



# PORTOFOLIO PROJECT

## SALES FORECASTING & ANALYTICS DASHBOARD

END-TO-END DATA SCIENCE PROJECT

ADJIE HARI FAJAR  
PYTHON | STREAMLIT | XGBOOST | SHAP

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# PROJECT OBJECTIVES



- Build interactive analytics dashboard
- Exploratory Data Analysis (EDA)
- Train ML model for sales forecasting
- Explain model decisions using SHAP
- Enable segment & category-level forecasting



# TECH STACK

- Python
- Pandas, NumPy
- XGBoost
- SHAP
- Plotly & Matplotlib
- Streamlit
- Visual Studio Code



# BUSINESS PROBLEM

- How have sales evolved over time?
- Are there clear trends, seasonality, or volatility patterns?
- How can future sales be forecasted for different horizons?
- Which factors most strongly influence sales predictions?
- Can forecasts be explained and trusted by stakeholders?

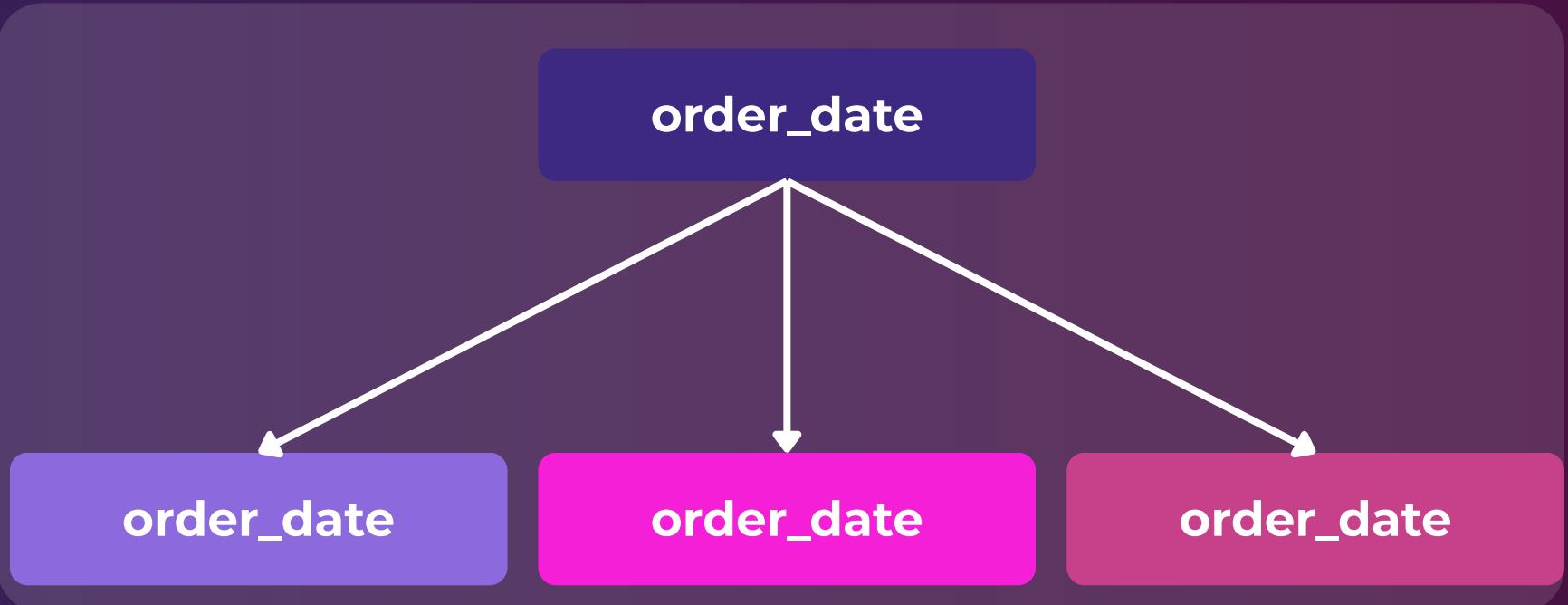
HOW CAN WE TURN RAW SALES DATA INTO ACTIONABLE INSIGHTS & FORECASTS?





# DATASET OVERVIEW

- **Source:** Superstore Sales Dataset (Kaggle)
- **Granularity:** Daily transactional sales data
- **Key Fields:**
  - **order\_date** — transaction date
  - **sales** — sales value
  - **segment** — customer segment
  - **category** — product category



order_date	sales	segment	category
2015-01-09 00:00:00	9.344	Consumer	Office Supplies
2015-01-09 00:00:00	31.2	Consumer	Technology
2015-01-04 00:00:00	11.784	Home Office	Office Supplies
2015-01-04 00:00:00	272.736	Home Office	Office Supplies





# DATA PROCESSING



## Data Cleaning & Formatting

- Handle Missing values
- Standardize Column Names

## Datetime Conversion

- Convert To Datetime
- Extract Year, Month, Day

## Feature Engineering

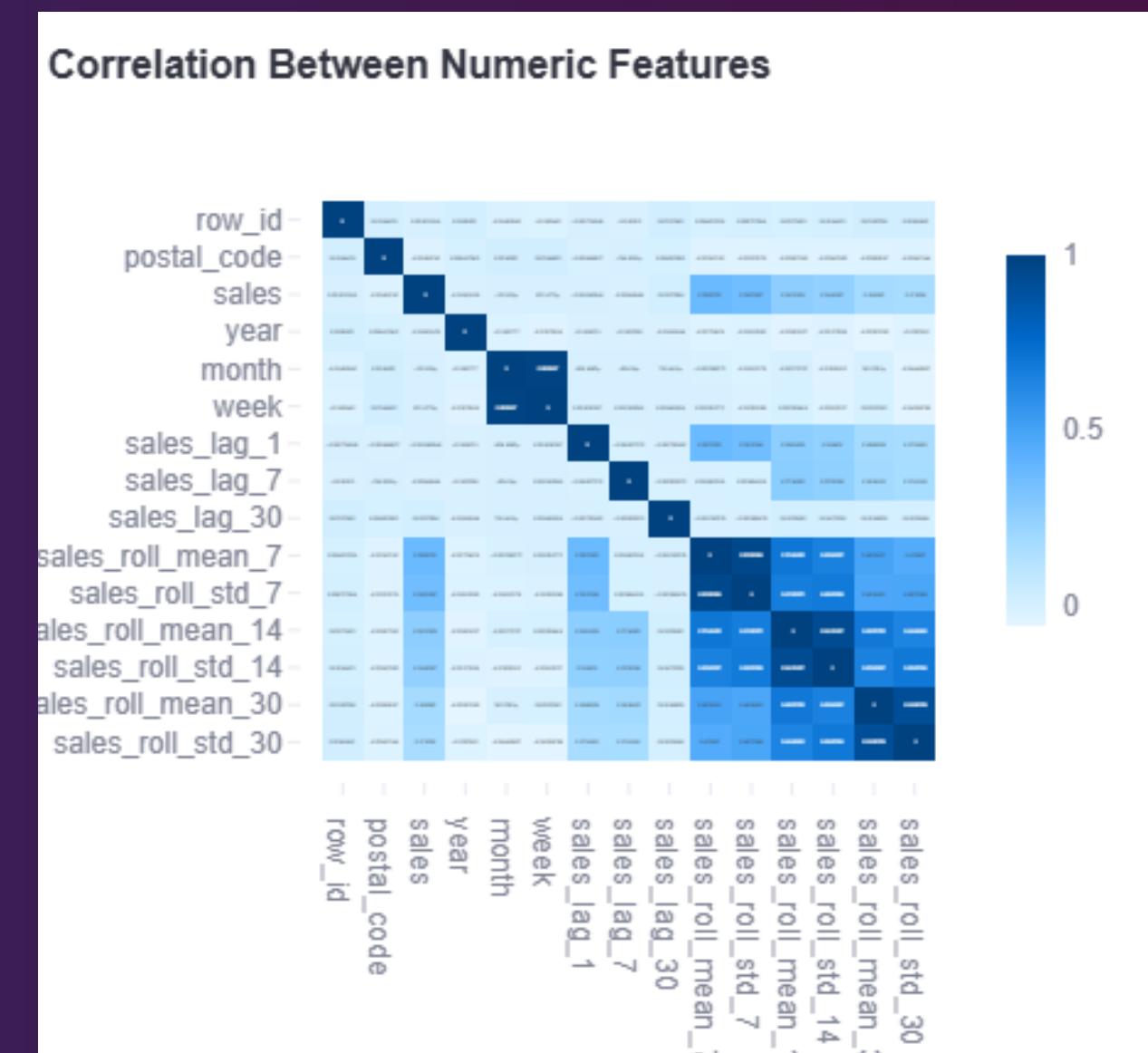
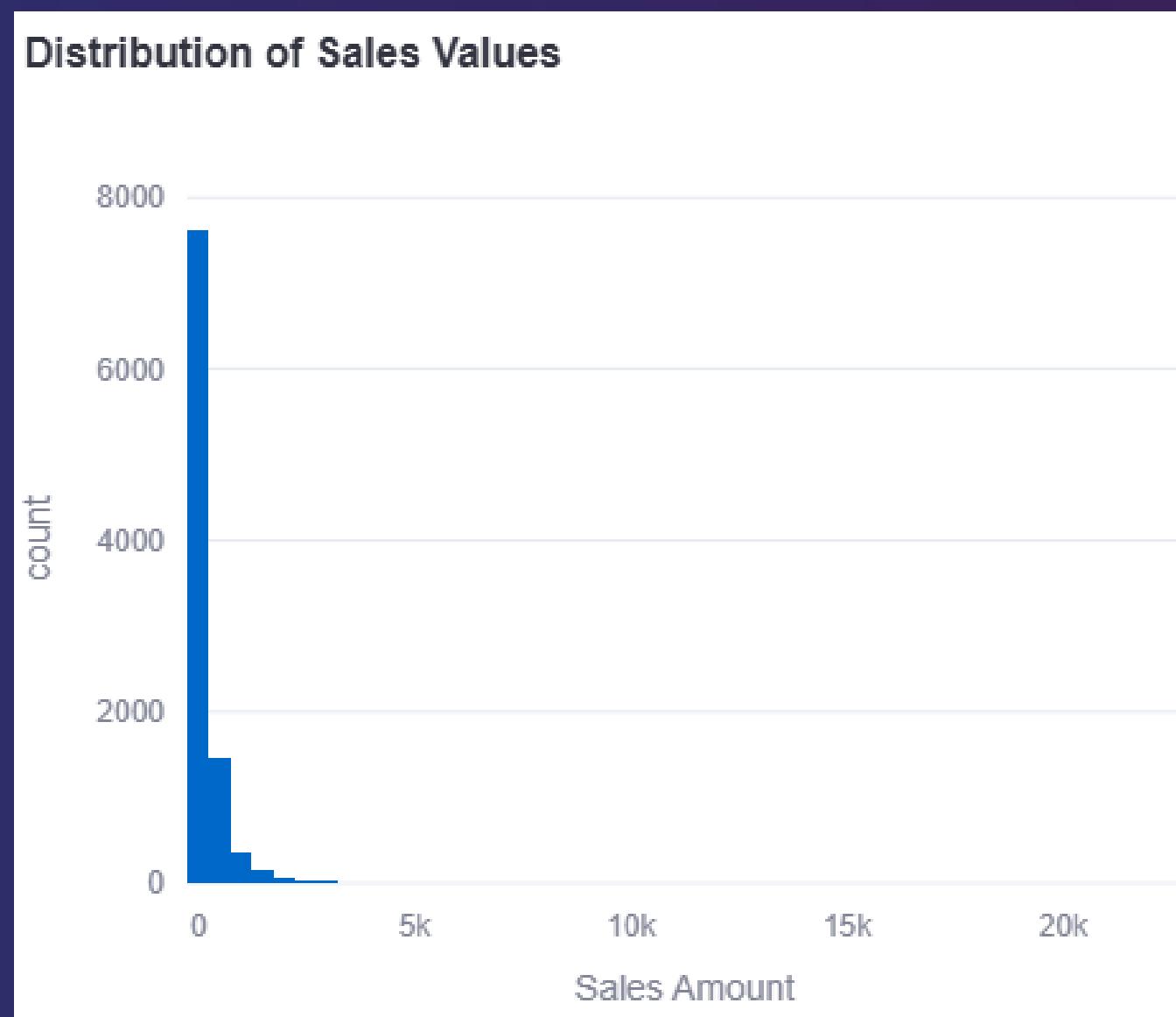
- Time Features
- Lag Features
- Rolling Statistic

## Final Modelling Dataset

- Clean, Numeric
- Sales, Lag, Rolling Features



# EXPLORATORY DATA ANALYSIS (EDA)



- Sales Distribution is right-skewed with Occasional Spikes
  - Lag and Rolling Features Highly Correlated With Sales
  - Support Time-series Modelling Approach



# MACHINE LEARNING MODEL

## Model: XGBoost Regressor



### Why XGBoost?

- ✓ Handles non-linear patterns
- ✓ Robust to skewed data
- ✓ Strong performance on tabular time-series

## Evaluation Metrics

 MAE <b>275.95</b>	 RMSE <b>679.05</b>	 R <sup>2</sup> Score <b>-0.13</b>
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# FORECASTING APPROACH

Segment: Consumer

Category: Electronics

**Autoregressive Multi-Step Forecasting:**

- ✓ 1 Day
- ✓ 7 Days
- 📅 1 Month
- FilterWhere Segment & Category Filtering

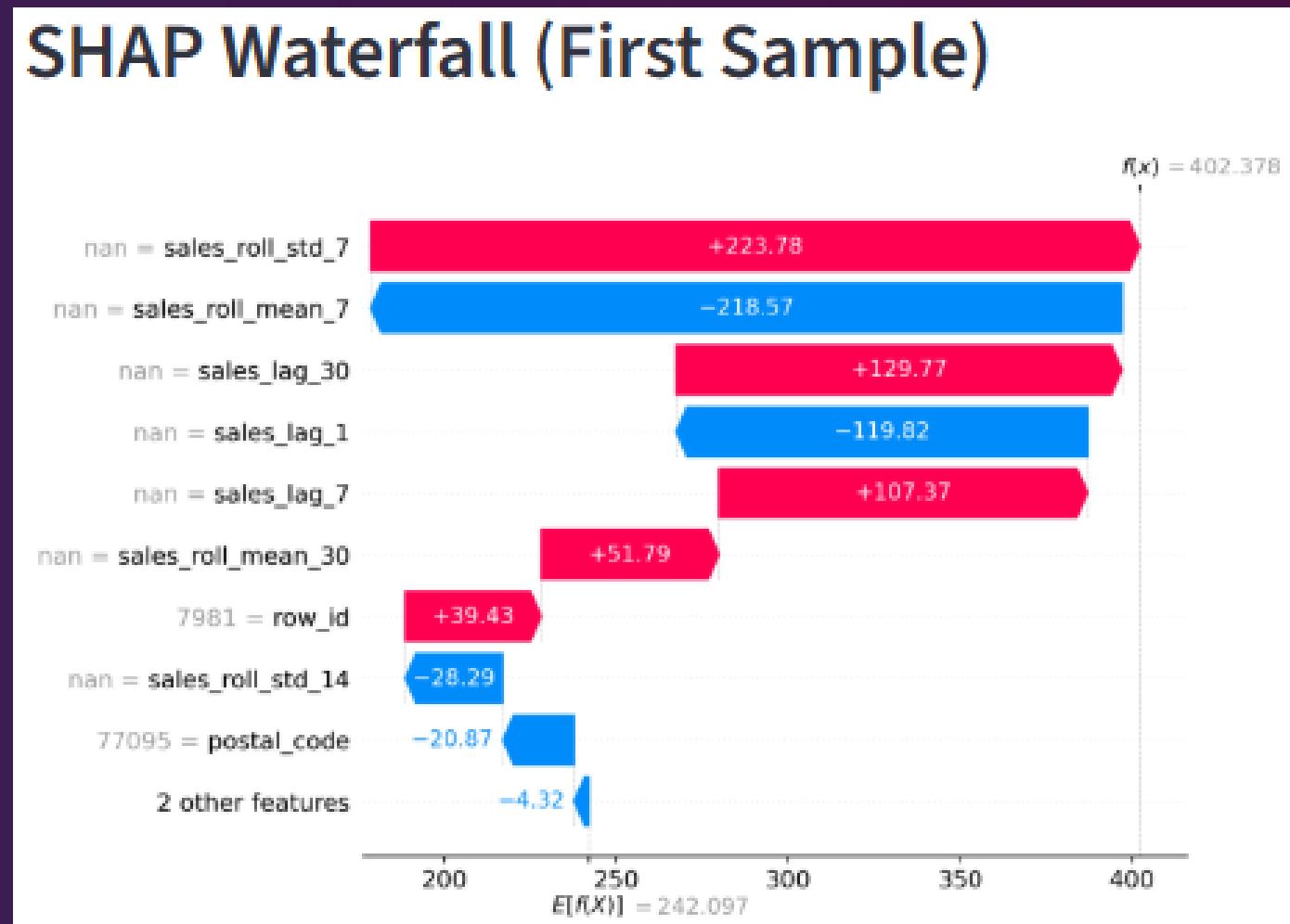
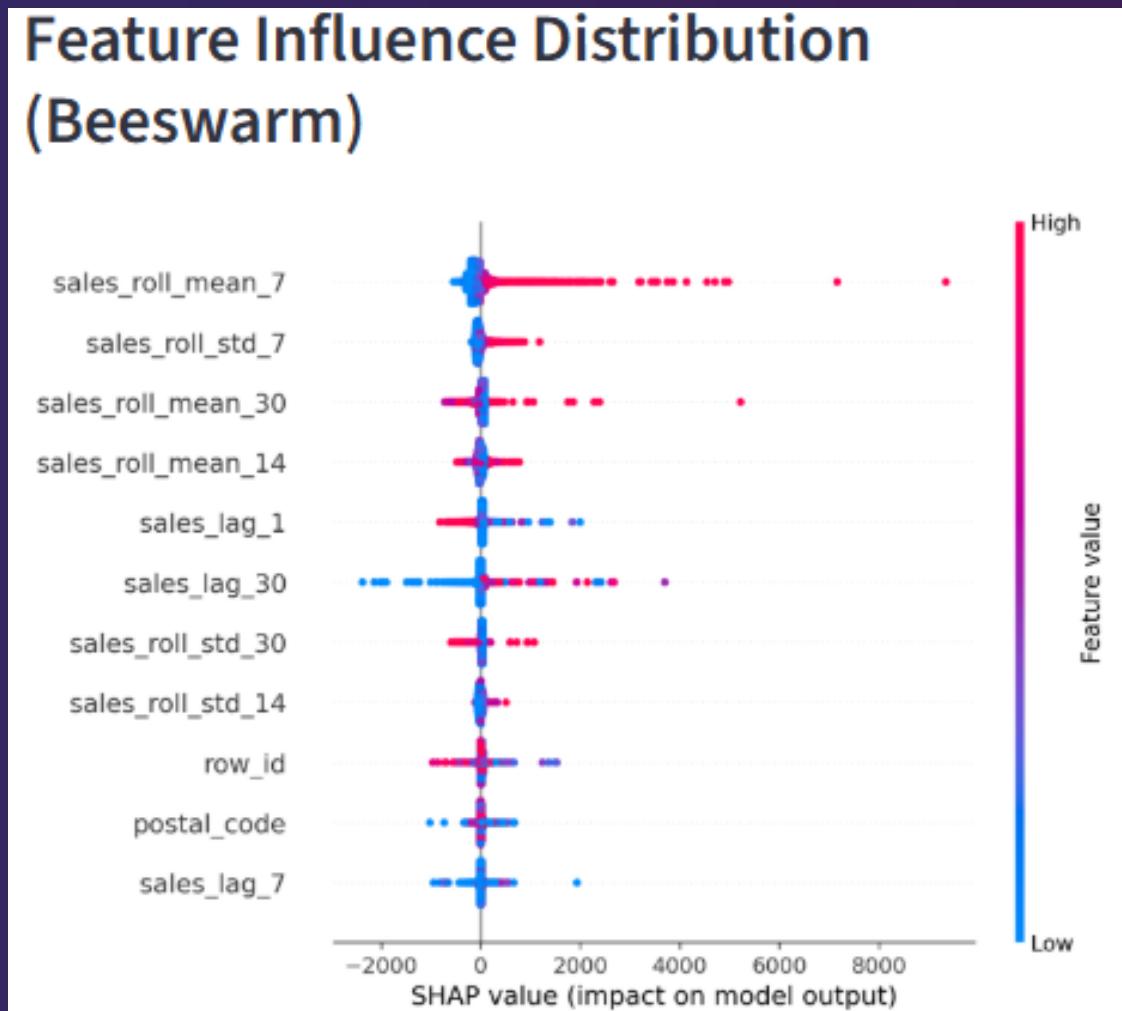
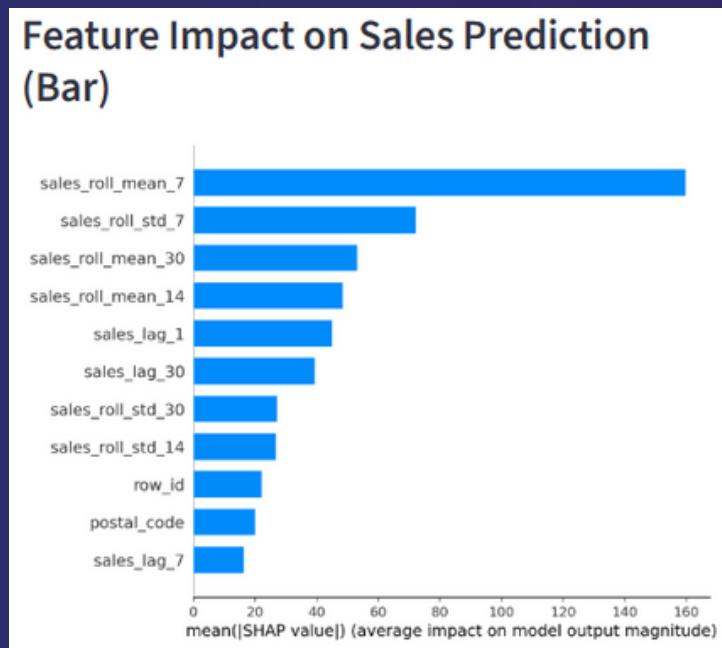
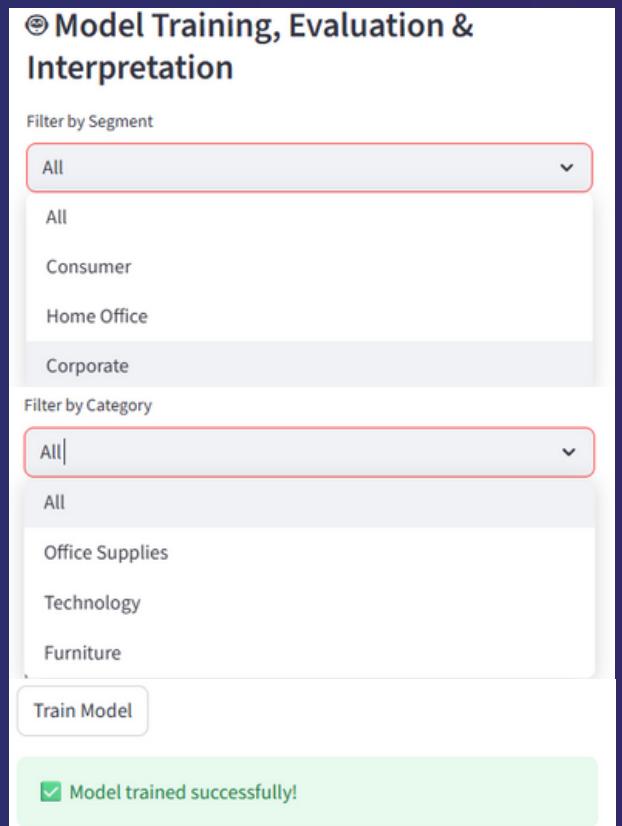


- Forecast Dynamically Adapts to selected Business Segment





# MODEL EXPLAINABILITY (SHAP)



- Lag Features Dominate Short-term
- Time Features Capture Seasonality
- SHAP Increases Trust in Predictions





# BUSINESS IMPACT

Faster Sales Monitoring

Explainable Forecasts



Data Driven Planning

Scalable to Other Products / Regions

- Empowers Data-Driven Decision and Strategic Growth Initiatives



# CONCLUSION & NEXT STEP

## Conclusion

- End-to-end Analytics & Forecasting

- Combines ML & Explainability

## Next Step

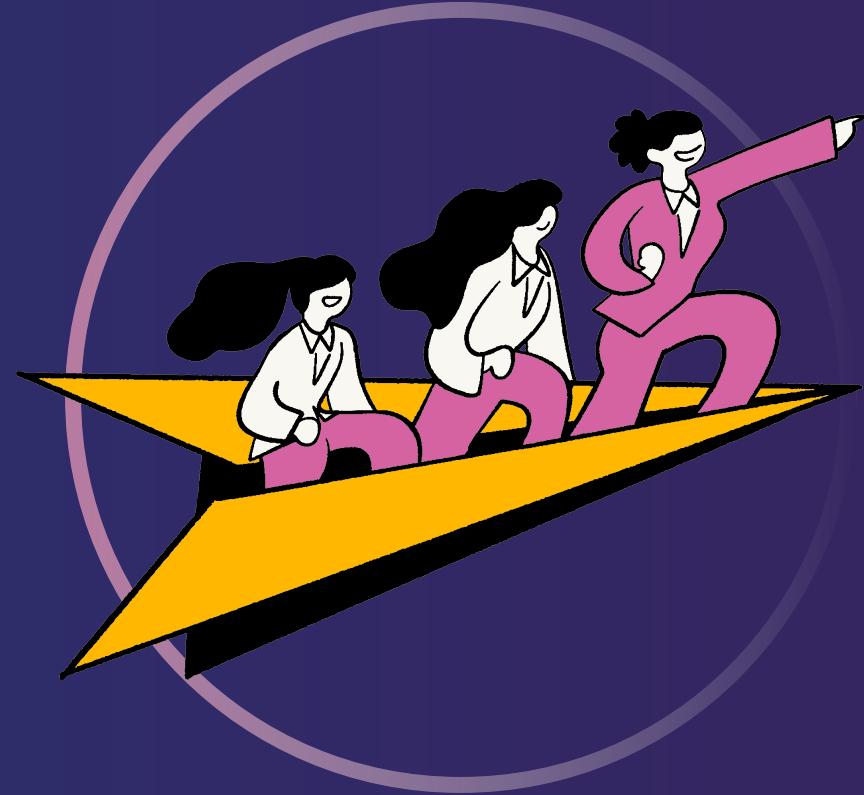
- Add External Factors (Promo, Holiday, Campaign and more)

- Longer Horizon Forecasting

- Model Comparison (LSTM, Prophet)



- Paving the way for data-driven, adaptive business decisions



# LIVE DEMO & REPOSITORY



*<https://adjiehf231-sales-forecasting-analytics.streamlit.app/>*

*<https://github.com/adjiehf231/sales-forecasting-analytics>*



# THANK YOU!

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