Hotel Cancellation Risk Predictor

Booking Details

Month of Arrival

December

Days Booked Ahead of Arrival

120

Length of Nights Stayed

2

Room Price per Night

260.14

Guest Engagement

Booking From a Repeated Guest?

No

Number of Special Requests

2

Parking Space Required?

No

Guest History

Number of Previous Bookings Completed

0

Number of Previous Bookings Cancelled

0

Predicted Cancellation Rate

69.67%

This predictor uses a statistically calibrated model based on historical booking patterns to project cancellation risk. It helps evaluate policy options, pricing strategies, and overbooking thresholds.

Key factors influencing higher cancellation rates include guests with long lead times, low engagement, no prior booking history.

Hotel Cancellation Risk Overview
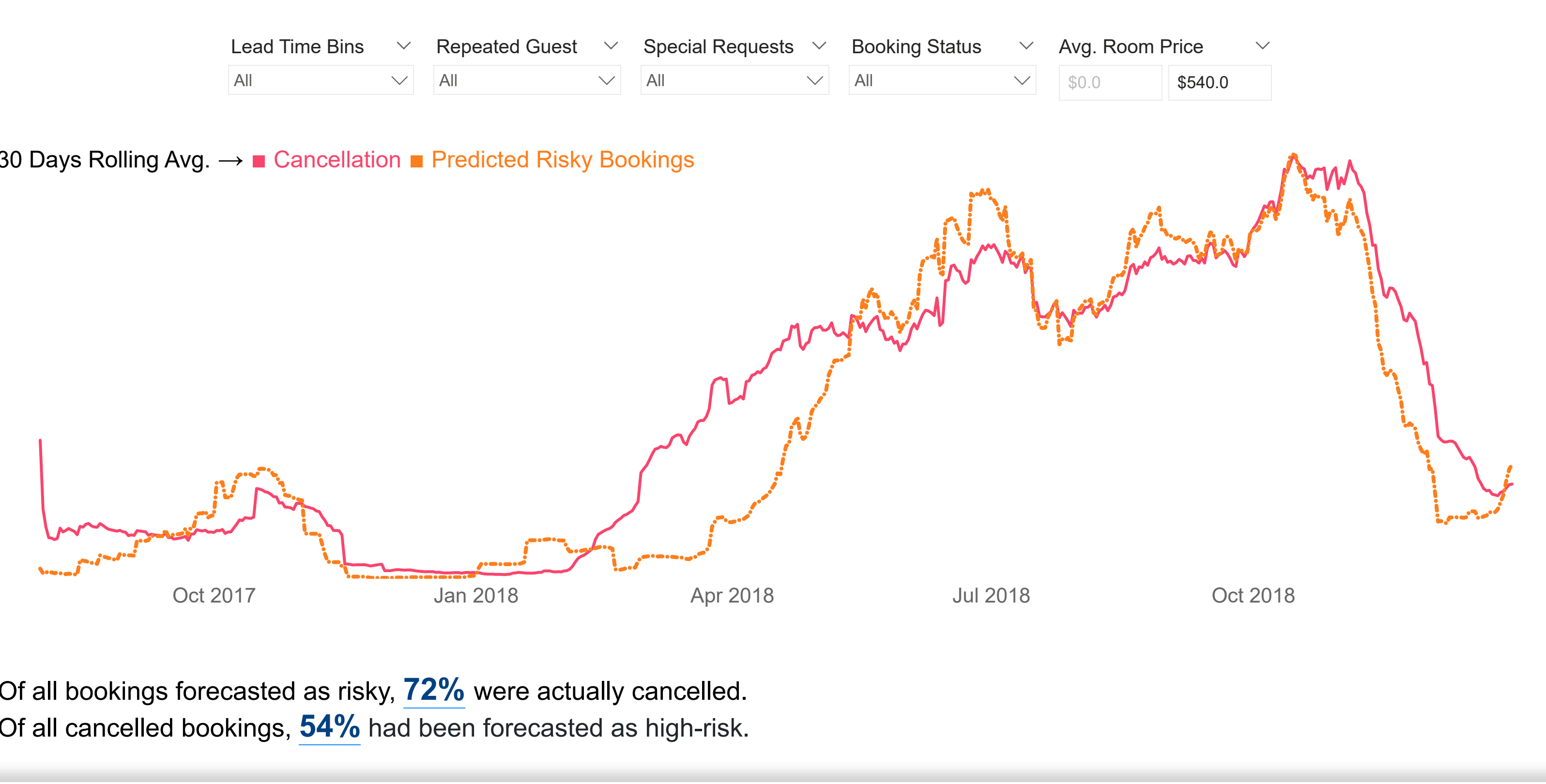
About This Study

This project analyses 36,000+ bookings at a hotel to identify guests most likely to cancel.

By modelling behavioural signals, we can predict risk at booking time and tailor strategies to reduce cancellations (at 72% accuracy) for real-time decision-making.

Methodology

The prediction uses a statistically calibrated model based on historical booking patterns to project cancellation risk. It helps evaluate policy options, pricing strategies, and overbooking thresholds.

- Predicted by the following factors: Lead Time, Nights of Stay, Room Price, Engagement Score, Credit Score, and Month of Arrival.
- Engagement Score = Special Request + Required Parking Space + Repeated Guest (Y/N)
- Credit Score = Previous Completed Bookings - Previous Cancelled Bookings

Lead Time Bins ⌄	Repeated Guest ⌄	Special Requests ⌄	Booking Status ⌄	Avg. Room Price ⌄
All	All	All	All	$0.0 $540.0

30 Days Rolling Avg. → ■ Cancellation ■ Predicted Risky Bookings

Oct 2017   Jan 2018   Apr 2018   Jul 2018   Oct 2018

Of all bookings forecasted as risky, **72%** were actually cancelled.
Of all cancelled bookings, **54%** had been forecasted as high-risk.

Cancellation-Enhancing Factors

Longer lead time

More nights

Higher Room Price

Seasonality

Risk-Reducing Factors

More engagement

Less nights

Repeating Guest

Seasonality

Actionable Strategies

1. Proactive Segmentation
Use *Engagement Score* and *Lead Time* to assign risk tiers at booking time.

2. Strategic Overbooking
Leverage low-risk, low-engagement profiles to safely overbook and optimise revenue, also provide protection on overheads.

3. Incentivise Commitment
Introduce discounts for non-refundable bookings among high-risk groups.

4. Pre-Arrival Care
Boost low-engagement guests' intent with tailored emails, perks, and experience previews.

5. Dynamic Monitoring
Real-time cancellation risk tracker flags shifting trends for proactive response.

Key Factors of Hotel Cancellations

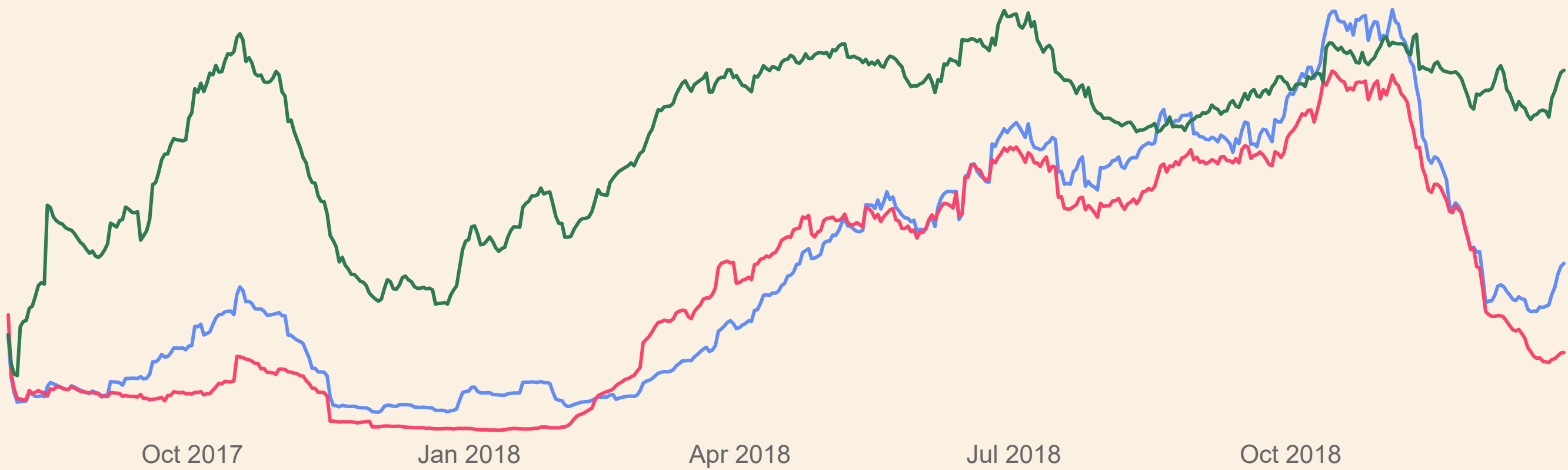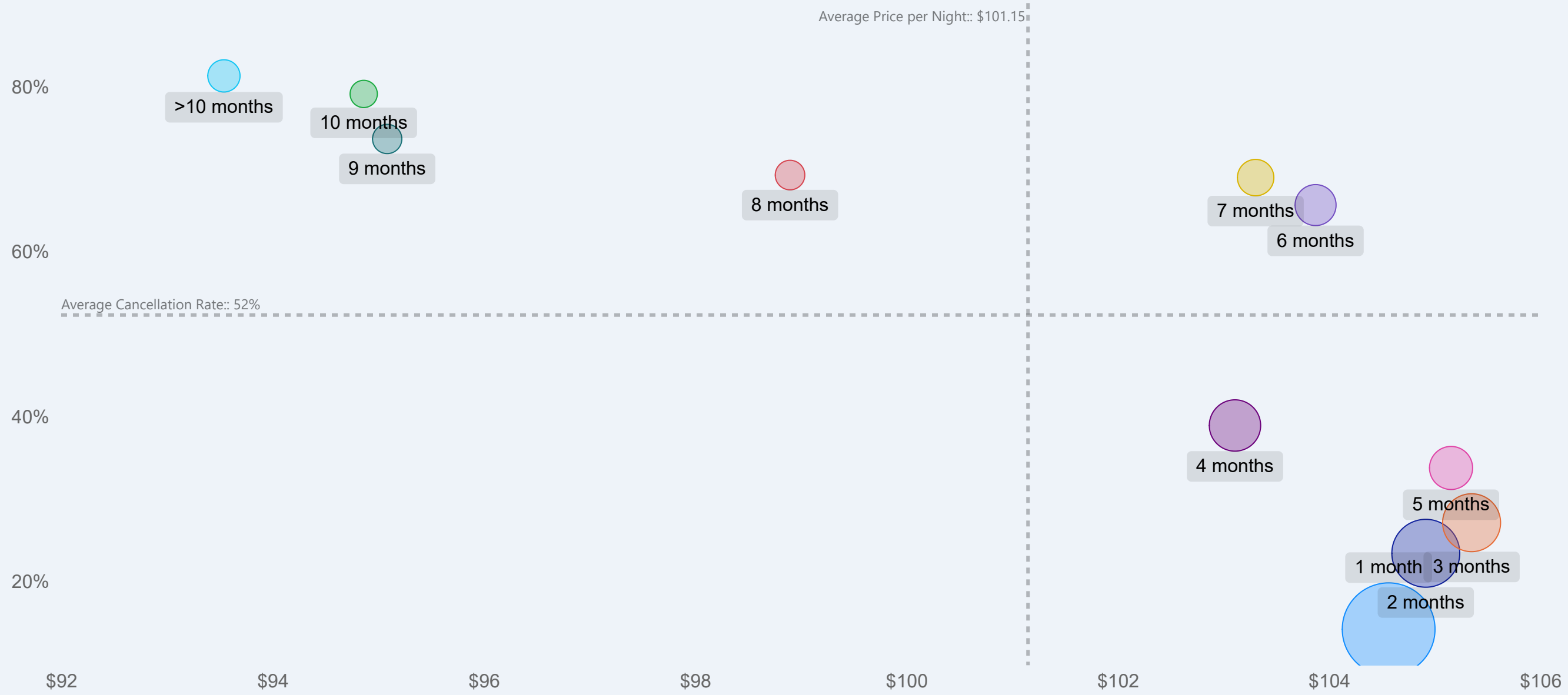| Total Bookings	Cancellation	Cancellation Rate	Predicted Risky %
35911	**11642**	**32.4%**	**24.4%**

A Strong Connection to Cancellation Lies in How Early the Booking is Made

30 Days Rolling Avg. → ■ Lead Time ■ Cancellation ■ Non Cancellation

Oct 2017   Jan 2018   Apr 2018   Jul 2018   Oct 2018

Cancellation Rate by Room Price, Lead Time and Booking Volume

Average Price per Night:: $101.15

Average Cancellation Rate:: 52%

>10 months, 10 months, 9 months, 8 months, 7 months, 6 months, 4 months, 5 months, 1 month, 3 months, 2 months

80% 60% 40% 20%

$92 $94 $96 $98 $100 $102 $104 $106

Strategic Security bookings (eight months or more ahead) need extra protection.

Action: Use **overbooking buffers**, **late room allocation**, **stricter non-refundable rules**, and **predictive modelling** to manage risk.

Strategic Critical bookings (six to seven months ahead) are valuable but risky.

Action: Reduce cancellations by **studying common triggers**, **showing offers clearly**, **helping guests plan trips**, and **giving incentives** to stay booked.

Tactical Profit bookings (within five months) are usually reliable.
Action: Focus on **seasonal offers**, **easy booking steps**, and **clear communication** to keep guests committed.

Impact of Stay Length on Cancellation Rate

100% 80% 60% 40% 20%

0   5   10   15   20

Nights Of Stay
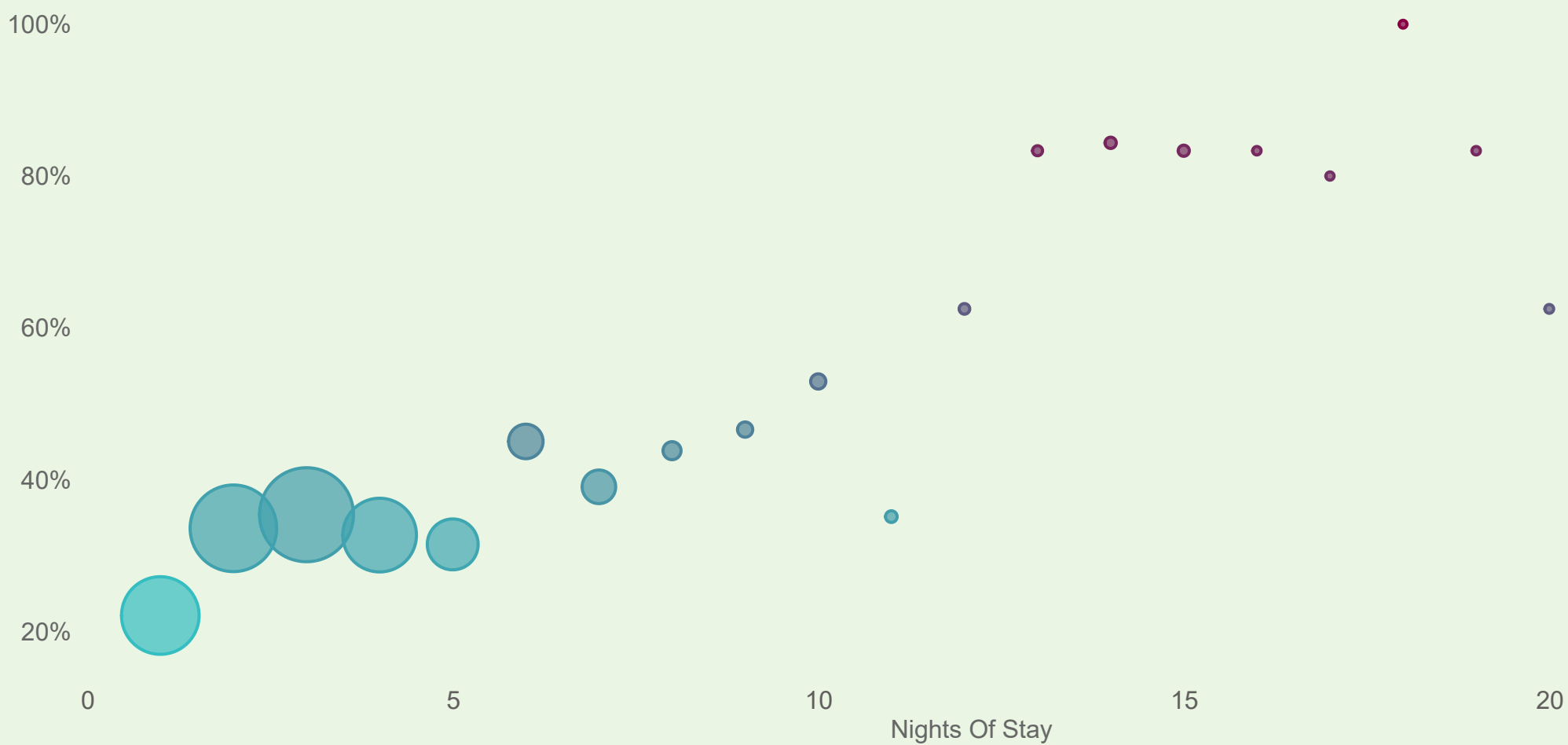
- **Short stays (within 5 nights)** have an acceptable cancellation rate, but account for a large booking volume.
Action: Strengthen policies or **targeted offers** for short-stay guests (e.g., **stricter deposit rules**, **last-minute offers**, **loyalty incentives**) to reduce high-volume cancellations.

- **Medium stays (6–10 nights)** show rising cancellation risk above 40%.
Action: Monitor closely and apply **flexible pricing**, **tailored engagement**, and **mid-stay perks** to reduce cancellations.

- **Long stays (10+ nights)** face very high cancellation risk, often above 80%.
Action: Use **stricter booking conditions** (e.g., **non-refundable deposits**, **staged payments**) and provide **personalised support** or **incentives** to secure high-value bookings.