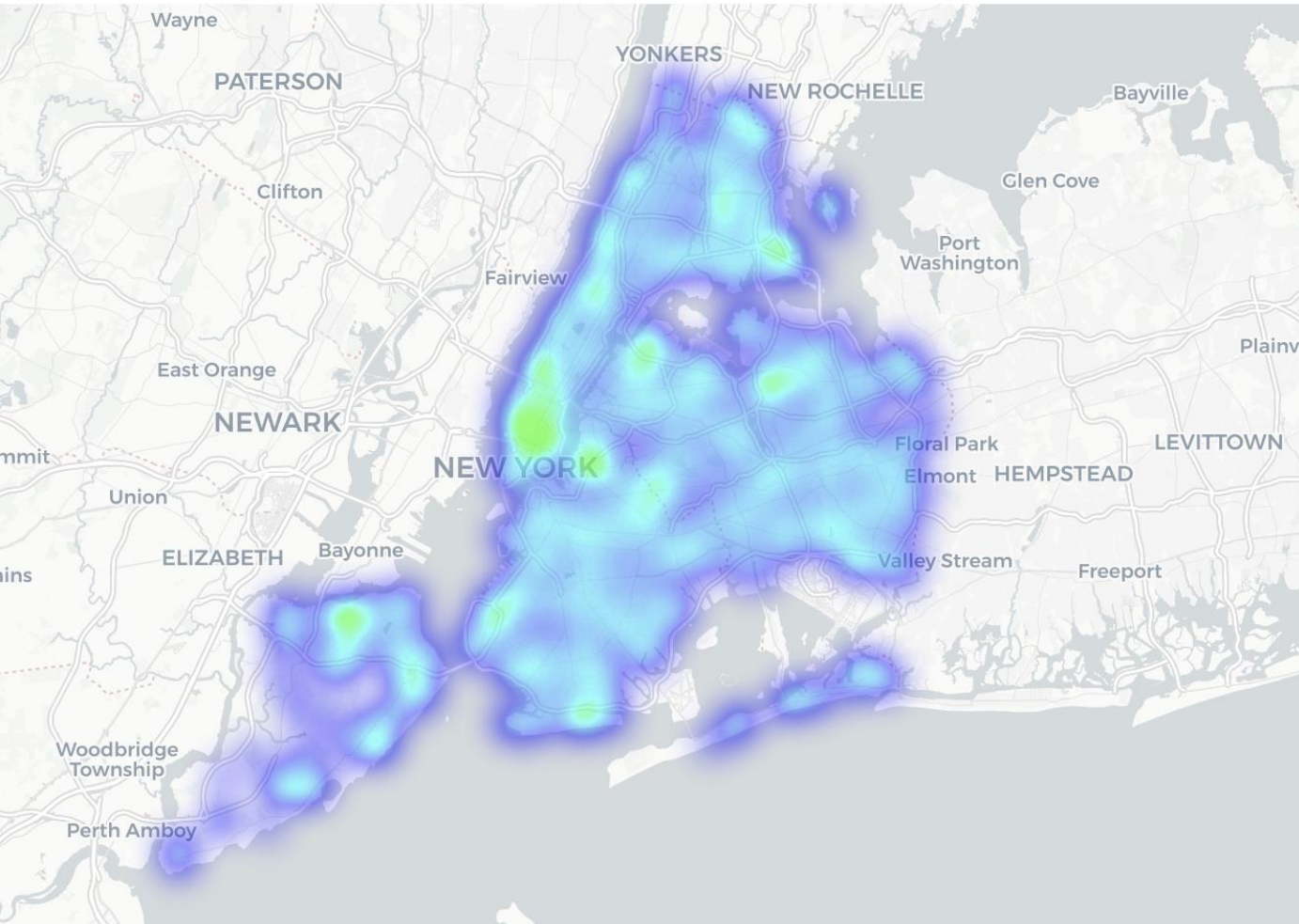
The distribution suggests:

- Tourist preference for central locations (Manhattan) and flexible options (Brooklyn private rooms)
- Potential growth opportunities in Queens and Bronx



NYC Price Heatmap Insights

Airbnb Listings Heatmap in New York City (Intensity by Price)



Premium Zones (2-3X higher prices)

- **Manhattan:** Midtown, Upper East/West
- **Brooklyn:** Williamsburg, DUMBO

Value Areas

- Bronx (except Yankee Stadium)
- Eastern Queens
- Staten Island

Key Stats

- ✓ Manhattan avg: **\$196** vs Bronx **\$87**
- ✓ 72% of luxury listings (>\$200) in Manhattan

Methodology

Tools Used

Python: Pandas (Cleaning), Seaborn/Matplotlib (Viz), Folium (Maps)

- **Platform:** Google Colab
- **Presentation:** PowerPoint

Data Preparation:

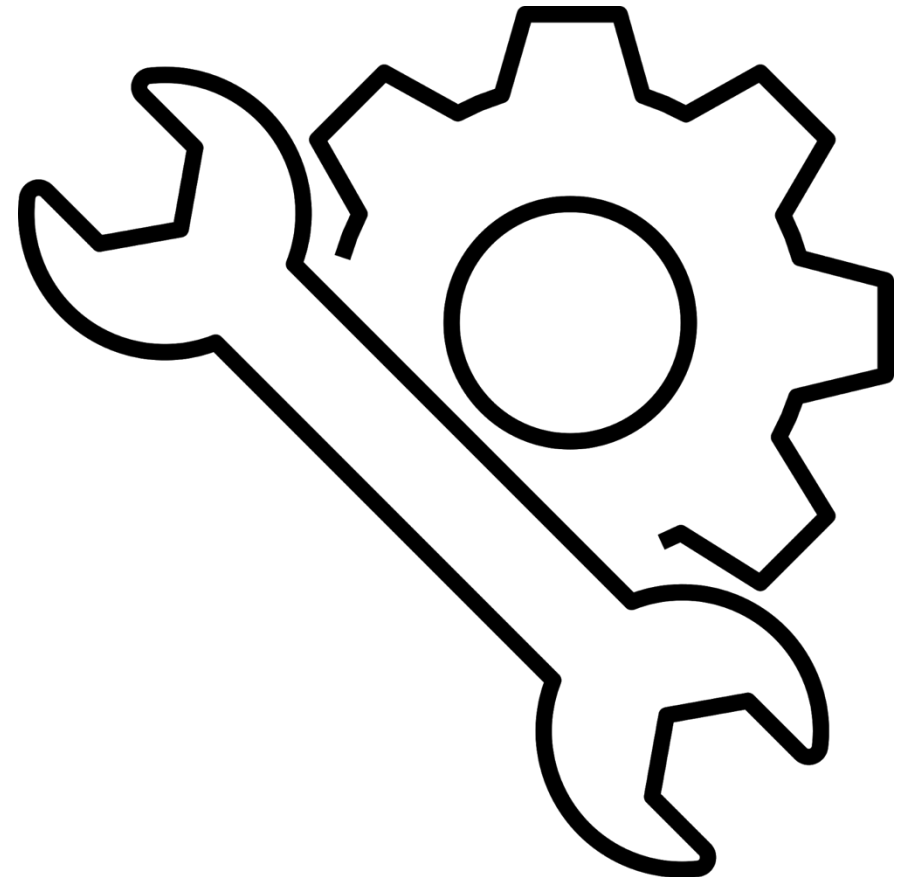
- Cleaned nulls (reviews \rightarrow 0)
- Removed 2,732 outliers (IQR)

Analysis:

- Price trends by neighborhood/room type
- Pearson correlation (reviews vs. price)

Visualization:

- Interactive maps (Folium)
- Charts for key insights



Strategic Recommendations & Next Steps

For Hosts

- Focus on **Manhattan entire homes** (highest ROI)
- Offer **Brooklyn private rooms** (steady demand)

For Travelers

- Stay in **Queens** (best value, 20-min to Manhattan)
- Use heatmap to **avoid peak pricing**

For Airbnb

- Boost **Bronx listings** (underserved market)
- Promote "**hidden gem**" neighborhoods

Next Steps

Seasonal price analysis
Compare with hotel data
Subway proximity study





Key Conclusions

Location = Price Driver

- Manhattan costs **2-3X more** than Bronx
- Premium zones: Midtown, DUMBO

Room Type Matters

- Luxury: Manhattan **entire homes** (\$196 avg)
- Budget: Brooklyn **private rooms** (\$72 avg)

Actionable Value

- ✓ Hosts: Price by **neighborhood benchmarks**
- ✓ Travelers: Use **heatmaps** for best deals