AIRBNB - CHICAGO

Group 31

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DATASET SUMMARY

- Data on Chicago properties evaluated across eight Superhost periods from 2016-2018.
- Includes details on Host and Property, Superhost Status, Performance Metrics, Historical Data, Revenue and Booking Data, Locational and Competitive Metrics
- Total Records: 120,217
- Number of Columns: 111 (out of which 95 are relevant)
- Data Types:
  - Numerical: 79
  - Categorical: 5
  - Binary: 11

Metric	Count	Mean	Std Dev	Min	25%	Median (50%)	75%	Max
Average Rating (Past Year)	100,372	4.746	0.302	1	4.65	4.819	4.95	5
Nightly Rate ($)	120,217	159.77	154.8	8.67	70	115	199	1,999.00
Occupancy Rate (%)	82,109	19.14	17.95	0.41	6.7	14.74	25	100
Number of Reviews (Past Year)	101,419	86.2	198.49	0	9	28	73	2,650.00
Number of Cancellations (Past Year)	101,419	0.518	1.658	0	0	0	0	64

"HOW CAN HOSTS AND AIRBNB EARN MORE?"

DATA PREPROCESSING

MISSING VALUES

- Drop the missing rows if percentage of missing data of the column was above 20%
- Impute the remaining missing values using median (numerical) and mode (categorical)

OUTLIER REMOVAL

- Z score method: Dropped rows where Z score is greater than 3

ONE HOT ENCODING

- Categorical columns were converted into binary with many dummy variables

PREDICTING SUPERHOST STATUS

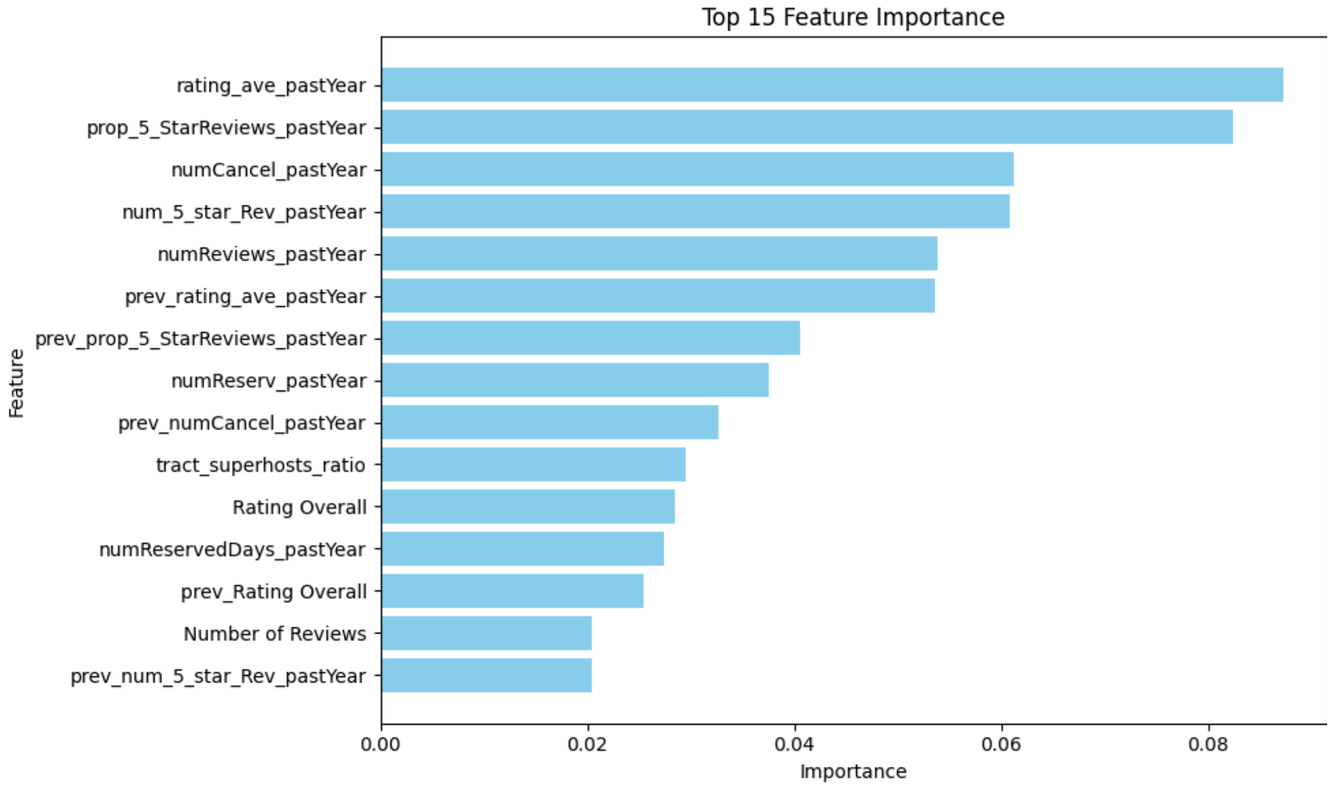
- Random Forest Classifier with 100 estimators
- host_is_superhost_in_period as target variable
- Training data: 70%, Testing data: 30%
- Created a new variable called Listing_Age_Days which calculates difference between Scrapted_Date and Created_Date.
- Predictors used were all predictors excluding variables related to superhost status, previous year superhost status, change in superhost status, loss or gain of superhost status.

MODEL RESULTS

95.14% Prediction Accuracy

Classification Report (Superhost Status):

	precision	recall	f1-score
0.0	0.95	0.97	0.96
1.0	0.95	0.93	0.94
accuracy			0.95



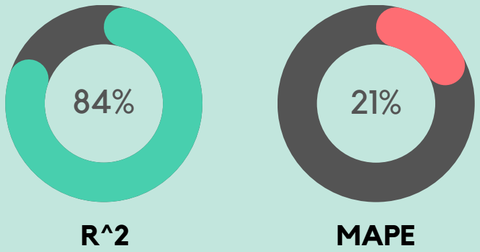
PRICE PREDICTION AND ELASTICITY

How accurately can we predict nightly Airbnb rates for Chicago?

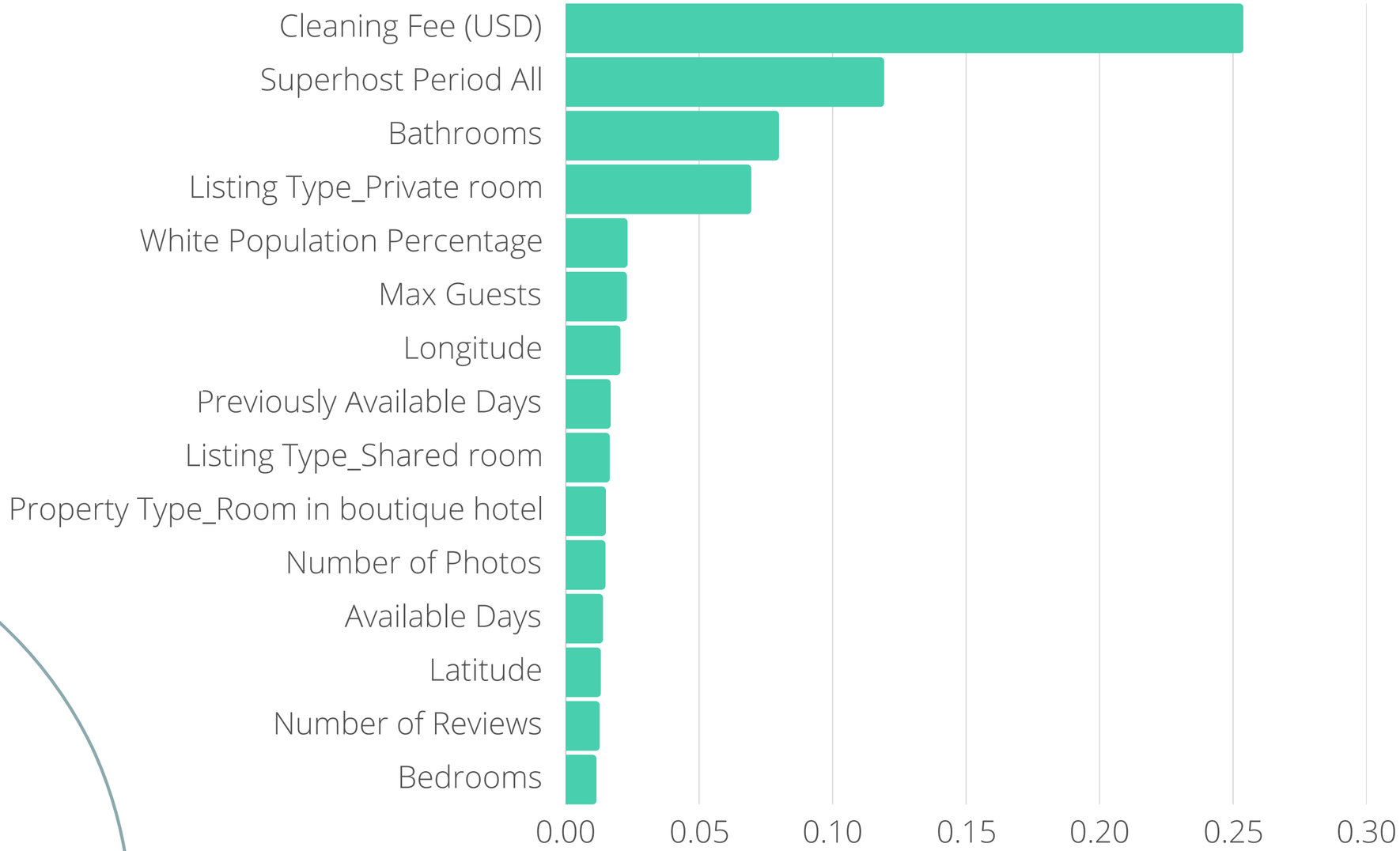
How does Superhost status affect the price elasticity of Airbnb listings?

Model Details:

Random Forest (n_estimators=100)



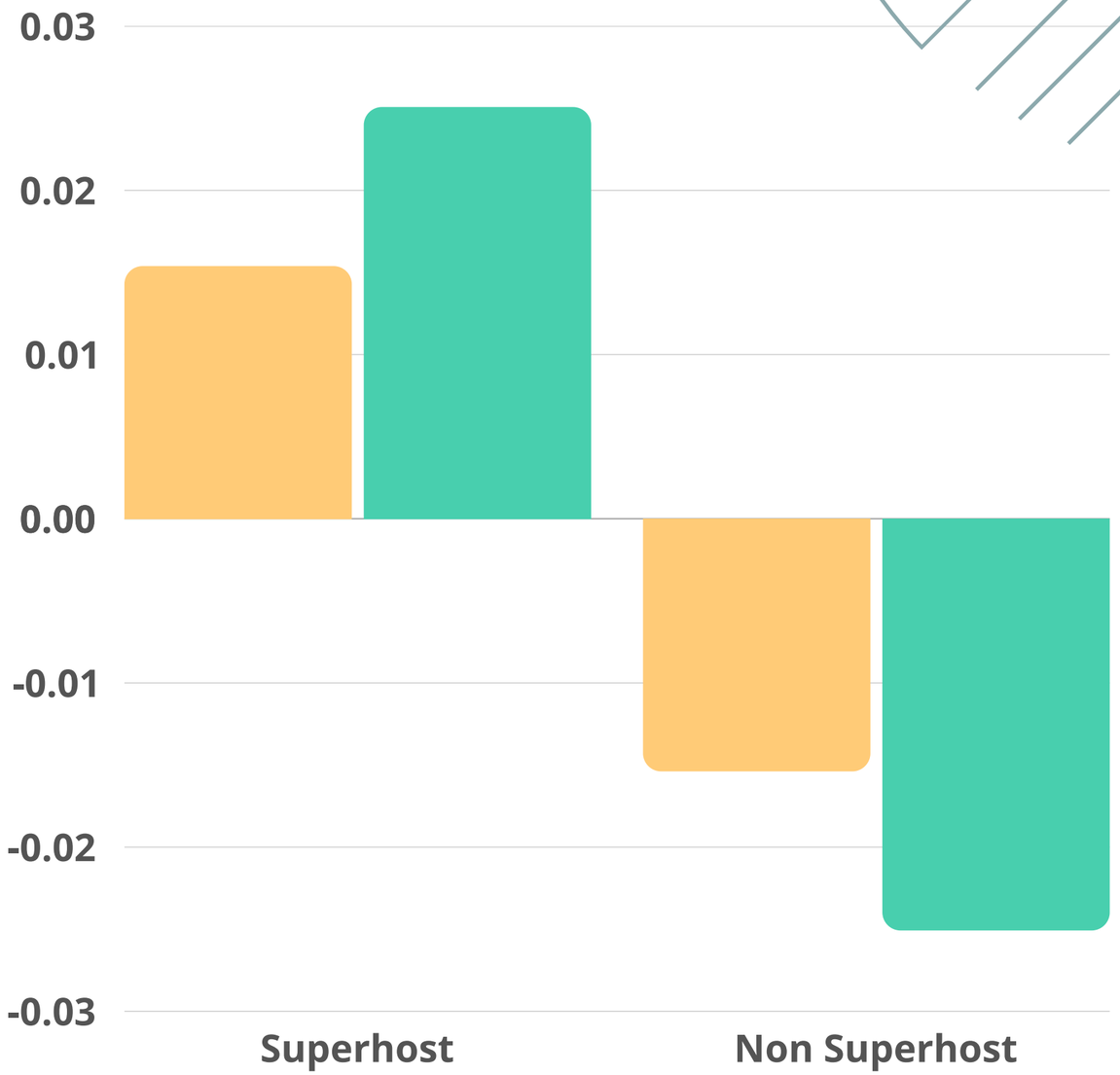
PRICING PREDICTION - FEATURE IMPORTANCE



PRICE ELASTICITY

01 - PREDICTED ELASTICITY

02 - ACTUAL ELASTICITY



MARKET REPORT

Explore the hidden dynamics of Chicago’s Airbnb market.

TWO MARKETS

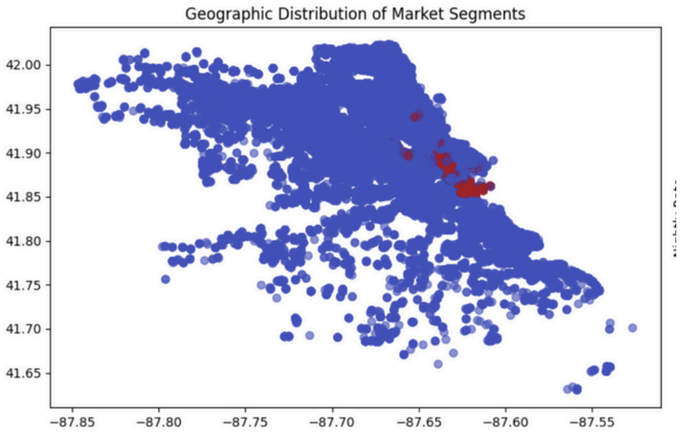
We built a housing competition index based on

- Density of listings (30% weight)
- Price diversity (20% weight)
- Quality of competition (20% weight)
- Market share metrics (30% weight combined)

Using K Means, ideal number of clusters was 2 and can be described as

LOW-COMPETITION SUBURBAN

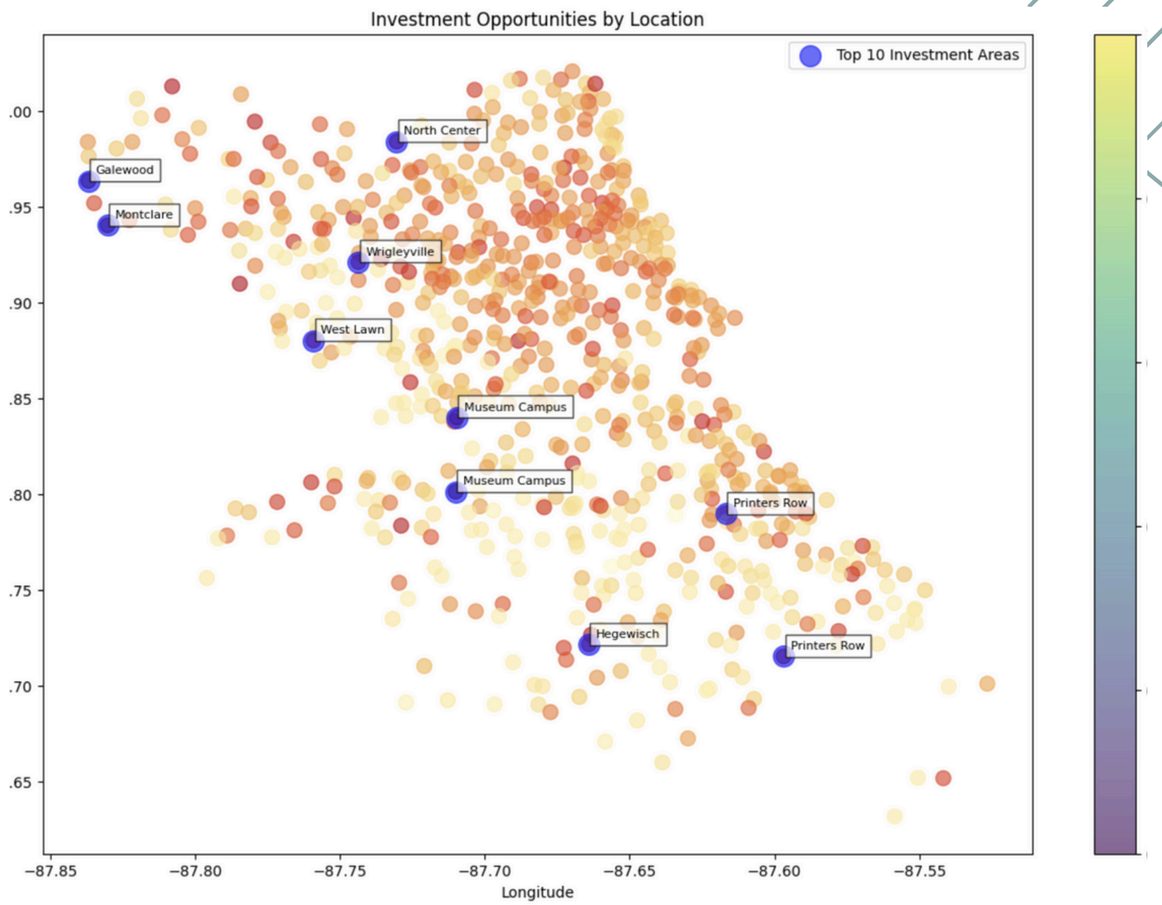
HIGH-COMPETITION URBAN



WHERE TO INVEST?

This scoring system prioritizes:

- Lower competition levels
- Higher revenue potential
- Quality of existing listings
- Sustainable pricing power



GOOD

BEST

BAD

INSIGHTS AND RECOMENDATIONS

OFFER A UNIQUE SELLING POINT

Offer personalized experiences, discounts, or additional amenities that make your listing stand out

SUPERHOST STATUS

Superhost status enables hosts to charge slightly higher prices

PRICING

New hosts should enter low-competition areas for pricing flexibility or high-competition areas for stable pricing

CONSISTENCY

Ensure that your guests consistently leave high ratings

HIGHLIGHT VALUE

Emphasize the importance of a cleaning fees, geographic benefits

HOST SUPPORT

Support tools for hosts in high-density areas (>100 listings) to maintain service quality and competitive pricing.

SUMMARY

-Model Predicting Superhost Status
-Model Predicting Listing Price
-Cluster analysis for Market Segmentation and Competition

THANK YOU

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