



Improved forecast accuracy across the supply chain

HCL helps a leading US-based logistics service provider optimize business operations

About the Customer

The client is a leading logistics service provider for restaurant chains around the world and provides service from the supplier dock to the restaurant stock, making it easier to run great restaurants.

With so many internal as well external variables at play in the market today, it becomes difficult to have accurate demand forecasting using traditional forecasting models. Hence, HCL embarked on a mission for its client to improve forecast accuracy across the supply chain by assessing sales and factors which influences it. HCL utilized a statistical model based on artificial intelligence and machine learning to aid supply chain and demand planning by forecasting demand and quantifying the impact of external variables on demand.



The struggle to have accurate demand forecasting

The Challenge

The client, a logistics service provider was struggling with multiple business-related Issues such as:



High shrinkage and lost opportunities experienced due to forecast inaccuracies and a lack of inventory management



Unavailability of a direct mapping between products actually sold and the products being supplied (raw materials) due to a lack of proper demand planning



Sparse supply chain data leading to difficulties in forecast estimation



High cost and low flexibility associated with the legacy solutions



Non-existence of a feedback loop from the business



Limited visibility into the impact of promotions and exogenous variables

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The HCL Solution

HCL leveraged its DDVN (Demand-Driven Value Network) to help the client organize its supply chain across areas.



HCL utilized statistical and machine learning to aid demand planning by forecasting demand and quantifying the impact of external variables on demand.



HCL collated both structured data (such as order history,, SKUs, stores, demographics, and promotion plans, etc.) and unstructured data (such as fuel pricing, unemployment, and other macro-economic factors) from multiple data sources such as PoS data, data lake, social media information, and other external sources of data.



HCL did the correlation analysis to identify the features which had an impact on sales and used VARMAX to assess the existence or non-existence of dynamic relationships and SARIMAX to understand the seasonality of every product.



HCL performed a Fourier transformation for the final forecast based on MAPE and MAE.



HCL also created the restaurant order application which provides a detailed BMI (Base menu item) order list at the store level.

HCL Solution: Supply Chain Model Optimization

1 Data Ingest

STRUCTURED

- Order history store level (consumers/non-consumers)
- Products hierarchy to SKU (SMI/BMI/AI)
- Store/location/geography
- Market region/sub-region
- Number of customers per store and demographic
- Weather
- CPI per market region
- Fuel price per market region (weekly average per city/state/market)
- Promotion plan (store detail)
- Holidays, local events
- Inventory- At the store/DC and SKU level (planned, actual, transfer, replenished, out-of-stock, safety stock, etc.)
- Other related variables

2 Exploration

DATA ANALYSIS

- Data cleansing
- Descriptive analysis
- Outlier/extreme value detection
- Missing value treatment
- Data enrichment
- Charts

3 Core analytical engine(s)

SC OPTIMIZATION MODEL

- Restaurant order proposal— Store level
- Supplier demand forecast

4 Recommendation

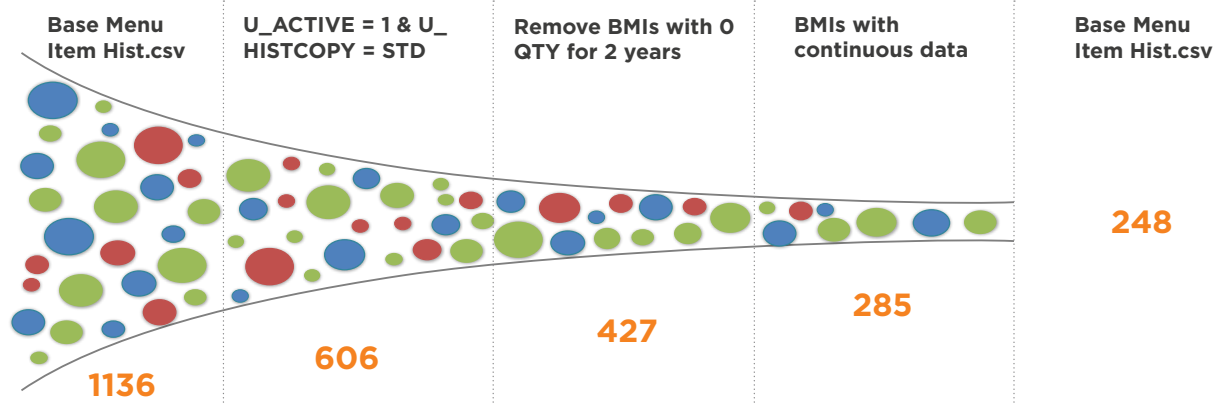
Restaurant Order Proposal

Store ID	Inventory
134566	Order list
4434599	Order list
843	Order list

Leveraging statistical models based on artificial intelligence and machine learning to create an accurate forecasting model

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Approach Methodology: Criteria for Base Menu Item (BMI) Analysis



The Benefits



The solution improved forecast accuracy by 7%



Reduced manual effort of promotion detection by 30%



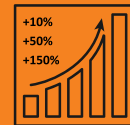
Improved inventory management during holidays which was historically unavailable earlier



Faster and greater realization of benefits anticipated from enterprise-wide CRM/ERP and improved insight



Factor and the extent of impact of promotional events



Increased accuracy leading to better utilization and lesser wastage

For more details contact: rcpg.solutions@hcl.com

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HCL

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