Walmart Sales Performance Analysis

Executive Summary

This analysis reviews Walmart sales data from 2010 to 2012, involving 45 stores across various departments. The goal is to uncover revenue-driving patterns, evaluate promotion effectiveness, and provide actionable insights to guide business strategy. Methods included exploratory data analysis, time series decomposition, markdown correlation testing, and forecasting using Prophet.

Key Insights

- Sales exhibit strong seasonal peaks around major holidays such as Black Friday and Christmas.
- Markdown1 shows slight positive correlation with sales; Markdown2 - 4 appear ineffective overall.
- Store Type A consistently generates the highest revenue across all locations.
- Fuel prices and temperature show minimal influence on sales performance.
- Prophet-based forecasts reveal clear cyclical patterns, enabling proactive resource planning.

Strategic Recommendations

- Redirect markdown spending from underperforming categories (Markdown2–4) to more impactful tactics.
- Use sales forecasts to align inventory and staffing with peak seasons.
- Investigate Store Type A’s operational best practices for potential replication.
- Assess markdown strategies at the department level rather than globally.
- Implement A/B testing to measure and optimize promotional effectiveness.

Methodology & Tools

The dataset combined historical weekly sales with auxiliary data such as markdowns, holidays, fuel prices, and weather conditions. Data cleaning included handling missing markdown values with zero imputation. Exploratory Data Analysis (EDA) was performed using pandas, matplotlib, and seaborn. Time-based features (year, month, week) were engineered to identify trends and seasonality. Prophet was applied to forecast weekly sales,

providing insights into future performance. All visualizations were exported as PNG files and used to support a stakeholder-facing Canva presentation.

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