Mastering Avocado Pricing

A Strategic Approach to Regional, Seasonal, and Predictive Insights
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Agenda

What this presentation covers
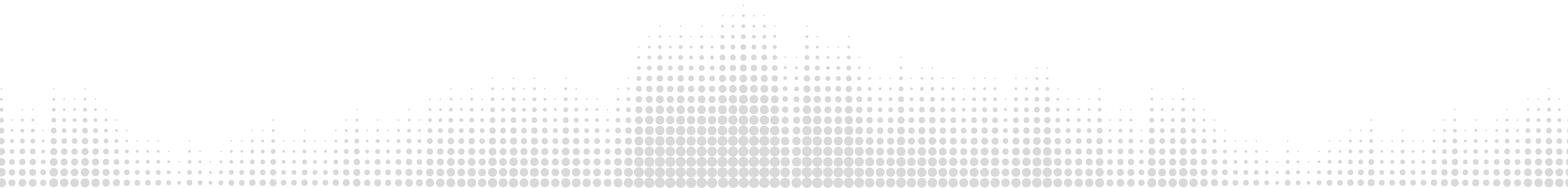
Introduction

Objective:
To leverage historical data for predicting avocado sales.

Methods:
Data analysis, machine learning models (Linear Regression, Random Forest, XGBoost).

Outcome:
Insights to optimize pricing, improve sales forecasts, and enhance inventory strategies.

Data Overview
Dataset Source: Hass Avocado Board (2015–2023)

Weekly sales data across 60 U.S. regions.

Product types: Conventional vs. Organic.

Pricing and volume data.

Data Preparation

Key Steps:

Fixing Gaps: Filled in missing data.

Making It Uniform: Standardized names and labels.

Removing Extremes: Took out unusual values.

Adding Details: Created new columns like year and month.
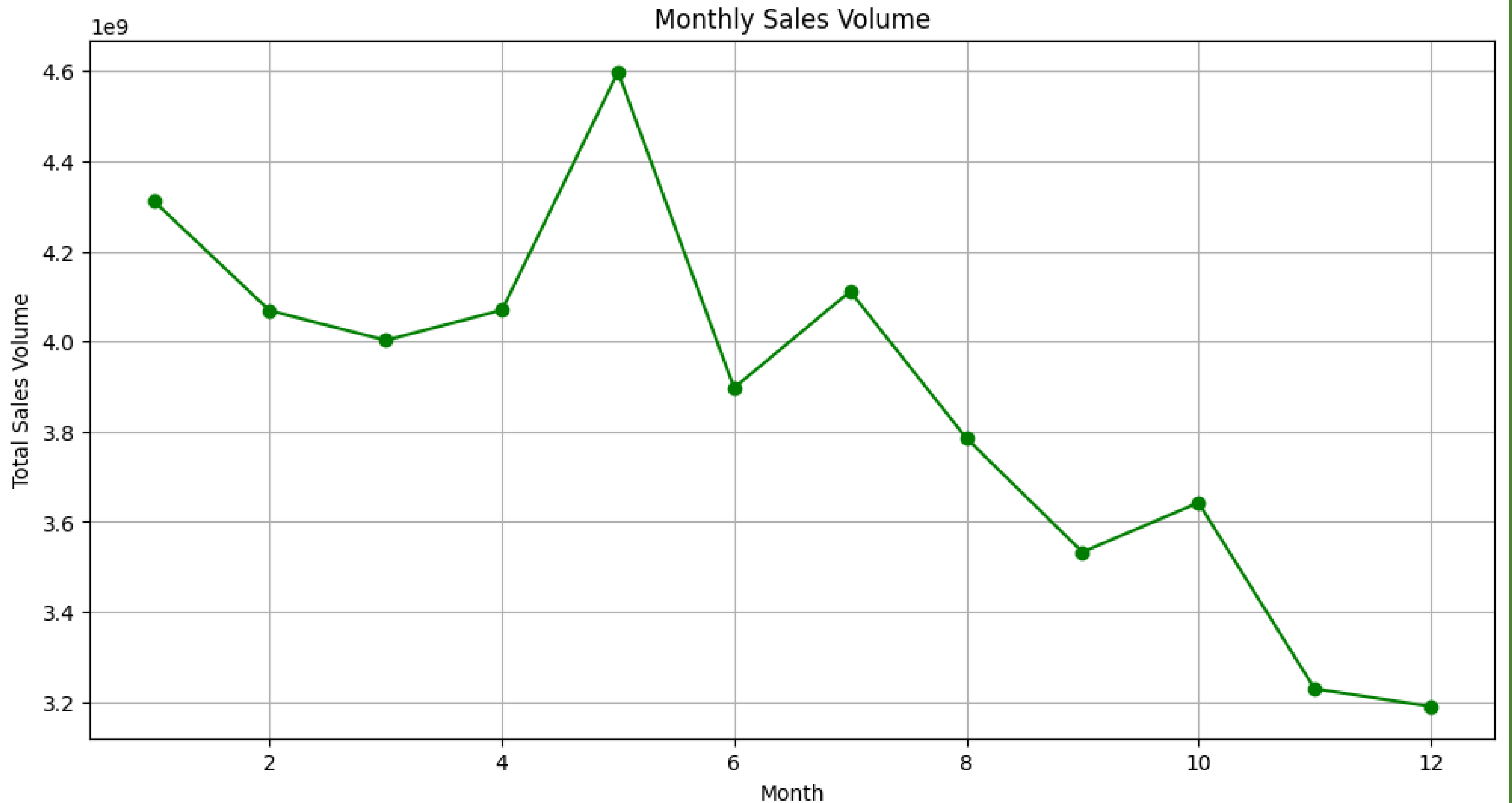
Key Insights:

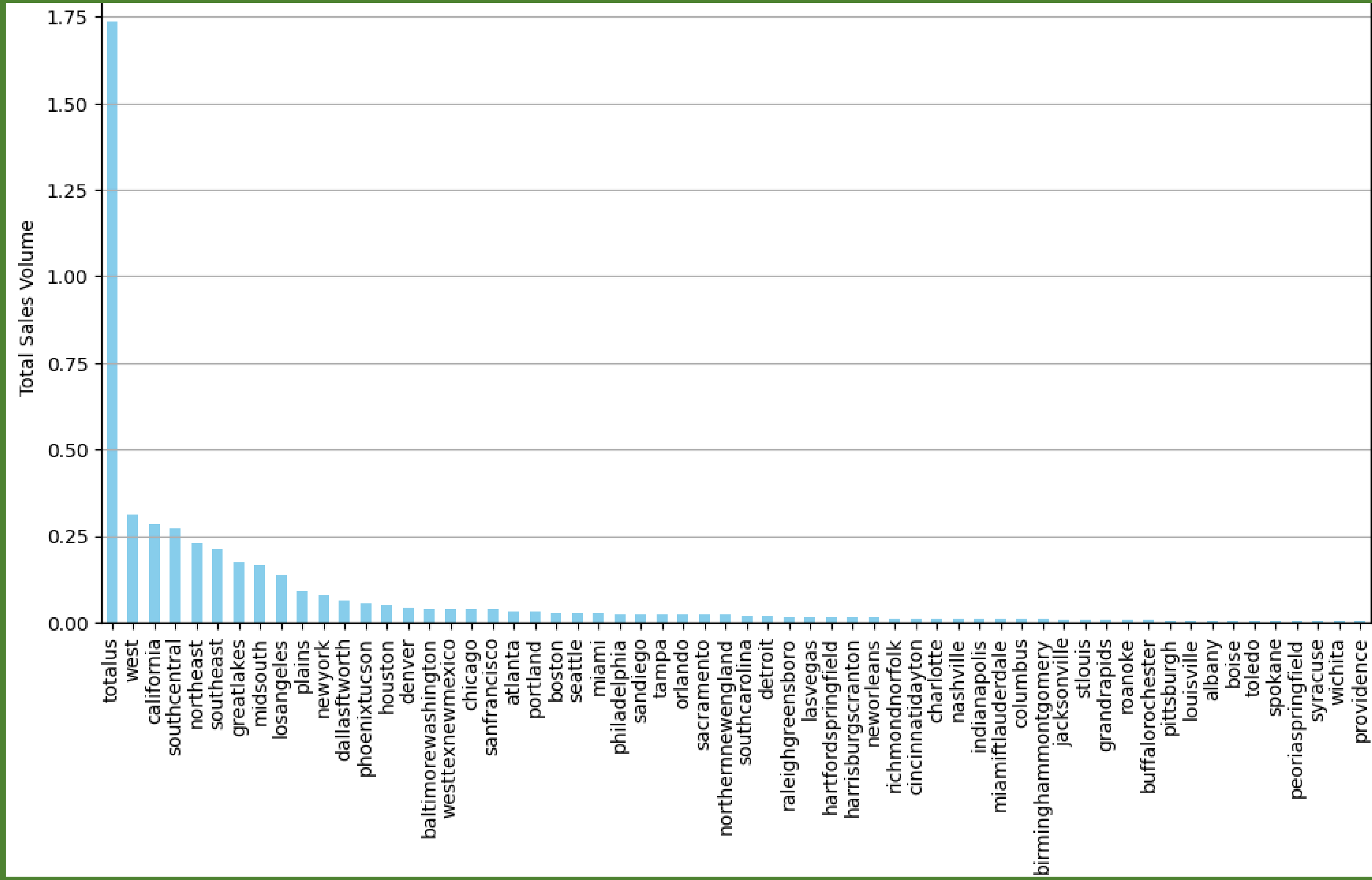Sales Trends

Regional Variance
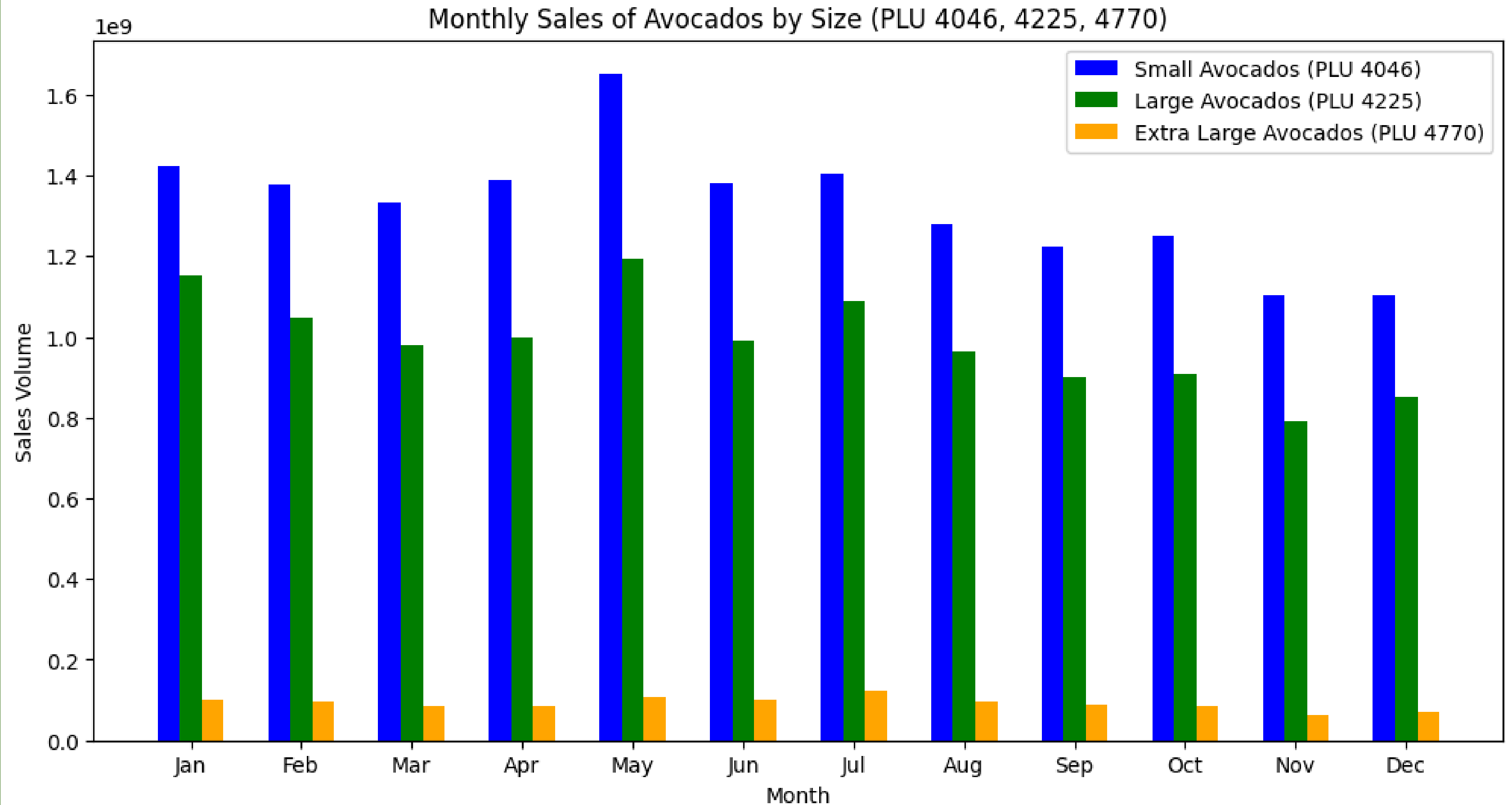
Consumer Preferences
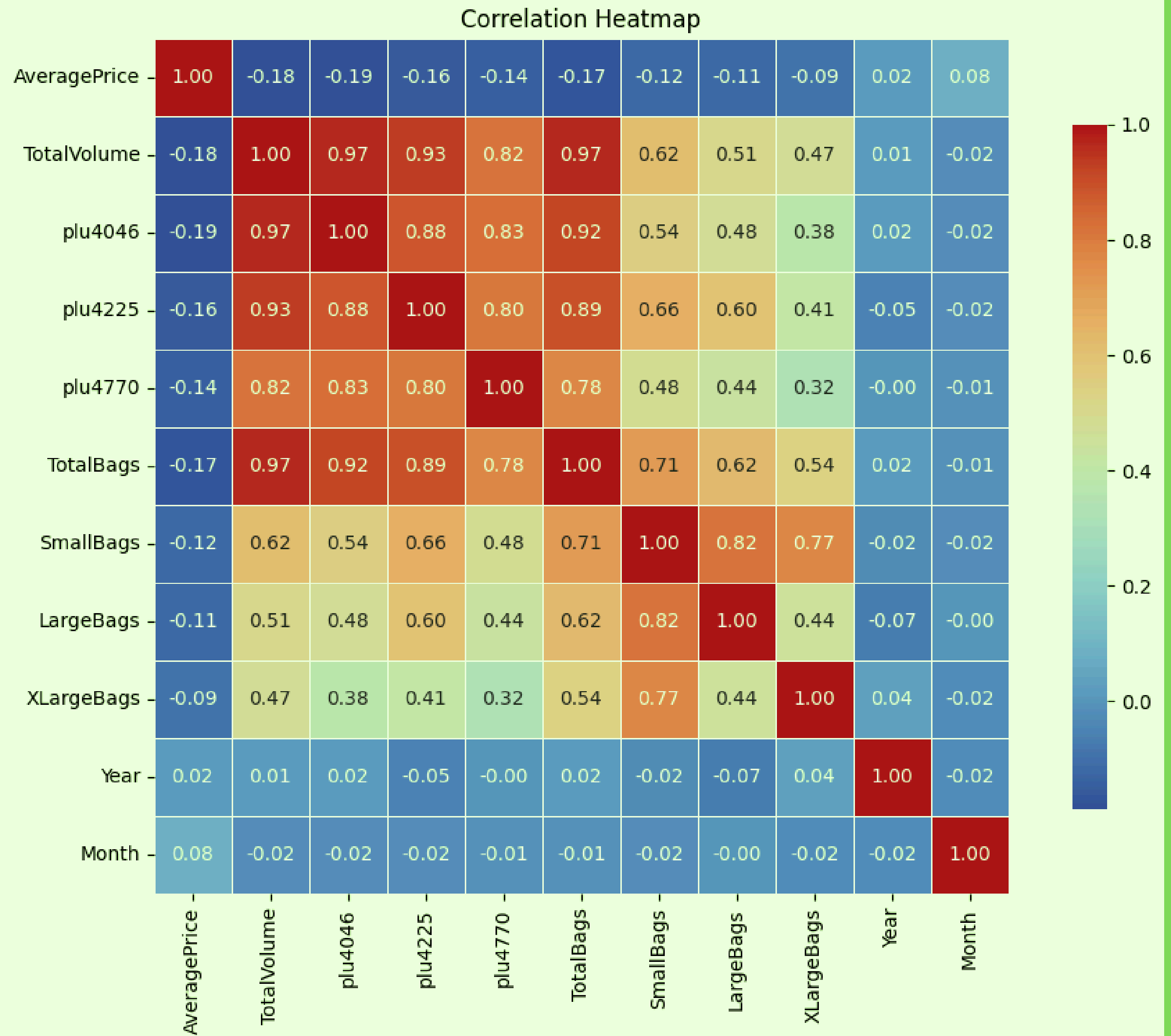
Correlations

Sales Trends

Monthly Sales Volume

Regional Variance

Consumer Preferences

Monthly Sales of Avocados by Size (PLU 4046, 4225, 4770)
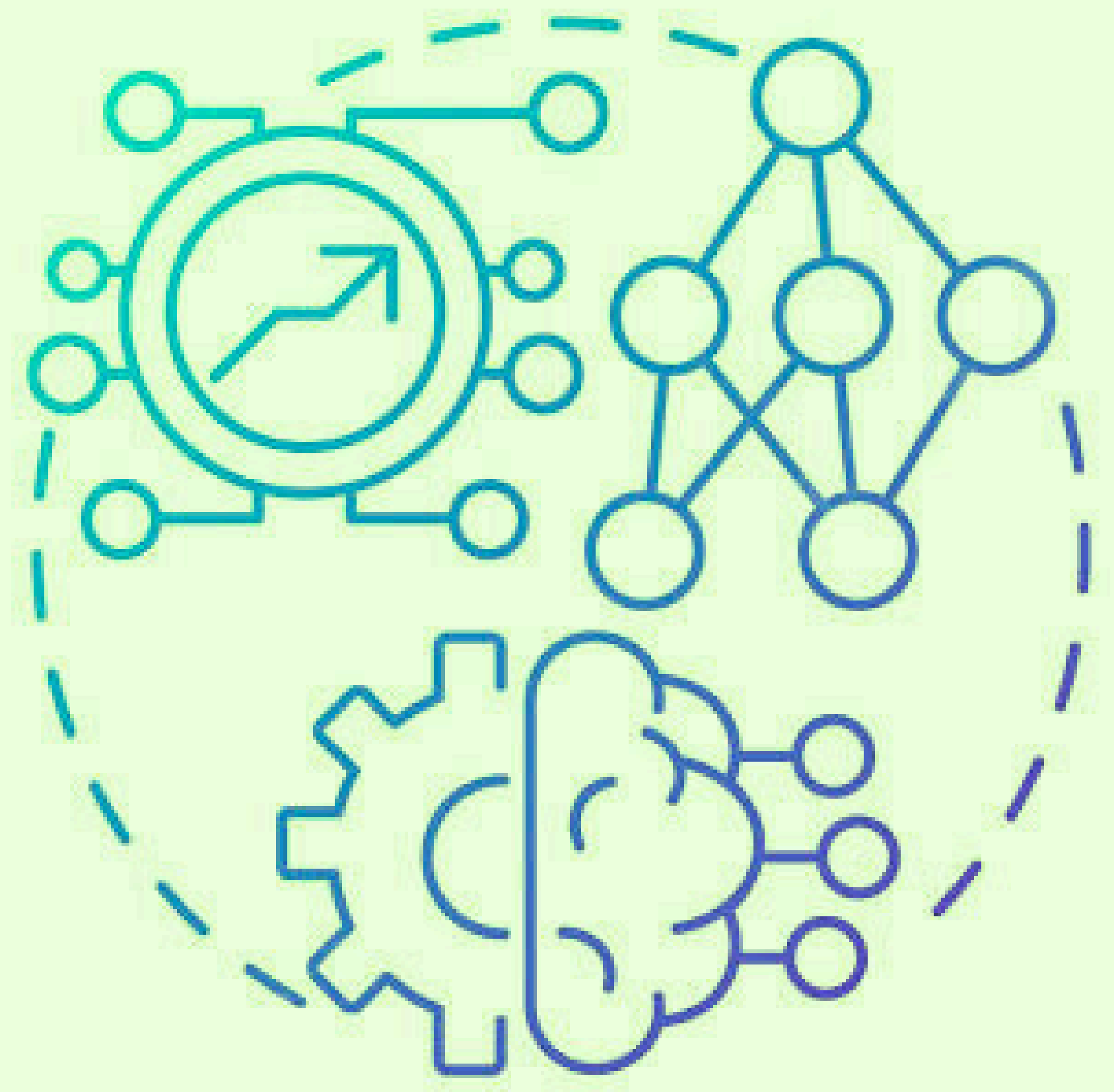
Correlations

Correlation Heatmap

MODEL DEVELOPMENT

- DATA PREPARATION

- MODEL TRAINING

- MODEL EVALUATION

- TUNING

- MODEL DEPLOYMENT

Modeling Overview

Models Tested:

- Linear Regression (Baseline).
- Random Forest (Best performer).
- XGBoost.

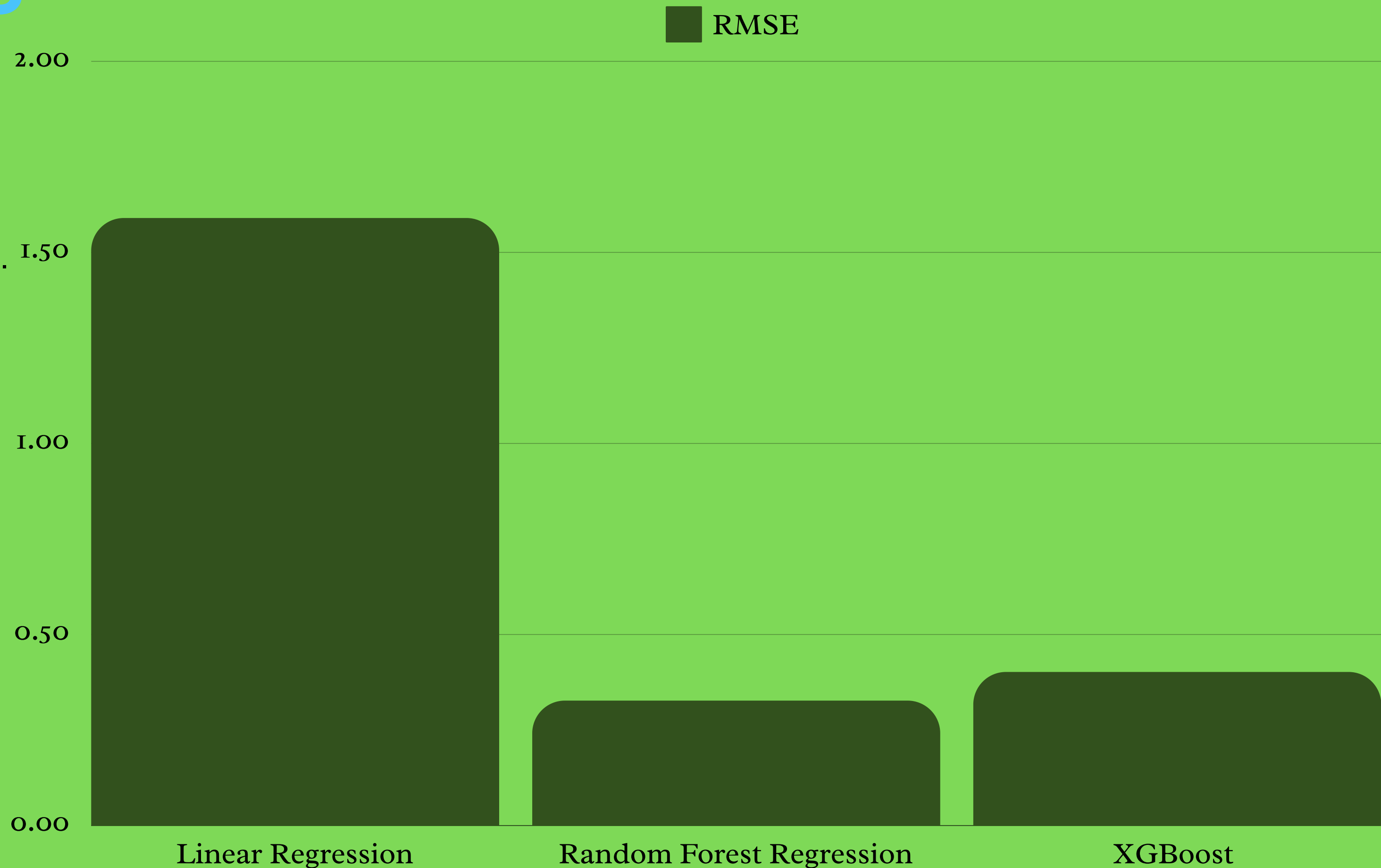Metric: Root Mean Square Error (RMSE) to evaluate prediction accuracy.

MODELS

Training results:

- Linear Regression: RMSE = 1.59

- Random Forest: RMSE = 0.327 (Best).
- XGBoost: RMSE = 0.402.

Insights:
Random Forest captured non-linear relationships effectively.

Recommendations

1. Marketing Strategies:
Focus on seasonal peaks and high-demand regions.

2. Pricing Adjustments:
Leverage small increases strategically.

3. Product Offerings:
Prioritize popular sizes and packaging types.

Conclusion & Future Work

- Random Forest model provides actionable insights.

- Data-driven strategies improve sales and pricing efficiency.

- Include external factors (e.g., climate, economy).

- Expand analysis to international markets.

Thank you!

Feel free to pop any question