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The Critical Role of Model Interpretability in Demand Planning and Forecasting

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Abstract: *Model interpretability has emerged as a critical factor in the successful implementation of machine learning and time series forecasting systems within demand planning. As organizations increasingly adopt sophisticated forecasting models, the need to balance prediction accuracy with explainability becomes paramount. The tension between model complexity and transparency presents significant challenges for stakeholders who must understand and trust these systems. While advanced neural networks and ensemble methods offer improved forecasting capabilities, their black-box nature often hinders effective decision-making. This document explores the multifaceted aspects of model interpretability, from fundamental challenges to strategic advantages, and presents a comprehensive framework for building and implementing interpretable forecasting systems. By focusing on stakeholder communication, continuous improvement mechanisms, and practical implementation strategies, organizations can develop forecasting solutions that combine technical excellence with business utility.*

Keywords: Interpretable Machine Learning, Demand Forecasting, Model Transparency, Stakeholder Trust, Decision Support Systems

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