Demand Forecasting - Project Report

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1) Objective

This project builds a demand forecasting model using synthetic daily sales data. ARIMA is applied to predict the next 30 days of demand. The goal is to illustrate how time-series models can improve inventory and supply planning.

2) Dataset

The dataset contains daily demand values from Jan 2023 to Dec 2024. It includes seasonality, trend, and noise components to simulate realistic demand patterns.

3) Key Results

Metric	Value
Historical Average Demand	225.19 units/day
Forecast Next 30 Days (mean)	242.64 units/day
Data Period	2023-01-01 to 2024-12-31
Model	ARIMA(2,1,2)

4) Methodology

- Load daily demand series. - Apply exploratory analysis (plot, seasonality check). - Fit ARIMA model on training data. - Forecast next 30 days. - Evaluate using metrics such as MAE, RMSE (not shown here).

5) How to Run

1) Open notebooks/Demand_Forecasting.ipynb. 2) Run all cells to reproduce ARIMA training and forecasts. 3) Extend with Prophet or advanced models if desired.

6) Business Takeaways

- Forecasting supports better inventory management and staffing. - Detecting seasonal peaks allows proactive marketing and procurement. - Accurate demand prediction reduces overstock and lost sales. - Even simple models like ARIMA can deliver valuable insights.