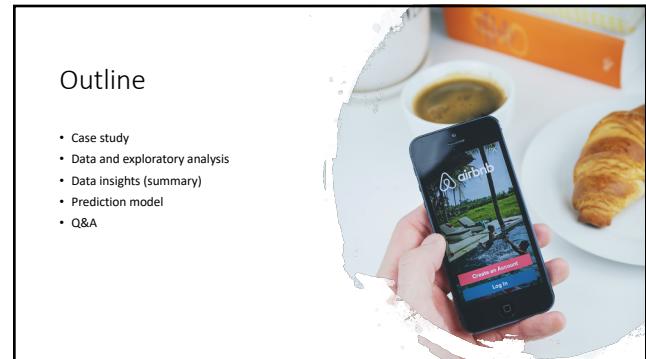




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### Case study

The client is thinking of becoming an Airbnb host in Seattle. He did a little research, and he notices that some hosts charge additional fees like a cleaning fee. He is curious to know if he adds this fee, will this impact that booking availability?

He wants to know more about the Airbnb market, like does the booking price stay the same throughout the year? Which area most people book? Have more insight to maximize the earning.

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### Case study

Airbnb host   Seattle   Jan - Dec 2016

Question

**Customer's question:**

- Does the cleaning fee affect the monthly availability?
- Do the booking prices change per location?
- Do the booking prices change throughout the year?

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### Data



- Booking price
- Cleaning fee



- Availability
- Property type
- Accommodates
- Room type
- Number of bathrooms
- Number of bedrooms



- Latitude
- Longitude
- Zip code



- Date



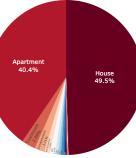
- Review score rating
- Review score cleanliness



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### Exploratory analysis

Property type



Property Type	Percentage
House	49.5%
Apartment	40.4%
Other	9.1%

Houses and Apartments were the selections most demanded in 2016.



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### Exploratory analysis




- The average booking price per day is \$107.47
- The average cleaning fee per day is \$29.11

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### Exploratory analysis

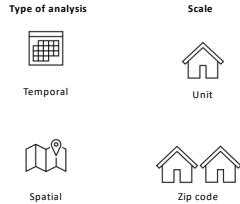
Property	Average Price	Average Cleaning fee
House	\$132	\$42
Apartment	\$123	\$39
Condominium	\$151	\$55
Loft	\$136	\$37



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## Exploratory analysis

→ BOOKING PRICE + AVAILABILITY



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## Exploratory analysis

→ BOOKING PRICE

Average Booking Price in 2016



- The red lines are holidays
- The average price per booking starts rising in March 2016
- The summer has the highest average price per booking

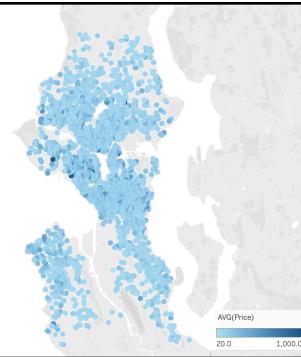
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## Exploratory analysis

→ BOOKING PRICE



- Booking prices range from \$20 - \$1000 per day
- Prices seem relatively even across the area

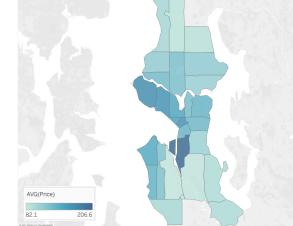


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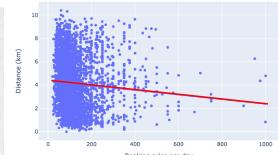
## Exploratory analysis

→ BOOKING PRICE

Average Booking Price by zip code



Distance vs Booking price per day



- Highest average booking price was \$207
- Zip code: 98134

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## Exploratory analysis

### → AVAILABILITY

- Number of available units remains relatively constant over the year

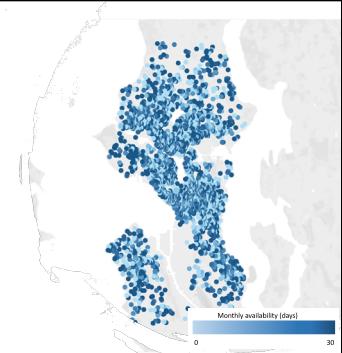
Weekly Availability



## Exploratory analysis

### → AVAILABILITY

- Availability = not booked (available for booking)
- No significant spatial pattern



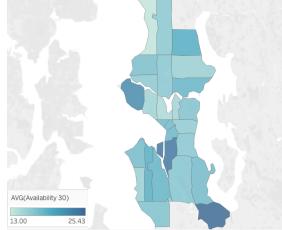
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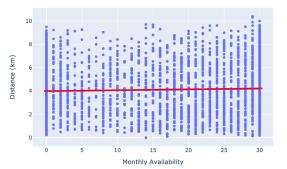
## Exploratory analysis

### → Availability

Monthly Availability by zip code



Distance vs Monthly Availability



- Availability = not booked (available for booking)
- Zip code: 98134

## Exploratory analysis

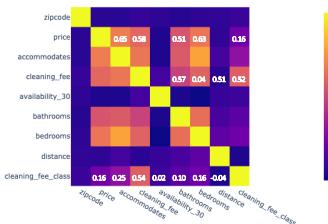


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## Exploratory analysis

Heatmap



## Insights:

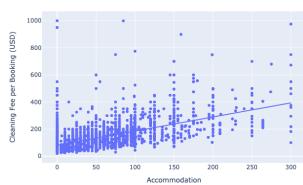
- No correlation between cleaning fee classification and the monthly availability
- Cleaning fee classification doesn't have a strong relationship with any other features

## Exploratory analysis

Price vs Accommodation



Cleaning fee vs Accommodation



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## Summary

- Most of the Airbnb units in Seattle are houses and apartments
- The booking price per day doesn't depend on the location.
- Adding a cleaning fee to the booking does not affect the customer's decision to book an Airbnb.



## Prediction model

- Build and train five different models.
- The accuracy score will be the evaluation method for the models.
- The score should not be below 0.60.
- The model will predict Airbnb prices.

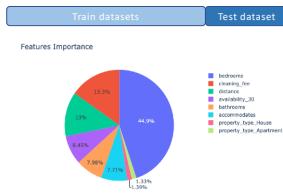


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## Feature Selection & Data Split

- Models:**
- Linear Regression
  - Random Forest
  - Gradient Boost
  - Extreme Gradient Boost



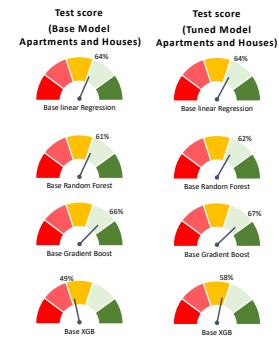
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## Models Result

Model	Test Score	MAE	RMSE
Base Linear Regression	0.6355	0.3812	0.5449
Base Random Forest	0.6142	0.3726	0.5226
Base Gradient Boost	0.6624	0.3462	0.5243
Base XGB	0.4972	0.4084	0.6398

Tune Model	Test Score	MAE	RMSE
Tune Linear Regression	0.6354	0.3889	0.5449
Tune Random Forest	0.6289	0.3688	0.5492
Tune Gradient Boost	0.6712	0.3446	0.5175
Tune XGB	0.5835	0.3764	0.5724



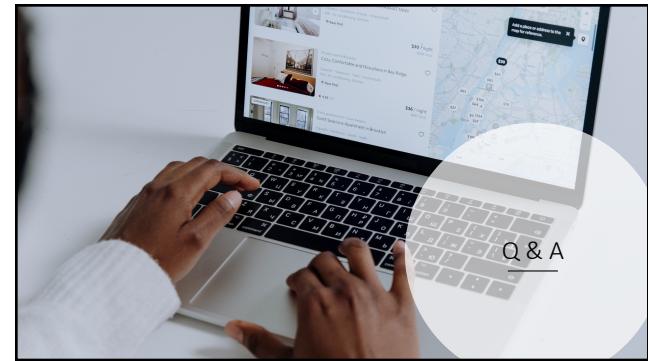
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## Conclusion

- It is important to remember the highest price season is in summer.
- The cleaning fee is not a deal-breaker for the Seattle Airbnb customers.
- The model will be helpful for the client to determine what is the best assigning price to the Airbnb unit considering the number of bedrooms, bathrooms, the number of people staying in the house, and the location.



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