Analysis of Airbnb Rental Cost Using Various Factors

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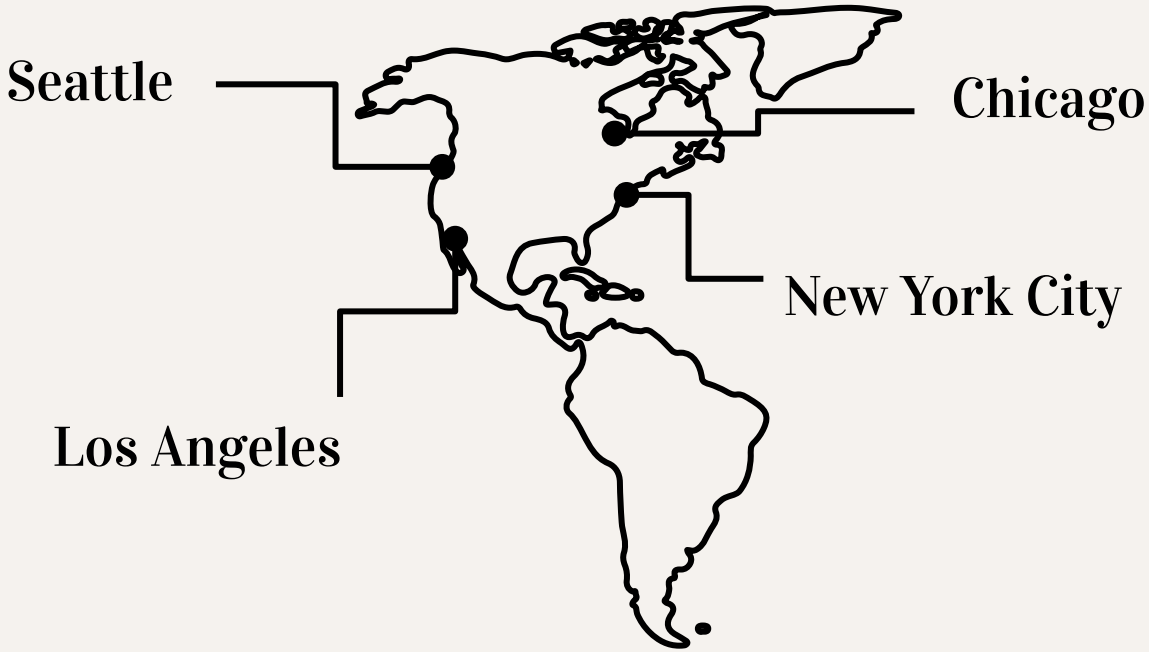
Data Collection Plan

www.airbnb.com

December 30, 2021 - January 1, 2022 = 2 Nights



Important Variables

Price/Night

quantitative response variable, Measured in dollars

of Guests

How many guests can stay at the rental?

of Bedrooms

How many bedrooms does the rental have?

of Bathrooms

How many beds does the rental have?

Indoor Fireplace

Is there an indoor fireplace at the rental?

Service Fee

What is the service fee? Measured in dollars

Cleaning Fee

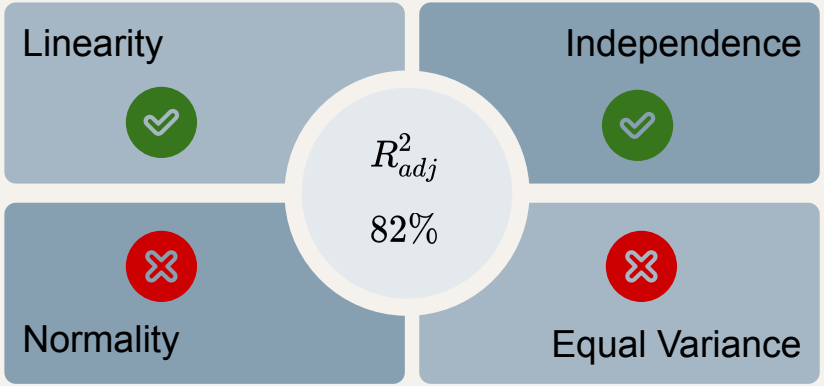
What is the cleaning fee? Measured in dollars

Parking

Is there free parking available?

1st Iteration

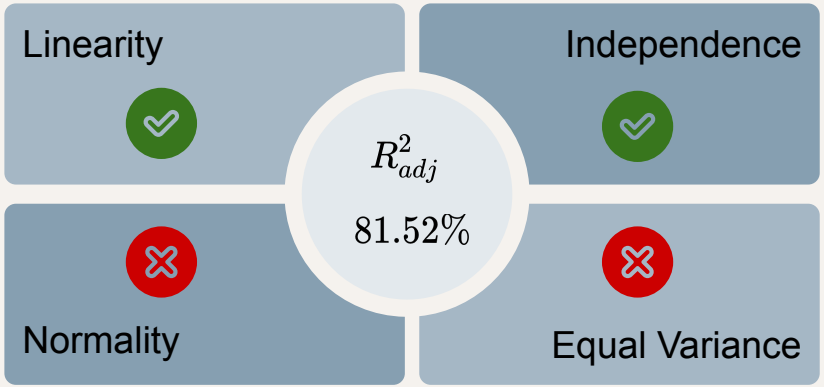
- Quantitative Variables:
  - Service fee
  - cleaning fee
  - # of guests
  - # of bedrooms
  - # of bathrooms
- Categorical Variables:
  - Free parking
  - Backyard
  - Indoor fireplace



- Model was significant
- Many variables were insignificant
  - Individual t-test

2nd Iteration

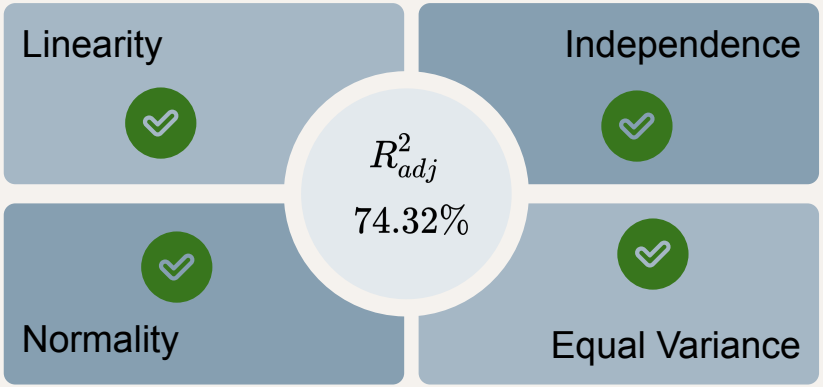
- Quantitative Variables:
  - Service fee
  - cleaning fee
  - # of guests
  - ~~# of bedrooms~~
  - ~~# of bathrooms~~
- Categorical Variables:
  - Free parking
  - ~~Backyard~~
  - ~~Indoor fireplace~~



- Model was significant
- All variables were significant

Box-Cox Transformation

- To fix equal error variance and normality, ran Box-Cox transformation.
- Approx. lambda was 0.5, square root transformation of price/night
- Transformation fixed error variance and normality
- Remained significant and linear



Final Model

$$(\text{Price }/\hat{\text{N}}\text{ight }\,)^{1/2} = 192.06 - 0.329\text{CleaningFee} + 1.89\text{ServiceFee} + 12.9\text{NumofGuests} + 38.4\text{FreeParking}[\text{No}]$$

Quantitative

1. Service Fee
2. Cleaning Fee
3. # of Guests

Qualitative

Free Parking on Premises [Baseline Yes]

$(\text{Price/Night})^{0.5}$

Of an AirBnB in our selected cities.

Trials & Tribulations

Intuitive Variables Found To Be Consistently Insignificant :

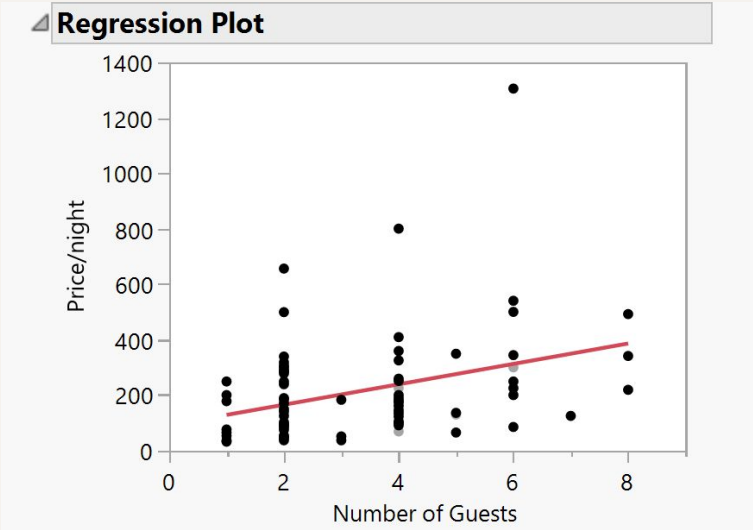
- # of Beds Available to Renters
- # of Bedrooms on Rental Property
- # of Bathrooms on Rental Property
- Availability of a kitchen
- Availability of a backyard

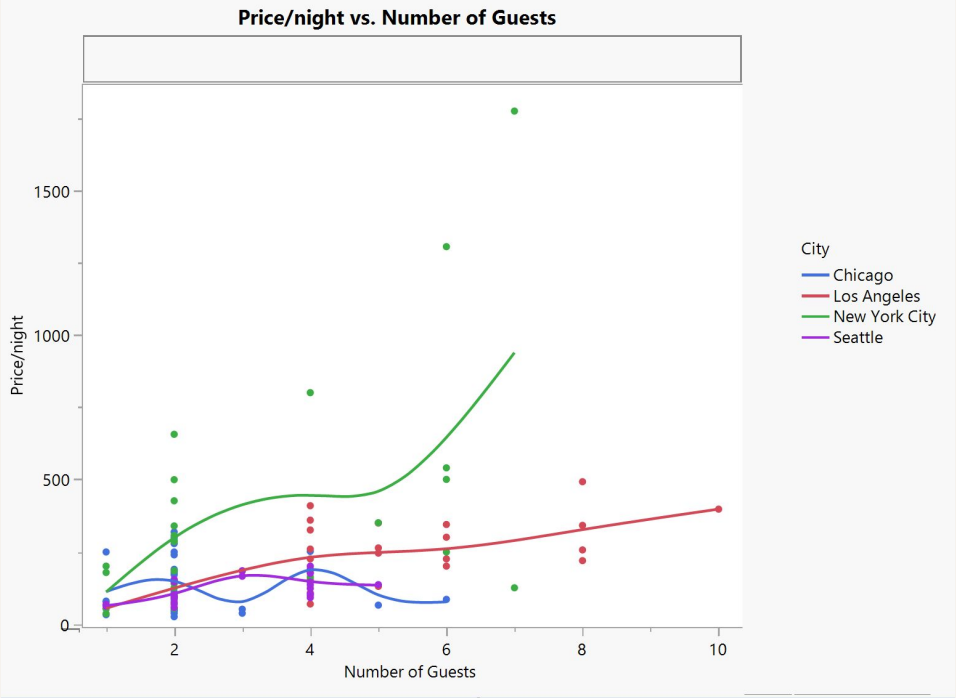
Interesting way free parking predicts price/night:

- Intuitively, free parking increases price
- Actually decreases price
- Dense areas are more desirable?

Categorical Analysis by City

- Benefits
- Residual Analysis





Conclusion

- The Square-Root Model is appropriate and significant
- Price/night can be predicted using **service fee**, **cleaning fee**, **# of guests**, and **free parking** in four major U.S. cities from Dec 30 - Jan 1

Possible Future Considerations

- Limitations of the current dataset
- Possible tools to better procure data
- New statistical tools and techniques that become available

Thank You!

Any Question?