Predicting Apartment Rent Prices in Manhattan

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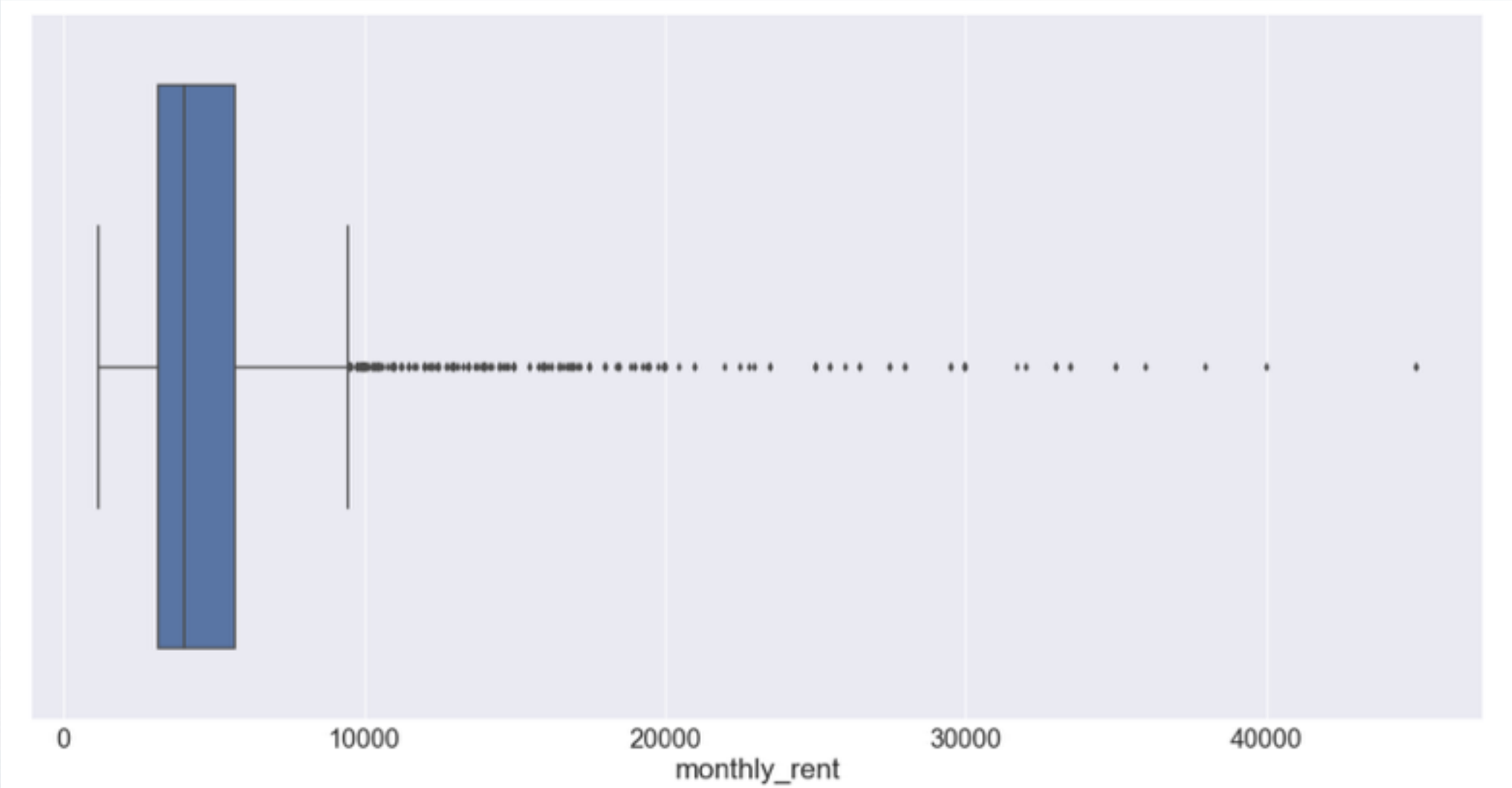
OBJECTIVE

- Use a linear regression model to predict the monthly rent of an apartment in Manhattan

- Web scraping data source: renthop.com

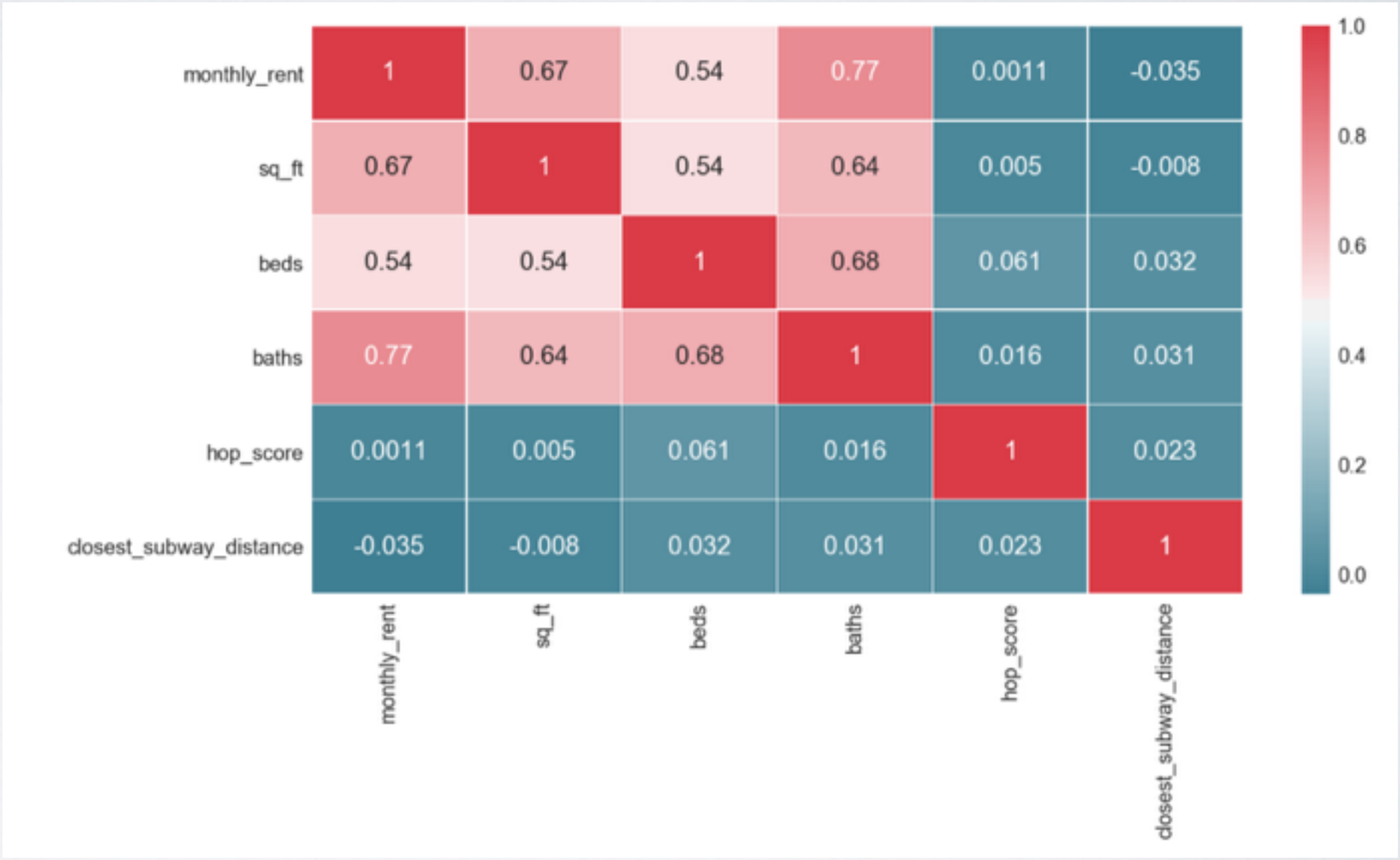
MONTHLY RENT

- There's a wide range of rent prices in Manhattan, with a long tail extending past $40,000.
- The vast majority of apartments, however, is in the $3,000-5,000 range.



NUMERICAL FEATURES

- Monthly rent is positively correlated with square feet, beds, and baths.
- Rent is negatively correlated with distance to the closest subway station



CATEGORICAL FEATURES

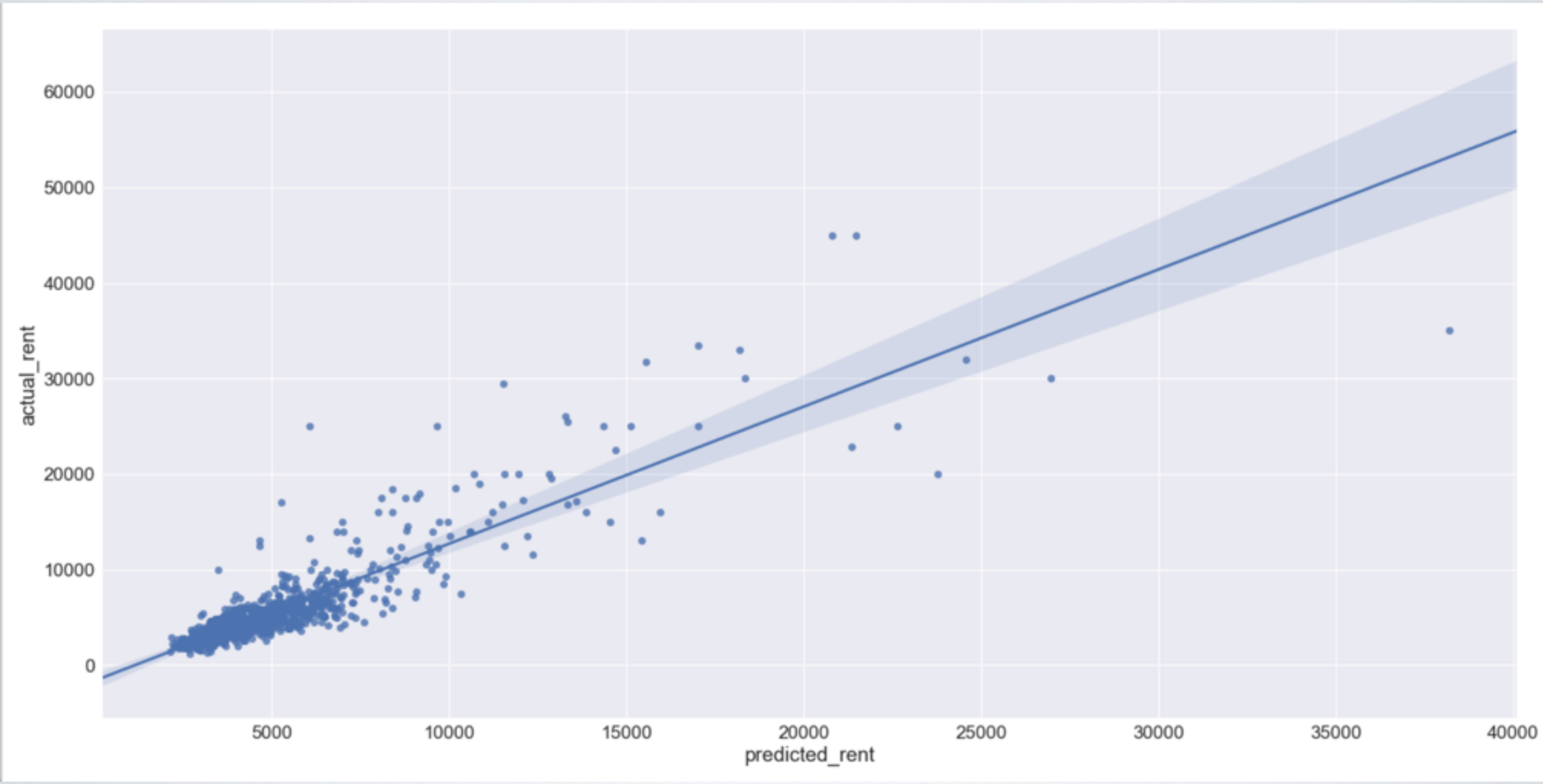
- Location of apartment
  - 57 neighborhoods bucketed into 4 areas
- Apartment amenities
  - Started with 2356 unique features
  - Chose the top 50 by frequency

THE MODEL

- Ridge regression, alpha = 0.1
- Average R-squared from a 10-fold cross validation for the train set is **0.744** and for the test set is **0.712**

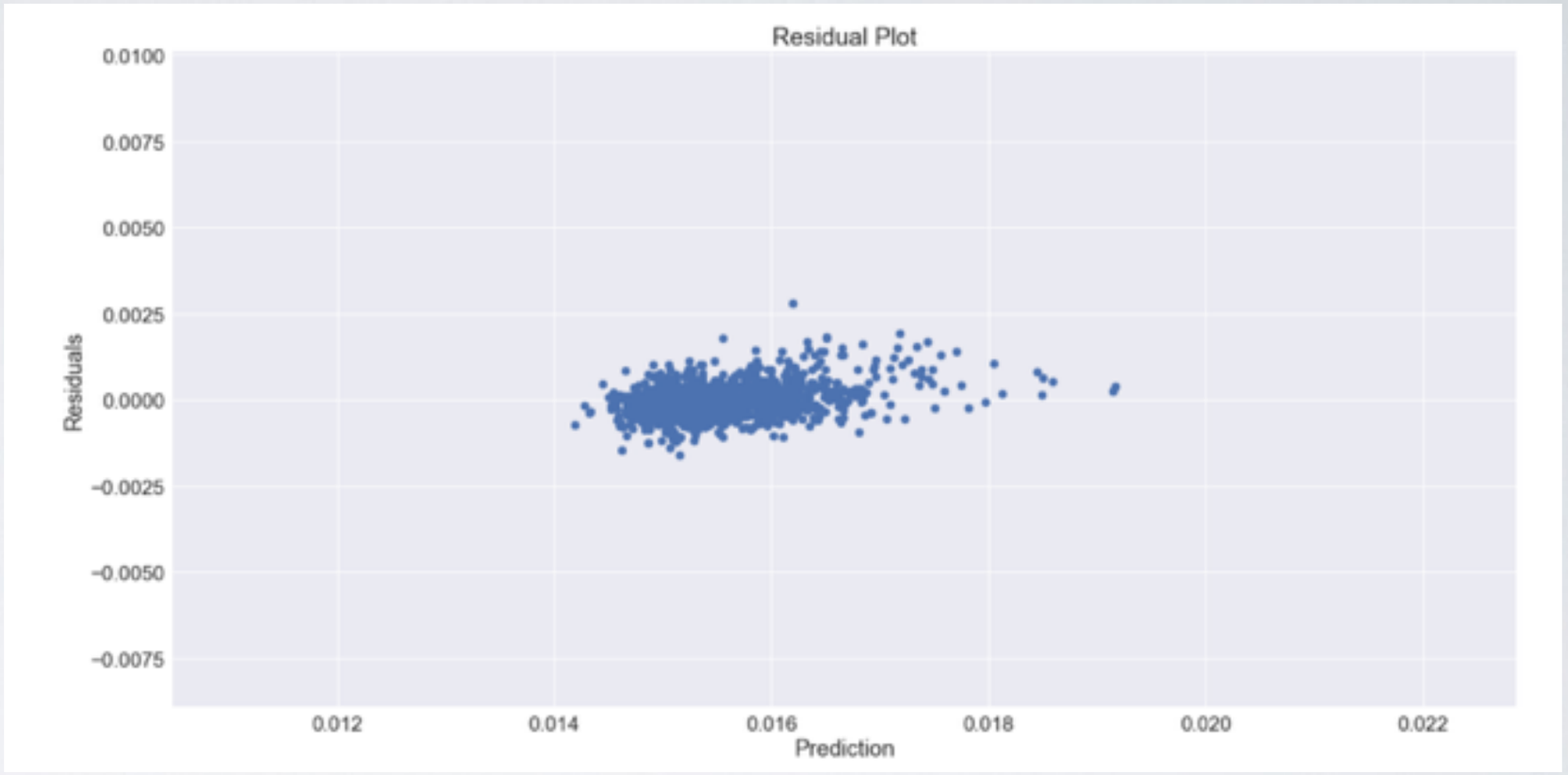
REGRESSION FIT

- The model is able to predict apartment prices less than $10,000.

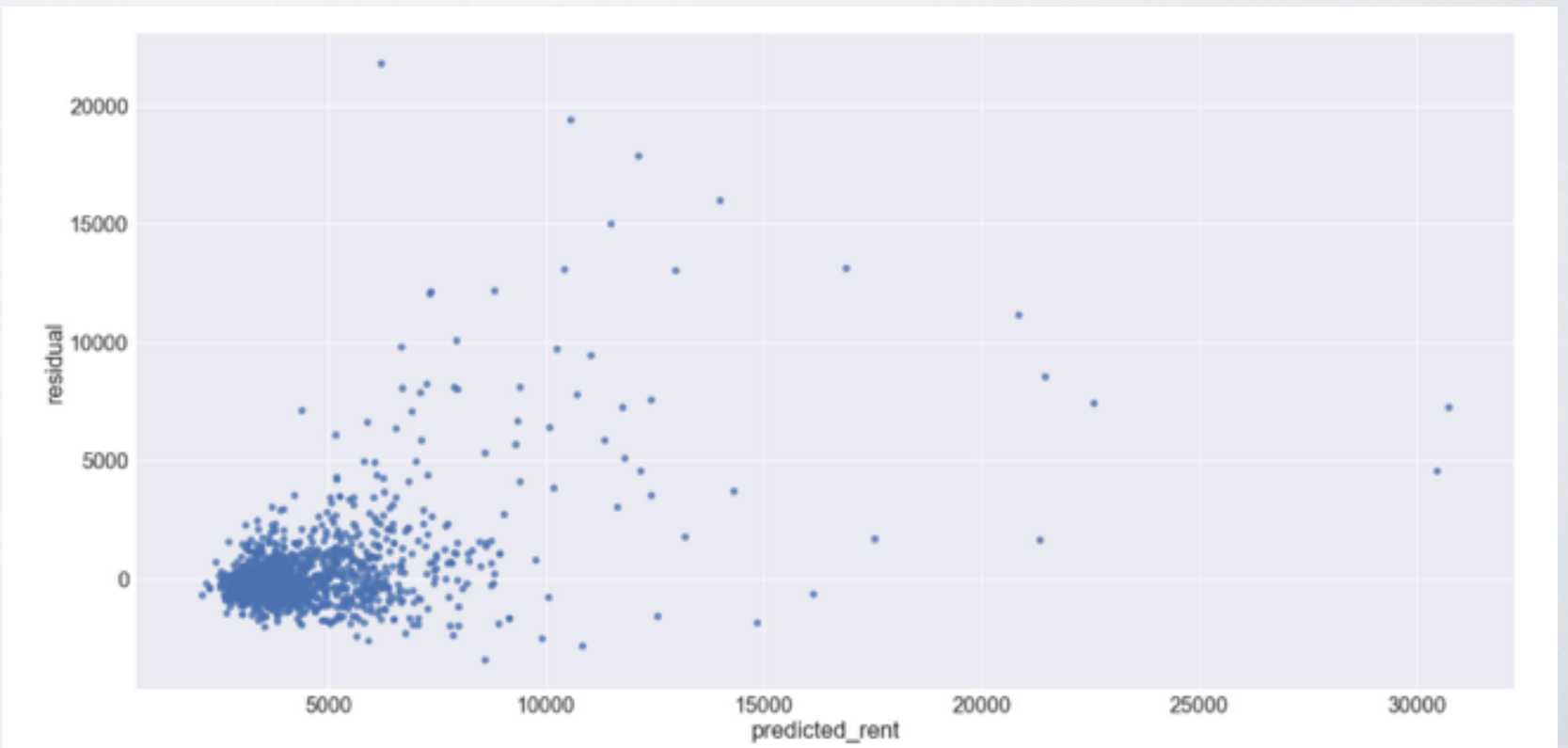


RESIDUAL PLOTS

- The residual plot for log of monthly rent



- The residual plot converting back to monthly rent



FINDINGS

- Able to get a good regression (R_squared of 0.740) to predict Manhattan apartment rent

- The top features that **positively** contribute to monthly rent are:
  - Number of baths
  - Number of beds
  - Square feet
  - Doorman
  - Laundry in unit.

- The features that **negatively** contribute to monthly rent are:
  - Midtown
  - Uptown
  - Distance to closest subway station.

QUESTIONS?