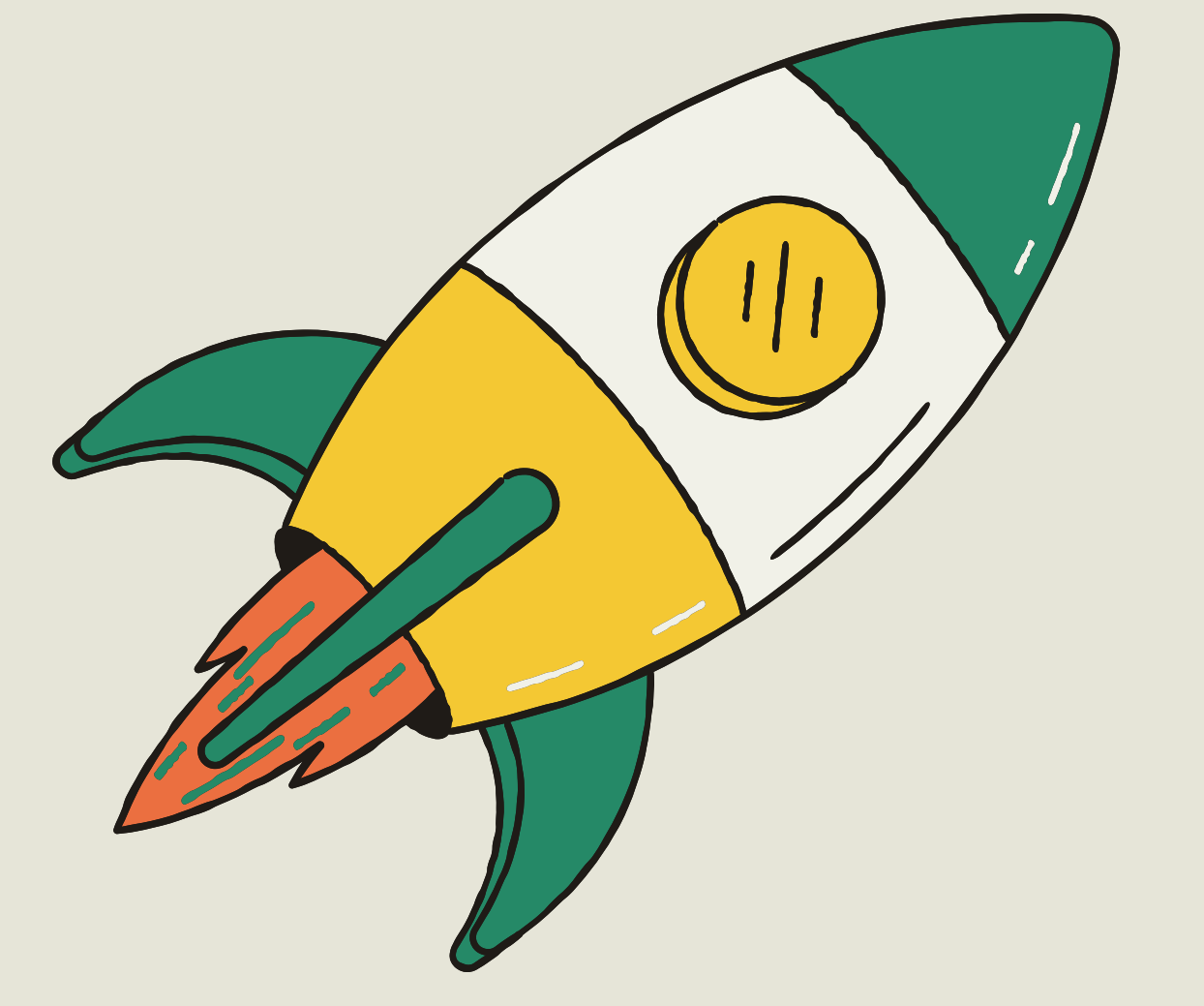


Early Indicators

MLs models excel at capturing complex patterns in historical data. This allows for more nuanced detection of unexpected demand spikes and dips, enabling us to pinpoint potential upstream or downstream issues with greater accuracy.

By analyzing historical delivery times, fulfillment rates, and communication patterns, LLMs models learn supplier behavior. Deviations from these established patterns can now trigger earlier warnings of potential disruptions at the supplier level.

LSTMs learn the historical trends of raw material prices. Significant deviations can now be identified more effectively, potentially revealing shortages, geopolitical issues, and disruptions impacting production costs.

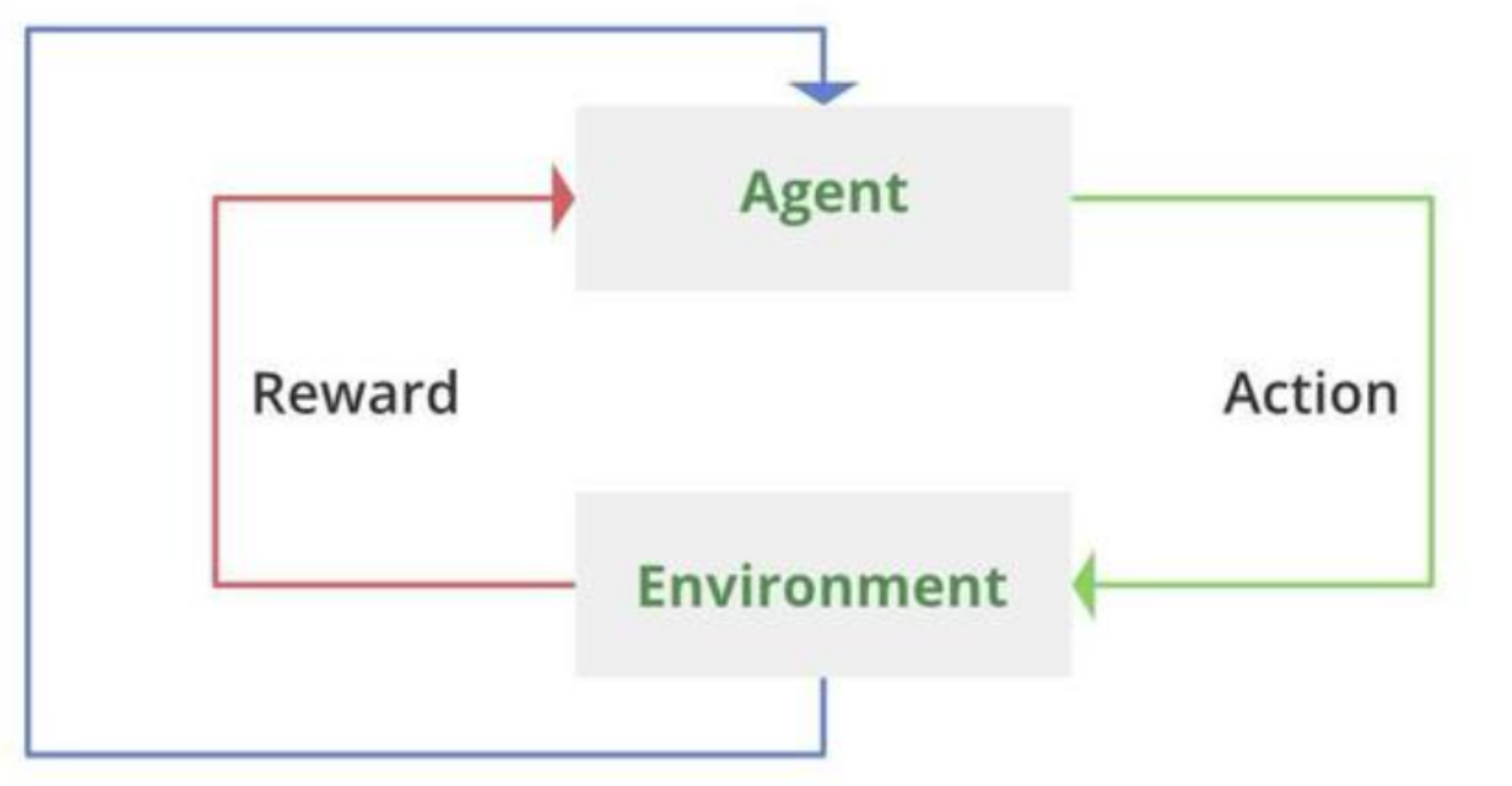


AI-POWERED DECISION SUPPORT FOR RESILIENT SUPPLY CHAINS: MITIGATING RISKS AND OPTIMIZING PERFORMANC

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Next Steps

Applying reinforcement learning models, agents will be trained to autonomously make real-time decisions in response to supply chain disruptions, optimizing actions based on feedback loops and learned state strategies. These agents enhance agility by adapting to dynamic environments, mitigating disruptions, and improving supply chain resilience.



INTRODUCTION

Supply chain resilience refers to the ability of a supply chain to anticipate, adapt, and recover swiftly from unforeseen disruptions while maintaining operational continuity. Artificial Intelligence (AI) is a key enabler in achieving this goal, AI can contribute to supply chain resilience by developing business continuity capabilities and enhancing visibility, sourcing, and distribution capabilities, AI can also help in real-time risk assessment, enabling businesses to identify and mitigate potential disruptions in the supply chain.



TOOLS

METHODOLOGY

Utilizing a multi-industry approach, we'll gather datasets from diverse companies. Employing Data Preprocessing and Feature Engineering techniques, we'll standardize data for consistency. LSTM algorithms will then be applied to historical datasets, encompassing past disruptions and demand fluctuations. Trained models will discern patterns, enabling real-time prediction of potential disruptions from ongoing data streams.

RESEARCH QUESTION

How can AI-powered demand forecasting systems improve risk management in the supply chain by identifying potential disruptions and providing proactive solutions?

What role does real-time data integration play in optimizing supply chain performance, and how can AI-driven technologies enhance this process for better decision-making and adaptability?

Technologies



RELATED LITERATURE

McKinsey (2023) reported that effective use of AI in inventory control can lead to a 20% reduction in inventory carrying costs and a 50% decrease in stockouts, emphasizing the significant impact of AI on supply chain operations.

GJIA (2024) discussed the role of AI in developing resilient supply chains, particularly in supply chain planning, production, inventory management, and product distribution, showcasing how companies can leverage AI technologies to enhance supply chain resilience.

Rohit Kumar Singh (2023) investigated how artificial intelligence is used to enable resilience among supply chains and found that the disruption impact of an event depends on the degree of transparency kept and provided to all supply chain partners.

Sunil Kumar Jauhar (2023) proposed a No Code Artificial Intelligence (NCAI) model to enable non-technical companies to build machine learning models based on production quantity and inventory replenishment.

Samuel Fosso Wamba (2022) proposed a novel framework based on Artificial Intelligence, Blockchain, and Big Data Analytics to bring useful ideas and contribute to overcoming such disruptions, which can support new insights for scholars and practitioners about the use of cutting-edge technologies during and after severe disruptions.

RESEARCH METHODOLOGY