Business Context

- - Highly competitive grocery industry
- - Understand customer buying behavior
- - POS data reveals customer preferences
- - Aim: Increase basket size and loyalty

Problem Statement

- - Identify frequently purchased item combinations
- - Create combo offers and improve inventory strategy

Objective

- - Analyze POS data using Association Rule Mining
- - Identify frequent itemsets
- - Propose targeted marketing strategies

Dataset Overview

- - Columns: Date, Order_id, Product
- - Each row = 1 product per order
- - Total transactions and unique products summarized

Summary Statistics

- - Orders/day: Mean, Min, Max
- - Top purchased products
- - Most active days of week

Summary Statistics:

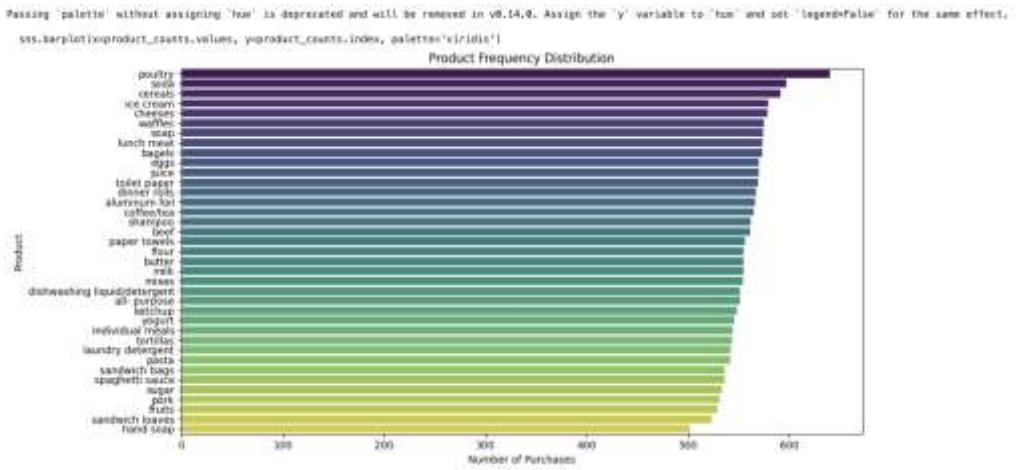
	Date	Order_id	Product
count	20641	20641.000000	20641
unique	603	NaN	37
top	08/02/19	NaN	poultry
freq	183	NaN	640
mean	NaN	575.986289	NaN
std	NaN	328.557078	NaN
min	NaN	1.000000	NaN
25%	NaN	292.000000	NaN
50%	NaN	581.000000	NaN
75%	NaN	862.000000	NaN
max	NaN	1139.000000	NaN

Univariate Analysis – Orders Over Time

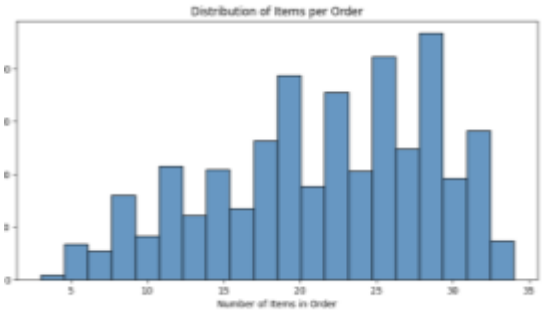
- - Trends over time: daily, weekly, monthly
- - Weekend spikes observed

Univariate Analysis – Top Products

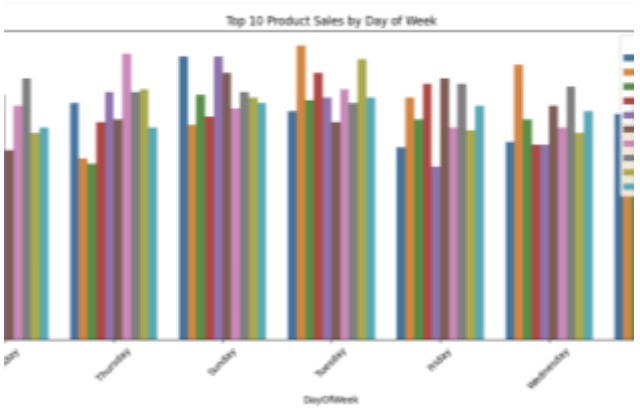
- - Top 10 products (bar chart)
- - 30% sales from core items



Bivariate Analysis – Product vs Order Count

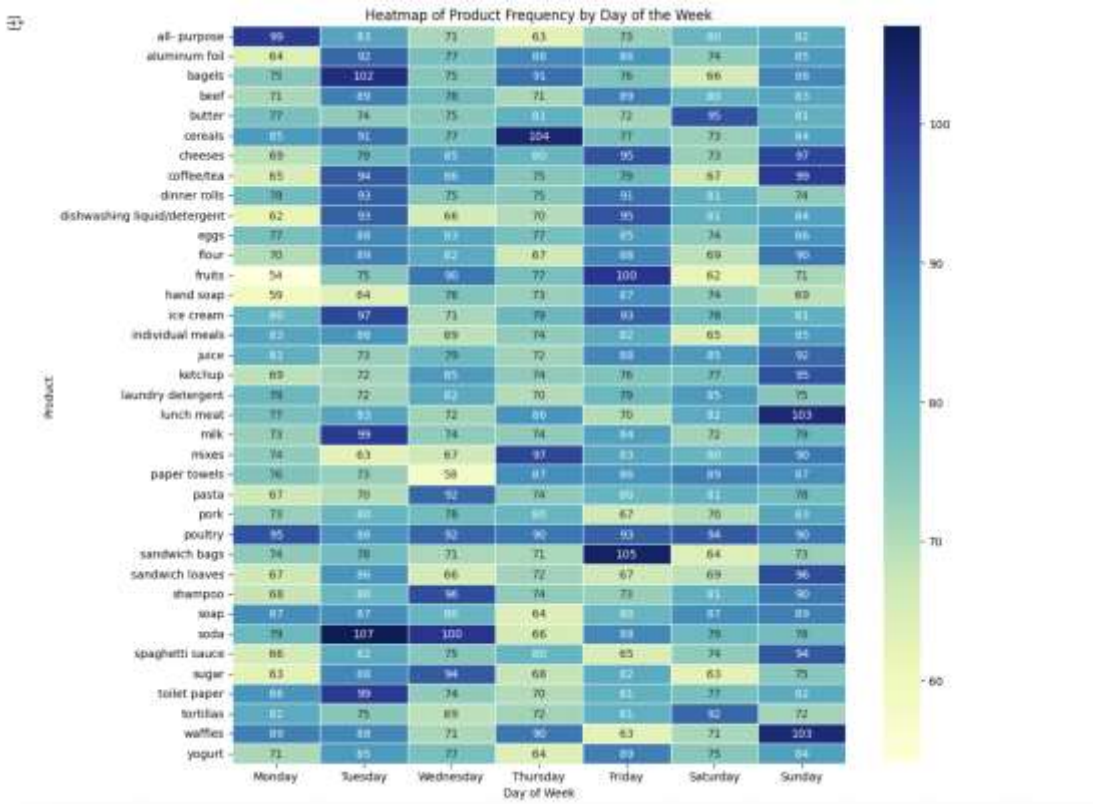


- - Histogram:Products vs order frequency
- - Detect strong product combinations



Multivariate Analysis – Product Trends

- - Time-based plots for top 5 items
- - Seasonal buying patterns

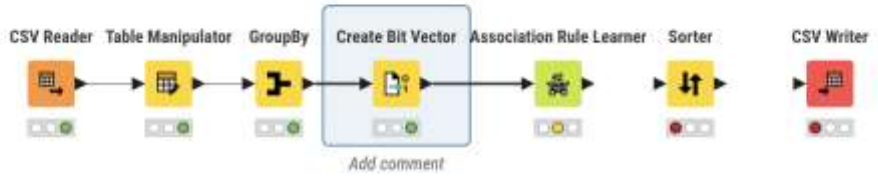


EDA Insights Summary

- - Core basket items: Milk, Bread, Butter
- - Frequent combinations identified
- - Daily and weekly patterns influence buying

Market Basket Analysis in KNIME

- - CSV → Group Orders → Create Item List
- - Bit Vectors → Association Rule Learner
- - Support ≥ 0.02, Confidence ≥ 0.3



Key Association Rules

- Rule Support Confidence Lift
- {Milk} → {Bread} 0.12 0.40 1.3
- {Bread} → {Butter} 0.08 0.30 1.1
- {Eggs, Milk} → {Bread} 0.05 0.36 1.5

Key Insights from MBA

- - {Milk} → {Bread} = Strongest rule
- - Suggest combo packs
- - Inventory optimization
- - Targeted offers

Business Recommendations

- - Combo offers for core items
- - Cross-sell via lift-based rules
- - Time promotions to demand patterns

Marketing Strategies

- - Loyalty points on combos
- - Personalized coupons
- - Regional campaign strategies

Conclusion

- - POS data → actionable insights
- - MBA reveals basket structure
- - Drives profitability and retention