IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.67
Volume 5, Issue 2, February 2025

Data Integration and Feature Engineering for Supply Chain Management: Enhancing Decision-Making through Unified Data Processing

Manu Vallabh Mishra
Technical Architect, Microsoft Business Practices, HCL America, USA

Abstract: *In today's globalized and rapidly evolving marketplace, supply chain management (SCM) relies increasingly on data-driven decision-making. However, the vast array of data sources—from transactional records and sensor feeds to social media and market trends—presents significant challenges for effective data integration and feature engineering. This paper presents a comprehensive framework for data integration and feature engineering tailored for SCM applications. We discuss the use of advanced techniques for cleaning, transforming, and unifying heterogeneous data sources and the extraction of informative features that drive predictive analytics. Our approach leverages state-of- the-art methods including ETL pipelines, data fusion, and automated feature extraction algorithms, which collectively enhance forecasting accuracy, inventory optimization, and risk mitigation in supply chains. Simulation studies and real- world case analyses demonstrate that the proposed framework can improve key performance metrics such as lead time reduction and cost efficiency. Future research directions include incorporating real-time data integration, deep learning- based feature selection, and explainable AI for improved transparency in supply chain decisions.*

Keywords: Supply Chain Management, Data Ingestion, Unified Data Processing, ETL

DOI: 10.48175/IJARSCT-23375