

Solving Inventory Inefficiencies Using SQL

Presented by :

Nainish Kothari
23118050
IIT Roorkee

Tamanna Bhatti
23323043
IIT Roorkee

Aryan Mehra
23115025
IIT Roorkee



Challenges

- Frequent stockouts of fast-moving products, resulting in missed sales and poor customer experience
 - Overstocking of slow-moving items, locking up working capital and increasing warehousing costs
 - Lack of real-time insights into SKU performance, reorder thresholds, and supplier reliability
 - Poor visibility across product categories, store locations, and regions
-

Objective

- Create efficient and scalable SQL queries to extract, transform, and analyze inventory and sales data
- Diagnose inefficiencies, suggest corrective actions, and predict future needs based on data
- Deliver both technical outputs (SQL scripts, schema designs) and analytical insights that the business can act on

Entity Relationship Diagram

The ERD connects inventory, product, store, and seasonal data to analyze sales, stock, and promotions for optimizing inventory and enhancing retail decision-making.

SQL-Script

This SQL script creates views for date, store, product, and inventory data, then performs inventory analytics including stock levels, turnover, stockouts, seasonal trends, and performance metrics across products and stores

SQL-Documentation

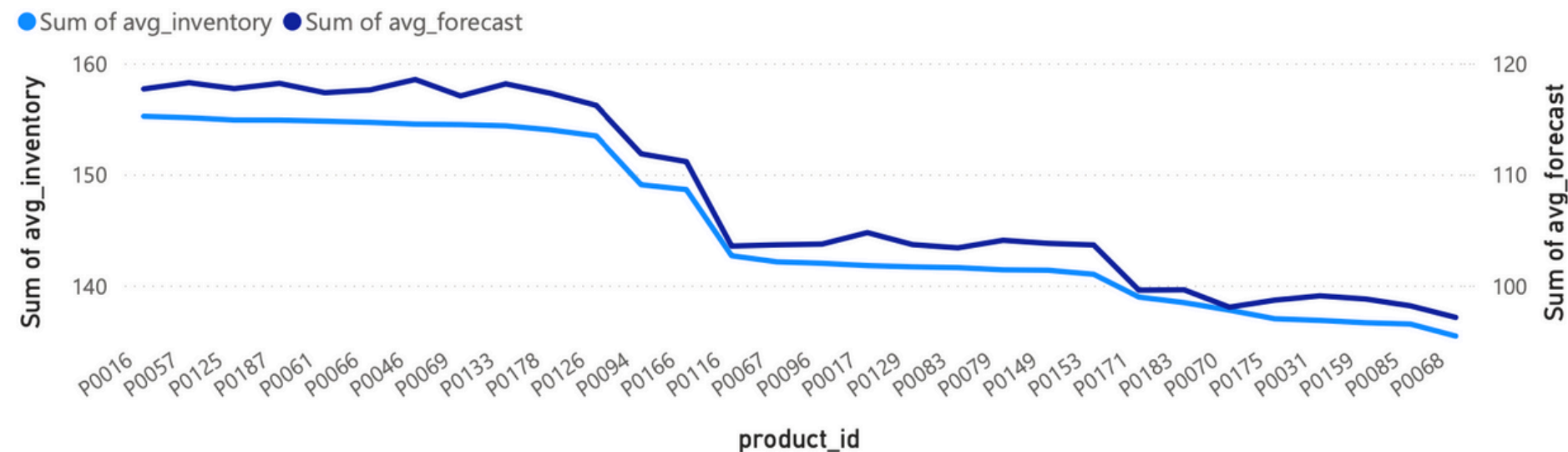
The SQL documentation explains view creation and analytical queries for inventory data, covering reorder points, stockouts, turnover, seasonal trends, and sales performance to support data-driven inventory decisions

KPI Dashboard

The dashboard highlights key inventory KPIs. It shows stockout rates by product and region, average stock levels by store, and inventory age. These metrics help identify supply gaps, optimize stock distribution, and reduce aging inventory across regions and stores.

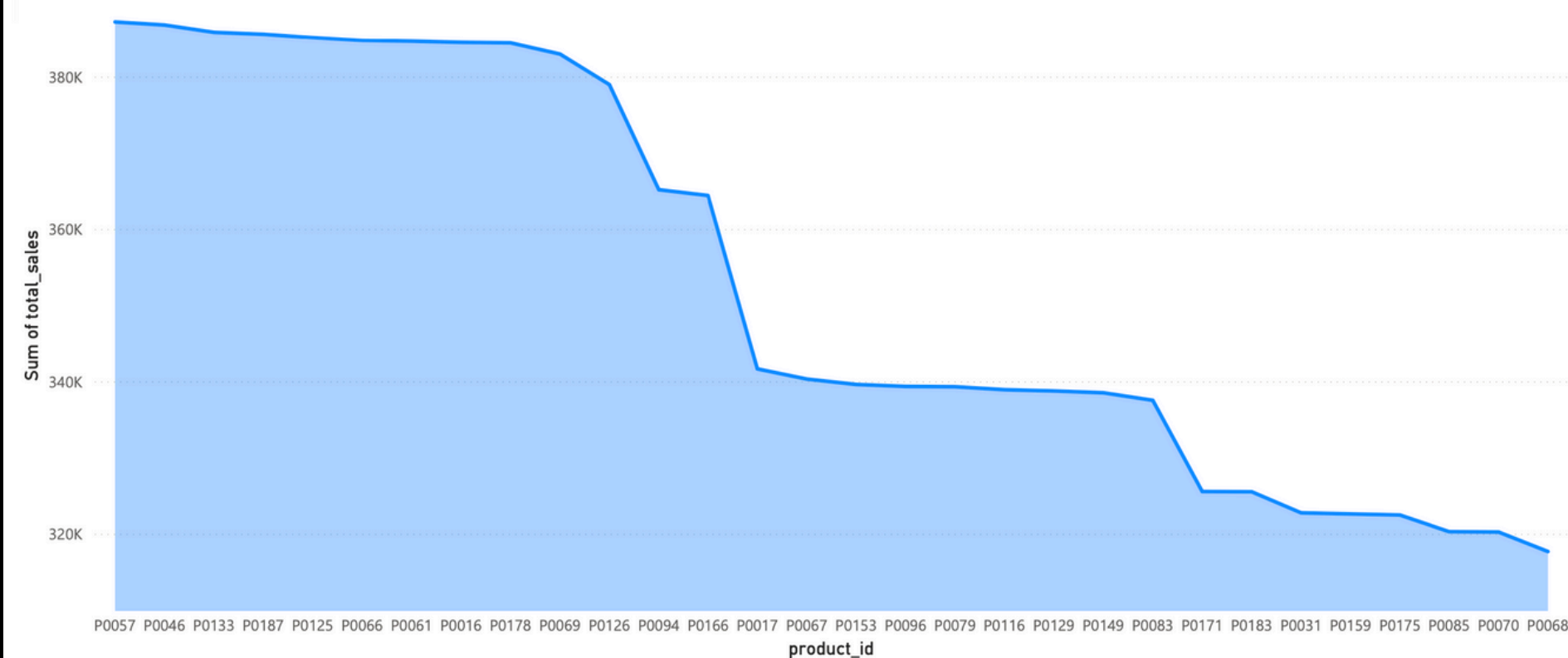
Analytical Output

Sum of avg_inventory and Sum of avg_forecast by product_id



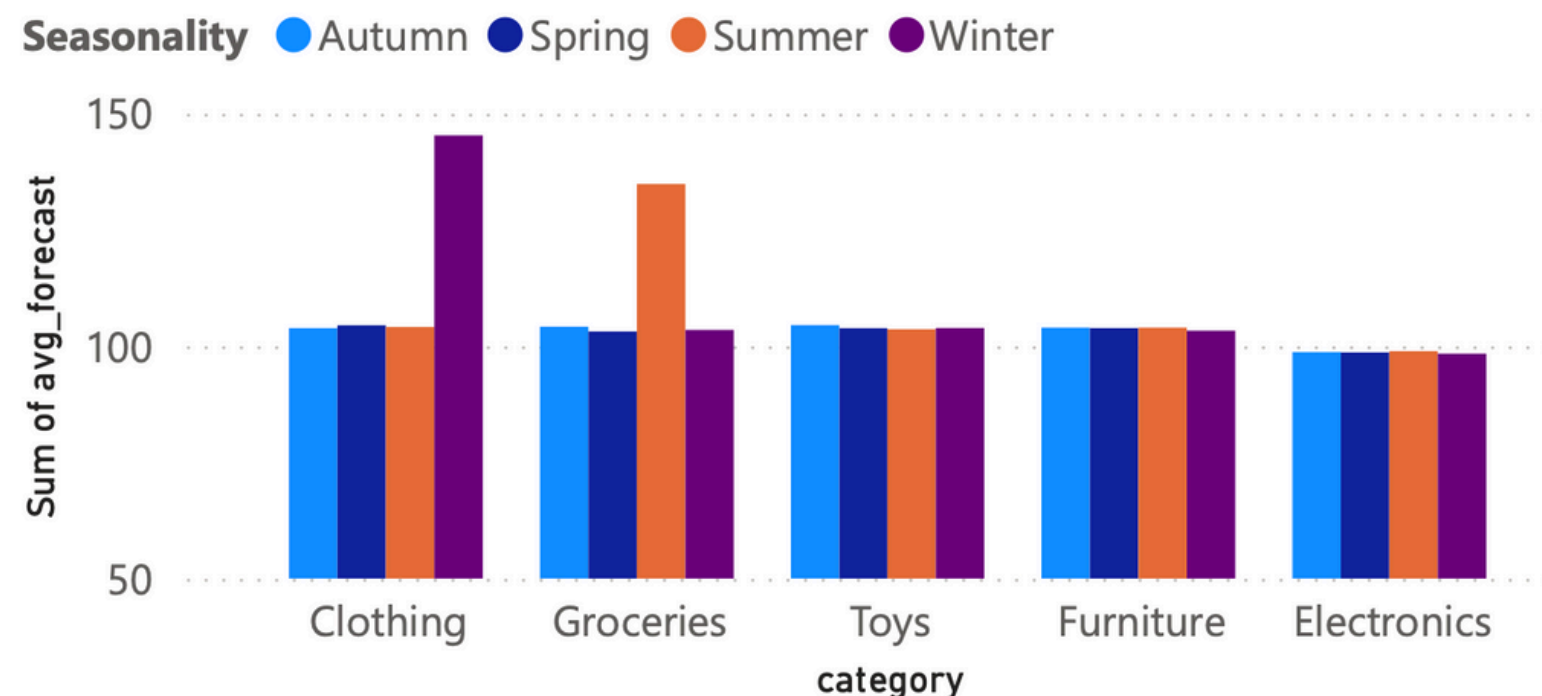
The chart indicates overstocking in products such as P0016, P0057, and P0125. Forecast deviations are notable for SKUs between P0094 and P0116. Products like P0067, P0096, and P0171 demonstrate strong alignment. Key actions include optimizing inventory for overstocked SKUs, enhancing forecast accuracy, and segmenting SKUs by demand tier.

Sum of total_sales by product_id



Fast-selling products like P0057, P0046, and P0133 should be prioritized for stocking and promotions. Slow-moving SKUs such as P0175, P0085, and P0068 need review for discounting, bundling, or rationalization to improve portfolio efficiency.

Sum of avg_forecast by category and Seasonality



The forecast shows strong seasonality for specific categories. Clothing peaks in winter with a forecast of ~145 units, significantly higher than other seasons (~105). Groceries see a sharp rise in summer (~135) compared to other seasons (~105). Toys, furniture, and electronics remain stable across all seasons (~105–100), indicating minimal cyclical impact.