

Abstract

The objective of this project is to use K-means clustering an unsupervised machine learning algorithm to categorize customers based on characteristics such as demographics, purchasing history and interaction behavior. The purpose is to discover different client segments that can be targeted with specialized marketing techniques that improve marketing campaign efficiency and increase consumer satisfaction and engagement.

Introduction

The objective of the project is to classify consumers into discrete segments using K-means clustering, an unsupervised machine learning algorithm, in accordance with a range of criteria including demographics, purchasing patterns, and interaction records. Through the identification of these segments, organizations are able to customize their marketing strategies in a more efficient manner, thereby increasing consumer engagement and satisfaction. Collecting and preprocessing customer data, clustering customers using the K-means algorithm, and analyzing the resulting segments to obtain insight into customer behavior will comprise the assignment. Statistical metrics and visualizations will be employed to assess the clusters' quality and direct marketing strategies.

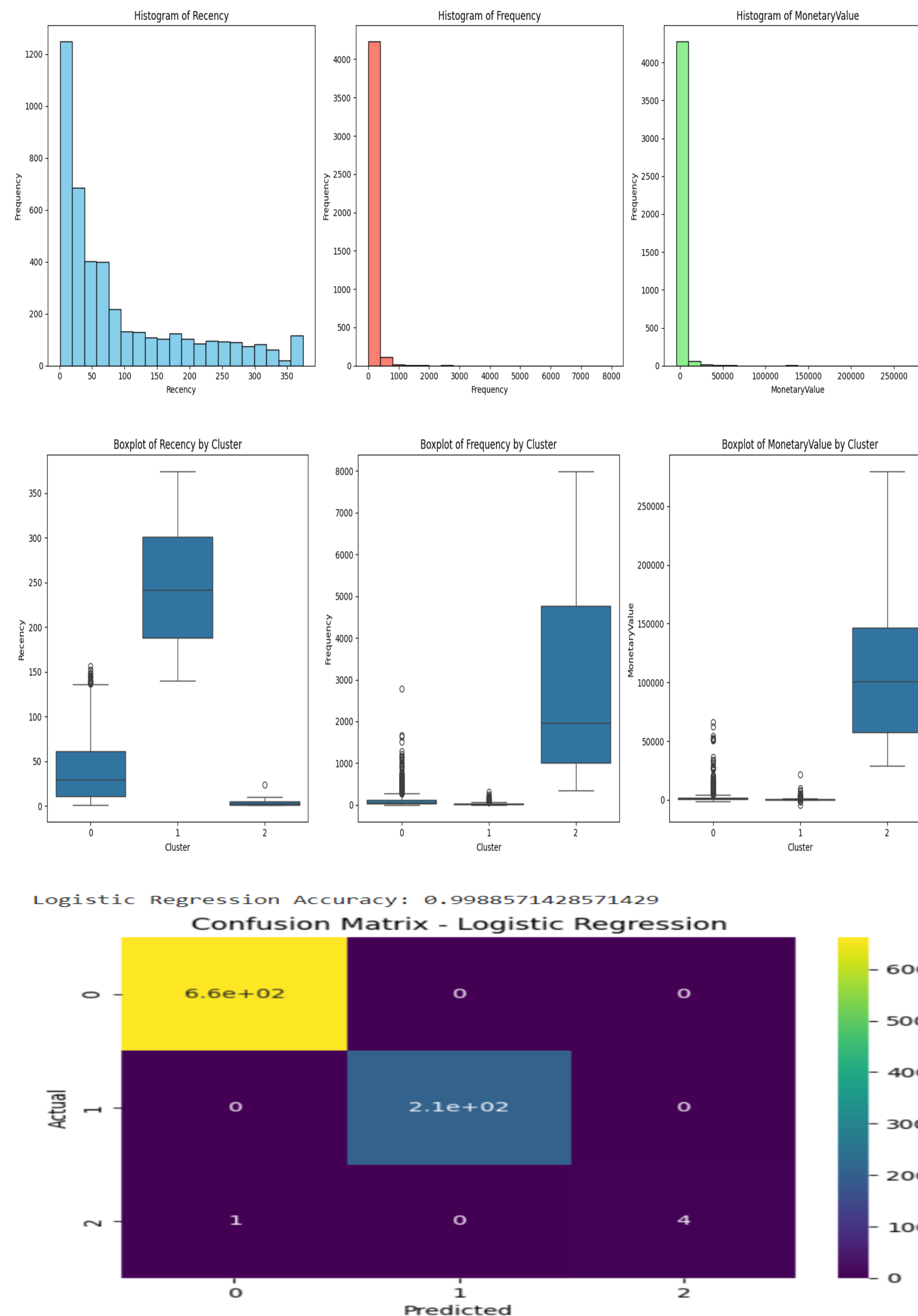
Research

This research aims to investigate the efficacy of utilizing K-means clustering, an unsupervised machine learning algorithm, for customer segmentation in marketing campaigns. By analyzing diverse customer characteristics including demographics, purchasing behavior, and interaction patterns, the study seeks to identify distinct customer segments. The ultimate goal is to optimize marketing strategies by tailoring them to the specific needs and preferences of each identified segment, thereby enhancing campaign efficiency, consumer engagement, and satisfaction. Through rigorous data collection, preprocessing, and clustering techniques, this research aims to contribute to the advancement of customer segmentation methodologies and their practical application in marketing analytics.

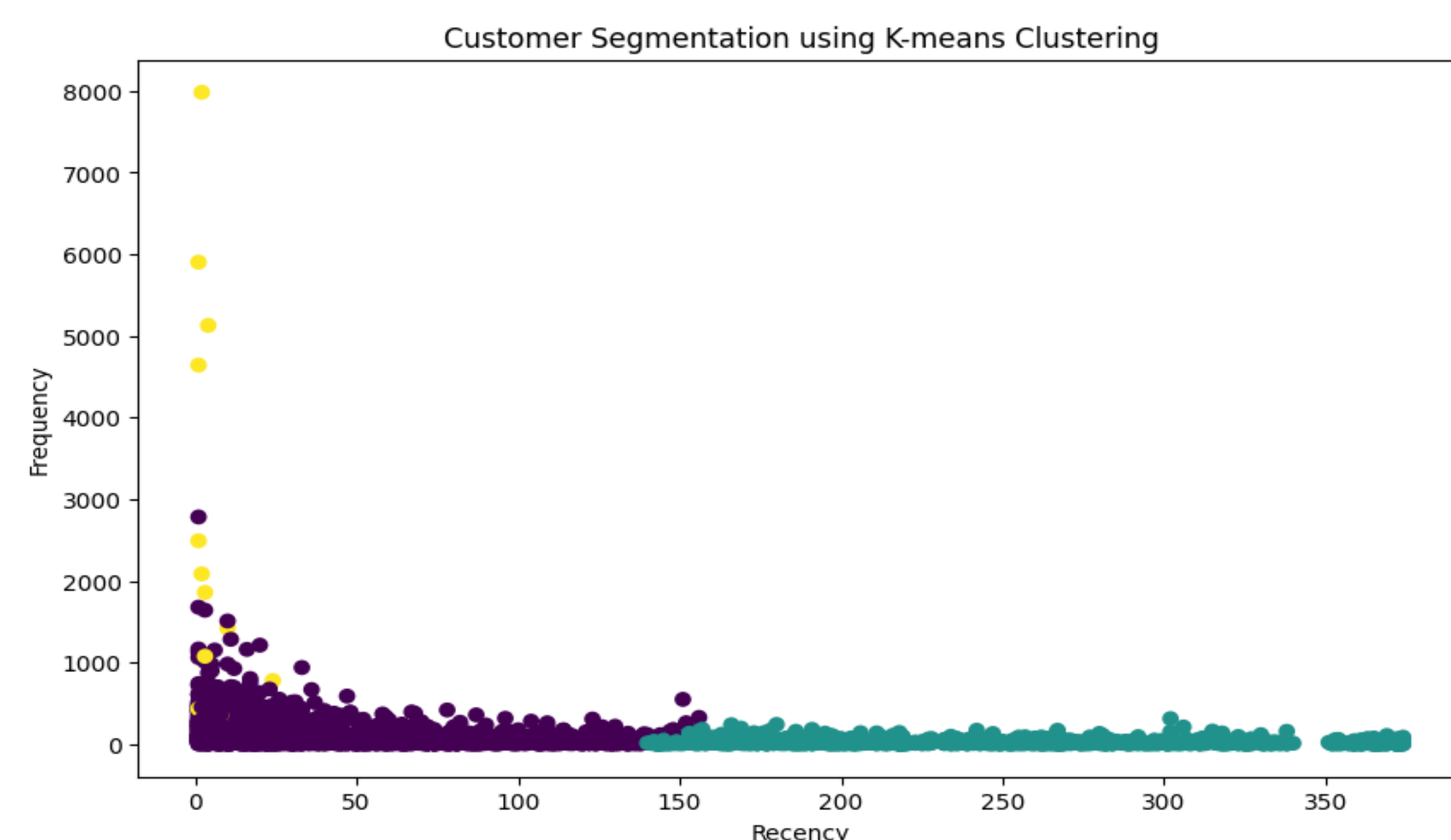
Materials and Methods

- Data Collection: Collect client information like demographics, purchasing history and interaction patterns.
- Data Preprocessing: It is the process of cleaning and preparing data for clustering including the management of missing values and outliers.
- Feature Selection: Determine which features can differentiate client segments.
- K-means Clustering: Use the K-means method to divide clients into different categories.
- Evaluation: Evaluate the clusters' quality using measures like silhouette score or inertia.

Results



Preliminary Results and Analyses



Conclusions

Our K-means clustering consumer segmentation method could assist target marketing actions. Future work includes enhancing the clustering algorithm, analyzing consumer clusters more closely and assessing whether the segmentation improves marketing ROI.

Acknowledgments

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References

- [1] Brahmana, R. S., Mohammed, F. A., & Chairuang, K. (2020). Customer segmentation based on RFM model using K-means, K-medoids, and DBSCAN methods. Lontar Komput. J. Ilm. Teknol. Inf, 11(1), 32.
- [2] Alam, M. F., Singh, R., & Katiyar, S. (2021, December). Customer segmentation using k-means clustering in unsupervised machine learning. In 2021 3rd International Conference on Advances in Computing, Communication Control and Networking (ICAC3N) (pp. 94-98). IEEE.
- [3] Li, Y., Chu, X., Tian, D., Feng, J., & Mu, W. (2021). Customer segmentation using K-means clustering and the adaptive particle swarm optimization algorithm. Applied Soft Computing, 113, 107924.
- [4] Mulyo, I. A., & Heikal, J. (2022). Customer Clustering Using The K-Means Clustering Algorithm in Shopping Malls in Indonesia. Management Analysis Journal, 11(4), 365-371.
- [5] Li, Y., Qi, J., Chu, X., & Mu, W. (2023). Customer segmentation using K-means clustering and the hybrid particle swarm optimization algorithm. The Computer Journal, 66(4), 941-962.