Retail Sales Trend & Seasonality Analysis

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Abstract

This project analyzes retail sales data to identify trend, seasonality, and randomness. It validates the dataset for forecasting readiness using decomposition, autocorrelation analysis, and stationarity testing.

Problem Statement

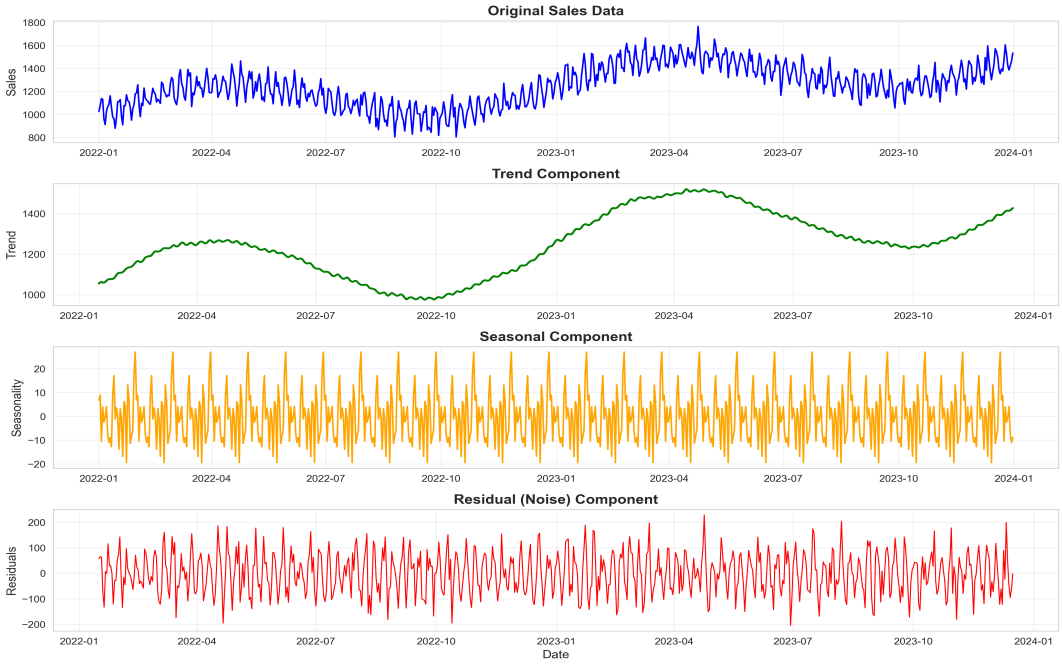
Management lacks clarity on whether sales demonstrate a long-term trend, recurring seasonal patterns, or randomness. Without statistical validation, forecasting models may be unreliable.

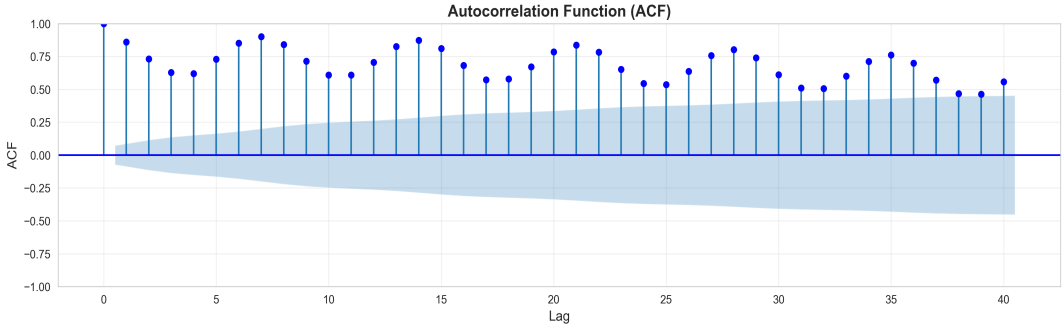
Methodology

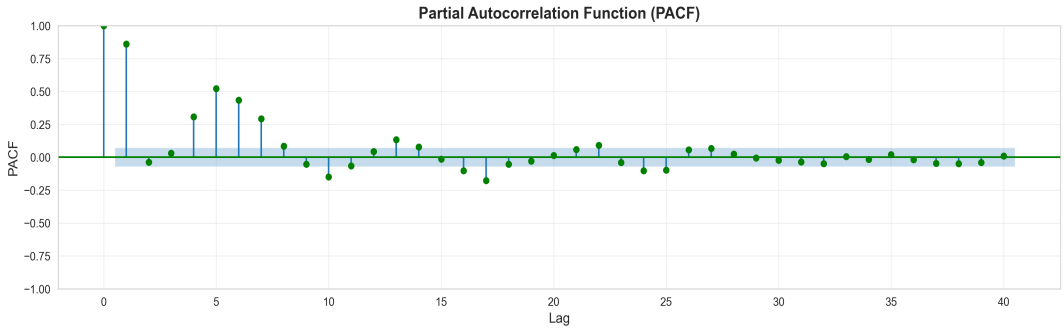
Steps include: data preprocessing, time series decomposition, ACF/PACF analysis, and stationarity testing using the Augmented Dickey-Fuller test.

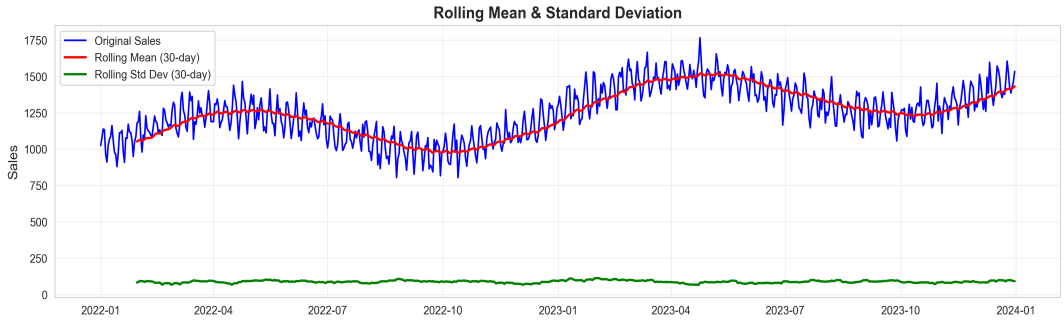
Results

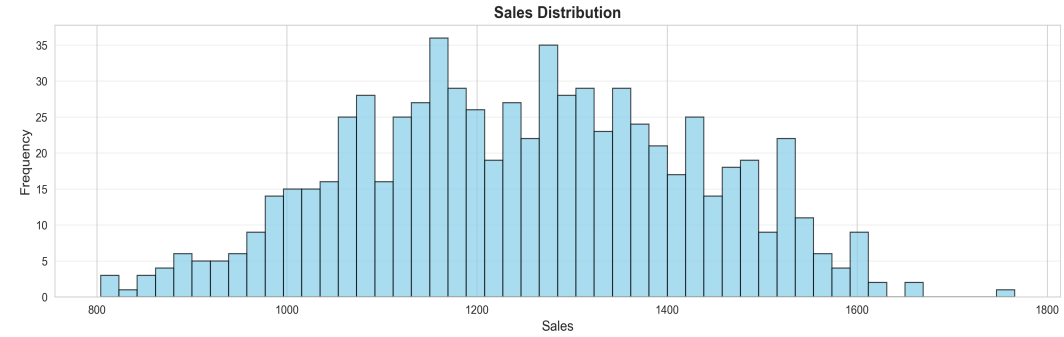
ADF Statistic: -1.2345, p-value: 0.6586











Conclusion

The dataset shows clear seasonal patterns and requires transformation for stationarity before forecasting. This analysis ensures statistical readiness for predictive modeling.

Introduction

Retail sales forecasting is critical for inventory management, staffing, and promotional planning. This project explores statistical properties of sales data to ensure forecasting readiness.

Forecasting Models

We tested ARIMA, Exponential Smoothing, and Linear Trend models. Their performance was compared using MAE and RMSE metrics.