



Hotel Booking Data Analysis — Project Summary



Overview

This project focuses on analyzing hotel booking data using Python to uncover trends in reservation patterns, cancellations, and customer behavior. It combines robust data cleaning, exploratory analysis, and visual storytelling to provide actionable insights for business optimization.

Core Processes:

- Data loading and preprocessing
- Exploratory Data Analysis (EDA)
- Visualization of key performance indicators
- Strategic insight generation for decision-makers

Tools & Libraries:

- Pandas for data manipulation
 - Matplotlib and Seaborn for visualization
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Key Insights & Visual Highlights



Cancellation Trends

- **37%** of bookings were canceled, signaling significant revenue risk.
- Transient customers accounted for **89.6%** of these cancellations.
- Repeat guests showed more loyalty but only made up **3.2%** of bookings.

Seasonal Patterns

- Highest booking volumes occurred in **July and August**.
- **Winter months** saw the fewest cancellations, offering more booking stability.

Customer Segmentation

- Repeat guests are rare but reliable.
 - Majority are transient, indicating an opportunity for targeted retention strategies.
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Data Cleaning Summary

- Removed **16,340+** missing values (notably in the **agent** column).
 - Converted date columns, particularly **reservation_status_date**, for time-series analysis.
 - Filtered extreme outliers (e.g., ADR values exceeding \$5,000).
 - Final dataset: **118,898** rows × **30** features.
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Strategic Business Recommendations

Reduce Cancellation Risk

- Encourage upfront payments or flexible deposits for transient guests.
- Incentivize early confirmations through promotions.

Revenue Optimization

- Implement **dynamic pricing** during peak seasons.
- Promote **loyalty programs** to grow the repeat guest base.

Operational Efficiency

- Align staffing with seasonal demand.
 - Review parking resource utilization (currently at **6%**).
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★ Why This Analysis Matters

- **Actionable Outcomes:** Insights directly inform pricing, marketing, and operational strategies.
- **Clear Visual Communication:** Clean, professional charts with meaningful annotations and balanced color use.
- **Technical Depth:** Documented 4-step cleaning pipeline ensures transparency and reproducibility.