Price Optimization Using Elasticity Modeling

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1. Executive Summary

This project applies data-driven price optimization techniques to identify the price point that maximizes revenue. Using regression-based elasticity modeling, predicted demand at varying prices was simulated, and the corresponding revenue curve was analyzed. The findings provide actionable insights for strategic pricing decisions.

2. Problem Statement

Pricing directly impacts both demand and revenue. Businesses often struggle to find the optimal balance — a price that maximizes revenue without losing significant demand. The goal of this project is to determine the optimal price point using historical sales data and elasticity modeling.

3. Dataset Overview

• **Source:** The dataset used in this project is **Competition_Data (Transactional Retail Pricing Dataset)**, sourced from the **Statso Case Study (AmanXai)**.

• **Size:** 100000 rows × 9 columns

• **After preprocessing Size:** 100000 rows × 17 columns

• **Key Variables:**

- *Price* – Product price per unit

- *Item_Quantity* – Units sold

- *Revenue* – Total sales revenue

- *Other derived variables:* Predicted Quantity, Elasticity, Revenue Curve

4. Methodology

1. Elasticity Estimation

- Regression was applied to estimate price elasticity of demand.
- Elasticity formula used:
  Q = Q0 × (P/P0)^elasticity

2. Simulation of Price vs Quantity

- Created a price range across observed values.
- Predicted demand calculated using elasticity.

3. Revenue Curve Analysis

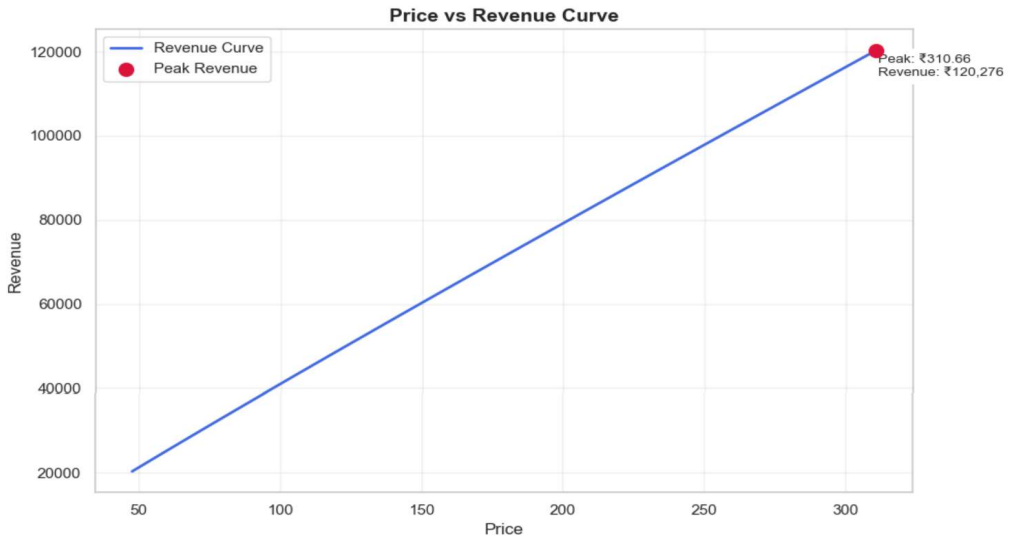
- Revenue = Price × Predicted Quantity.
- Optimal price identified as the point where revenue is maximized.

5. Results & Insights

• **Optimal Price:** 310.66

• **Maximum Revenue:** 120,275.58

• At this price point, revenue can be maximized while maintaining a balance in demand.



6. Business Impact

• This model provides a data-driven framework for price-setting.
• Helps businesses avoid underpricing or overpricing.
• Can be extended to multiple product categories for strategic pricing decisions.

7. Conclusion

The elasticity-based price optimization approach successfully identified the revenue-maximizing price point. Businesses can use this insight to make more informed pricing decisions and drive profitability.