

Optimizing Returns On:



airbnb

With Machine Learning

Business Case

- Increasingly competitive environment
 - 2015: 5000+ listings in SF
 - 2019: 8000+ listings in SF
- With high real estate prices and smaller margins, returns must be optimized

Goal: Leverage data and machine learning to guide individuals on:

- Place - Where to purchase property
- Price - What's the optimal price to set
- Product - What do guests value
- Promotion - How do I market my listing



Workflow

Process

Data: Inside Airbnb's San Francisco Data

- From 2015 to 2020
- Pricing information, review scores, location details
- 8000 unique listings

Place: Investment Thesis, Macro level analysis

- Tableau for visualization
- Rental trends, Year on year changes
- Listing Distribution

Price: What's the optimal price to set?

- Regression modelling
- 100+ variables
- Including NLP components (e.g polarity scores)

Product: Distilled feature importances from the model

Promotion: Advertise through their write ups

- Neural network for text generation
- Corpus of listing descriptions

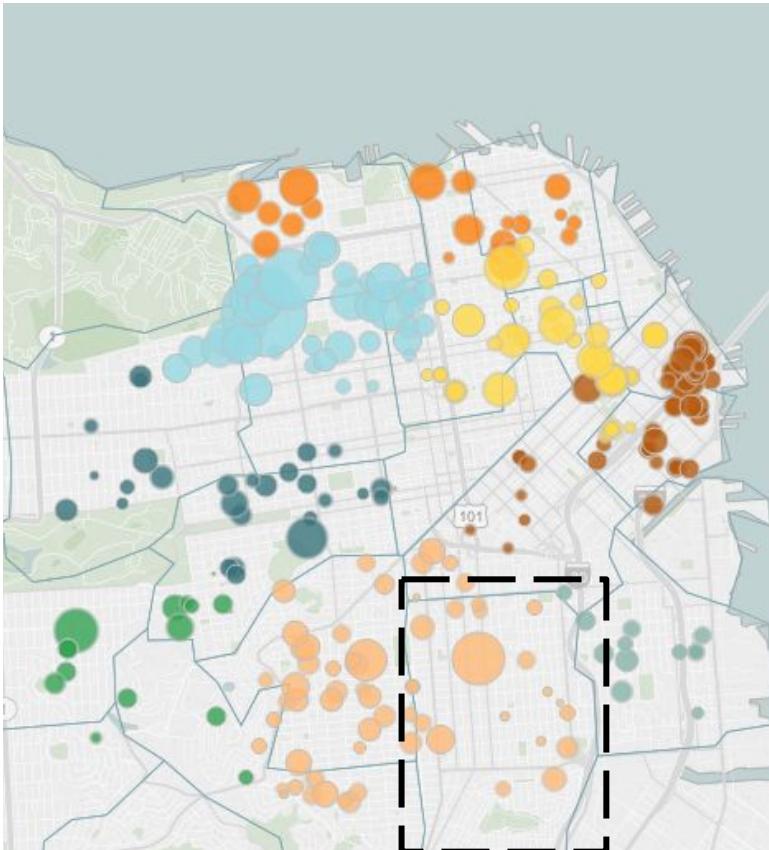
Tools

Inside Airbnb
Adding data to the debate

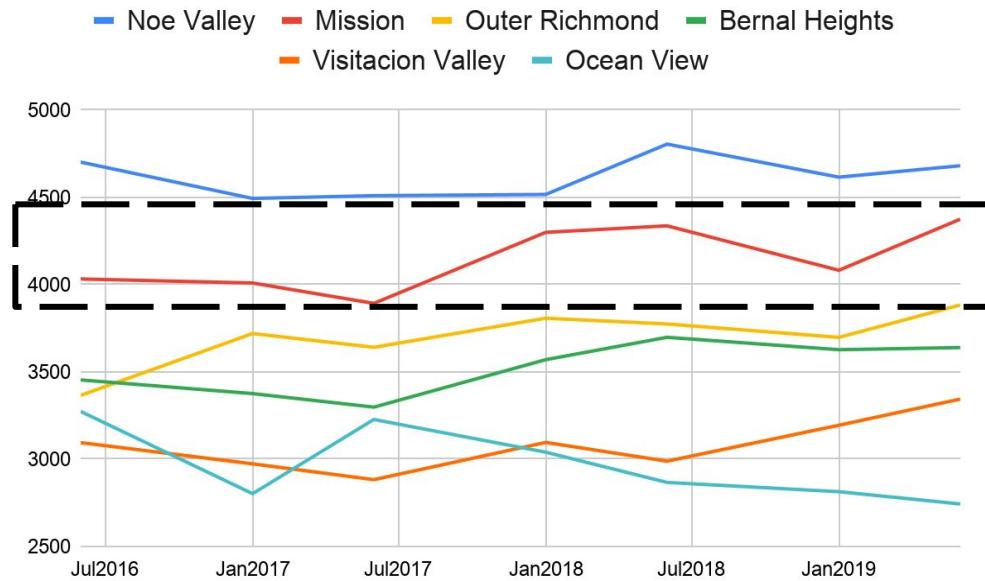


Use Case: Place

Listing heatmap



**Yield Trend
(USD/month)**



Use Case: Price

Features: Room type, review scores, cleaning fees, listing age, bed to bathroom ratio..

Use properties with > 5 reviews

MODEL PERFORMANCE

R Squared	Mean Absolute Error
0.66	~20 USD

Hypothetical Use Case: 1BR Suite at Missions

Summary Features

Neighbourhood: Missions Accommodates: 4 Guests

Beds: 2 Review Score: 4.9 #Reviews: >100

Predicted Price	Airbnb Price	Actual Price (Comparable)
171 USD	109 USD	150+ USD



Use Case: Promotion

Take all listing descriptions in the "Missions" neighbourhood..

Recurrent Neural Net with:

- 2 dense layers
- Vocabulary of ~5000 words

Input:

"Come stay at our ...

Output:

large elegant bedroom, with a dryer. Share the kitchen with adventurers and the house is located in the mission district"



Future Work

Text Generation

- Inclusion of certain key words
- Cloud computing capabilities
- Work with larger text corpus

Ensembling

- Use outputs of multiple models

Information Accessibility

- Flask App

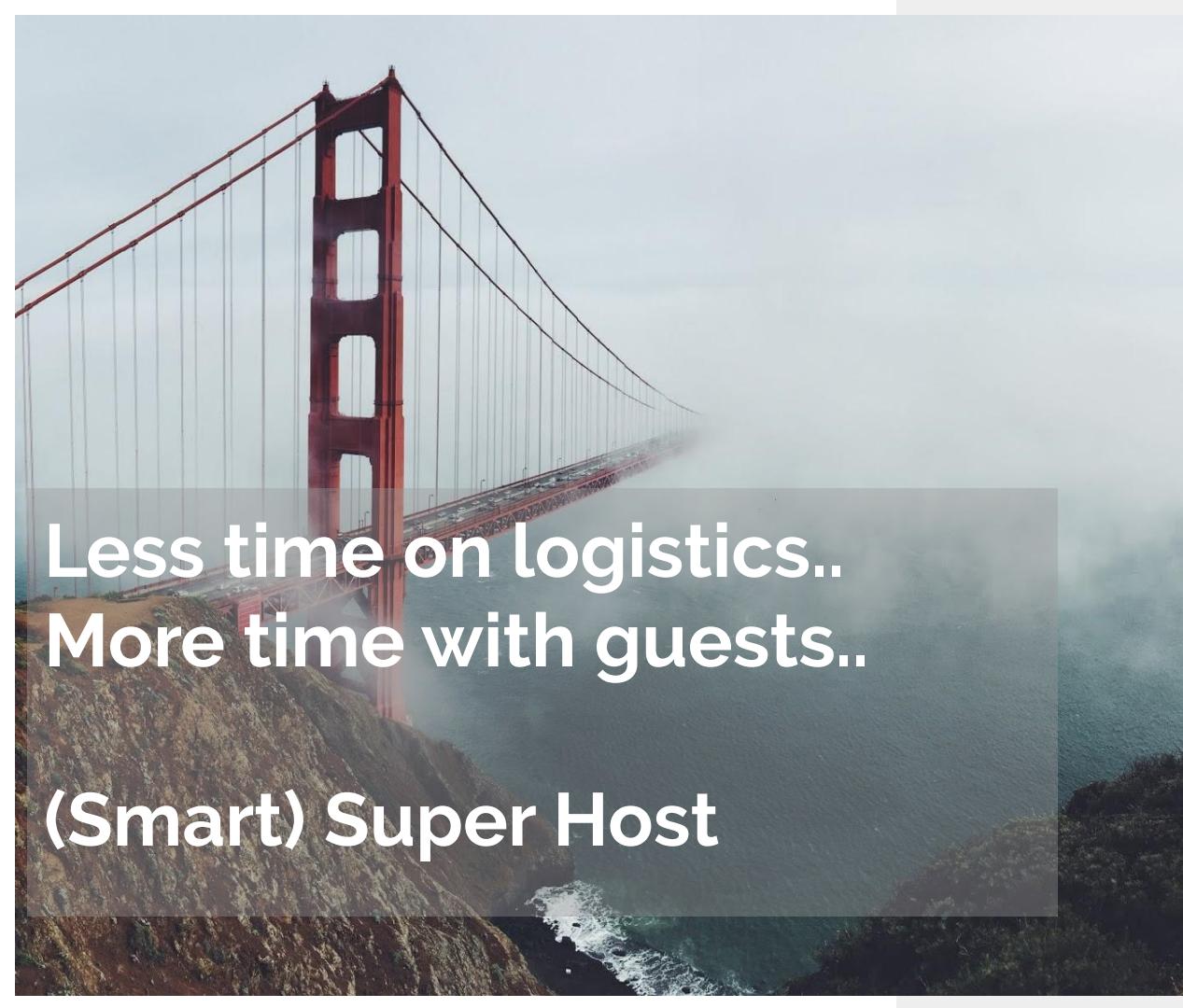




**Less time on logistics..
More time with guests..**

Super Host

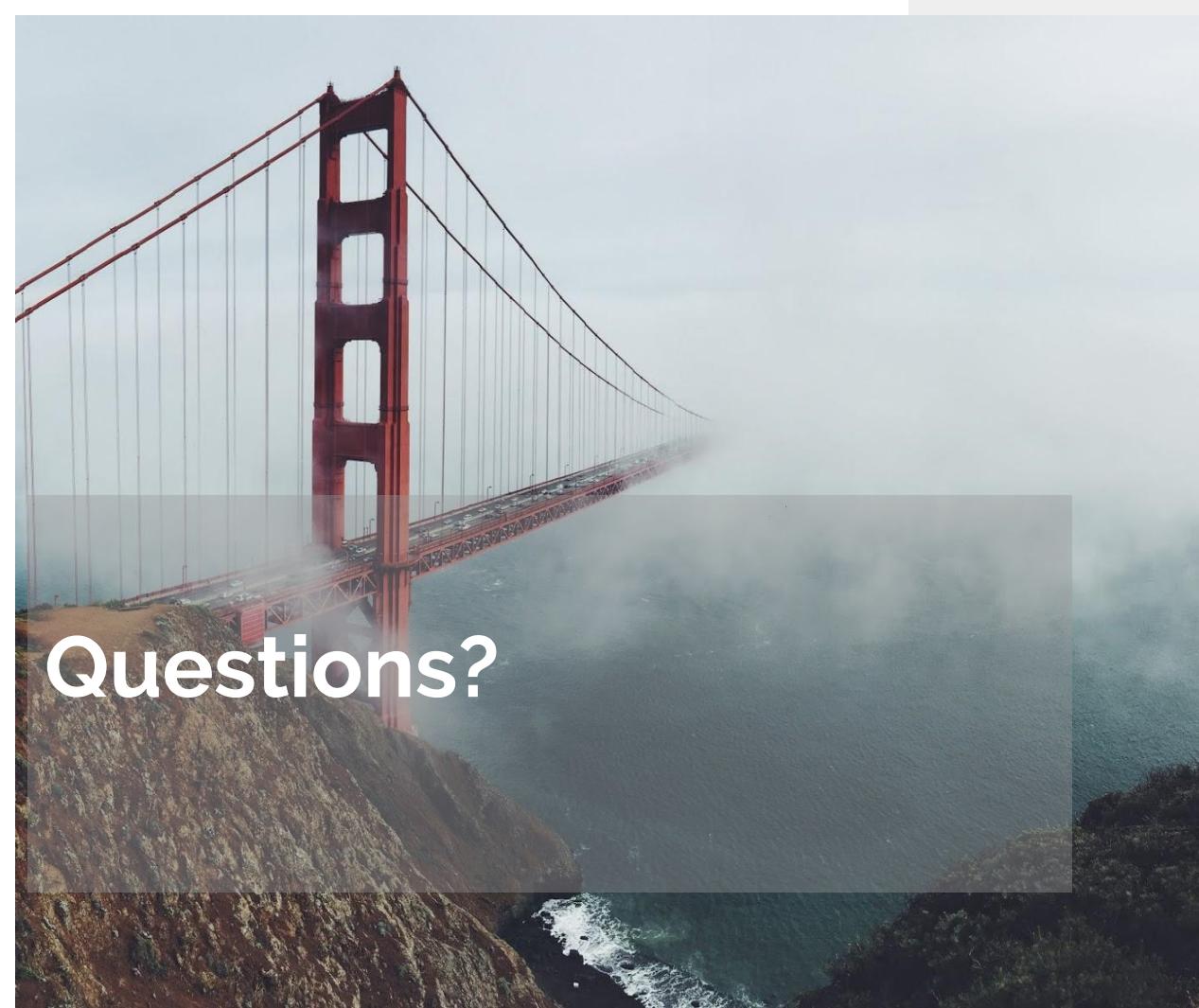




**Less time on logistics..
More time with guests..**

(Smart) Super Host





Product: Feature Importance

