Walmart Capstone Project

Summary

Walmart is a multinational retail corporation and one of the world's largest and most well-known retail chains.

Problem Statement

Walmart is experiencing difficulties in managing its inventory effectively, leading to challenges in aligning product supply with varying consumer demand

Project Objective

The primary objective is to create accurate prediction models using fbprophet that forecast sales for the retail store over a defined period of 12 weeks. This will enable the optimization of inventory levels, ensuring a seamless alignment between anticipated demand and actual supply across all outlets.

Lets delve into our data for a Comprehensive Overview

The dataset comprises historical sales data, inventory levels, and relevant variables such as promotional activities, seasonal trends, and economic indicators. It encompasses data from multiple outlets, providing a comprehensive view of the retail operations.

Feature Name	Description
Store	Store number 45 Stores across
Date	Weekly date
Weekly Sales	Sales done by the particular Store in week
Holiday_Flag	If it is a holiday week
Temperature	Temperature on the day of the sale
Fuel_Price	Cost of the fuel in the region
CPI	Consumer Price Index
Unemployment	Unemployment Rate

Data Pre-processing Steps

The data pre-processing involves handling missing values, normalizing data, and encoding categorical variables.

Exploratory Data Analysis (EDA) and Insights

Check Data Summary and Quality

Examine basic statistics, missing values, and data types

Ensure data integrity and cleanliness

Algorithm Used

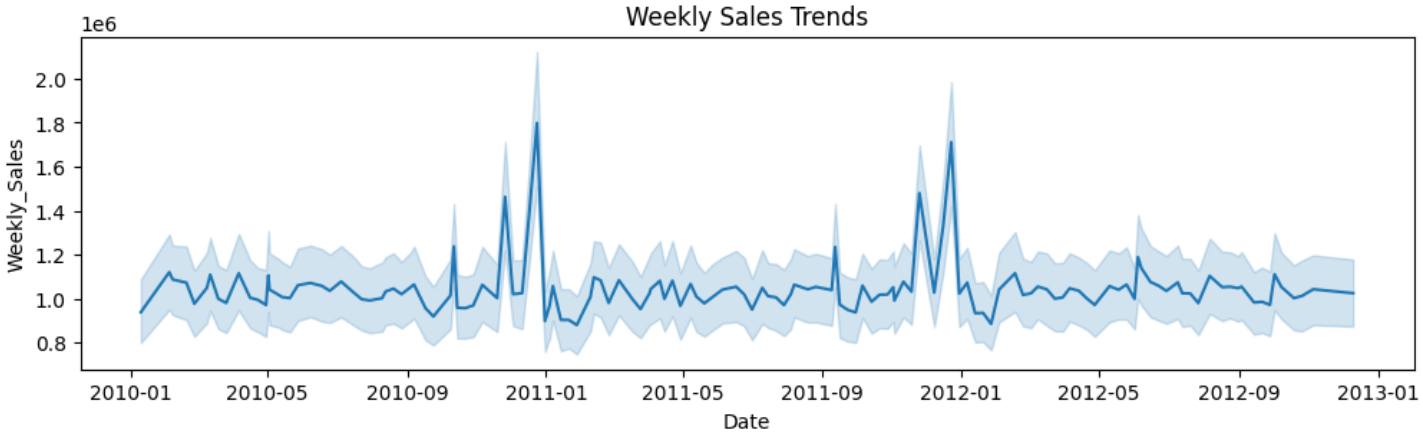
For this project, the p**rophet** algorithm is chosen due to its effectiveness in time-series forecasting, especially in scenarios where there are seasonal patterns and holidays influencing sales data.

Motivation and Reasons For Choosing the Algorithm

The motivation for selecting fbprophet lies in its ability to handle various time-series forecasting challenges, including seasonality, holidays, and trend changes. It offers simplicity and ease of use, making it suitable for quick implementation and interpretation.

Assumptions

Assumptions include the persistence of historical sales patterns, the relevance of external factors (e.g., promotions, economic conditions), and the stability of consumer behavior. These assumptions guide the model-building process.



Model Evaluation and Techniques

Model evaluation involves assessing accuracy metrics specific to fbprophet, such as Mean Absolute Percentage Error (MAPE) and visual inspection of forecast plots. Cross-validation techniques and train-test splits will be employed to validate the model's performance on unseen data.

Score 5.43 %

Inferences from the Same

The model evaluation results will provide insights into the accuracy and reliability of the forecasting models using prophet. Inferences will guide potential adjustments to the algorithm or data preprocessing steps for further refinement.

Weekly Sales Performance Analysis:

1. **Sales Enhancement Recommendations:**

Special Offers Strategy:

- Identify high-performing stores and implement targeted special offers.
- Tailor promotions to boost sales in underperforming stores.

Inventory Management:

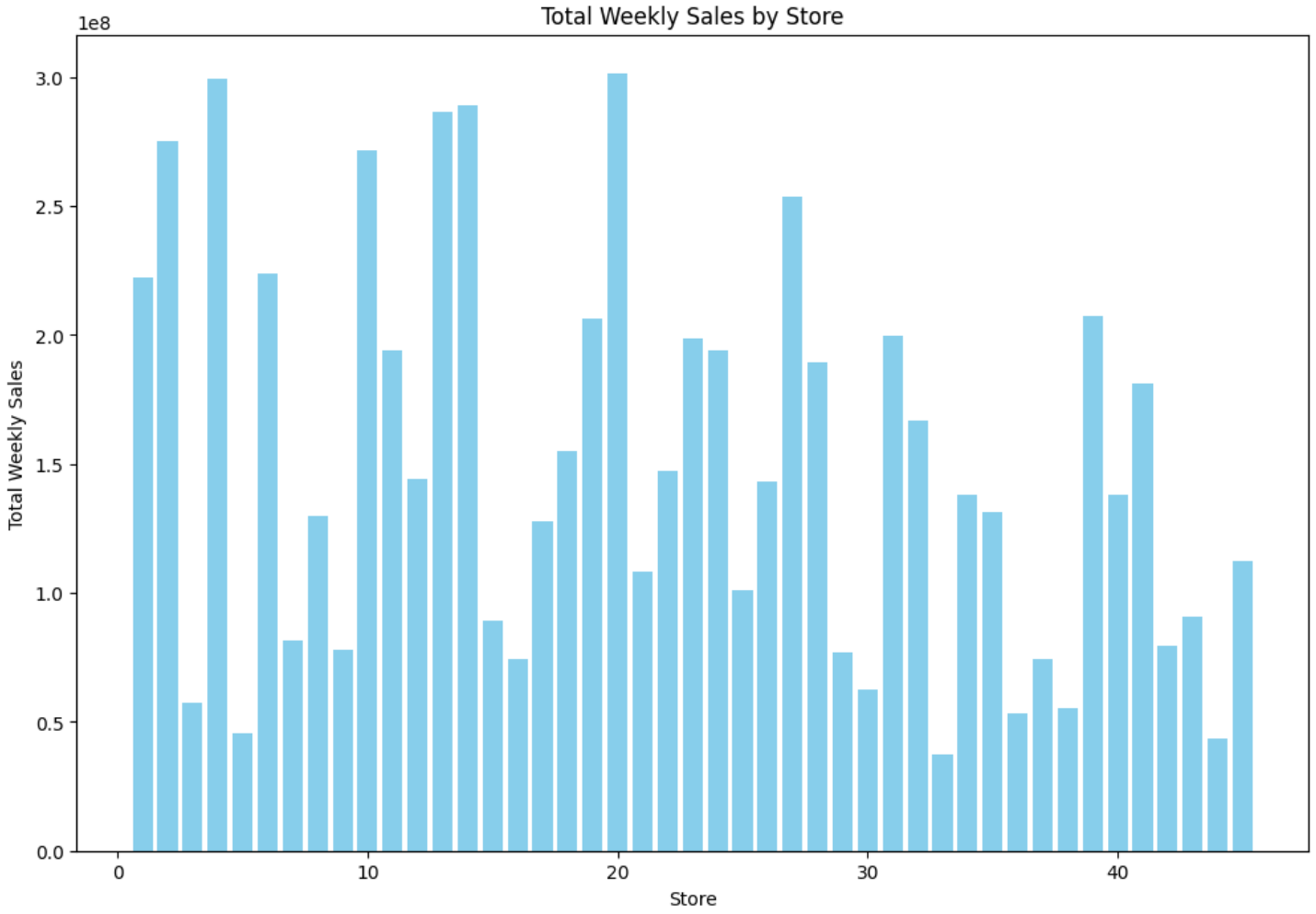
- Adjust inventory levels based on individual store sales patterns.
- Focus on stocking products with high demand in low-sales stores.

Staff Allocation:

- Optimize staff allocation according to store-specific sales trends.
- Ensure adequate staffing during peak periods.

Product Analysis:

- Identify top-selling products in underperforming stores.
- Increase stock for popular products to meet customer demand.



Predictive Analysis: Forecasting Sales Across All Stores for the Next 12 Weeks Store wise and in all.

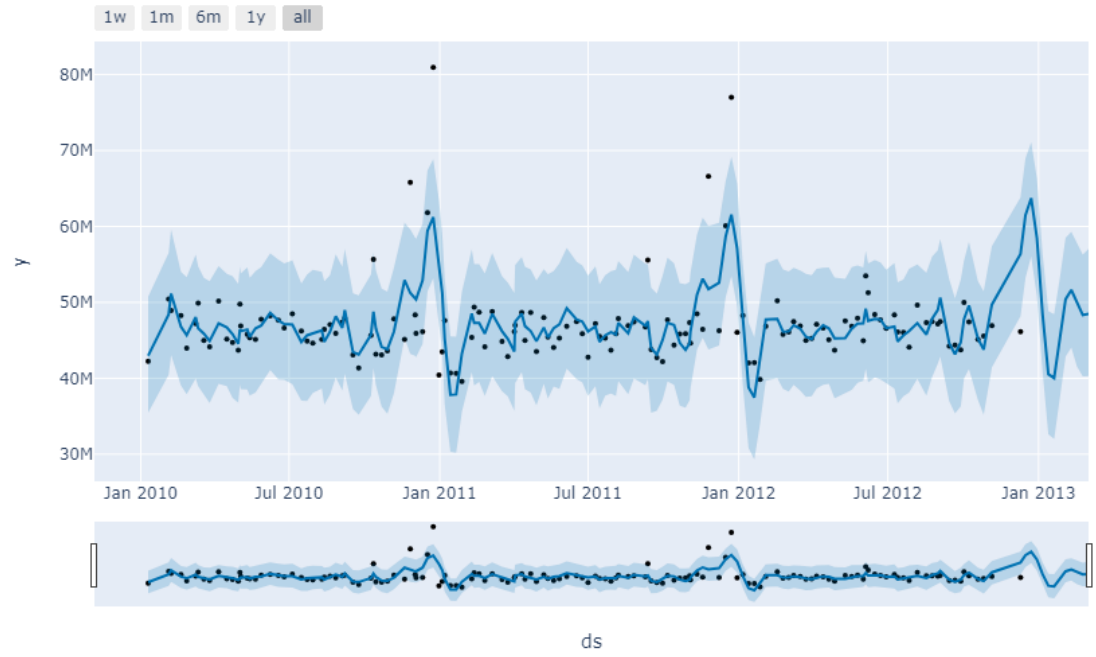
Holistic Holiday Sales Strategy: Maximizing Year-End Trends for Optimal Success

Strategic Inventory Planning:

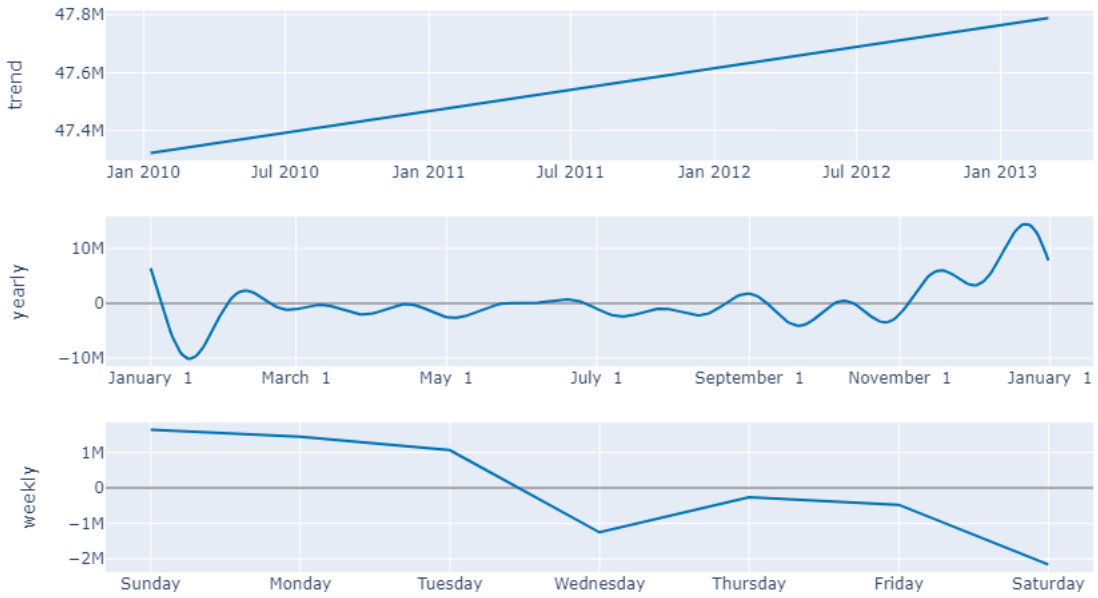
- Proactively manage inventory for the year-end holiday surge.
- Ensure ample stock to meet seasonal demand and capitalize on sales opportunities.

Efficient Workforce Management:

- Strategically plan workforce allocation to accommodate holiday sales demands.
- Ensure adequate staffing levels for seamless customer service during peak periods.



Sales Trends



Wednesday Revitalization Strategy: Planning Targeted Sales and Offers to Boost Midweek Performance

Strategic Sales Initiatives:

- Introduce targeted promotions and discounts specifically designed for Wednesdays.
- Implement limited-time offers to create urgency and drive sales.

Customer Engagement:

- Leverage email campaigns and social media to promote Wednesday-exclusive deals.
- Encourage customer loyalty through loyalty programs or special incentives.

Product Bundling and Upselling:

- Bundle complementary products and promote upselling opportunities on Wednesdays.
- Create value-driven packages to entice customers and stimulate purchases.

January Sales Boost Strategy: Initiating Promotions and Incentives to Drive Year-Opening Revenue Surge

New Year Clearance Events:

- Introduce clearance sales to move excess holiday inventory.
- Offer attractive discounts on remaining holiday-themed products.

Customer Loyalty Incentives:

- Launch loyalty programs or exclusive discounts to retain holiday-season customers.
- Encourage repeat business through personalized offers for existing clientele.

Winter Essentials Promotion:

- Highlight winter essentials and relevant products for the season.
- Implement promotions on cold-weather items to meet customer needs.

Future Possibilities of the Project

Future possibilities include exploring advanced features of fbprophet, incorporating additional external variables, and adapting the model for real-time forecasting. Continuous improvement and adaptation will be key for the project's long-term success, with a focus on enhancing the accuracy and responsiveness of inventory management.