ABSTRACT

COMPARATION OF K-MEANS & FUZZY C-MEANS ALGORITHM IN CUSTOMER SEGMENTATION BASED ON RECENCY, FREQUENCY, AND MONETARY (RFM) ANALYSIS.
(CASE STUDY: SALES DATA KENARI RESTAURANT)

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In In an increasingly competitive and dynamic trade era, a deep understanding of customer behavior becomes crucial for restaurants facing growing competition, especially Kedai Kenari in Semarang, Central Java. Based on sales transaction data at Kedai Kenari from January 2023 to April 2024, information on customer purchases is provided. However, there has been no in-depth analysis of purchasing trends at Kedai Kenari. This study aims to analyze customer behavior using Recency, Frequency, and Monetary (RFM) analysis and to segment customers with K-Means and Fuzzy C-Means (FCM) algorithms. The K-Means and FCM algorithm approaches are based on RFM data. The analysis results identified six customer segments (Champions (31 customers), Golden (102 customers), Occasional (31 customers), Everyday (34 customers), New (27 customers), and Dormant (42 customers)) and 111 unsegmented customers influencing Kedai Kenari's sales strategy based on RFM values. The segmentation results with RFM values provide a direct overview of customers. Furthermore, customer grouping using K-Means and Fuzzy C-Means resulted in four clusters (Active, Loyal, Passive, and At-Risk), with K-Means focusing more on similar RFM characteristics and FCM providing more varied segmentation in customer purchasing patterns. K-Means and FCM were evaluated using the Silhouette Coefficient and Davies-Bouldin Index. The evaluation results show that K-Means and FCM have very small differences, namely 0.844 (K-Means) and 0.843 (FCM) for the Silhouette Coefficient and 0.251 (K-Means) and 0.244 (FCM) for the Davies-Bouldin Index. Based on the evaluation results, K-Means and FCM demonstrate that both methods provide good data clustering with clear clusters. Therefore, to support sales strategy decision-making, Kedai Kenari is advised to utilize RFM analysis and K-Means. This analysis helps to better understand customers and develop more effective marketing strategies. K-Means is prioritized as it produces uniform data clustering, making similar purchasing patterns easily identifiable. However, if the goal is to understand the complexity and variation in purchasing patterns, FCM can be used.

Keywords: Customer Segmentation, Fuzzy C-Means, K-Means, RFM