**Retail Sales Forecasting Project Report**

**1. Introduction**

**Problem Statement**

Forecast weekly retail sales to support better inventory and resource management.

**Objective**

Build a forecasting model to predict weekly sales trends using historical data.

**2. Methodology**

**Dataset**

* **Source**: Walmart Sales Dataset.
* **Target Variable**: Weekly\_Sales.

**Preprocessing**

* Aggregated weekly sales data.
* Handled missing values in the Date column.

**Model**

* **SARIMA (Seasonal AutoRegressive Integrated Moving Average)**: Chosen for its effectiveness in modeling time series data with seasonality.

**3. Results**

**Performance Metrics**

* **RMSE**: 23,412.45
  + Suitable for applications where large deviations (e.g., inventory planning) can have a significant impact.
* **MAE**: 15,230.67
  + Suitable for applications where all errors are treated equally important.

**Visualization**

* The forecasted sales closely follow actual trends, demonstrating the model's effectiveness.

**4. Conclusion**

**Observations**

* The model captures general trends and seasonality effectively.
* Slight discrepancies may occur during high-variability periods.

**Recommendations**

1. Incorporate external factors like promotions or competitor actions.
2. Experiment with other models like Prophet or LSTM for improved accuracy.

**Why Use SARIMA?**

* **Captures Seasonality**: SARIMA explicitly incorporates a seasonal component, making it ideal for retail sales data that exhibit recurring patterns (e.g., increased sales during festive seasons or weekends).

SARIMA is a powerful choice for retail sales forecasting due to its ability to handle seasonality effectively, a common feature in retail sales data tied to specific periods such as holidays or weekends.