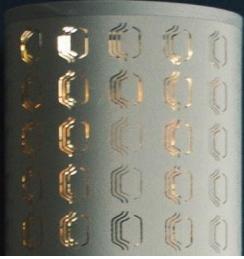




Classifying Hotel Reservation Cancellations



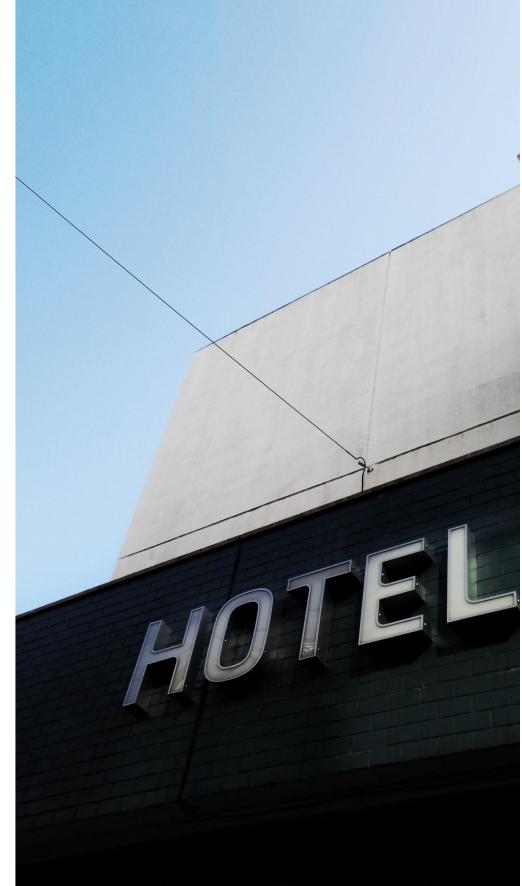
Hotel Demand Forecasting

Importance

- Planning staff and resources
- Revenue management

Challenge

- Difficulty predicting due to cancellations
- Customers seeking better deals





Can **reservation
cancellations** be
predicted to
inform demand
forecasting?



Process

Exploration

- Data Cleaning
- Data exploratory analysis

Modeling

- Modeling
- Testing
- Feature Engineering
- Results

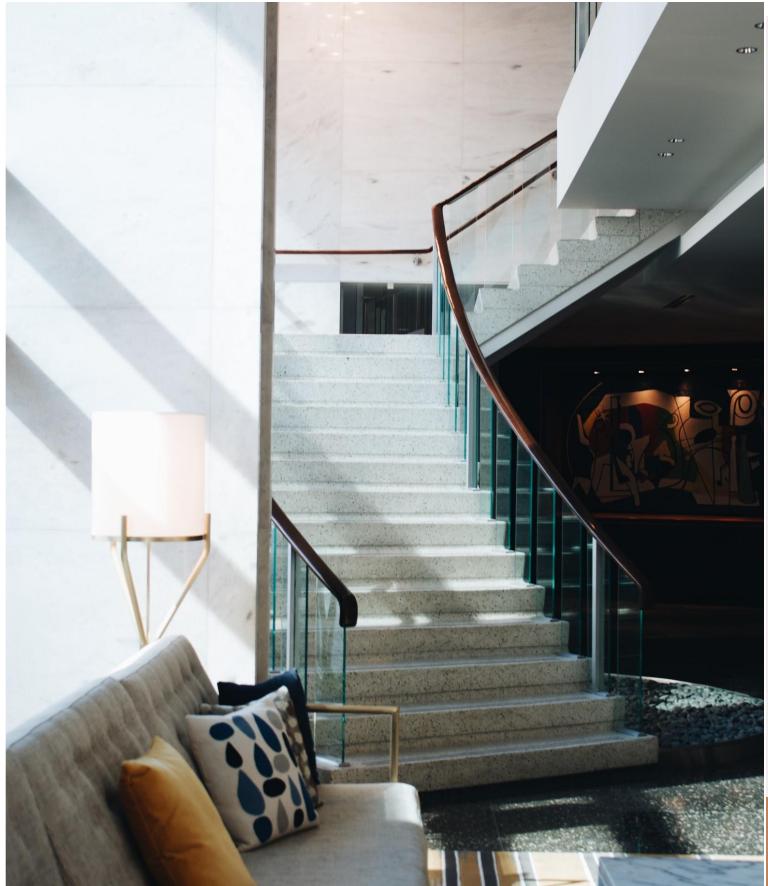
Application

- Analysis
- Conclusions



Data

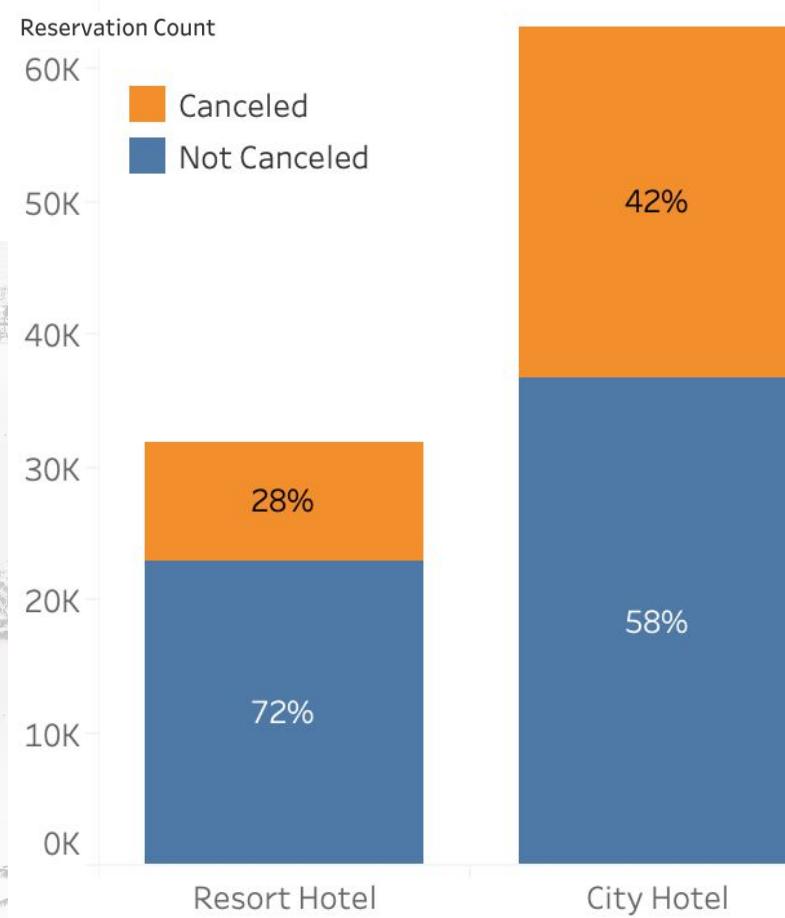
- 2 hotels in Portugal
- 120K reservations
- 32 features
- July 2015 - August 2017



37%

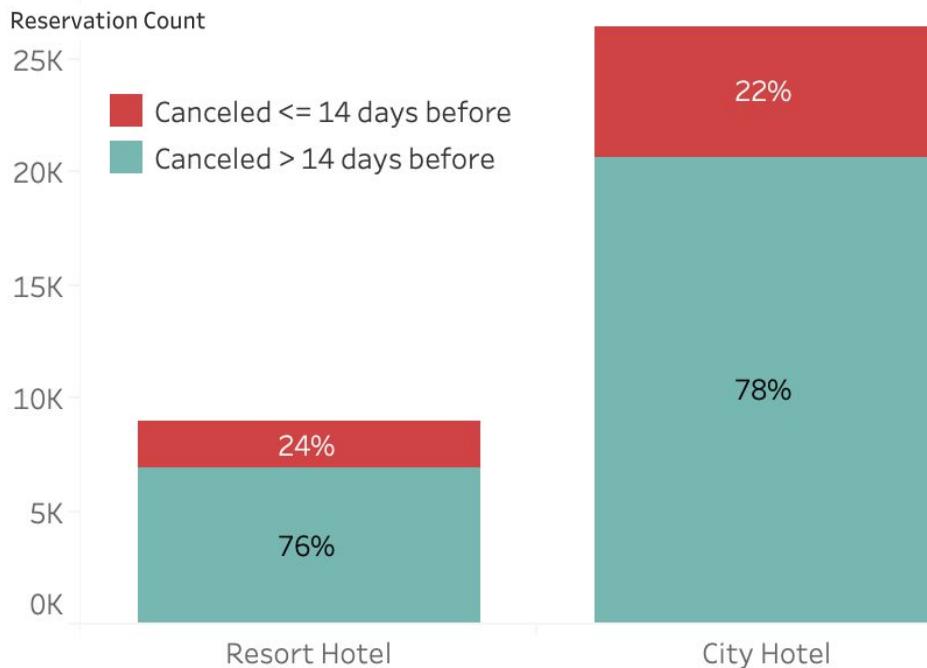
Overall
Cancellation Rate

Cancelation rates per hotel



Late cancellations

Rate of cancellations within 14 days of stay



- Minimal time to rebook vacancy
- Potential revenue loss

Features into random forest model

Basic

Hotel

Stay Month/Year

Week/Weekend nights

Lead time

Adults/Children

National/Not national

Average Daily Rate (ADR)

Details

Meal

Car parking

Special requests

Deposit type

Agent used/not used

Market segment

Calculated

Total stay cost

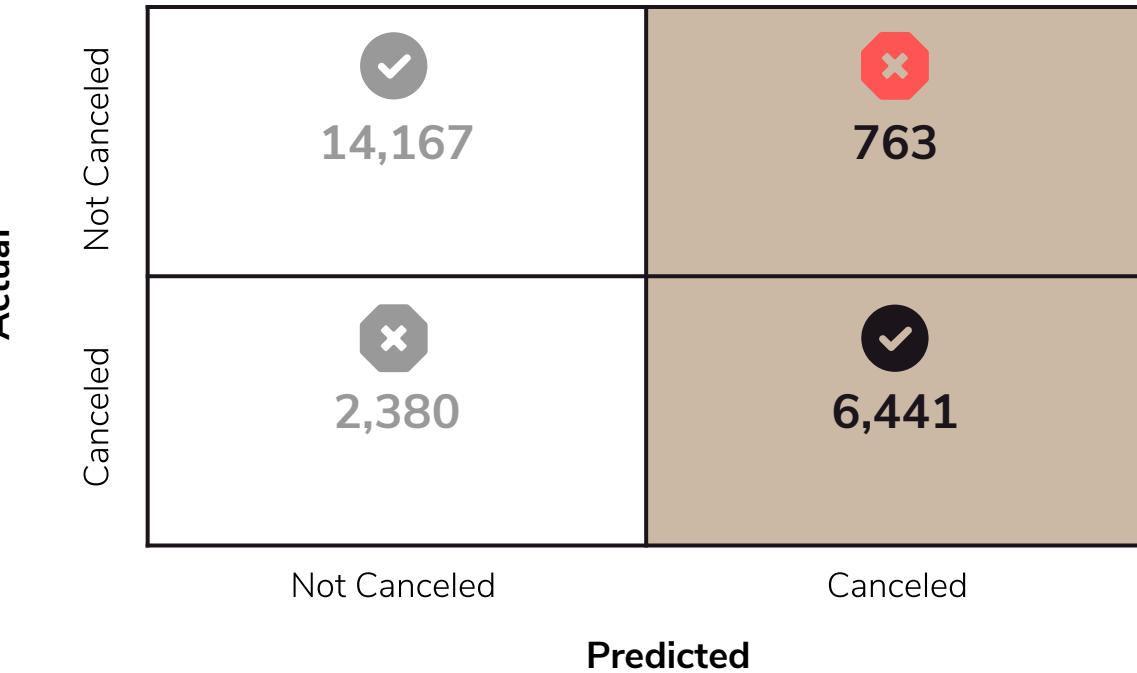
ADR over hotel average

Balancing Model Goals for Net Demand



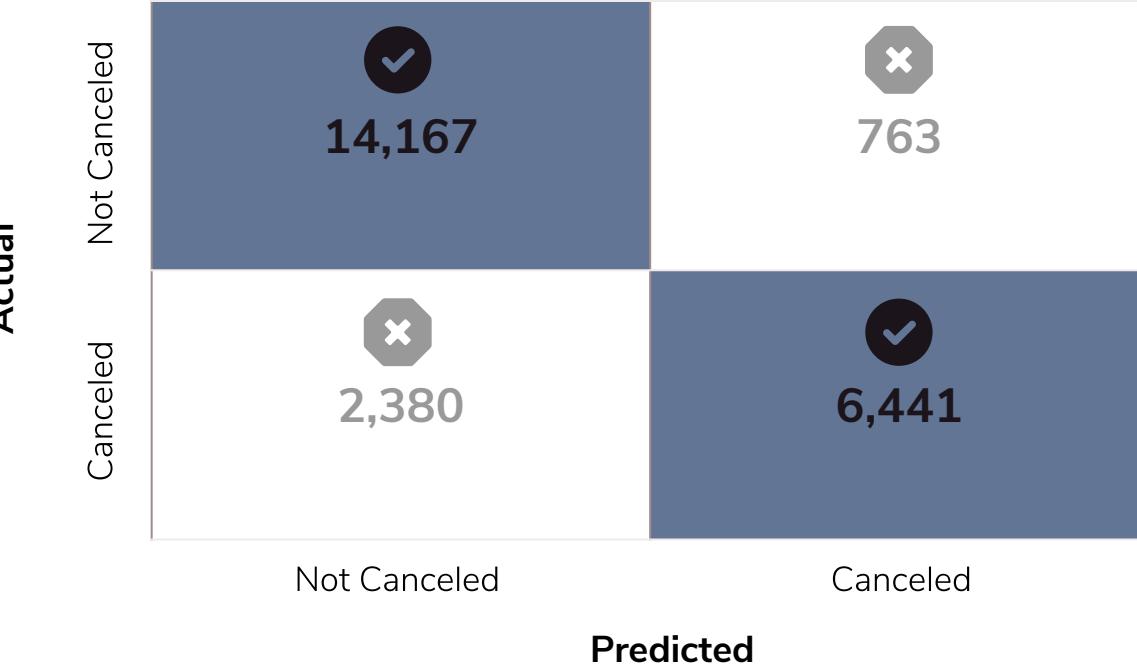
1. **Precision** - higher confidence in cancelation classification
2. **Accuracy** - being correct
3. **Recall** - identifying as many cancelations as possible

Model performance



1. Precision - 89% of
Canceled classification
correct

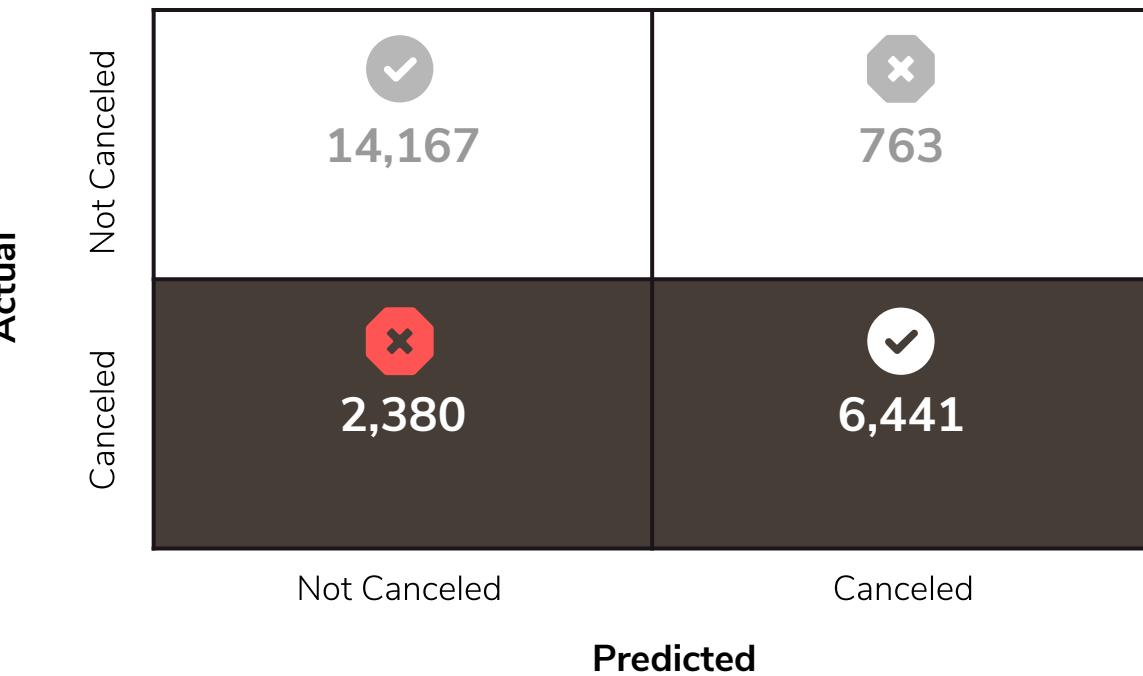
Model performance



1. Precision - 89% of
Canceled classification
correct

2. Accuracy - 87%
classified correctly

Model performance



1. Precision - 89% of Canceled classification correct
2. Accuracy - 87% classified correctly
3. Recall - 73% of Canceled reservations identified

Model performance on last minute cancellations

Recall



		Predicted
Actual	Canceled	 2,380
	Not Canceled	 6,441

Predicted

Last Minute
Cancellations

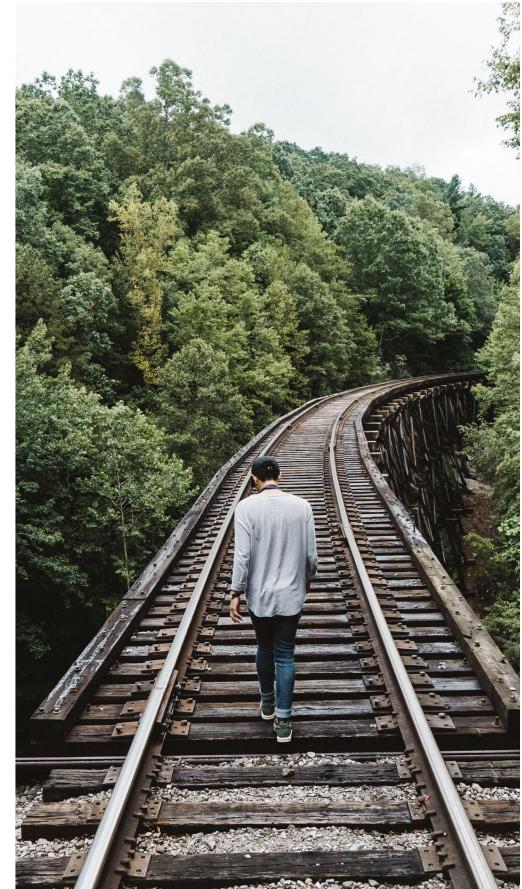
		Predicted
Actual	Canceled	 1,042
	Not Canceled	 930

Predicted

47% of last
minute
cancellations
identified

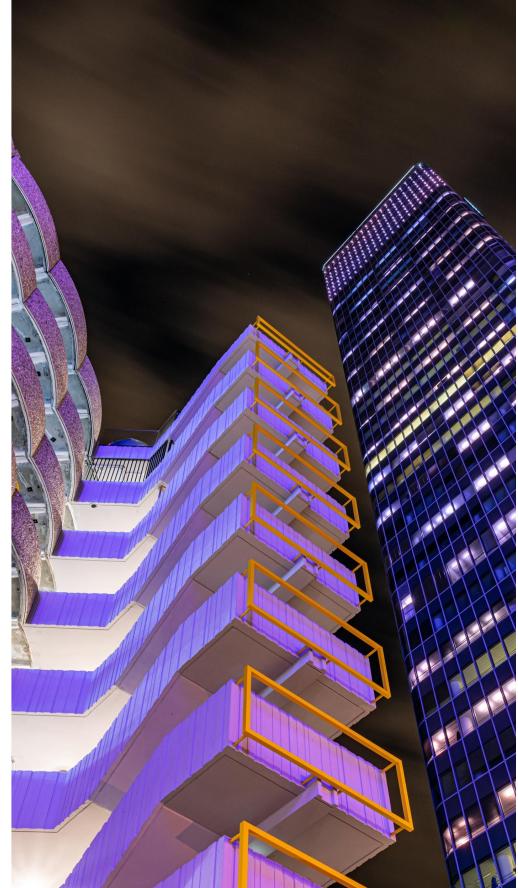
Conclusions

- Model classifies cancelations with 89% confidence
- Model can inform demand forecasting to support:
 - Resource planning - staff/meals
 - Pricing/Cancelation strategy
 - Marketing - target likely cancelations for promotions or additional perks



Future Improvements

- Additional modeling to target last minute cancellation classification
- Explore logistic regression to identify feature relationships to outcome
- Explore separation of hotel data





Thanks!
Any questions?

Appendix

Sample Tree - first 4 levels

