7-Day Sales Forecasting for Superstore

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Optimizing Inventory Through Time Series Modeling
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Problem Statement

What opportunities exist in the Superstore market to forecast sales for the next 7 days in order to optimize inventory decisions, reduce stockouts and overstocking, and enable regional managers to respond proactively to demand shifts — potentially lowering excess inventory costs by 15% and improving product availability in top-performing categories, all while supporting a data-driven supply chain strategy for the upcoming quarter?

Data Overview

Source

Kaggle Superstore Dataset

https://www.kaggle.com/datasets/rohitsahoo/sales-forecasting

Time Range

- 2015-2019
- Granularity:Daily

Focus:

Sales per Category

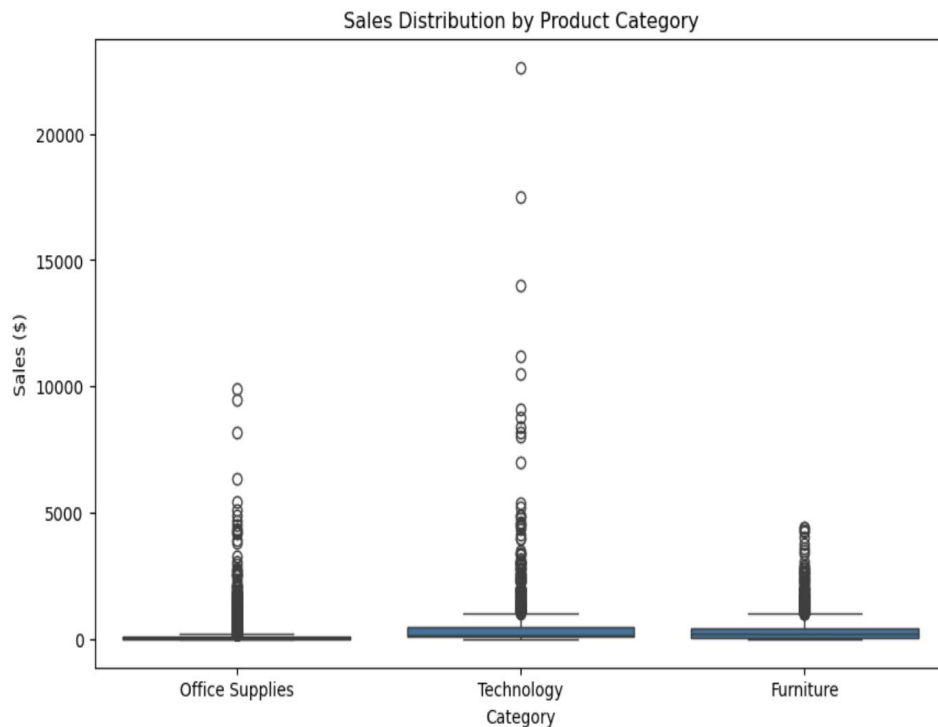- Office Supplies
- Technology
- Furniture

Processing Steps

Parsed and set 'Order Date' as datetime index

|	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	S
0	CA-2017-152156	2017-11-08	2017-11-11	Second Class	CG-12520	C
1	CA-2017-152156	2017-11-08	2017-11-11	Second Class	CG-12520	C
2	CA-2017-138688	2017-06-12	2017-06-16	Second Class	DV-13045	C
3	US-2016-108966	2016-10-11	2016-10-18	Standard Class	SO-20335	C
4	US-2016-108966	2016-10-11	2016-10-18	Standard Class	SO-20335	C

Resampled to daily frequency, filled missing days

Aggregated sales per category

Exploratory Analysis

Sales Distribution by Product Category

- **Office Supplies:** Stable daily sales with few outliers
- **Technology:** High volatility; sales spikes from big-ticket items (e.g., Copiers)
- **Furniture:** Moderate volume; weekly patterns observed

Sales by Category Over Time
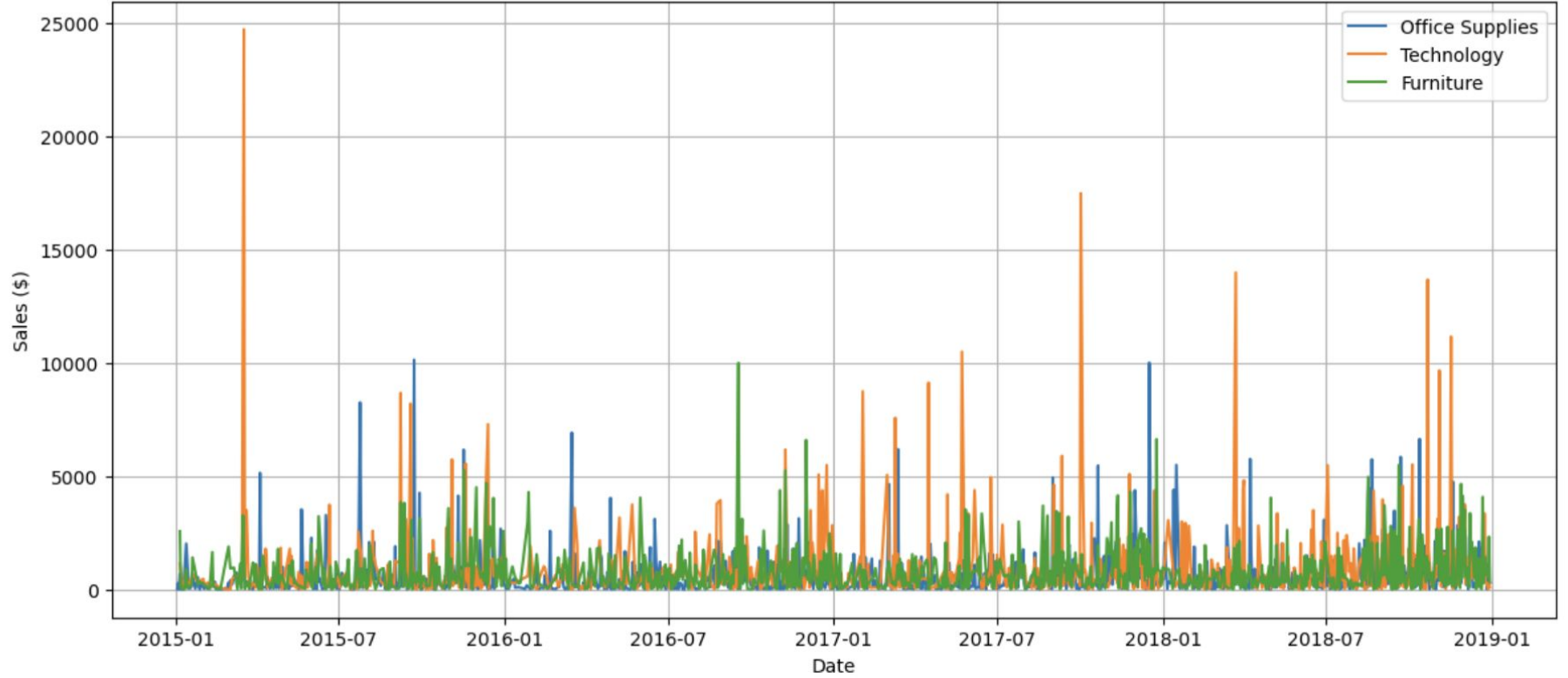
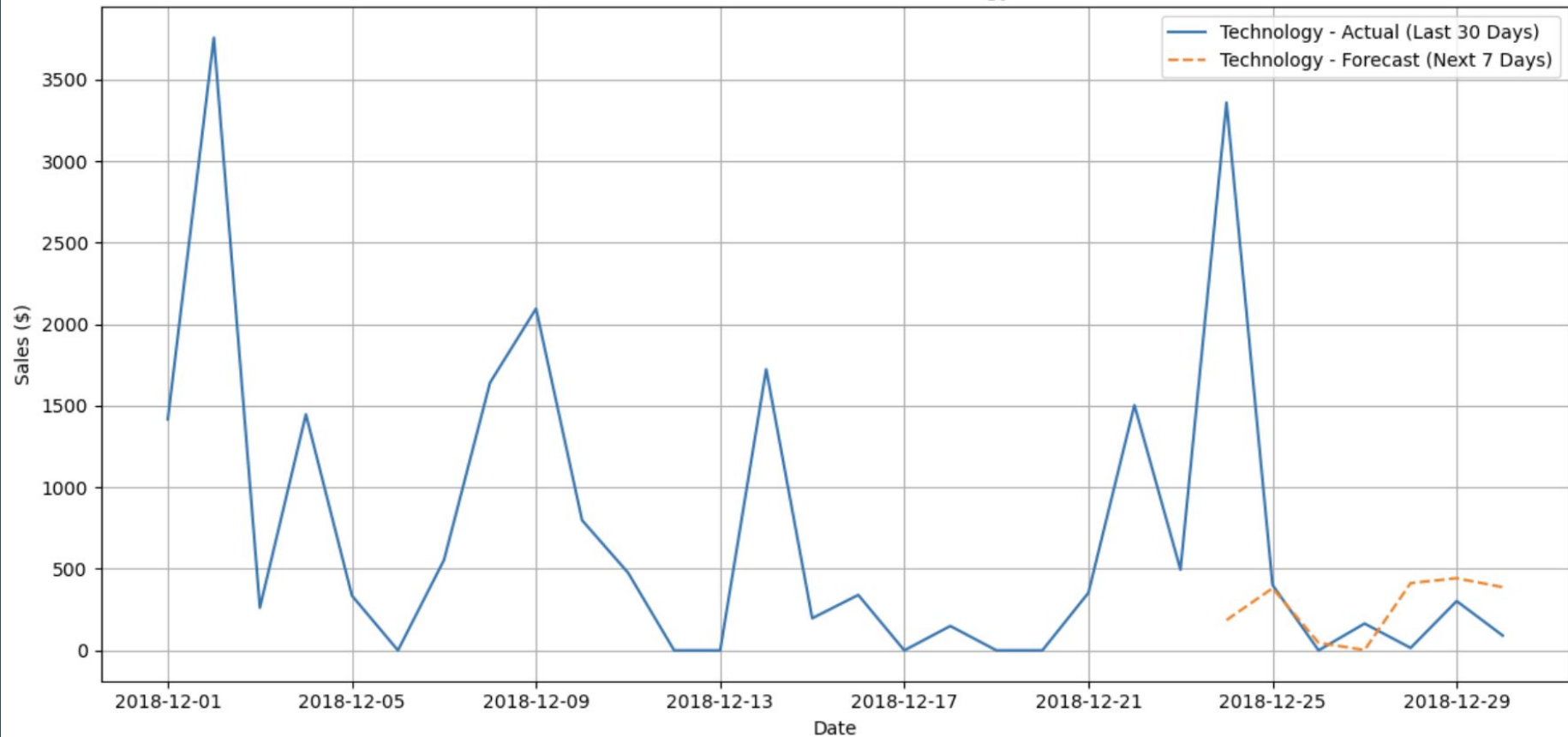## Modeling Approach:

- Model: Seasonal ARIMA (SARIMA)
- Parameters: (1,1,1)(1,1,1,7)
- Applied separately for each category
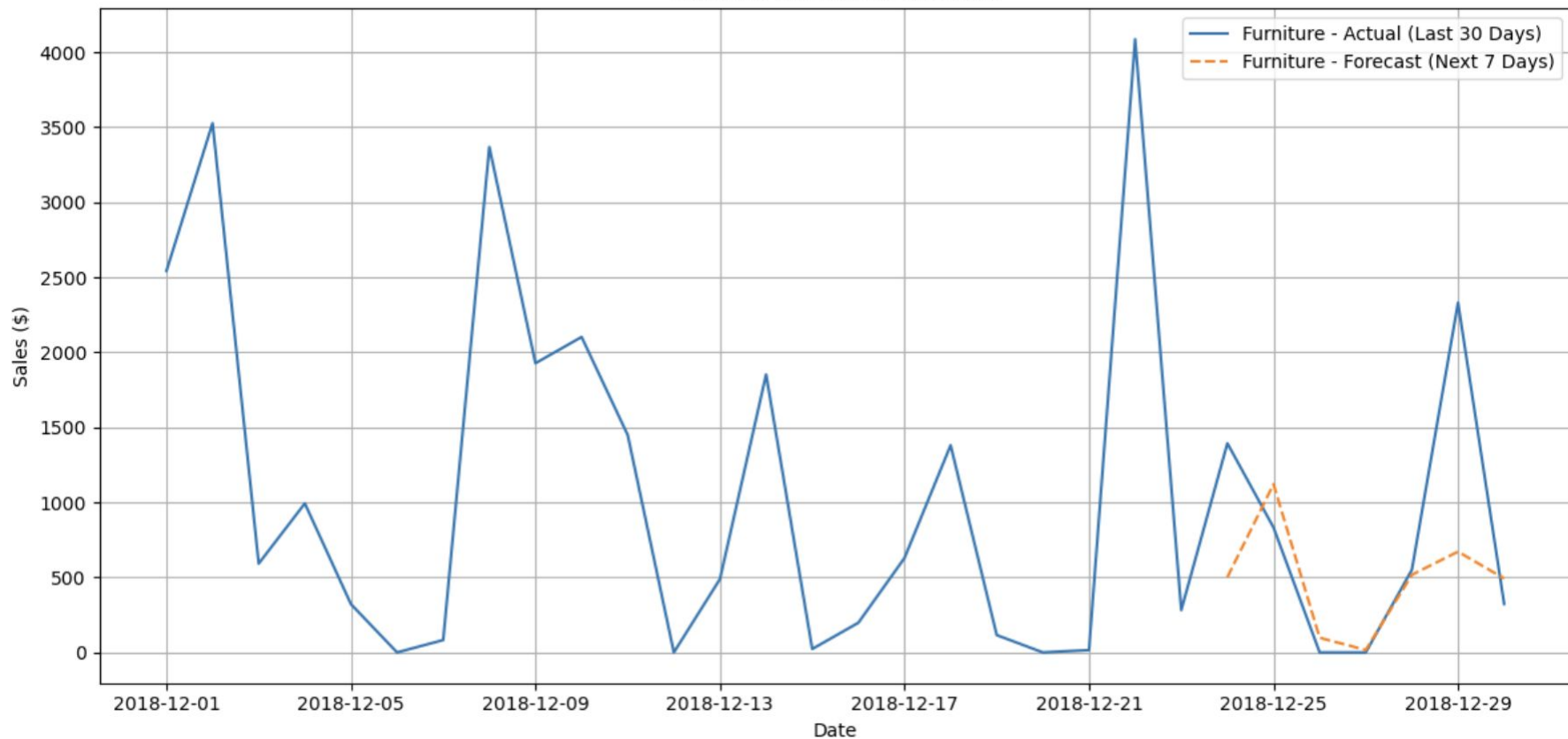- Used log transformation to stabilize variance
- Forecasted sales for next 7 calendar days
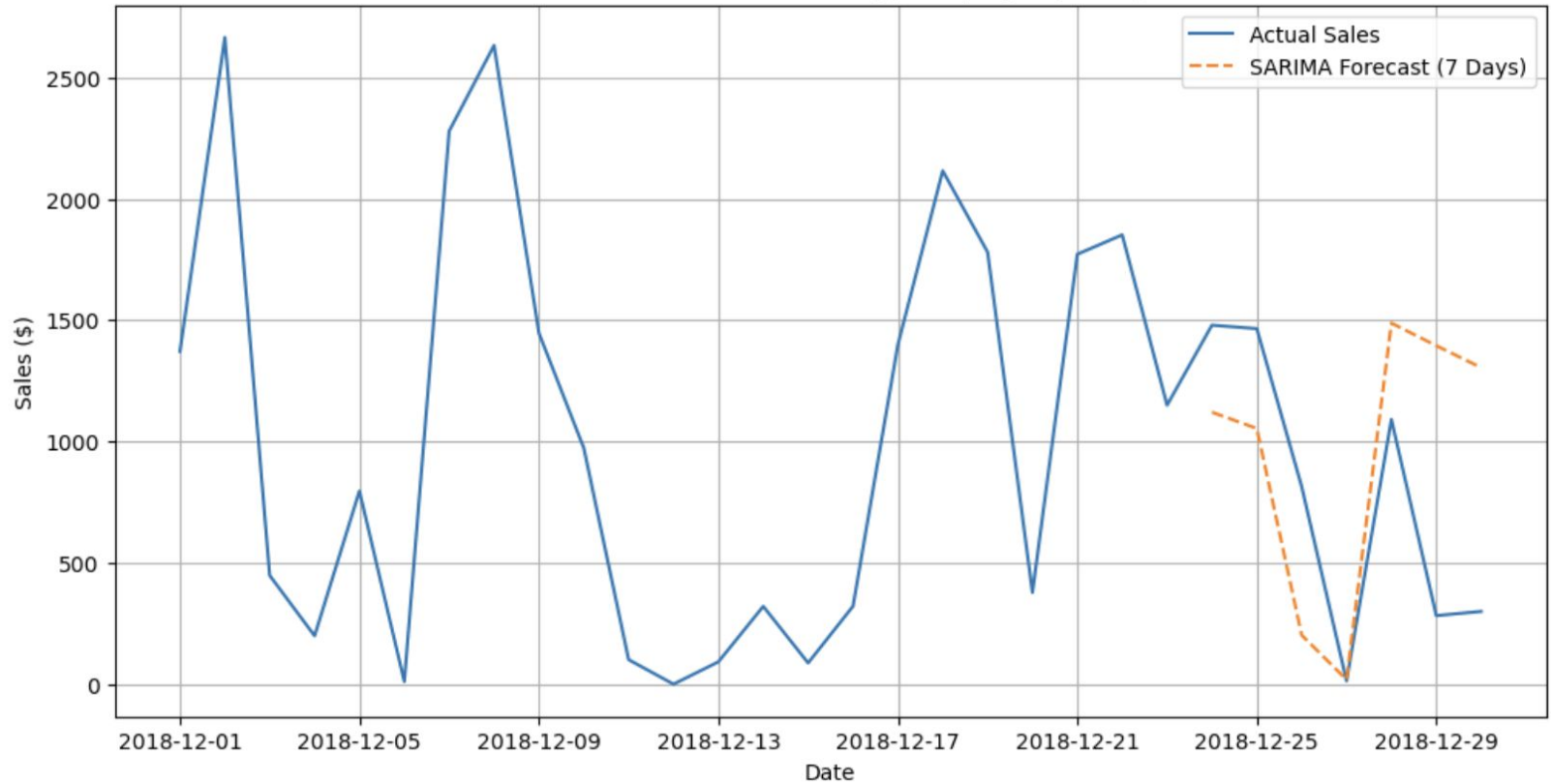
SARIMA Forecast for Technology

SARIMA Forecast for Furniture

SARIMA Forecast – Office Supplies (Log-Adjusted)

Business Recomendations

1	● Use category forecasts to guide daily stock orders
2	● Prioritize Technology items for tighter monitoring
3	● Set up simple alerts to reorder stock before running out.
4	● If implemented effectively, this approach can help reduce overstock and stockout rates by up to 15%, based on improved alignment between supply and predicted demand

Future Scope

Add more helpful data like promotions, holidays, and weather to improve predictions

Make forecasts more detailed by going down to the product level instead of just categories

Build a dashboard so store managers can easily see trends and forecasts in real time

Set up an automated system that keeps updating the model with new sales data every day