Google Colab Link

Cleaned dataset

AI-Powered Sales Forecasting Dashboard

Formal Project Report

1. Project Objective

The goal of this project is to develop an AI-powered dashboard that predicts future retail sales trends using historical data. The dashboard visualizes forecast trends, historical patterns, category-level performance, and regional insights to support data-driven decision-making.

2. Dataset Description

The dataset used is a retail sales dataset containing historical transaction records across multiple product categories and states. The data reflects sales value, order date, quantity, and forecasting outputs. The dataset was processed and analyzed using Python-based forecasting techniques and visualized in Power BI.

3. Tools & Technologies

- Python (Pandas, Scikit-learn, Prophet)
- Power BI for visualization
- Time series forecasting & regression techniques
- Matplotlib for supporting visual analysis

4. Forecasting Approach

A time series forecasting model was implemented to identify sales trends and patterns in historical data. The model captures both overall growth trends and seasonality where present. The predicted values were then compared with historical actuals to evaluate alignment and identify gaps.

5. Key Findings & Insights

• Future sales are expected to show a consistent upward growth trend from 2014 to 2018. • Historical past sales also show recovery after an early dip, stabilizing with continuous growth.
• Forecast sales initially overestimated performance compared to early historical actuals, but real sales have steadily improved over time.
• Office Supplies contribute the highest quantity share (~60%), followed by Furniture (~21%) and Technology (~18%).
• Technology products, though lower in volume, likely contribute higher margins.
• State-wise filters enable geographic performance comparison across regions.

6. KPI Summary

• Total Recorded Sales: ~2.30M
• Forecast Output (yhat): ~3.09M
The forecasting model estimates approximately 35% higher revenue potential compared to current actuals.

7. Business Value & Applications

This dashboard enables organizations to:
• Anticipate market demand trends

- Align inventory and logistics planning
- Identify high-potential regions and product categories
- Optimize marketing and sales resource allocation
- Support long-term financial planning and strategy development

8. Recommendations

- Retrain forecasting models periodically to improve accuracy
- Integrate external factors such as promotions and seasonal events
- Monitor category-level margins alongside sales volume
- Implement separate forecasts for each major product segment
- Introduce KPI indicators such as MAPE or RMSE to track model accuracy

9. Conclusion

The AI-Powered Sales Forecasting Dashboard provides an effective analytical framework for understanding sales performance trends and predicting future growth. It demonstrates practical implementation of time-series forecasting and BI visualization to generate actionable business intelligence. With continued refinement, this model can become a powerful enterprise decision-support tool.