Exploring Insights in Hotel Reservations: Machine Learning on Hotel Booking Demand Datasets

INTRODUCTION

This hotel booking demand dataset provides detailed insights into customer booking behavior, hotel occupancy trends, and operational aspects.

City hotel and resort hotel in Portugal

Objectives

Uncover patterns, understand customer segments, optimize hotel operations, and identify customer groups with similar characteristics

Clustering analysis aims to enhance revenue management, customer satisfaction, and operational efficiency using the dataset.
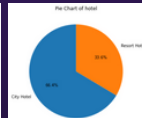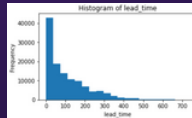
Data Description

Key aspects in this hotel booking demand dataset include:
- Booking Details
- Customer Profiles
- Financial Transactions
- Booking Channels
- Cancellation Patterns

Data Understanding

This dataset comprises data from 119k customers and includes 32 variables.

Glimpse of the EDA

Data Preparation

Before clustering, dataset preparation is essential:
1. Handling Missing Values
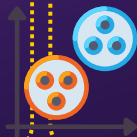2. Encoding Categorical Variables
3. Standardization

Clustering

K-means algorithm

K = 2

Silhoutte score = 0.57

The k-means algorithm is efficient in identifying groups in large datasets. Due to the most optimal k value being 2, customers will be segmented into two groups.

Conclusion

This hotel booking demand dataset can be clustered into two customer segments:

1. The Planned Customer: Moderately planned, budget-conscious, prefer shorter stays during the week, and occasionally make special requests with a mix of business and leisure focus
2. The Flexible Customer: Well-planned, slightly higher-budget, prefer for shorter stays, and more varied special requests with a balanced mix of business and leisure focus.

Strategies for both hotels to improve their revenue management, customer satisfaction, and operational efficiency:

The flexible customer:
1. Last minute deals
2. Diverse Special Requests
3. Dynamic pricing strategies
4. Efficient check-in/out processes

The planned customer:
1. Advance booking promotions
2. Flexible cancellation policies
3. Business Traveler packages
4. Customized Loyalty Programs

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