

Machine Learning-Based Approach and Customer Segmentation: A Review

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ABSTRACT

This chapter examines how machine learning (ML) has revolutionized customer segmentation, transforming traditional demographic and psychographic models into dynamic, data-driven frameworks. By highlighting advanced techniques such as K-means, hierarchical clustering, Gaussian mixture models, and density-based methods (e.g., DBSCAN), it underscores the strategic value of ML in uncovering granular customer insights. A narrative review of prominent ML clustering algorithms and emerging methods (including deep learning integration and hybrid models) is conducted. Case studies and practical applications illustrate how these frameworks scale and adapt to diverse business scenarios. Emphasis is placed on comparing algorithmic strengths, limitations, and suitability for different segmentation objectives. ML-driven segmentation enables hyper-personalized marketing by isolating nuanced customer segments often overlooked by traditional approaches. Real-time feedback loops enhance strategic decision-making and predictive accuracy, allowing businesses to anticipate evolving consumer behaviors. Nonetheless, algorithmic transparency, ethical concerns, and data privacy challenges require vigilant oversight and responsible implementation. By harnessing ML-based segmentation, organizations can boost engagement, loyalty, and profitability in an increasingly data-centric marketplace. Aligning these advanced techniques with robust ethical safeguards fosters consumer trust and strengthens competitiveness. The chapter provides a roadmap for integrating ML into segmentation strategies, demonstrating how responsible, innovative applications can drive sustainable business growth.

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