Department 27

Walmart weekly sales

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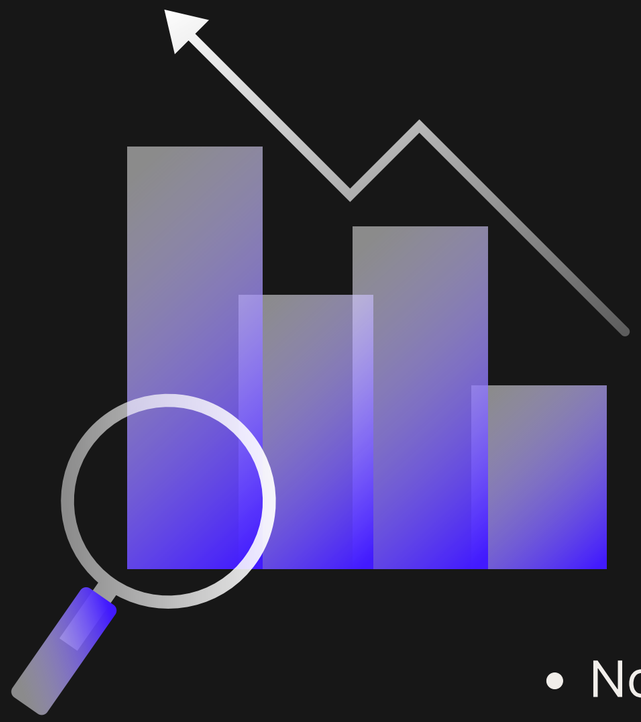
Project Overview

- Forecasting weekly sales for Walmart Department 27
- Dataset: 143 weekly records (Feb 2010 – Oct 2012)
- 6 Features: Date - IsHoliday - Temperature - Fuel_Price - CPI - Unemployment
- Target variable: Weekly_Sales



Data Exploration

- No missing values in date or target columns
- Clear yearly seasonality
- ACF/PACF analysis to inform ARIMA/SARIMA

Modeling Approach

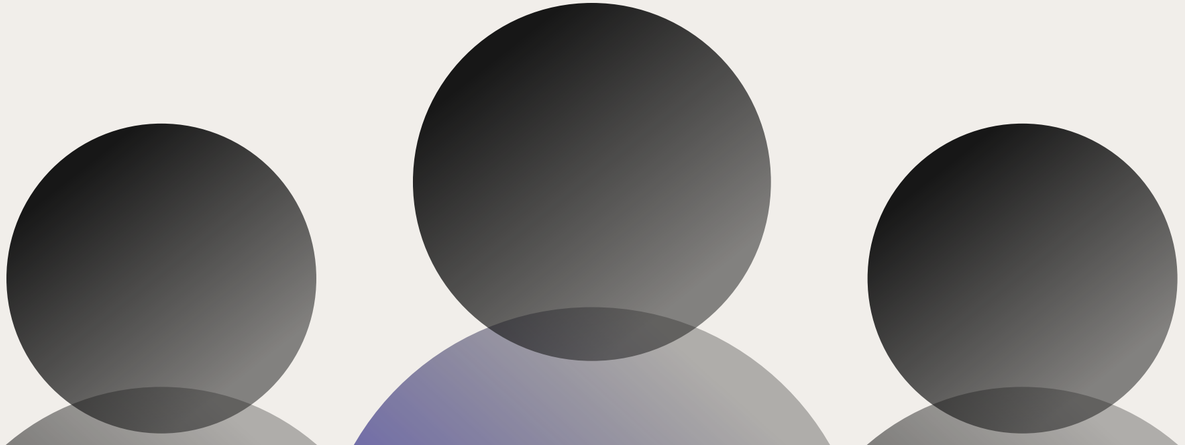
- Explored classical time series models:
Holt’s Linear Trend, Holt-Winters, ARIMA and SARIMA.

- Applied machine learning regressors:
Random Forest and XGBoost

- Tested deep learning:
MLP (Multi-Layer Perceptron) and LSTM

- Investigated an innovative model:
N-BEATS

- Final model chosen for deployment: **Prophet**



Modeling Approach

Model metrics sorted by RMSE

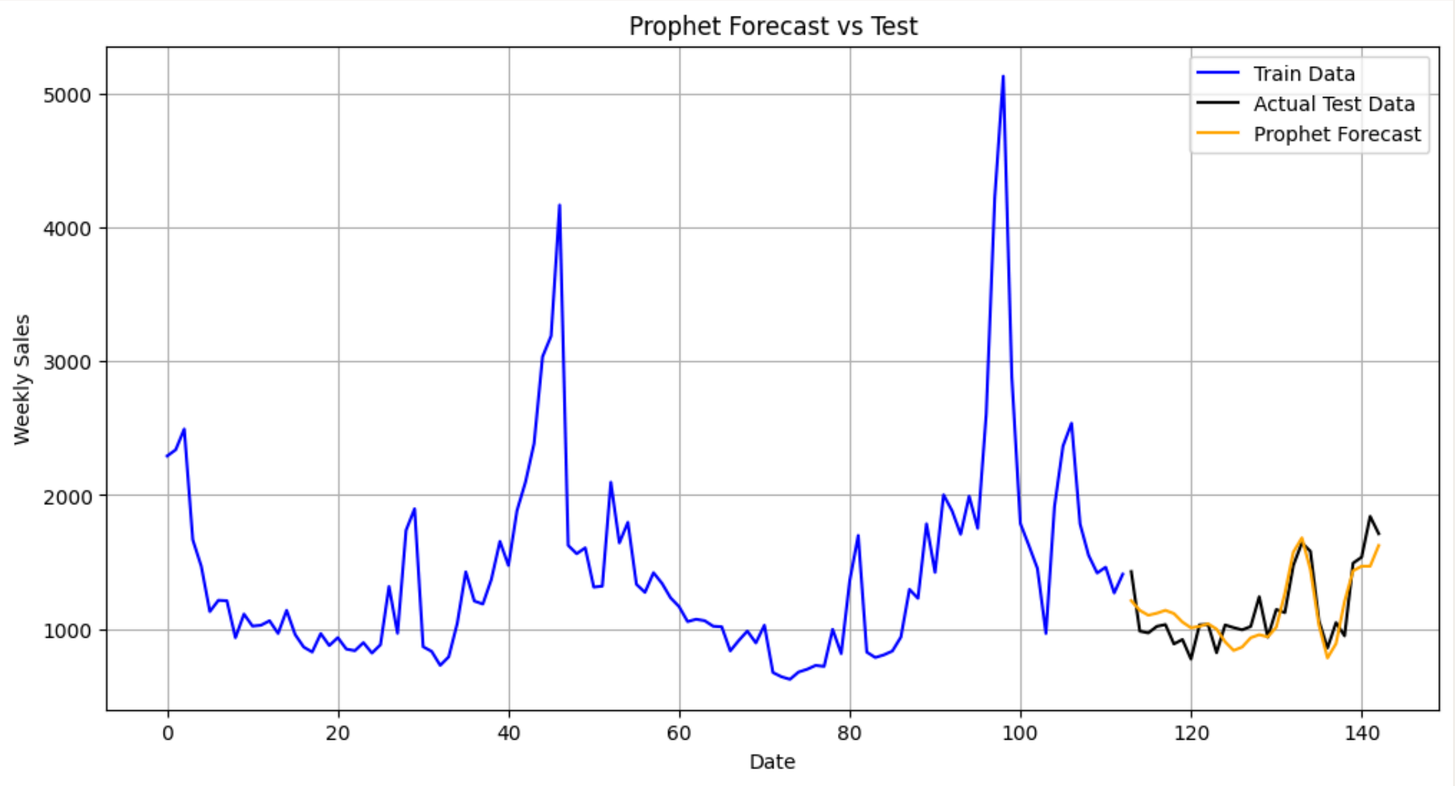
Model	RMSE	MAE
Prophet	156.24	131.36
MLP	187.13	144.20
SARIMA(2,1,2)(1,0,1,52)	213.22	165.94
Random Forest	229.62	186.40
XGBoost	243.16	183.70
LSTM	243.72	202.48
Holt-Winters	265.32	215.23
Holt Linear	354.11	314.54
ARIMA(3,1,2)	428.87	384.86
N-BEATS	1403.73	1087.43

Modeling Approach

Prophet Metrics:

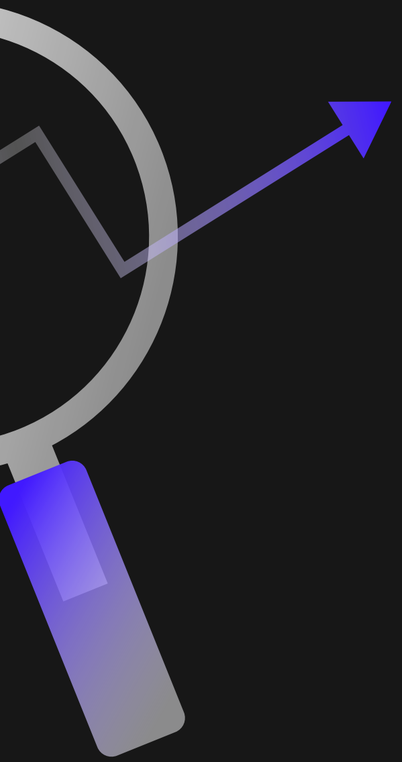
MAE: 131.36

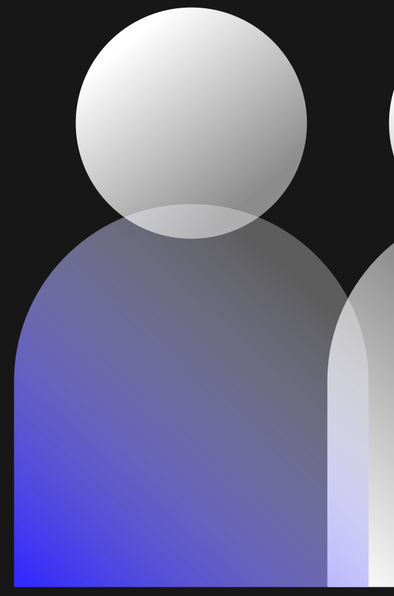
RMSE: 156.24



Deployment

1. Prophet model pickled for reuse
2. Built interactive Streamlit app:
3. User inputs forecast horizon
4. Generates table of forecast
5. Ready for integration / hosting



Challenges Faced

- Aligning forecasts with correct future dates
- Tuning models without overfitting (especially for DL/ML models)
- Formatting outputs for non-technical users

Thank You