

Machine Learning-Driven Automation in Modern Business Decision-Making Systems

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Abstract: Machine Learning has transformed Business Intelligence by transforming how firms analyze massive volumes of data. This abstract examines how ML is changing BI and decision-making. ML streamlines data collection and preparation via integration, cleansing, and feature engineering. Predictive analytics using ML helps with forecasting, consumer segmentation, demand prediction, and churn analysis. ML detects outliers, fraud, and operational irregularities. Natural Language Processing improves customer service using sentiment analysis, text mining, and chatbots. Personalization is achieved by ML approaches including collaborative and content-based filtering. After preparation, data is analyzed using different methods and algorithms. Real-time monitoring and interactive dashboards are possible with ML-driven data visualization and reporting. ML improves BI accuracy, decision-making speed, customer experience, cost, and competitiveness. However, data quality, ethics, interpretability, and skill shortages must be addressed. Advanced ML, enhanced analytics, edge computing, and ethical AI are future developments. ML transforms BI, therefore firms should use it to maximize its potential and gain a competitive advantage.

Keywords: Machine Learning, Predictive Analytics, Data-Driven Decision Making.