Sales Forecasting Using AI and Deep Learning

Abstract

Accurate sales forecasting is essential for supply chain optimization, revenue planning, and inventory management. Traditional time-series forecasting methods often fail to adapt to dynamic market conditions. This project proposes an **AI-powered deep learning approach** using **Temporal Convolutional Networks (TCNs), LSTMs, and Transformer models** to predict sales trends with high precision.

The dataset includes historical sales data, customer purchase behavior, social media trends, and seasonal variations. The deep learning model employs **attention mechanisms** to identify key influencing factors and optimize demand forecasting. Additionally, **reinforcement learning-based predictive agents** simulate different market scenarios to provide businesses with real-time decision-making capabilities.

The model is further enhanced with **GAN-based data augmentation** to handle sparse datasets and improve generalization. AI-driven **predictive analytics dashboards** visualize sales trends, offering insights for marketing and supply chain teams. Future developments may integrate **AI-powered chatbot assistants** for personalized customer engagement and sentiment-driven demand prediction.