

Hotel Churn (Booking Cancellations) Analysis

Analysis Report

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1. Executive Summary

This report analyzes hotel booking data to identify key factors contributing to high cancellation rates in **City Hotel** and **Resort Hotel**. Using data from **2015 to 2017**, the primary objective is to uncover trends, customer behaviors, and operational inefficiencies that lead to revenue loss due to cancellations. Insights derived from Exploratory Data Analysis (EDA) and data cleaning efforts help frame actionable strategies to reduce cancellations and optimize hotel operations.

2. Business Problem

Both **City Hotel** and **Resort Hotel** have experienced increased cancellation rates, leading to lower room occupancy and revenue loss. The goal of this analysis is to identify cancellation patterns, evaluate the contributing factors, and provide recommendations to mitigate these issues and improve overall booking retention.

3. Assumptions

1. No significant external events between **2015-2017** skew the data.
2. The dataset remains relevant and reflective of current booking behaviors.
3. Implemented strategies will not have unintended negative impacts.
4. Hotels have not yet applied the recommendations highlighted in this report.

4. Data Cleaning

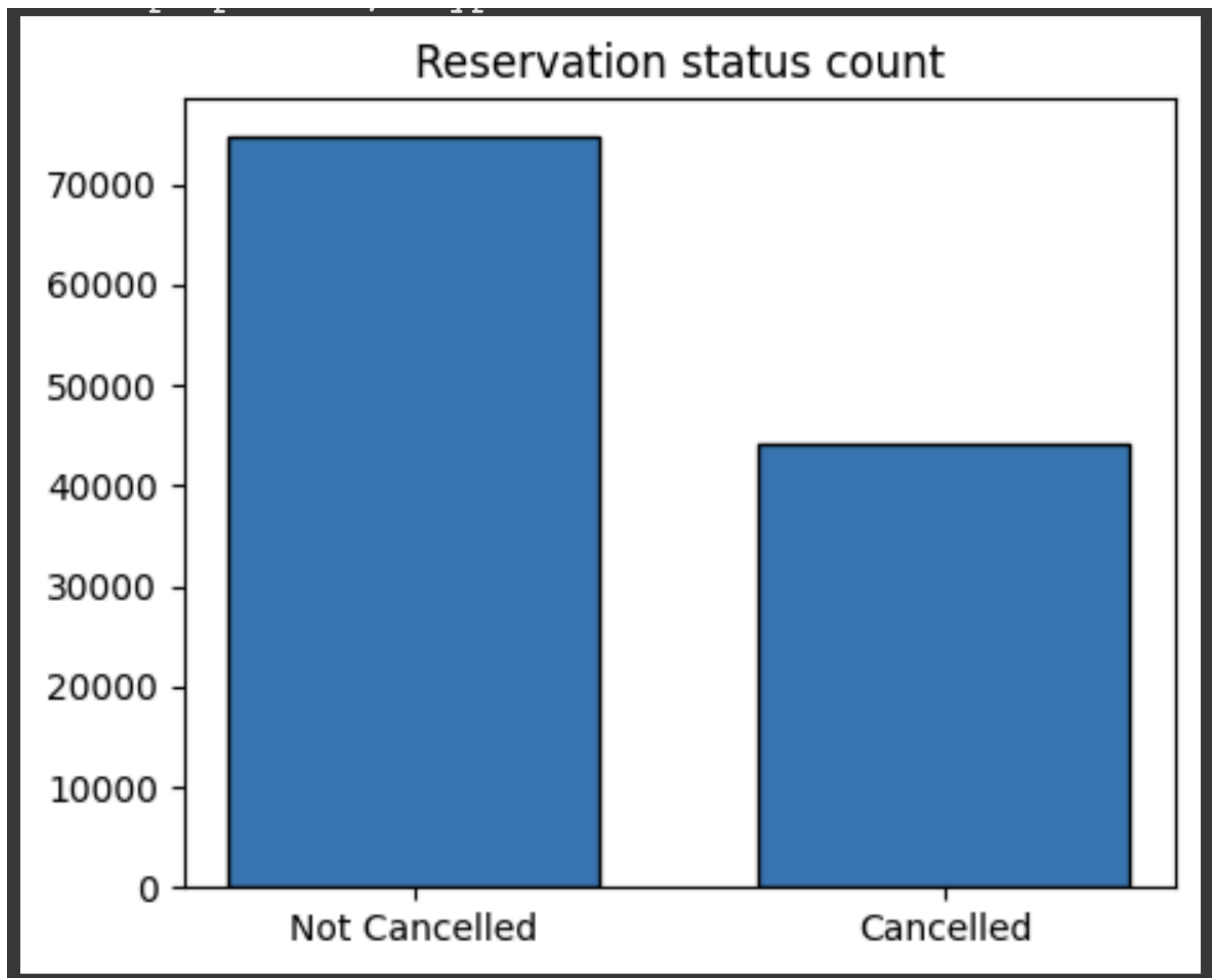
- **Personal Data Removal:**
Removed sensitive columns like **Name**, **Email**, **Phone Number**, and **Credit Card** for privacy compliance.
- **Data Quality Checks:**
 - Handled missing values through imputation/removal.
 - Corrected inconsistent data entries (e.g., standardizing hotel names).
 - Converted date fields to appropriate **datetime** formats.

- **Filtering & Aggregation:**
 - Isolated canceled and non-canceled bookings for focused analysis.
 - Grouped data by **month**, **country**, and **booking source** for deeper insights.

5. Exploratory Data Analysis (EDA)

5.1 Cancellation Overview

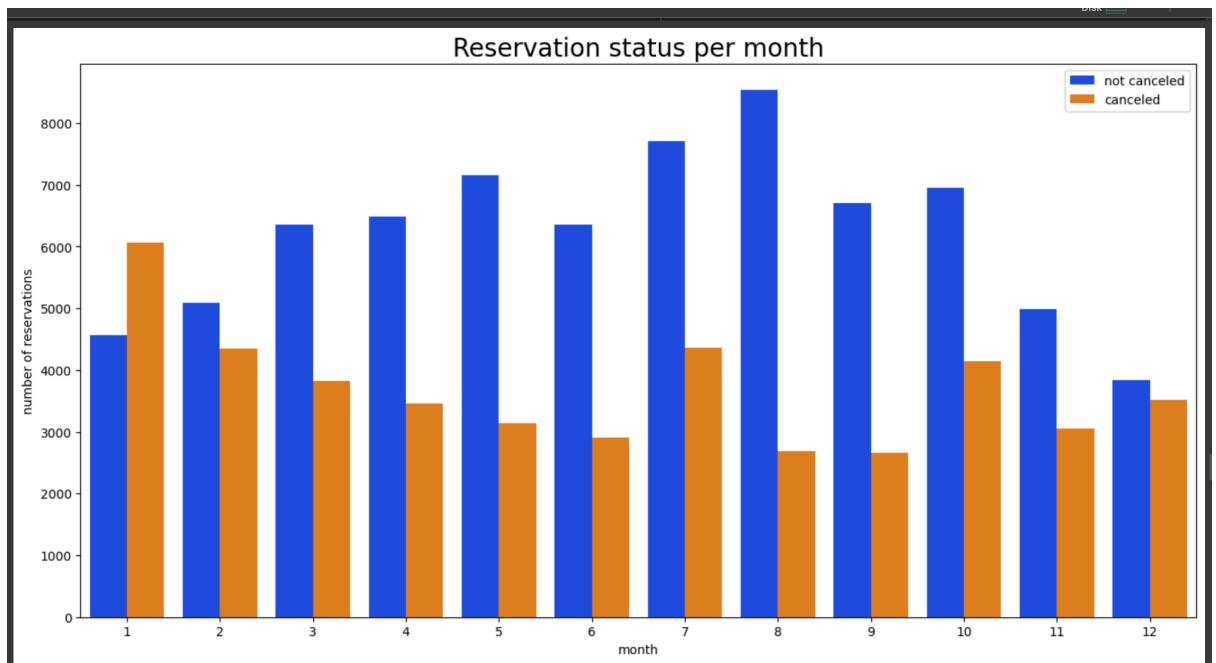
- **Cancellation Rate:** ~37% of all bookings were canceled, significantly impacting hotel revenues.



Reservation Status in Different Hotels

5.2 Seasonal Trends

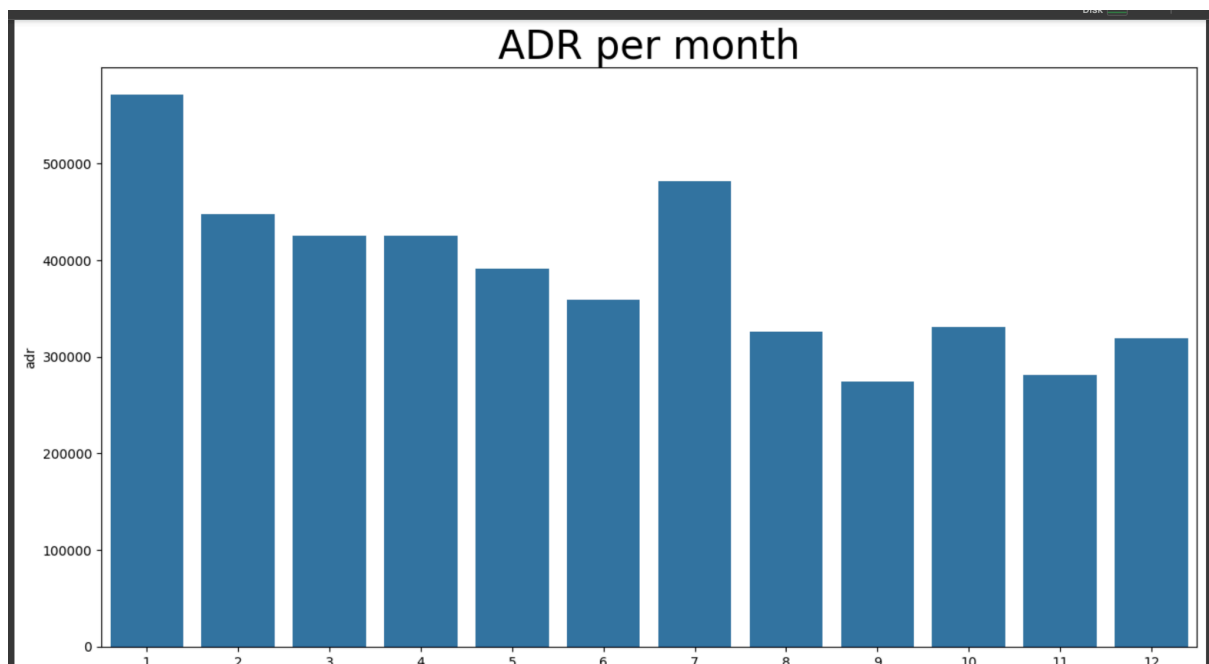
- **Highest Bookings:** August shows the highest confirmed bookings and cancellations.
- **Highest Cancellations:** January leads in cancellation rates.



Bar Plot — Reservations by Month

5.3 Price Sensitivity & ADR Analysis

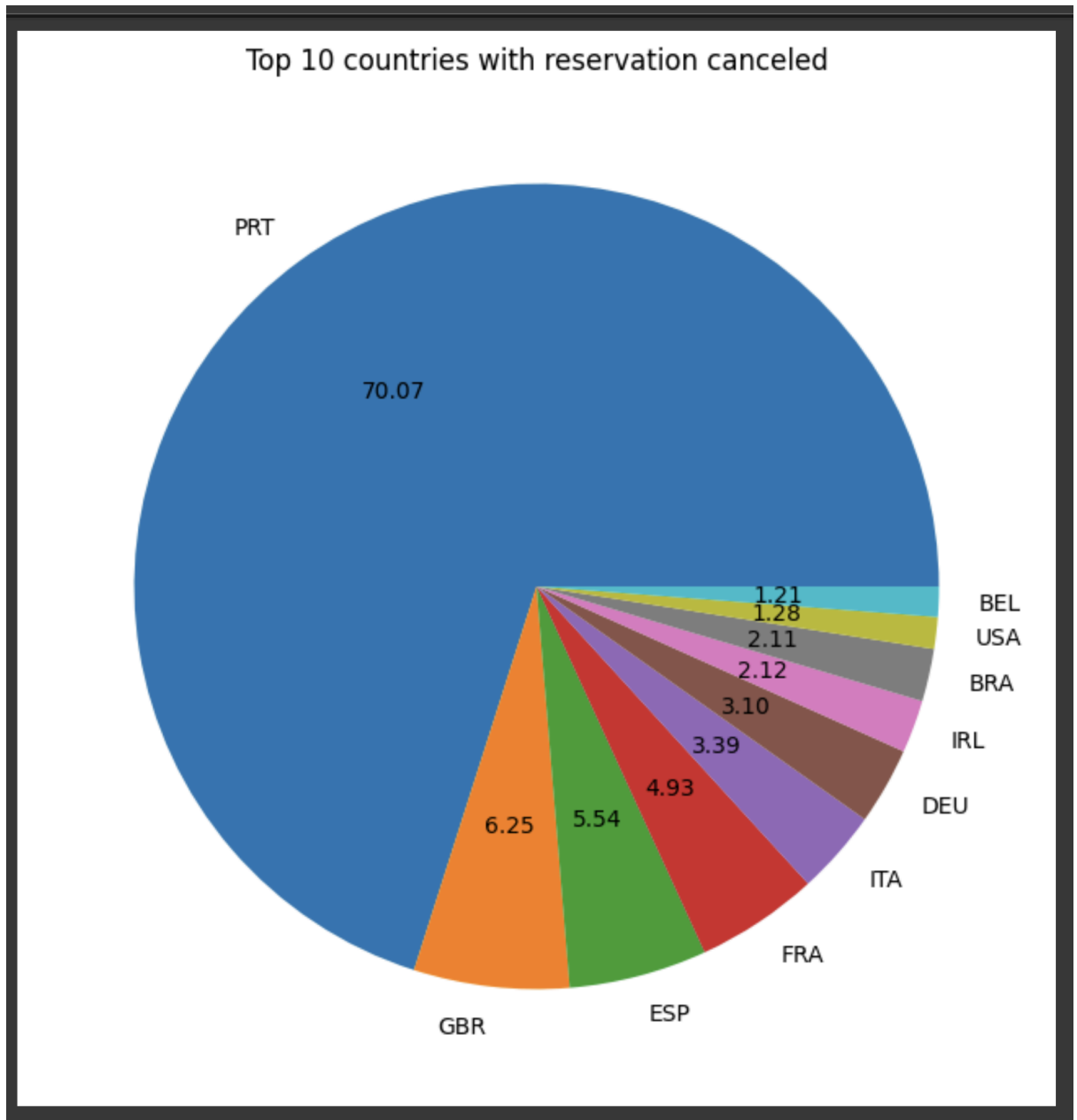
- **Trend:** Cancellations are most frequent when room rates (ADR) are higher.
- **Insight:** Pricing appears to be a major factor influencing cancellations.



ADR per Month Analysis

5.4 Geographic Analysis

- **Top Country for Cancellations:** Portugal ranks highest in booking cancellations.



Top 10 Countries with Cancellations

5.5 Booking Channels Analysis

- **Online Travel Agencies (OTAs):** Contribute to **46%** of bookings, leading in both confirmed and canceled reservations.
- **Direct Bookings:** Only **4%** of clients booked directly, indicating low customer engagement without intermediaries.

6. Key Insights

1. **High ADR Correlates with Higher Cancellations:** Guests are more price-sensitive, leading to more cancellations when prices peak.
2. **Seasonality Impacts Cancellations:** August has the most bookings, while January sees the most cancellations.
3. **Geographic Focus Needed:** Portugal shows the highest cancellation rates and requires targeted strategies.
4. **Over-Reliance on OTAs:** Heavy dependence on third-party agencies reduces hotel control over customer engagement and pricing.

7. Recommendations

1. **Optimize Pricing Strategies:**
 - Lower rates during peak cancellation periods.
 - Implement discounts for specific locations and high-cancellation months.
2. **Seasonal Promotions:**
 - Launch special offers during **January** to reduce high cancellation rates.
 - Use targeted marketing during **August** to capitalize on high booking volumes.
3. **Enhance Direct Bookings:**
 - Offer exclusive discounts for direct bookings to reduce reliance on OTAs.
 - Improve website UX and promotions to attract more direct reservations.
4. **Focus on High-Cancellation Regions:**
 - Improve hotel services and offers in **Portugal** to decrease cancellation rates.
 - Implement region-specific loyalty programs.
5. **Improve Resort Hotel Retention:**
 - Since resort hotels have higher cancellation ratios, offer weekend/holiday discounts and flexible booking policies.

8. Conclusion

This analysis highlights key factors contributing to hotel booking cancellations, emphasizing the importance of pricing strategies, seasonal promotions, and direct booking incentives. By implementing the outlined recommendations, both **City Hotel** and **Resort Hotel** can reduce cancellations, boost revenue, and enhance customer satisfaction.

9. Appendix

- **Tools Used:** Python, Pandas, Seaborn, Matplotlib
- **Dataset:** Hotel Booking Dataset (2015-2017) - <https://www.kaggle.com/datasets/mojtaba142/hotel-booking>
- **Image List:**
 - Reservation Status in Different Hotels
 - Grouped Bar Plot — Reservations by Month
 - ADR per Month Analysis
 - Top 10 Countries with Cancellations