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Deep Reinforcement Learning for Optimal Decision-Making in Supply Chains

Authors : Nitin Singh, Meng Ling, Talha Ahmed, Tianxia Zhao, Reinier van de Pol

Abstract : We propose the use of reinforcement learning (RL) as a viable alternative for optimizing supply chain management, particularly in scenarios with stochasticity in product demands. RL's adaptability to changing conditions and its demonstrated success in diverse fields of sequential decision-making makes it a promising candidate for addressing supply chain problems. We investigate the impact of demand fluctuations in a multi-product supply chain system and develop RL agents with learned generalizable policies. We provide experimentation details for training RL agents and statistical analysis of the results. We study the generalization ability of RL agents for different demand uncertainty scenarios and observe superior performance compared to the agents trained with fixed demand curves. The proposed methodology has the potential to lead to cost reduction and increased profit for companies dealing with frequent inventory movement between supply and demand nodes.

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