

Sales Forecasting Prediction Using Machine Learning

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Abstract: *This research paper presents a machine learning-based approach for predicting sales in the retail sector, using Big Mart as a case study. The study outlines the complete workflow, including data preprocessing, feature engineering, and model training using the XGBoost Regressor algorithm. The primary objective is to accurately forecast sales to support inventory management, resource planning, and strategic decision-making. Through rigorous experimentation and model evaluation, the study demonstrates the effectiveness of the proposed approach in delivering reliable sales predictions for Big Mart.*

Sales forecasting is a vital function for businesses, enabling them to anticipate future demand, allocate resources efficiently, and optimize operational processes. Traditional forecasting methods often rely heavily on historical trends and manual analysis, which may not adequately capture the complex, non-linear, and dynamic nature of modern markets. In contrast, machine learning techniques offer advanced capabilities to identify hidden patterns, model complex relationships, and adapt to real-time changes in data.

The paper also includes a detailed case study that illustrates the practical implementation of a machine learning-based sales forecasting system for a retail organization. This case study involves steps such as cleaning and preparing sales data, engineering relevant features, selecting suitable machine learning models, and evaluating model performance using standard metrics. The findings from this case study provide valuable insights into the effectiveness of machine learning for retail forecasting and highlight the practical benefits for businesses looking to adopt data-driven decision-making strategies..

Keywords: Sales forecasting, Machine learning, Regression models, Time series analysis, Ensemble methods Data, preprocessing, Feature selection, Model evaluation, Deployment

