



# Sales Forecasting and Optimization

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- Atef Hamdi
- Mariam Youssef
- Mohamed Walid
- Mohammed Yaser
- Omar Reyad
- Rana Abdelrahman



# 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



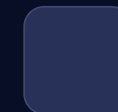
## Dataset Quality Issues

Started with poor data  
requiring full replacement.



## Time-Series Complexities

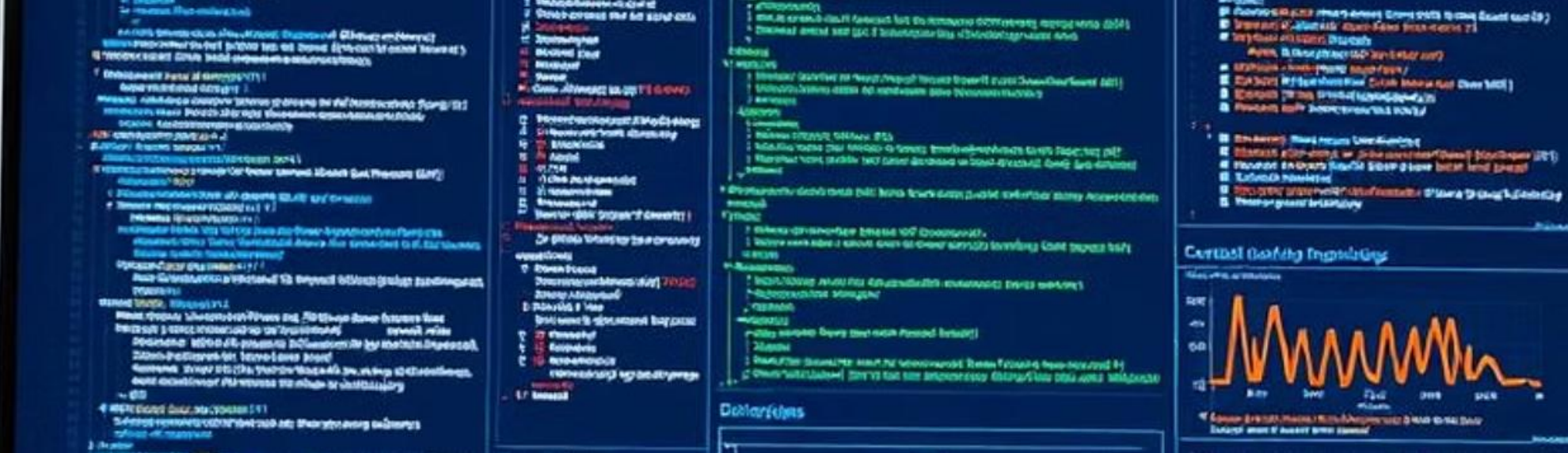
Handling non-stationarity and  
seasonality in sales data.



## Model Selection

Evaluated multiple models to  
find the most accurate.





# Data Collection and Preprocessing

1

New Dataset  
Acquisition

2

Data Cleaning  
Handled missing values  
and removed duplicates.

3

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

4

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.