Sales Forecasting and Optimization

Presented by our data science team | Date: May 15, 2025

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Project Overview

Goal

Predict future sales using historical retail and e-commerce data.

Business Impact

Optimizes inventory management, sales strategy, and operational planning.

Project Objectives

Data Exploration & Preparation

Understand and ready the sales history for modeling.

Analysis of Trends

Identify patterns and seasonality within sales data.

Model Building & Evaluation

Create, test, and refine forecasting models.

Tool Deployment

Implement a user-friendly predictive interface.
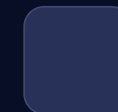
Challenges Faced

Dataset Quality Issues

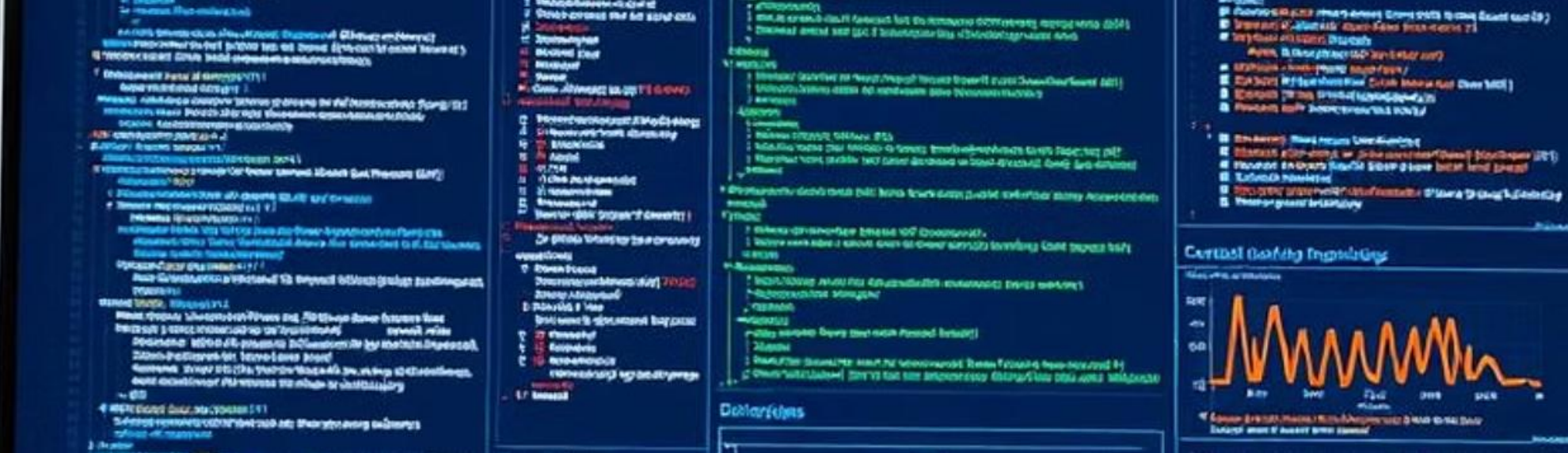Started with poor data requiring full replacement.

Feature Selection

Tried different features to find those that best influence sales.

Model Selection

Evaluated multiple models to find the most accurate.

Data Collection and Preprocessing

1	2	3	4

New Dataset Acquisition

Data Cleaning

Handled missing values and removed duplicates.

Feature Engineering

Created time-based features like day, month, and seasonality.

Scaling & Transformation

Prepared data for model input with normalization techniques.

Data Analysis and Visualization

Exploratory Data Analysis

Detected trends, outliers, and seasonal patterns.

Visualizations

- Line charts
- Histograms
- Heatmaps

Feature Impact

Analyzed how dates and holidays influence sales.

Model Development and Optimization

Models Tested

- Linear Regression
- Neural Networks
- Facebook Prophet
- XGBoost (final choice)

Evaluation Metrics

- RMSE
- MAE
- R2 Score

Selection Basis

XGBoost delivered the highest accuracy and robustness.

Deployment

Deployment Platform

Used Streamlit for interactive model interface.

Version Control

GitHub for code management and collaboration.

User Access

Provides real-time sales predictions to end users.

Key Outcomes & Next Steps

Reliable Forecasting Tool

Effective model with clear documentation.

Challenge Resilience

Adapted to data and modeling challenges.

Future Enhancements

Integrate external data for improved accuracy.

Q&A

Thank you for your time and attention. We now welcome your questions and feedback.

Open Dialogue

Foster collaborative understanding.

Clarifications

Resolve any project questions.

Next Steps

Explore future collaboration.