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Airbnb Analytics

Intro and Overview

Airbnb is an **online platform** that connects people looking to **rent** out their homes with travellers seeking **short-term accommodations**.

Overall Methodology: Used a combination of excel and python(random tree, monte carlo) to analyze the listings data set.

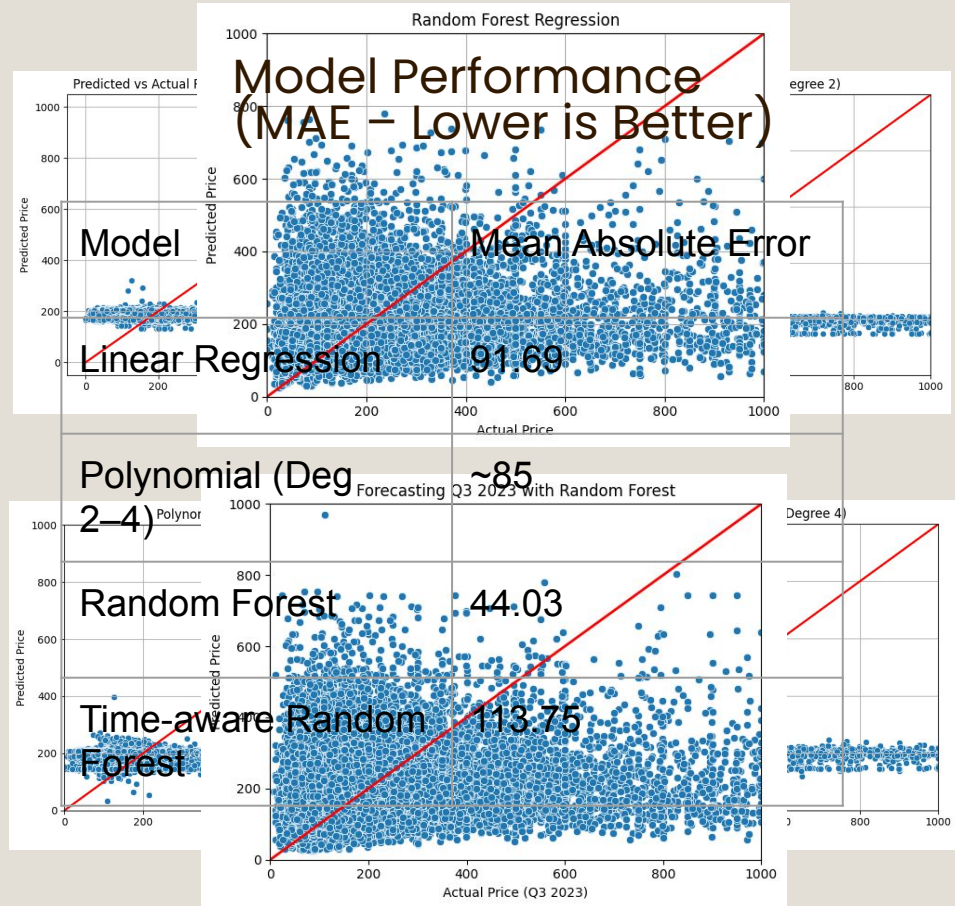


Home Sharing Methodology

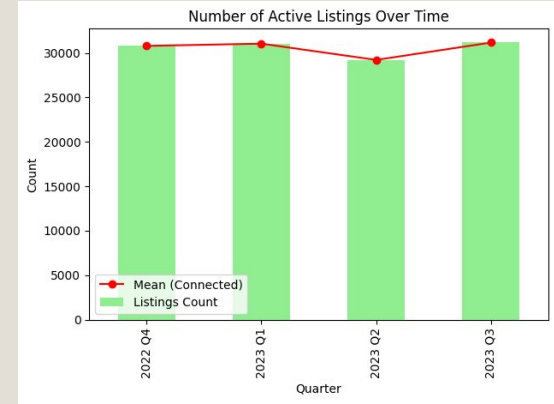
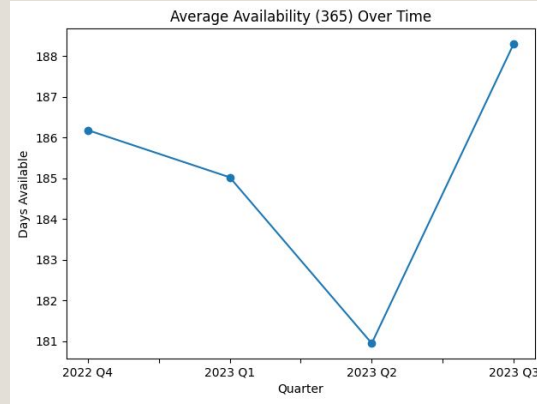
Goal: Predict listing prices using features like reviews per month, host listing count and availability 365.

- Linear Regression: Assumes a straight-line relationship.
- Polynomial Regression (Degrees 2–4): Adds complexity, but still underfits.
- Random Forest: Uses multiple trees to capture non-linear patterns.

Only **Random Forest** shows good price variation capture. Polynomial models cluster poorly near the \$200 mark, missing trends. Time-aware forecast (Q3-specific) performed worse due to limited training data.



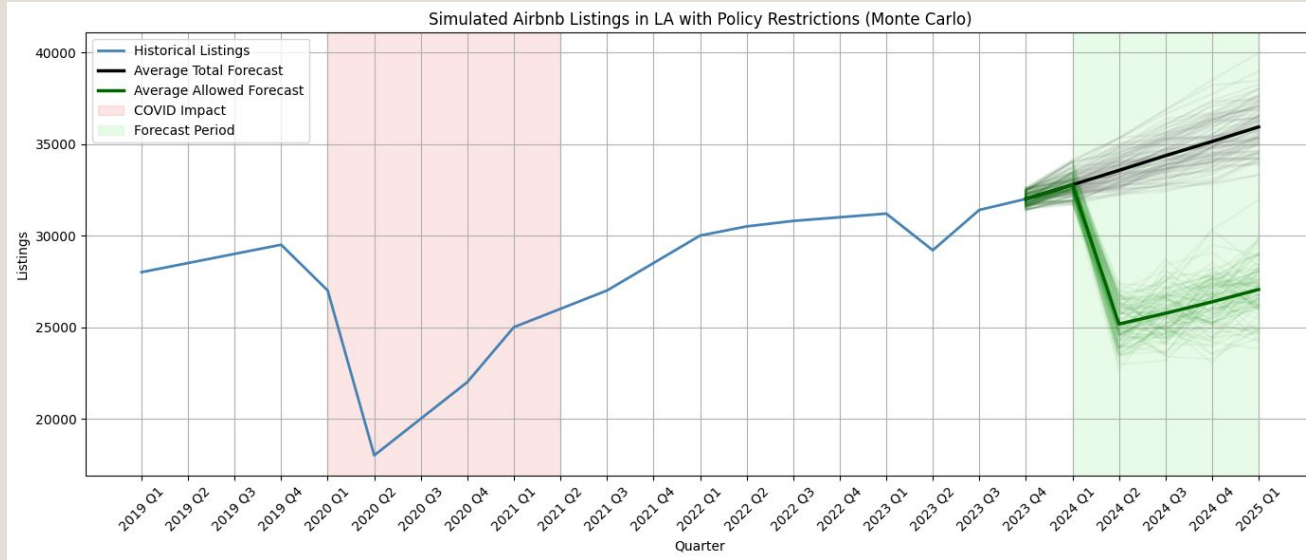
Home Sharing Findings



Market Trends Summary (2022 Q4 – 2023 Q3)

- **Prices rose steadily** through Q2 2023, then slightly dipped → potential market correction
- **Listings dipped in Q2**, but rebounded in Q3 → demand and host activity recovered
- **Availability dropped in Q2, spiked in Q3** → likely seasonal or personal use impact

2028 Olympic Predictions

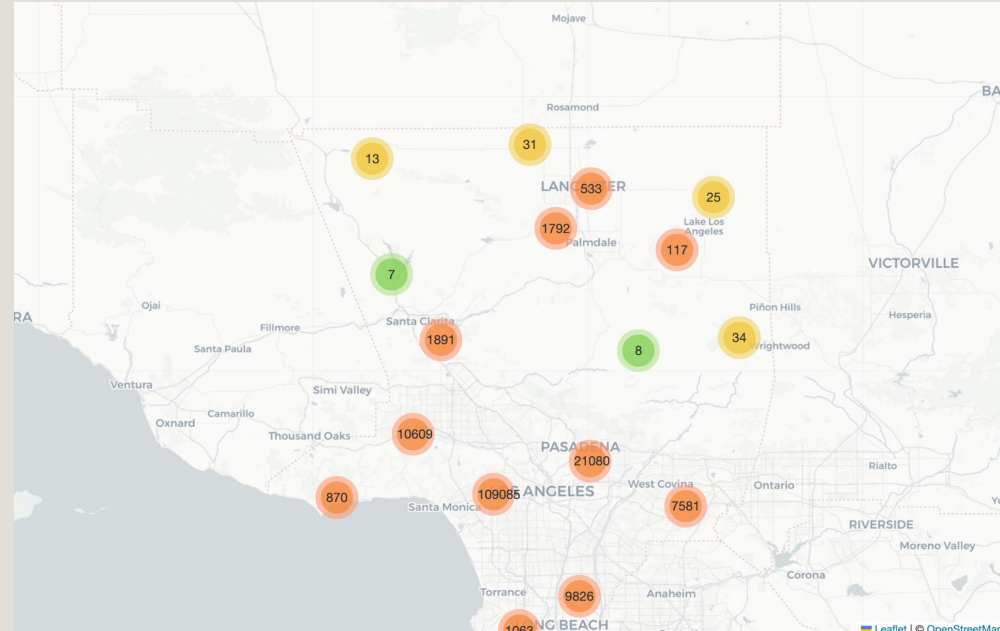


Forecast Summary: Listings & Policy Impact

- **Listings fell during COVID**, then steadily recovered through 2023
- **Projected growth halts** in 2024 due to assumed Olympic policies
- **Sharp drop** in allowed listings by Q3 2024 reflects 20–30% cuts in non-compliant zones
- **Utilizing existing stadiums**, Los Angeles Memorial Coliseum, Rose Bowl, Dodger Stadium

Region Listing Map

- Demo in VS Code
- # of listings per region visualizer



Successful Listings

1 Host Profile

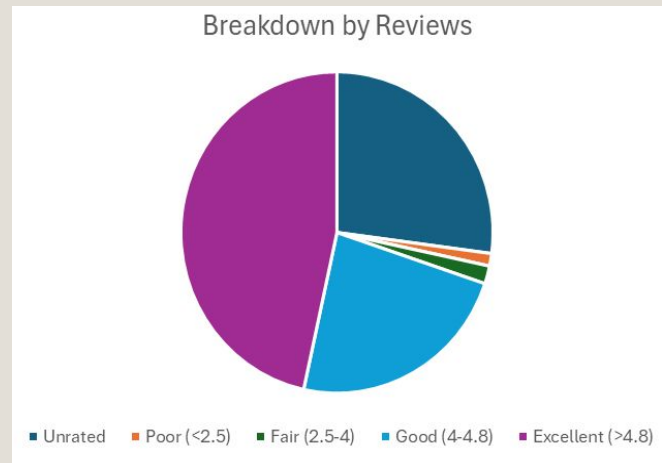
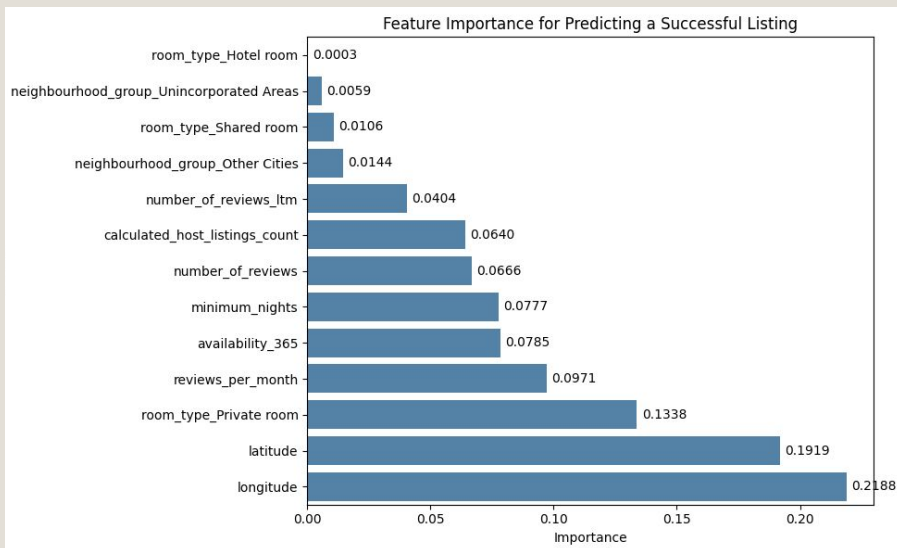
- Superhost / Licensed / Verified Status
- Acceptance Rate
- Number of total listings

2 Prices and Location

- Location (most important)
- Unit prices
- Neighborhood listing

3 Room Specific

- Facilities and amenities ratio
- Property description



Rating	Accuracy	Cleanliness	Checkin	Communication	Location	Value for Money
Poor	1.73	1.90	2.38	2.04	2.63	1.51
Fair	3.59	3.53	4.02	3.86	3.99	3.43
Good	4.64	4.54	4.76	4.74	4.70	4.52
Excellent	4.93	4.89	4.95	4.96	4.89	4.85

Home Sharing: Hosts

- **Highly responsive**
 - Quick replies help reduce booking anxiety, improve communication, and show professionalism
 - Airbnb rewards hosts with "Response Rate" and "Response Time" badge, and quicker replies help boost listing visibility
- **Verified, licensed and superhosts**
 - Superhost status awarded based on performance track record (high ratings, low cancellation rates, consistent hosting, and responsiveness)
 - Guests who feel safer and more confident in the booking
- **Fewer listings**
 - Less "commercial" and more personal, with good communication and hands-on maintenance
 - Smaller operators are usually more emotionally and financially invested in their properties and reviews



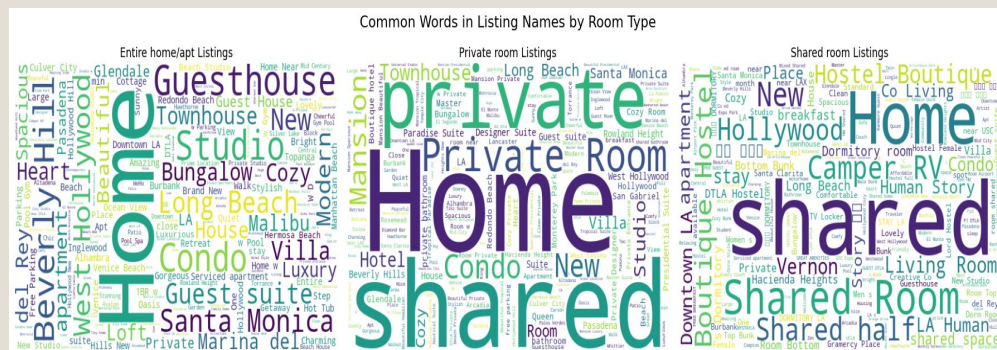
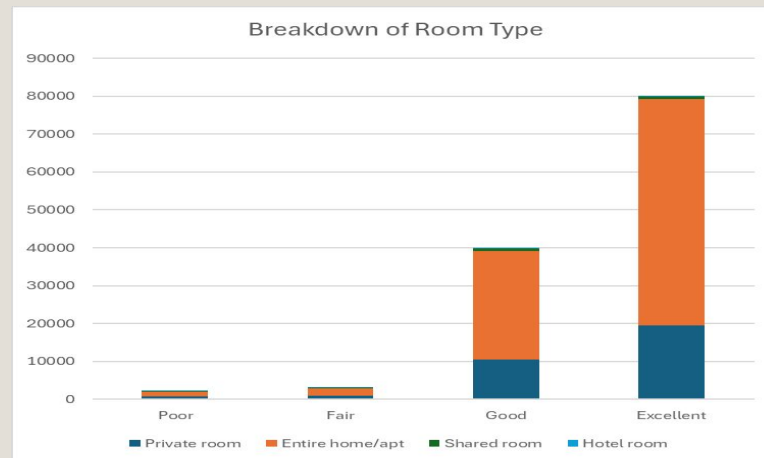
Preferred Listing Type

Breakdown of Room Type

- Entire homes dominate **“Excellent”** reviews, indicating strong preference for privacy and autonomy
- Private rooms** perform well, offering a balance between affordability and comfort
- Shared and hotel-style listings are **underrepresented** in high ratings, suggesting lower guest satisfaction
- Higher ratings correlate with full-property access, linking **satisfaction with exclusivity and control**

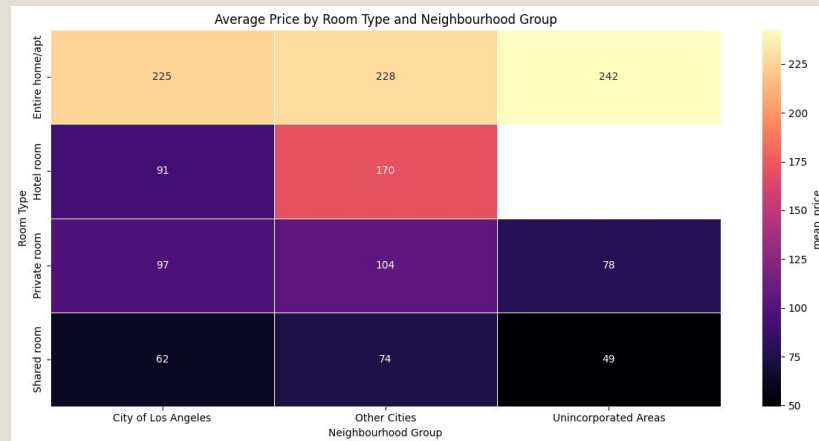
Listing Titles by Room Type

- Entire homes often feature terms like **“Guesthouse,” “Villa,” “Modern”**, appealing to premium and extended-stay guests
- Private rooms emphasize *privacy and amenities* (e.g., **“Private Suite,” “Boutique”**), targeting value-conscious travelers
- Shared rooms highlight *affordability and community* (e.g., **“Hostel,” “Shared Space”**), often at the cost of comfort
- Title language is tailored to audience, reinforcing booking intent through expectation-aligned messaging

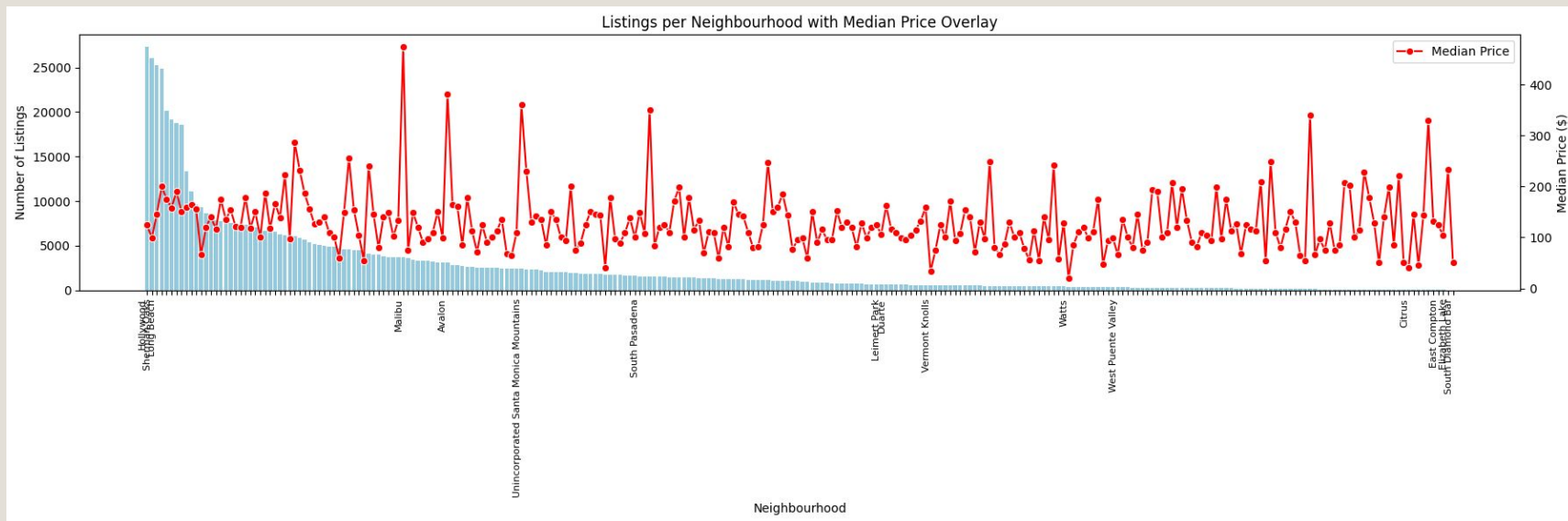


Home Sharing: Prices

- **Entire homes** consistently have the **highest prices**, while **shared rooms** are the **most affordable**, regardless of neighborhood
- High-listing neighborhoods have **moderate prices**, while low-listing areas show more **price variation**, reflecting a mix of luxury and budget zones across LA



Home Sharing: Prices



- **High-listing neighborhoods** tend to have moderate prices
- **Low-listing areas** show wide price variation, mixing luxury and budget listings
- **Listing volume** isn't driven by price alone — other factors like demand and uniqueness matter

Facilities and Amenities Ratio

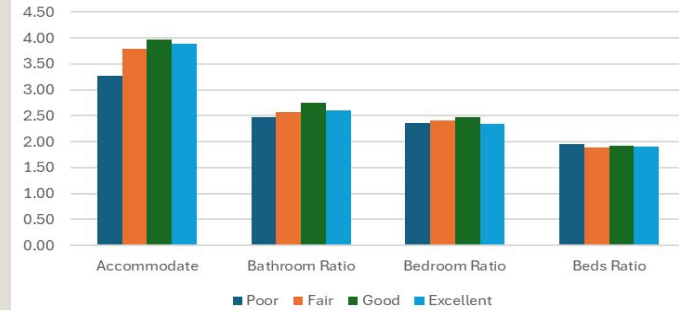
Property Descriptions Analysis:

- Entire Place listings become **increasingly frequent** → guests prefer privacy and independence
- **Unusual or unique stays** (treehouses, yurts, domes, houseboats) often in the "Excellent" and "Good" → Guests appreciate novelty and new experiences
- **Shared rooms**, especially in standard environments (hostels, homes), tend to appear in lower-rated categories, though some do appear in "Good" or even "Excellent" if **likely well-managed**

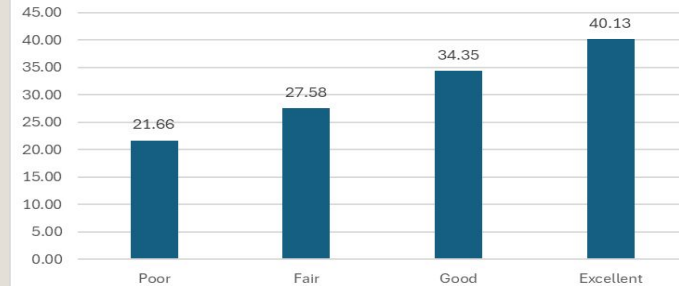
Facilities and Amenities:

- **Method:** Calculated ratio by dividing accommodate number by bathroom/bedroom/ beds, tracked frequency of words in amenities description using ChatGPT and hash tables to generate a word cloud
- **Higher amenities count** → professional host, smoother stays, perceived value and class
- **Basic safety requirements:** Carbon monoxide, smoke alarm and fire extinguisher → customers appreciate and pay attention to
- **Comfort Necessities:** Hot water, air conditioning → non negotiables for guests
- **Everyday convenience:** Coffee maker, cooking basics, parking features → little extras which make guests feel at home and taken care of

Facilities Ratio



Amentities Count



Conclusion

For Travelers



Seasonal Fluctuations (Quiet in Q2)



Price Stabilization (Consistent increase overtime)



Location Inequality (Saturated in prime City locations like Hollywood)



Random Forest (Best pricing tool)

For Hosts



Location (top driver)



Complete Host Profile (Verified, Superhost, Licensed)



Moderate Prices (\$75-400)



Room Specific (Amenities and Novelty)

Thank you!

Future Research / Feedback

Successful Listing

- For future research, we could have used a different metric for success beyond the user ratings
- E.g. Monthly Occupancy Rate = $(\text{monthly reviews} * 2) / (\text{availability_365}/12)$
 - Assumes 50% of guests leaves a rating and helps normalize listings with selective availability

Amenities & Word Cloud

- Given the hash tables and frequencies for amenities, we could have further divided amenities into success categories
- Provide insight on what amenities are commonly found in popular and high rated listings which future hosts can adopt