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Delay Prediction on Inventory Shortages in Sports Equipment Supply Chain

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Content

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Introduction

- **Context:**

  - Modern supply chains often face delays and inventory shortages.

  - Inefficiencies in traditional methods lead to higher costs and dissatisfaction.

- **Problem:**

  - Current forecasting methods fail to adapt to real-time and seasonal changes.

- **Objective:**

  - Use advanced models to predict delays and improve inventory management in sports equipment supply chains.

Research Aim	Research Objective
(a) Develop an effective forecasting framework for supply chain optimization.	(a) Pre-process and analyze historical inventory and sales data. (b) Visualize actionable insights using Tableau and Power BI. (c) Evaluate forecasting models such as ARIMA, XGBoost, SARIMA, and LSTM.

Methodolody

- **Approach:**

  - Quantitative analysis of 2015-2018 supply chain data.

- **Framework:**

  - Traditional Models: ARIMA, SARIMA.

  - Machine Learning Models: XGBoost, LSTM.

  - Hybrid Model: ARIMA + XGBoost.

- **Tools:**

  - Python, Tableau, Power BI.

- **Hybrid Framework:**

  - Combines traditional and machine learning approaches.

- **Insights:**

  - Seasonal demand patterns and supplier reliability as key factors.

  - Effective delay predictions improve customer satisfaction.

- **Visualization Tools:**

  - Facilitate actionable insights for stakeholders.

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Challenges and Limitations

- **Data Issues:**

  - Missing values and quality concerns.

  - Limited real-time data.

- **Computational Requirements:**

  - Models like LSTM demand high resources.

- **Adaptability:**

  - Real-time and dynamic updates needed.

Future Work

- **Expanding the Dataset:**

  - Integrate real-time and diverse industry data.

- **Model Enhancements:**

  - Explore ensemble learning and reinforcement learning.

- **Scalability:**

  - Develop cloud-based solutions for real-time predictions.

- **Ethical Focus:**

  - Address data privacy and transparency.