

HOTEL CUSTOMER SEGMENTATION AND BEHAVIORAL ANALYSIS

PREPARED BY:
ASSEM MUHAMMAD KHALIL



ABSTRACT

- ❖ This project presents a novel approach to hotel customer segmentation through combining clustering algorithms with the RFM model.
- ❖ The goal is to provide actionable insights for hotel managers and marketers, aiding in the identification, targeting, and retention of diverse customer types based on their value and behavior.
- ❖ The analysis provides a deeper understanding of customer preferences and expectations, aiming to enhance customer satisfaction and loyalty.
- ❖ The study showcases the application and evaluation of different clustering algorithms for effective hotel customer segmentation.

PROBLEM STATEMENT

1. Existing customer segmentation methods, often relying on ML, lack business interpretability. This study proposes a hybrid approach integrating clustering with the RFM model to overcome this limitation.
2. The study performs behavioral analysis on the customers of each segment to gain a better understanding of guest profiles.
3. The study fills a critical gap in current research and offers actionable insights to empower hoteliers to surpass customer expectations.

OBJECTIVES

The main objectives of this study are:

1. To assign each customer to a cluster and label the clusters based on their RFM features.
2. To perform exploratory data analysis on the behavioral features of each customer segment.
3. To provide recommendations for hotel marketing and revenue management based on the customer segmentation results.

METHODOLOGY

1. Data Exploration	
1.1. Importing Libraries & Reading Data	1.6. Examining Variables Distribution
1.2. Understanding the Data	1.7. Investigating Inconsistencies
1.3. Checking for and Investigating Nulls	1.8. Checking Variables Correlation
1.4. Checking & Investigating Duplicates	1.9. Checking for & Investigating Outliers
1.5. Exploring Summary Statistics	1.10. Exploring Categorical Variables

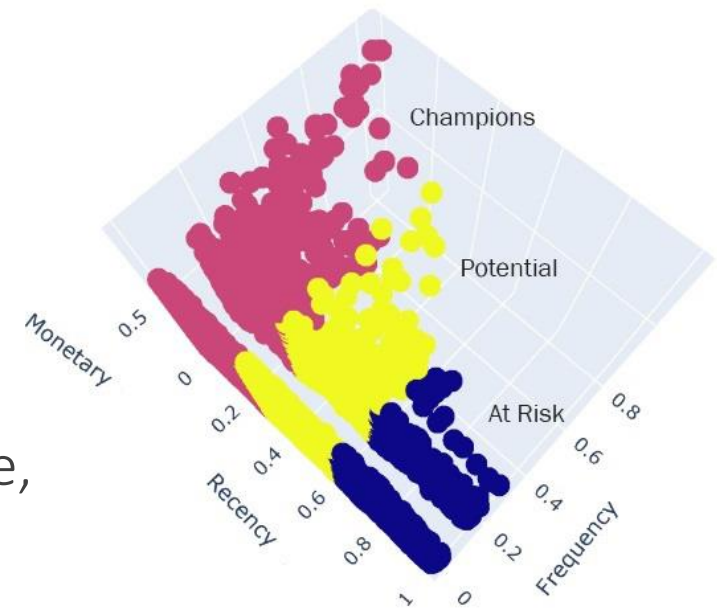
METHODOLOGY

2. Data Preprocessing	
2.1. Handling Full and Partial Duplicates	2.5. Feature Engineering
2.2. Handling Inconsistent Data	2.6. Transforming RFM Variables
2.3. Filtering Out Customers	2.7. Scaling RFM Variables
2.4. Imputing Missing Values	2.8. Dropping Outliers
3. Clustering	
3.1. Building and Evaluating K-Means	3.3. Building and Evaluating BIRCH
3.2. Building and Evaluating DBSCAN	3.4. Selecting the Champion Model
4. Analyzing Customer Segments	
4.1. Labeling Segments	4.2. Providing Recommendations

DISCUSSION

	K-Means	DBSCAN	BIRCH
Silhouette Score	0.4526	0.1677	0.4878
Clusters' Cardinality	0 : 1 : 2 31%:34%:35%	0 : 1 :-1 96%:4%:0%	0 : 1 : 2 57%:43%:0%

- ❖ Despite BIRCH having a slightly higher silhouette score, concerns about cardinality & magnitude favor K-Means.
- ❖ The RFM analysis revealed that cluster 1 holds the highest recency & monetary score, followed by clusters 2 and 0. Thus, the labels "Champions," "Potential," and "At Risk" were assigned to clusters 1, 2, and 0, respectively.

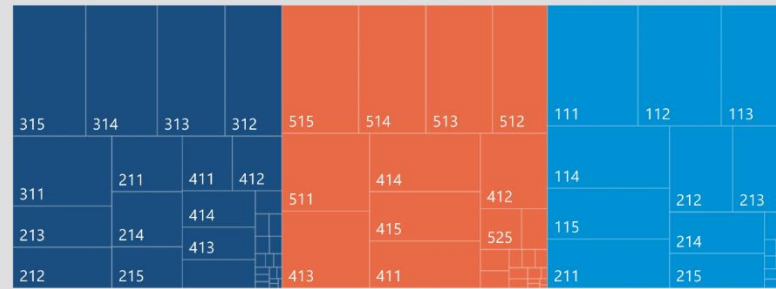


DISCUSSION

Hotel Customer Segmentation and Behavioral Analysis

RFM Scores per Customer Segment

Customer Segments: ● Potential ● Champions ● At Risk



At Risk

6.32	3.09	2.01	0.56
Avg Persons/Night	Avg Rooms/Night	Avg Persons/Room	Avg Occupancy Rate

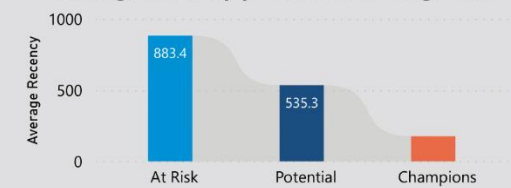
Champions

6.52	3.40	1.91	0.60
Avg Persons/Night	Avg Rooms/Night	Avg Persons/Room	Avg Occupancy Rate

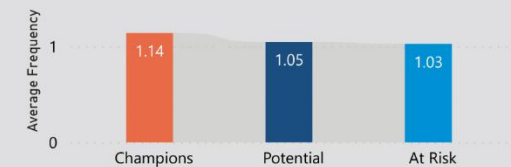
Potential

6.53	3.25	1.99	0.57
Avg Persons/Night	Avg Rooms/Night	Avg Persons/Room	Avg Occupancy Rate

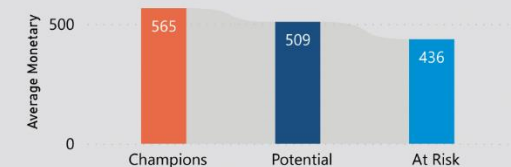
Average Recency per Customer Segment



Average Frequency per Customer Segment

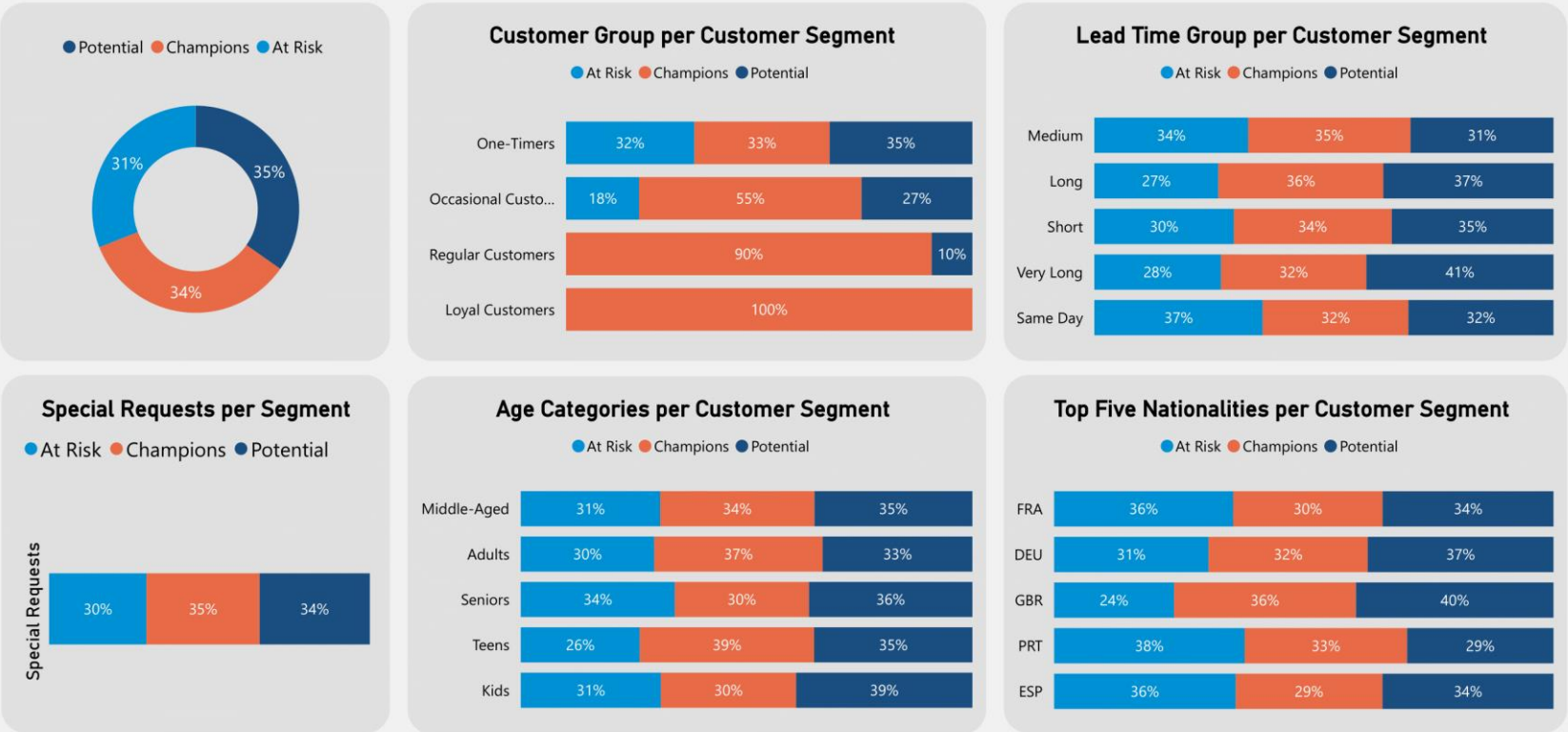


Average Monetary per Customer Segment



DISCUSSION

Hotel Customer Segmentation and Behavioral Analysis



DISCUSSION

Recommendations:

- ❖ Champions: Designing exclusive loyalty programs, leveraging personalized communication, and guaranteeing room availability.
- ❖ Potential: Offering early-bird discounts and special offers and designing family-friendly packages and amenities.
- ❖ At Risk: Offering more budget-friendly packages, promotional deals, and personalized incentives.
- ❖ Geographically targeted marketing, including language assistance and culturally relevant experiences, is suggested to engage diverse customer segments, with specific strategies for French, German, and British guests.

CONCLUSION

- ❖ The proposed method enabled a meaningful categorization of hotel guests based on their booking behaviors.
- ❖ The identification and analysis of these segments provided a foundation to guide more targeted marketing initiatives and service personalization.
- ❖ Tailoring strategies and offerings can better speak to the behaviors and preferences of each customer segment, which is expected to enhance guest satisfaction, loyalty and revenues.
- ❖ While the study has some inherent limitations imposed by the scope of the provided data, it still yields valuable insights, revealing clear patterns and trends within the identified segments.