

A modern living room interior featuring a white fireplace, a grey sofa, a coffee table, and a floor lamp. The room is decorated with plants, a patterned rug, and a large abstract painting. A red banner with white text is overlaid across the center of the image.

# London Airbnb Pricing Model

By Inesa & Grace



# Goals

- **Build** a model to predict price of London Airbnb properties
- **Recommend** strategies to Airbnb hosts

What are the main features that affect price, overall rating and Superhost status?



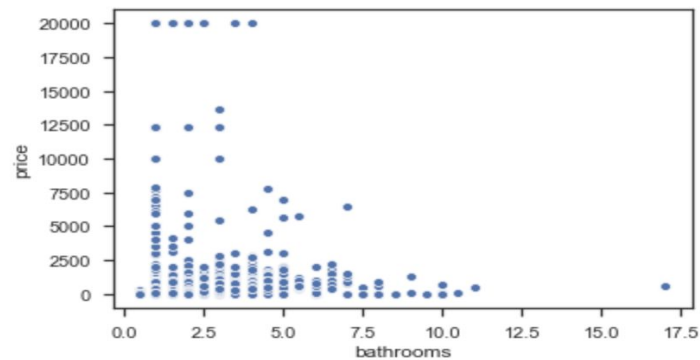
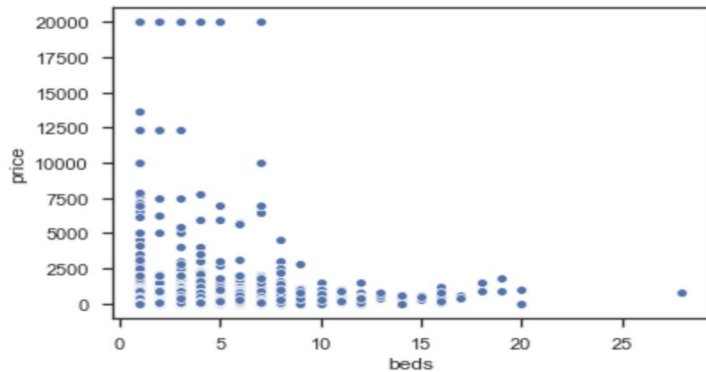
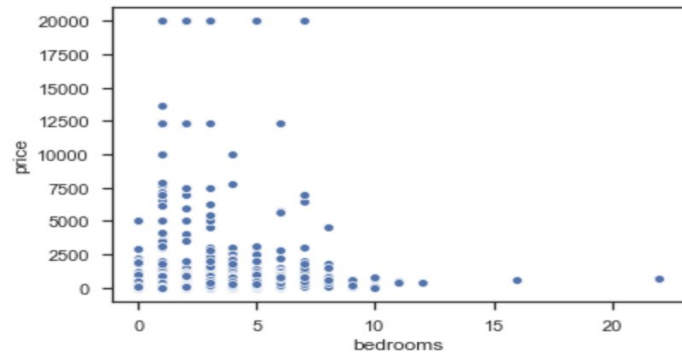
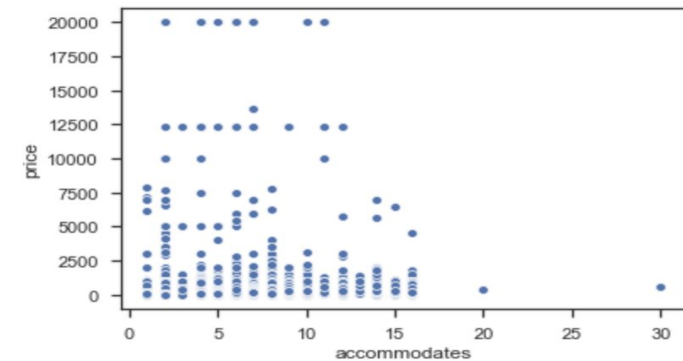
# Data

- Source: <http://insideairbnb.com>
- London Airbnb listings as of September 2019
- 85,273 listings: entire homes/apartments, private rooms, hotel rooms, shared rooms

**Inside Airbnb**  
Adding data to the debate

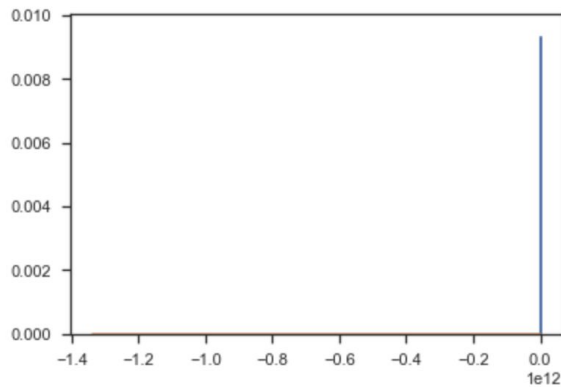


# Data



# Initial Models

- Linear Regression:
  - 121 features
  - Negative  $R^2$
- Polynomial Regression:
  - Optimal degree = 3
  - $R^2 = 31\%$



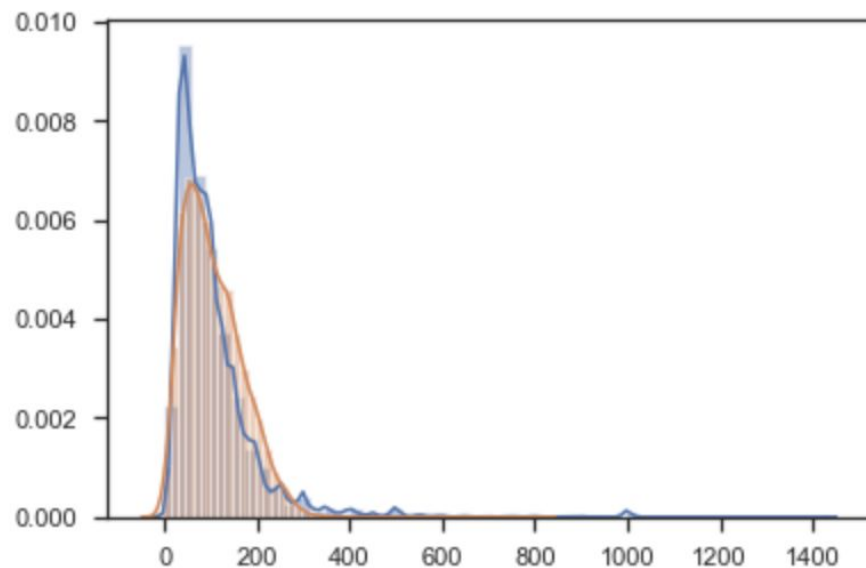
Testing dataset: price vs predicted price

{'training\_r^2': 0.40, 'mse\_train': 5843, 'testing\_r^2': -2.83e+16, 'mse\_test': 2.67e+20, baseline: -3.18e+19}

{'degree': 3, 'training\_r^2': 0.31, 'mse\_train': 6464, 'testing\_r^2': 0.31, 'mse\_test': 6829}

# Ridge Regression

- 121 features
- $R^2 = 40\%$  at  $\alpha = 0.20$

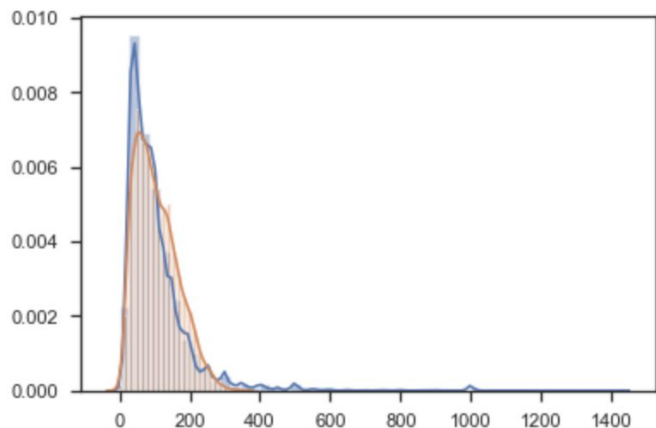


Testing dataset: price vs predicted price

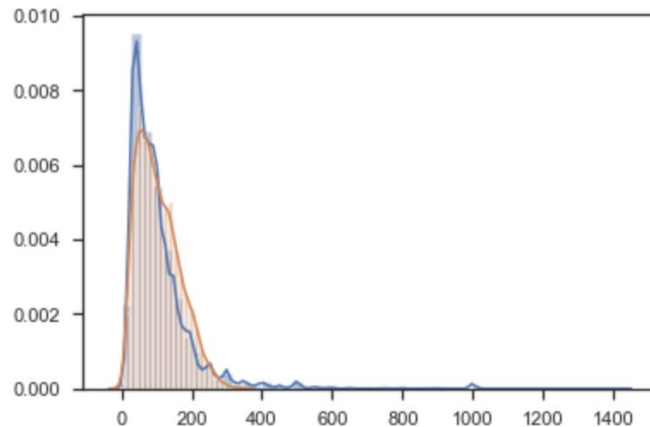
{'alpha': 0.20, 'training\_r^2': 0.40, 'mse\_train': 5843, 'testing\_r^2': 0.40, 'mse\_test': 5637, 'baseline': 0.39}

# LASSO Regression

- $\alpha = \sim 0$ : 121 features,  $R^2 = 40\%$
- $\alpha = 0.20$ : 50 features,  $R^2 = 38\%$



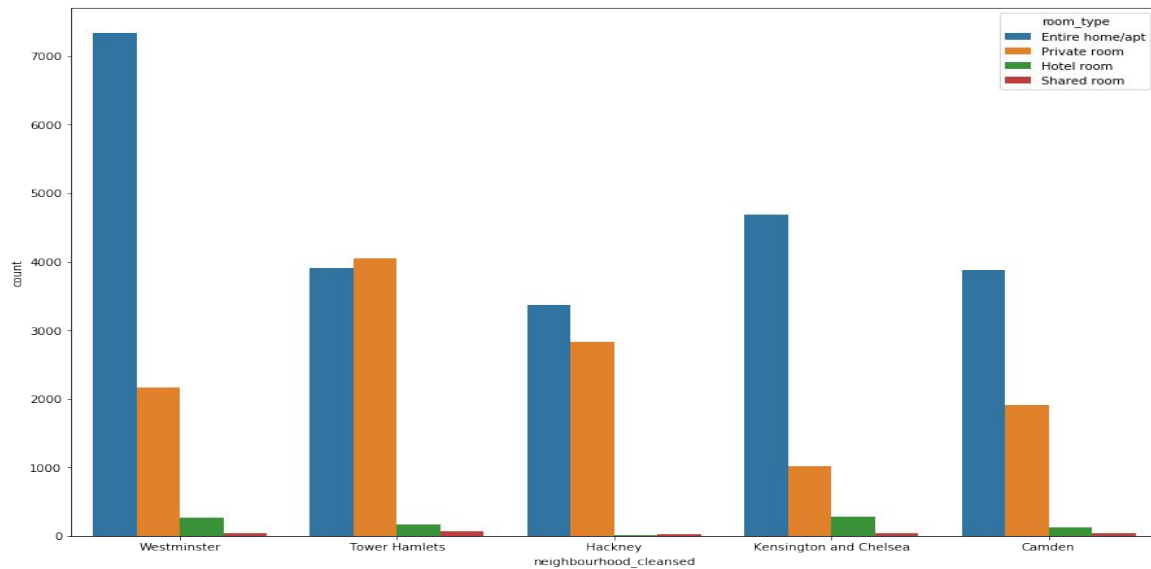
Testing dataset: price vs predicted price  
 $\alpha = \sim 0$



Testing dataset: price vs predicted price  
 $\alpha = 0.20$

{'alpha': 0.0, 'training\_r^2': 0.40, 'mse\_train': 5843, 'testing\_r^2': 0.40, 'mse\_test': 5634, 'baseline': 0.39}  
{'alpha': 0.20, 'training\_r^2': 0.38, 'mse\_train': 6000, 'testing\_r^2': 0.38, 'mse\_test': 5867, 'baseline': 0.38}

# Property Type



Entire home:  $R^2 = 0.40$

Private room:  $R^2 = 0.18$




# Recommendations

- **Price:** increase capacity and number of beds and amenities offered
- **Rating:**
  - encourage guests to write *good* reviews
  - maintain cleanliness and improve accuracy, responsiveness, check-in process
- **Superhost status:** improve overall rating and increase number of amenities offered



# Next Steps

- Employ other feature selection and scaling methods
- Account for interactions in the regression models
- Convert text (reviews, description) into predictors
- Explore other regression methods e.g. Elastic Net, K-Neighbors

A modern living room interior featuring a grey sectional sofa and a matching armchair. In the center is a dark wood coffee table with a book and glasses on it. Behind the sofa is a white fireplace mantel with a large abstract painting above it. To the right, a tall floor lamp with three glass globe shades stands next to a large potted plant. The room is decorated with various plants, a patterned rug, and a side table with a lamp. The overall atmosphere is warm and contemporary.

**Thank you!**  
**Questions?**