SALES FORECASTING & BUSINESS INSIGHTS REPORT

Visual Analysis & Strategic Recommendations

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CONTENT

PROJECT OVERVIEW

Purpose of the Project:
The goal of this project is to analyze past sales performance, build predictive models, and generate actionable business insights that help optimize operations and improve future planning.

Business Objectives:

- Predict future sales using historical data
- Identify factors that most influence sales performance
- Forecast trends for inventory and promotion planning
- Provide clear, strategic recommendations for stakeholders

DATASET DESCRIPTION

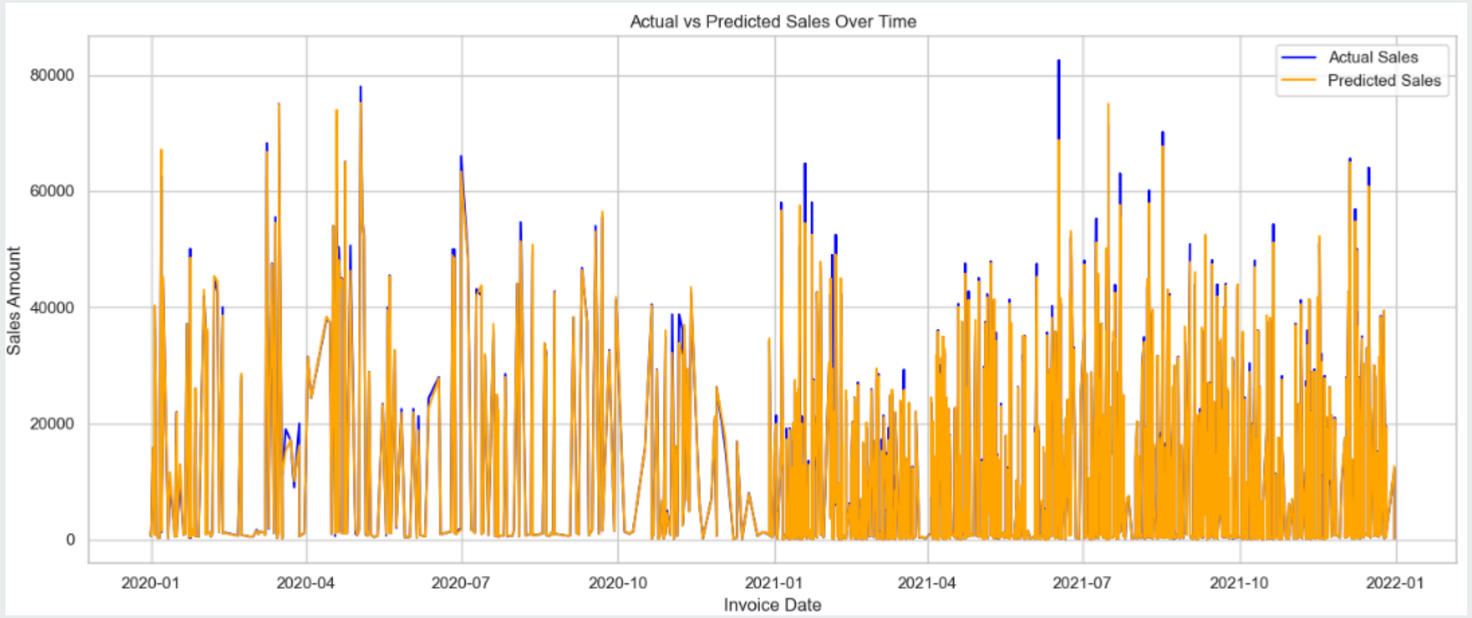
01 **Time Period**: Covers multiple months of sales data

02 **Features**: Invoice Date, Product Type, Units Sold, Price per Unit, Region, Operating Profit, etc.

03 **Volume**: Thousands of rows across various product categories and locations

04 **Preprocessing:** Cleaned for duplicates, missing values; dates standardized; features engineered for modeling

ACTUAL VS PREDICTED SALES – LINE CHART



Visual comparison of actual historical sales with predicted values

Evaluates the model's ability to replicate real-world patterns

Insights:

The model closely tracks overall sales trends

Some underprediction during seasonal sales spikes

Demonstrates high generalization capability across months

Implication:

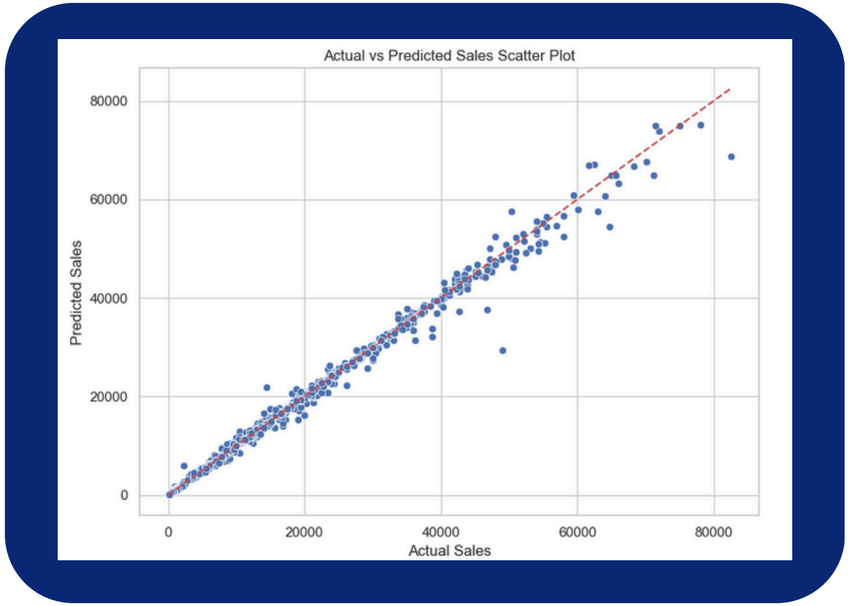
- Reliable model for regular forecasting
- Consider including holiday/event indicators for better spike prediction

Actual vs Predicted – Error Distribution

Prediction Error Distribution

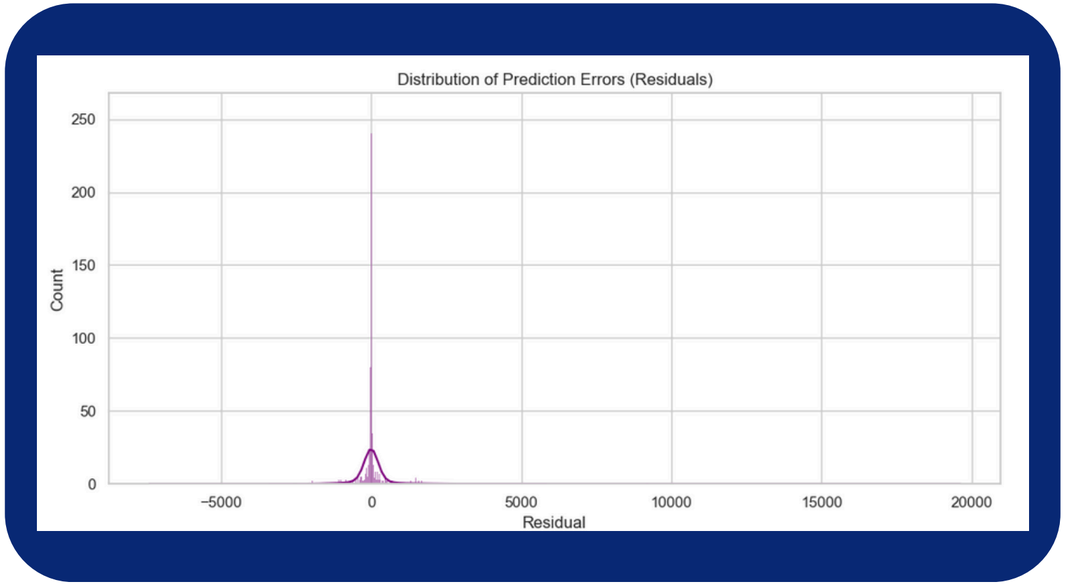
Insights:
Most errors are centered around 0 → Low bias
Few outliers during high-spike months (e.g., Nov, Jul)
Predictions are stable with no major skew or drift

Implication:
- Ready for operational use
- Improve model robustness with promotional & seasonal data



Scatter Plot – Actual vs Predicted

Evaluates how far off predictions are from actual sales

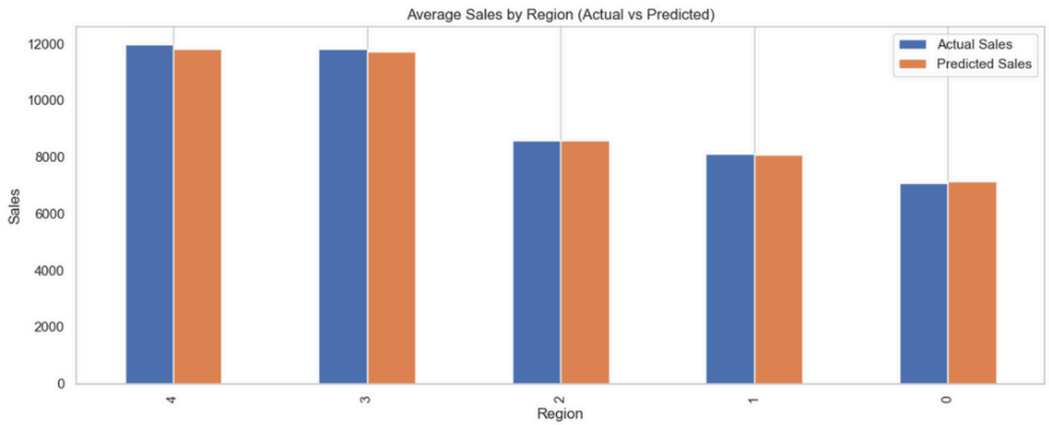


Histogram – Distribution of Residuals (Prediction Errors)

Helps identify systematic bias or erratic prediction behavior

FEATURE IMPORTANCE

What Drives Sales?



Bar Chart of Feature Importances

Key Features

- Units Sold
- Price per Unit
- Product Category
- Operating Profit

Insights

- Pricing and product-specific metrics are highly predictive
- Region/state has lower influence on outcomes
- Sales are more product-driven than location-driven

Implications

- Optimize pricing strategies
- Focus marketing efforts on high-importance product lines

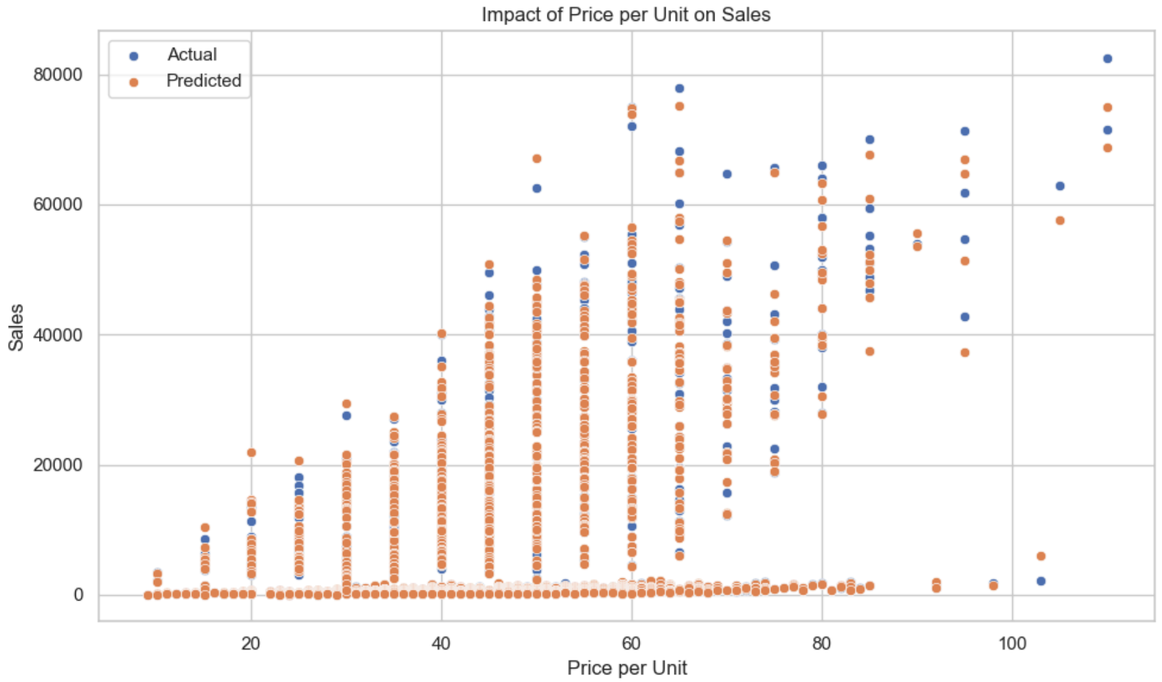
FORECASTED SALES TRENDS

Insights:

- Expected increase in sales mid-year and pre-holiday
- Continuation of the historical seasonal pattern
- Forecast confidence is steady and reliable

Implication:

- Prepare inventory and staffing in advance
- Plan marketing campaigns around anticipated spikes



Line Chart: Historical Sales + Future Forecast

Future projection using ARIMA for the next 6 months.
Incorporates time series seasonality

STRATEGIC RECOMMENDATIONS

Inventory & Operations

- Stock strategically ahead of peak demand months (July to November) to meet seasonal surges in sales, as indicated by forecast trends.
- Reduce overstocking in low-demand months like February and March to optimize storage and reduce holding costs.

Pricing Strategy

- Focus on products priced within the ₹100–₹150 range, where the model shows consistently high sales volume.
- Explore dynamic pricing during high-demand periods to increase revenue without hurting conversion.

Product Focus

- Prioritize high-performing categories like footwear and apparel based on historical sales performance and model accuracy.
- Discontinue or re-strategize underperforming products to focus efforts on profitable SKUs.

Regional Strategy

- Expand operations in top-performing regions (e.g., South and Southeast), where actual vs. predicted performance is stable and strong.
- Tailor regional campaigns based on product preferences and previous performance data.

THANK YOU