

SKU and area level daily demand forecasts for efficient inventory planning

Introduction

A leading consumer goods company with brands in hair care, skin care, edible oils, health foods, male grooming, and fabric care categories was achieving low accuracy in forecasting demand across its product portfolio.

Client had developed simple rules-based demand forecasting models with less than 70% accuracy on average resulting in:

- ❖ Frequent stock outs of some SKUs during high demand months
- ❖ Excess inventory of SKUs having low demand



Client wanted to build predictive models that forecast sales of different SKUs across all its brands and in top sales areas at a retailer level to optimize inventory.

In phase 1 of the project, Client shared three combinations of brand and areas/zones (ASM):

- ❖ Brand 1 for ASM areas ABC1, ABC2 and ABC3
- ❖ Brand 2 for ASM areas PQR1 and PQR2
- ❖ Brand 3 for ASM areas UVW1 and UVW2

TransOrg developed machine learning based demand forecasting models that predicted daily demand at a 'product-SKU' pair level across the chosen ASM areas. These daily forecasts are then used by the client to optimize its inventory.

Solution

TransOrg analysed three years of historical sales data at an SKU and area level and developed multiple predictive models to forecast the demand.

Over 150 secondary variables for each SKU, area and month combination were developed with top variables used to train the model including:

1. Planned Targets:
 - Secondary level planned targets
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- Primary level planned targets
 - Primary targets in last three months
 - Actual sales vs targets
2. Past months data:
- Secondary sales in block 1
 - Primary Sales in block 1*
 - Actual volume sales in past three months
 - Sales in different seasons
3. Trade and consumer offers (TO/CO)
- Last offer run date
 - Type of offer run
 - Month in which offers were run
 - Total offers run in last three months
4. Ratio variables:
- Average primary actual volume
 - Ratio of block 1 sales to target for last three months
 - Ratio of block 1 sales to previous month sales
 - Ratio of primary target to previous month sales

*Block 1 - Month is divided into 3 blocks of 10 days each

The model built using random forest algorithm performed best with an overall accuracy of over 85% accuracy for the selected brands.

Impact



**85% accuracy in
demand prediction**



**Better insights on
offer effectiveness**



**Reduced inventory stock-out
situations**

Subsequently, TransOrg improved the models further by incorporating more data such as distributor and retailer level sales, product pricing, and granular data on marketing spends while also expanding the scope by including additional brands and ASM areas.