A Data-Driven Analysis of Coffee Sales Trends Using Python

By N Lasya Priya

Malla Reddy University

Abstract

This paper presents a comprehensive data-driven analysis of coffee sales trends to uncover patterns in customer behavior, seasonal demand, and product performance. Using Python-based analytical tools, the study identifies key factors influencing coffee sales and provides insights for business growth. The analysis utilizes data visualization and descriptive statistics to reveal correlations between product categories, sales volume, and revenue.

Introduction

Coffee is one of the most consumed beverages worldwide, and understanding its sales dynamics is crucial for business success. This research aims to analyze sales data from a coffee retail dataset using Python. The study focuses on identifying high-performing products, sales trends over time, and factors contributing to revenue fluctuations. Data analytics provides a powerful foundation for decision-making and helps optimize business strategies in competitive markets.

Literature Review

Prior studies in retail analytics emphasize the role of data visualization and statistical analysis in business insight generation. Coffee sales forecasting has been explored through methods such as regression analysis, time-series modeling, and customer segmentation. Studies reveal that sales are strongly influenced by product type, pricing, and promotional strategies. The integration of Python and visualization libraries like Matplotlib and Seaborn enhances the interpretability of large datasets, supporting evidence-based decisions.

Dataset Description

The dataset titled 'Coffe_sales.csv' contains detailed transactional records including order date, product type, size, quantity, and total sales. It provides an opportunity to perform exploratory data analysis (EDA) and uncover patterns in consumer purchasing behavior. Key fields include 'Date', 'Coffee Type', 'Quantity Sold', 'Revenue', and 'Customer Category'. The dataset serves as the foundation for identifying time-based trends and product performance metrics.

Methodology

Python was used as the primary analytical tool, leveraging libraries such as Pandas for data manipulation and Matplotlib/Seaborn for visualization. The following steps were carried out: (1) Data cleaning and preprocessing, (2) Descriptive statistical analysis, (3) Visualization of sales by product and time, (4) Derivation of insights on revenue patterns. Jupyter Notebook served as the environment for conducting this analysis and presenting findings.

Data Analysis and Findings

The analysis revealed several key insights: (1) Espresso and Latte were among the most purchased coffee types, (2) A significant rise in sales occurred during winter months, indicating a seasonal pattern, (3) Large-size coffee orders contributed more to total revenue, (4) Customer loyalty was observed through repeated purchases. Visual representations of these trends helped in understanding business performance and optimizing inventory planning.

Conclusion and Future Scope

This research provides valuable insights into coffee sales trends using Python-driven data analytics. The findings support decision-making in areas such as marketing, product management, and pricing. Future work may include predictive modeling using machine learning to forecast demand and customer segmentation for targeted promotions. The integration of real-time data could further enhance the accuracy of sales predictions.

References

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