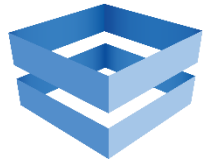
LatentView Analytics
Retail capabilities



latentview

Actionable Insights • Accurate Decisions

Agenda

01 LatentView Retail roadmap over the last decade

02 LatentView Projects across Retail Value Chain

03 Technical expertise

04 Representative case studies

(Sears, Walmart, Pepsi, Staples, Levi's, Ebay)

LatentView
Actionable Insights • Accurate Decisions

LatentView Retail Roadmap Over the last decade

2006

Founded in New Jersey

2008

- Top Performers at PAKDD 2009 Data Mining Competition

2010

- Recognized By Michael Porter And Allworld Network As One Of 'India's Fast Growth 25'
- Top Honors At The PAKDD 2010 Data Mining Competition

2012

- Won Top Innovator In Analytics-As-A-Service Category
- Ranked 12th Fastest Growing Technology Company on the Deloitte Technology Fast 50 India 2012

2014

- Named 2015 Analytics Company of the Year
- Hosted LatentView's Analytics Summit, SF

2016

- LatentView Celebrates a Decade of Rapid Growth and Market Demand for its Big Data Analytics Expertise
- Achieved a Microsoft Silver Cloud Platform Competency

2018

- Frost & Sullivan's "Analytics Solutions Provider of the Year"
- Winner: Deloitte tech fast 50
- Partnership with Arvato and Pointillist

Latent View Projects across Retail value chain

Supplier

Plan

Assortment mix analytics

Market/Demographics based assortment planning

Financial analytics

Interactive BI Dashboards

Buy

Vendor management dashboards

Demand Forecasting

Market trends analysis

Move

Route optimization

inventory optimization

Warehouse optimization

Sell

Media/Market mix modeling

Web Analytics

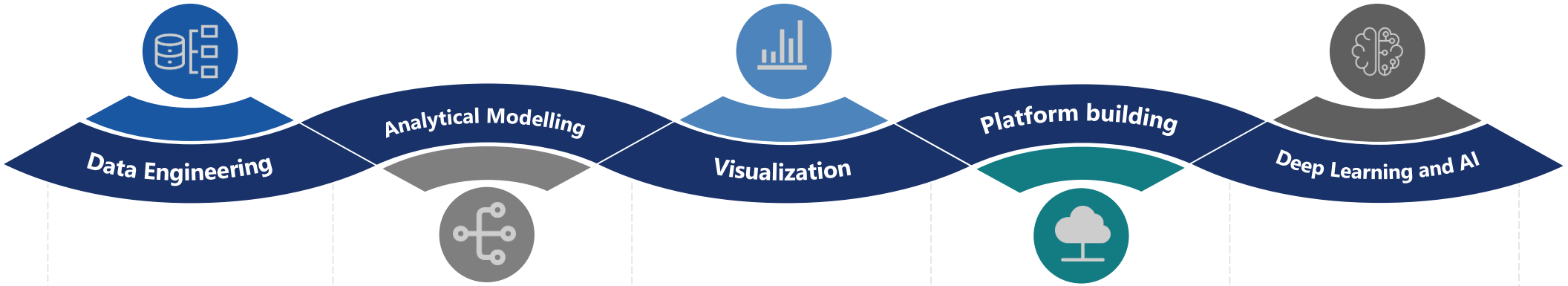
CRM analytics

Recommendation engines

Pricing analytics

Customer

Technical capabilities



Azure
amazon web services
Google Cloud Platform
Spark
hadoop

python
R
sas
THE POWER TO KNOW.

tableau
SOFTWARE
informatica
Power BI
QlikView

jQuery
write less, do more.

python
TensorFlow
Keras
PyTorch

LatentView
Actionable Insights • Accurate Decisions

Representative use cases

Plan

- Online marketing effectiveness
- Demographics driven assortment planning
- Sales trend prediction using machine learning

Buy

- Price elasticity modeling
- Optimize expenses
- Product feedback

Move

- Demand Forecasting
- Inventory diagnostics
- Supply chain optimization

Sell

- Recommendation Engine
- Loyalty Analytics
- Smart Insights

Case studies - Plan

LatentView

Actionable Insights • Accurate Decisions

Enhancing customer Assortment Planning using Consumer Reviews

Leading US Department Store Chain - Sears

The Problem: In the retail business, an effective assortment plan can move the needle on financial and personnel performance

The "Before" State

Assortment planning was done using only internal data resulting in gaps in merchandising decision making such as competitor information and understanding of consumer preferences across different product categories and geographies

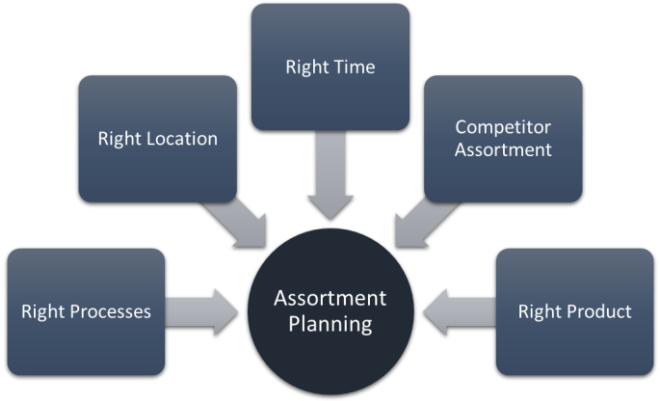
LatentView Solution

Built a text analytics platform to consolidate external, unstructured data to 'measure' customer preferences of client's product SKU's with respect to competition on various parameters that drives purchase

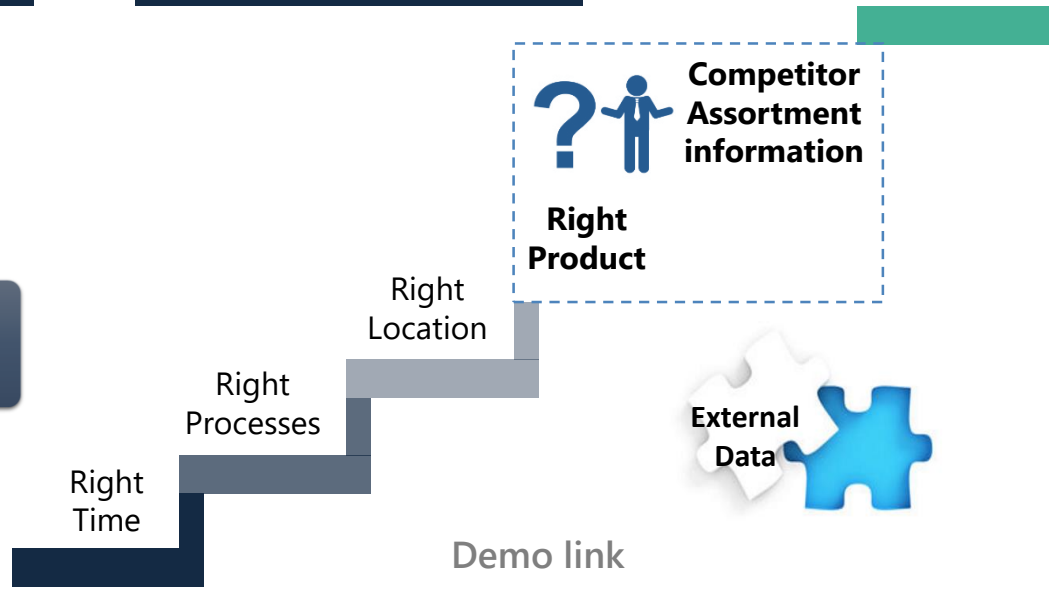
The "After" State

Deeper insight into product trends, consumer preferences and competitor information augmented assortment planning lead to 2% increase in footfall and increase in high frequent shoppers by 6% which had a major impact on the topline

What are the keys to successful assortment planning?



What is missing in Internal Data?



Demo link

How to address limitations using external data?

Identifying emerging trends in Consumer Electronics

Identify categories which have top trending SKU's

Why they are top SKU's

Triggers and drivers of purchase

Competitive Intelligence

Consumer perception - Client vs. Competition

Geography based Positioning

Findings at geography level

Consumer preference driven Assortment Planning

Leading US Based Beverages & Snack Manufacturer - PepsiCo

The Problem: In the CPG industry , understanding of consumer purchase preferences across geographies and demographics is a key input in assortment planning across brands and SKU sizes

The "Before" State

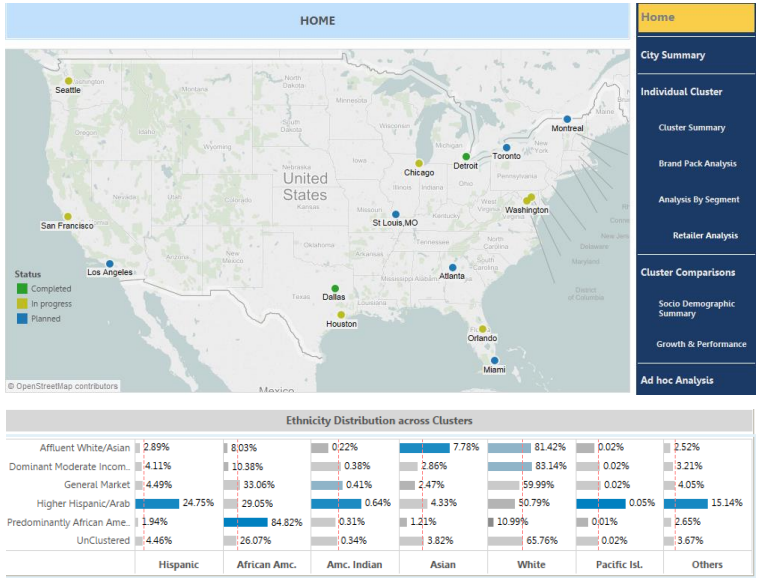
A lack of a unified view of consumer purchase preferences across different segments, cities and brands resulted in sub-optimal assortment planning across all stores

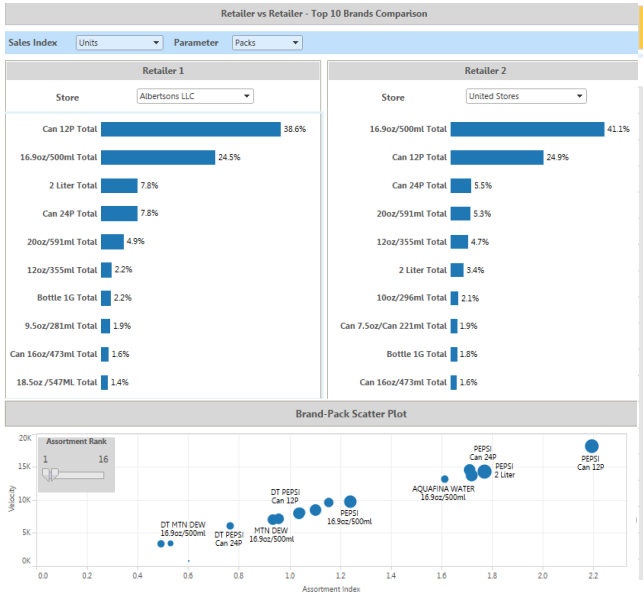
LatentView Solution

Built an intuitive, actionable visualization tool that provided insights into which brands and SKUs were underperforming and identify the causal factors such as geolocation, socio-demographics and consumption patterns

The "After" State

Streamlined assortment planning helped increase the efficiency of demand planning resulting in reduced manufacturing costs and inventory levels





<< Back

Brand Pack Performance Tabular Snapshot

BRND_NME	Pack Desc	Assortment Rank	Assortment Index	Velocity Index	Sales Index - CY	Sales Index - PY
	2 Liter	1	0.791	0.30	69,389	69,906
	2 Liter	2	0.499	0.31	40,240	39,612
	BIB 5G	3	0.406	0.32	30,767	33,420
	2 Liter	4	0.304	0.32	20,505	18,255
	1 Liter	5	0.300	1.00	2	
	1.5 Liter	6	0.289	0.96	44	80
	BIB 5G	7	0.267	0.32	17,009	18,145
	2 Liter	8	0.253	0.27	17,161	16,418
	20oz/591ml	9	0.250	0.83	2	12
	2 Liter	10	0.237	0.29	14,848	16,109
	BIB 5G	11	0.234	0.28	14,730	17,655
	Can 12P	12	0.191	0.63	11	14
	BIB 1G/3.79L	13	0.188	0.63	12	6
	20oz/591ml	14	0.188	0.63	10	
	1.5 Liter	15	0.183	0.61	93	140
	1.5 Liter	16	0.176	0.58	130	206
	Can 6P	17	0.164	0.55	43	68
	2 Liter	18	0.163	0.28	7,801	9,314
	18.5oz /547ML	19	0.161	0.52	421	473

9

Machine Learning Driven Sales Trend Detection at Scale

Leading Transnational Consumer Goods Company

The Problem: In the CPG industry , the speed to detect sales trends accurately at the most granular SKU level across multiple product categories can be a big source of competitive advantage

The "Before" State

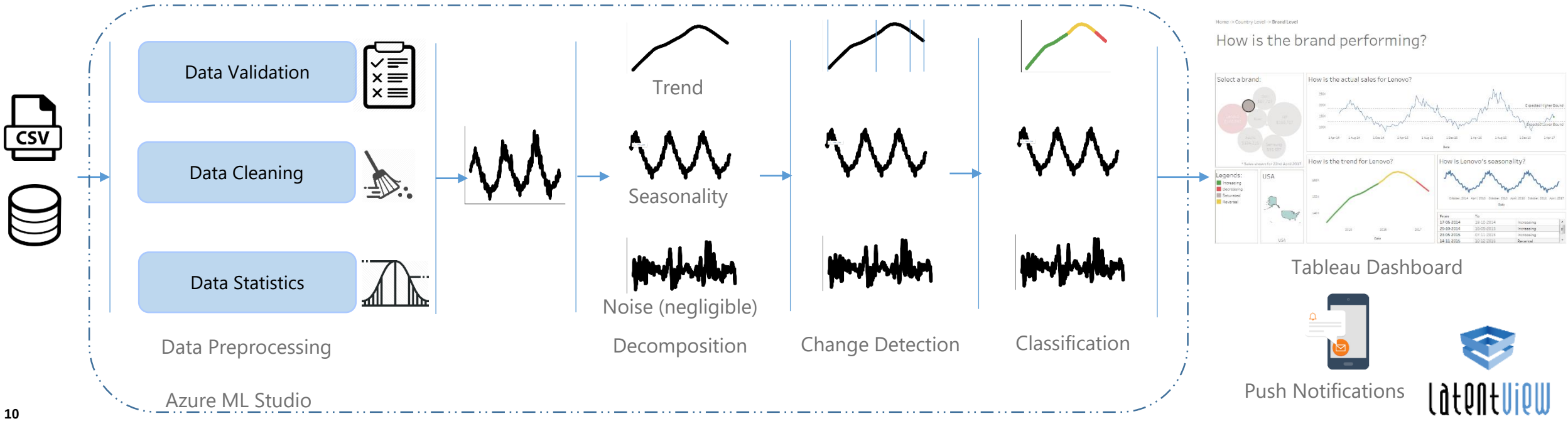
Detecting sales trends & anomalies across thousands of SKUs was a laborious, error-prone, time consuming activity taking almost 4-5 weeks to even get a rudimentary estimate

LatentView Solution

Built a Machine Learning, Rules & Notification engine to perform enhanced seasonal decomposition of time series (STLPlus) along with changepoint / breakpoint analysis on sales data, to identify & classify seasonal, trend components

The "After" State

Deep dive sales analysis output with notifications for over 10,000 SKUs in less than a day helped making timely market interventions in supply chain planning thus reducing stock-out rate by 5% & inventory costs by 2%



Integrated & Customized Campaign Activation for Higher Revenue

Leading Online Payments Company - PayPal

The Problem: While the highly engaged user transacted in 10-12 verticals, the average user only used the customer's payment services in 3 verticals and this gap presented a significant revenue upside opportunity

The "Before" State

Campaigns were managed manually and were developed and executed based on general product-based marketing strategies by different marketing teams

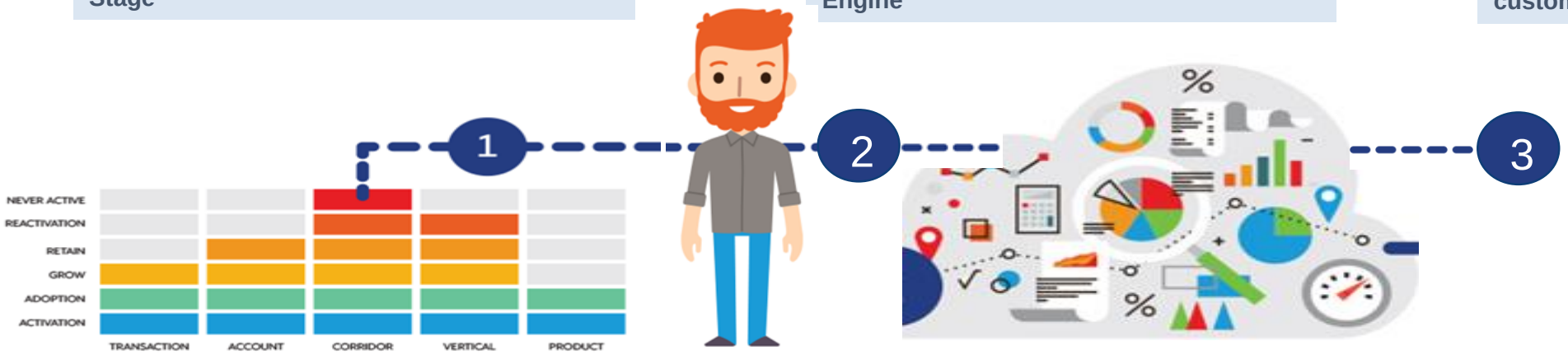
LatentView Solution

Developed an automated platform for managing campaigns, which were customized through dynamic selection of best offers and messages for each customer based on their life stage

The "After" State

Customized campaigns resulted in significant number of incremental transactions for the average user (footprint increased from 3 to 8 verticals) which netted an additional revenue of $7.5 million

Segment Customer by Dimension and Life Stage



Profiling customer by dimension and life stage.

Select Best campaign using Optimization Engine

Best campaign is selected for customer based on multiple criteria & Channel

Channel **Dimension**
Initiative **Target method**
Lifecycle stage

Message block dynamically selected for each customer

The Next Best Offer (NBO) Engine determines the best offers from the offer repository that are most relevant for customer.

LatentView
Actionable Insights • Accurate Decisions

Case studies - Buy

LatentView

Actionable Insights • Accurate Decisions

Predicting Price For Leading Retailer Based On Price Elasticity

Client is a leading US Retailer. - Sears

Business Objective

- Analyze sales response to discounts offered
- Determine customers' price elasticity towards different types of products

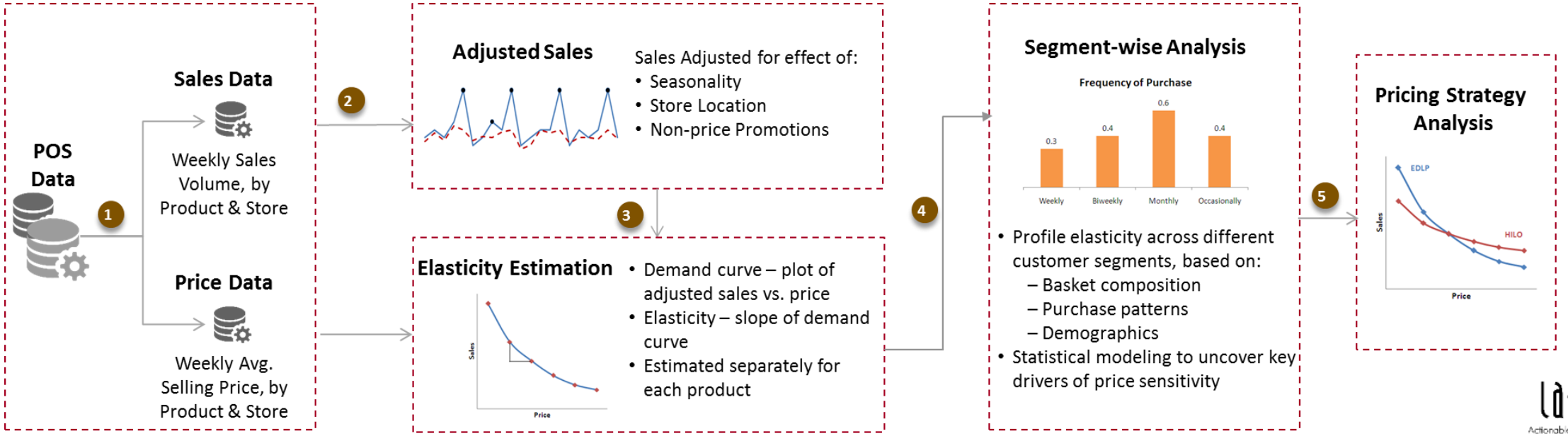
LatentView Solution

Built a price elasticity model which helps to:

- Analyze price elasticities across different customer segments
- Test different pricing strategies by checking potential loss / profit
- identify key characteristics that drive price sensitivity of customers

Business Benefits

- Predict demand for sales & volume across a range of price points
- Determine how sensitive customers are to a price change
- Determines if a price change is warranted & its potential impact based on the strategy



LatentView
Actionable Insights • Accurate Decisions

Optimizing Expenses At Various Customer Touch-points

Client is a leading Travel Website. - Expedia

Business Objective

- The objective is to reduce the costs at these cost centers (Customer Care center, Marketing Campaigns etc.,)
- This involved identifying the reasons for higher operational costs and ways to optimize/reduce these costs.

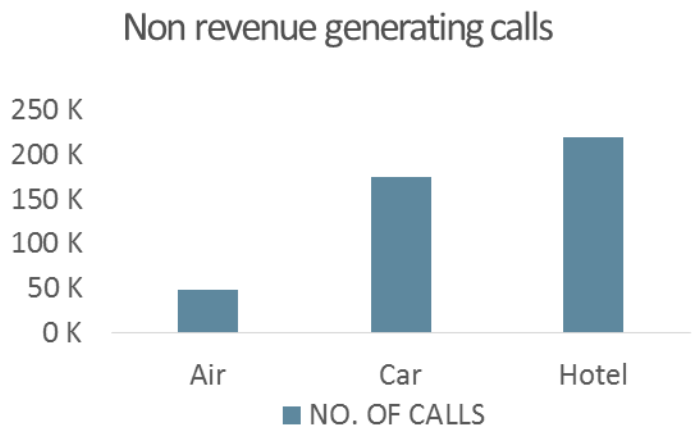
LatentView Solution

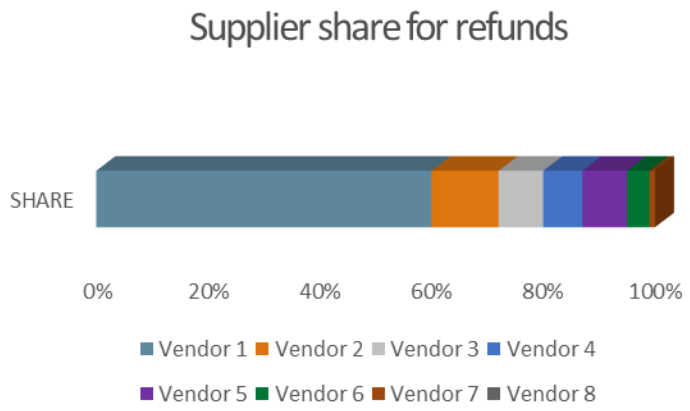
- LatentView analysed one year of customer calls to categorize the calls into revenue & non – revenue generating calls(request for refunds)
- LatentView also used fuzzy string matching algorithm to identify the correct email id to enable correct marketing.

Business Benefits

- Number of Non-revenue generating calls were reduced resulting in lowering in service costs.
- Effectiveness of Marketing campaigns were improved.
- Service quality at the customer care center was improved

Business Insights





Impact

45,000	Identified invalid e-mails accounts
$ 409 K	Reduction in expenses
17%	Reduction in non revenue generating calls

Data driven Product Innovation based on Consumer Reviews

Largest Home Appliances Manufacturer in US - Whirlpool

The Problem: Lack of/Delayed access to direct customer feedback on their products and competitors' can adversely affect a consumer durable company's ability to innovate and keep customers happy

The "Before" State

Purchase drivers were determined by post-facto analysis of POS data at stores and survey data resulting in delays of up to eight months to get consumer feedback on product features

LatentView Solution

Built a real-time text analytics platform to consolidate external, unstructured data to 'measure' customer feedback of client's brand with respect to competition on various parameters that drives purchase

The "After" State

Precise, fine-tuned innovation on product features and messaging was possible on an ongoing basis as consumer feedback reached the teams directly within 2.5 months of product launch

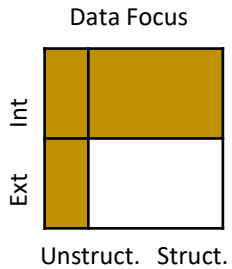
Industry Forums — Consumer Reports

+

Market Places — Home Depot, Amazon

+

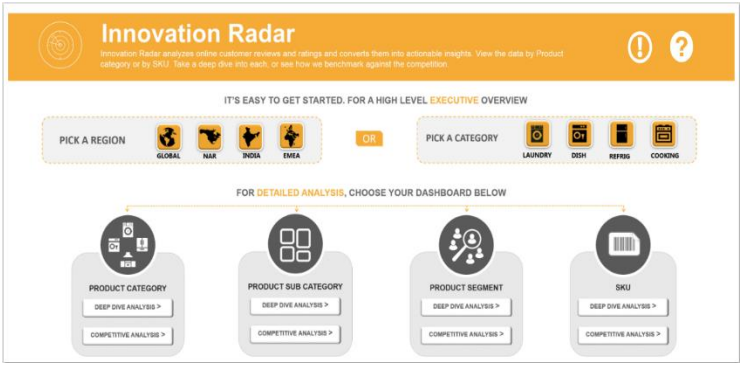
Brand Websites — LG, Whirlpool



Data Extraction & Data Landscape

- Sentiment Analysis
- Drivers of Purchase
- Triggers of Purchase
- Expert Opinion
- ★★★☆ Consumer Rating
- Popular Features

Text Analytics



SAS VA Dashboards

LatentView
Actionable Insights • Accurate Decisions

Case studies - Move

Precise Forecasting of Demand for Jewelry SKUs

World's 3rd Largest Jewelry Manufacturer - Pandora

The Problem: Accurate demand forecasts for new and existing SKU's is essential in a vertically integrated supply chain for high value products

The "Before" State

Lack of consensus on demand forecast across different business functions and no centralized category level forecast was further complicated by the frequent introductions of new products every year

LatentView Solution

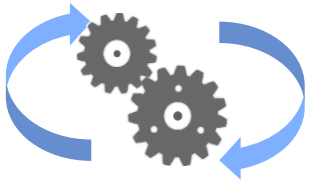
Generated baseline forecasts for 3000 SKU's using multivariate forecasting techniques and driving consensus among demand planners. Automated new SKU forecasts using similarity indices to identify most similar old SKUs

The "After" State

Improved overall demand forecast accuracy by 13% and availability of SKU level forecasts helped reduce supply planning costs by 2%

Existing SKUs

- Subset Data
- Determine if the time series requires any additional transformations



Repeat the process for all SKU's

- Fit the models from the subset identified above to the in-sample data and collect statistics on the out-sample
- Choose the model with the best accuracy to fit the whole range of data
- Identify and flag poor performing models for manual corrections

New SKUs

Add following variables to the data

- Net Weight
- Weight Gold/Silver
- DNA Metal
- US Retail Sale price
- DNA Stones
- DNA Colour

Clustering of SKUs

- Calculate similarity indices for new SKUs to identify most similar old SKUs
- Choose the model with the best accuracy to fit the whole range of data
- Use business inputs to fine tune models

- **ARIMA**
- **STLF**
- **Neural Networks**
- **Croston's**
- **Tbats**
- **Prophet**
- **K- Prototypes**
- **PAM**

LatentView
Actionable Insights • Accurate Decisions

Automated Inventory Diagnostic Tool

Leading Snack and Beverages Company - PepsiCo

Business Objective

- To provide a starting point for the analytics dimension of inventory management capabilities
- To identify average excess inventory levels and set smart targets by SKU and location
- To identify 'near term' inventory reduction opportunities
- To understand key operational drivers

LatentView Solution

- Dashboards were built using Tableau to provide an end to end solution illustrating the flow of Inventory for both Raw Materials and Finished Goods
- A logical flow of dashboards was built which provided a holistic snapshot of the supply chain network , capturing the key governing parameters from a sector level to an SKU level
- Developed a What-If analysis framework providing the user a platform to simulate different scenarios and hence identify the optimal method to reduce excess inventory.

Business Benefits

- Provides better inventory planning in the warehouses thus reducing the cost of carrying goods and also avoid stock-outs
- Identifies the opportunities for improvement from a Sector level up to a SKU location level using the key performance indicators for various inventory components

Identifying Insufficient and Excess Inventory

- **Supply Chain Health**
- **Inventory Analysis**
- **SKU Analysis**
- **Component Overview**

Set and Refresh Inventory Targets

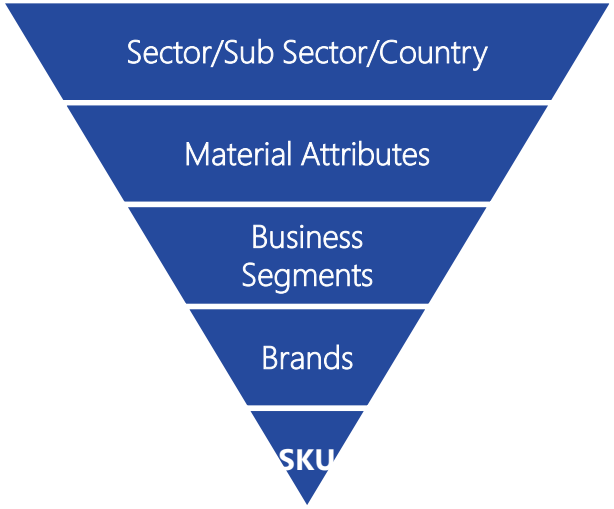
- **Safety Stock Analysis**
- **Cycle Stock Analysis**
- **In Transit Analysis**
- **Pre-Build Analysis**

Analysis of Improvement Scenario

- **Scenario Analysis**
- **Goal Setting Analysis**
- **What-if Analysis**

Go Back

Levels of Granularity



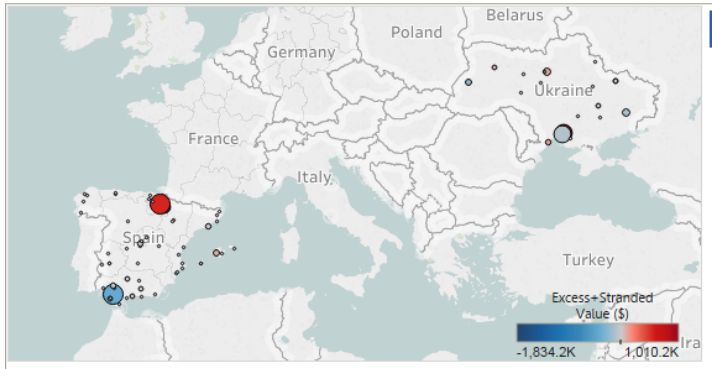
Automated Inventory Diagnostic Tool Screenshots

Scenario

Supply Chain Health

Last Tableau Data Refresh: 28-06-2016 21:03:31

Location	Sector	All	Region	All	Market ID	All	Country	All	Location Type	All	Location All
aa											
Material Attributes	Product Line	All	Brand Group	All	Brand	All	Sub Brand	All	Pack	All	SKU All
ss											
Others	UOM	Value ($)	Tool Calc vs Mkt Prvd	Tool Calculated	Proc. Type	All	ABCD Level	Market	ABCD	All	Period/ Month All



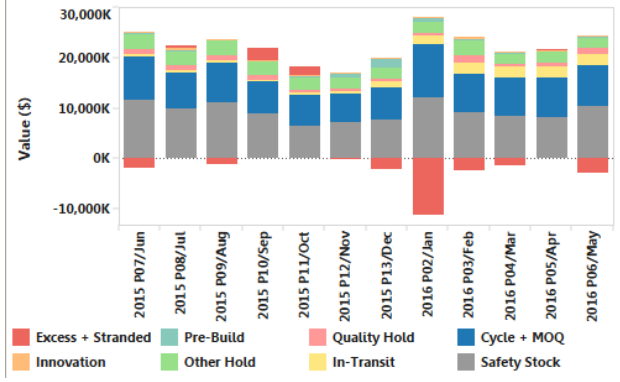
Size of the bubble represents Actual Inventory Value

Inventory Snapshot

	Actual	Calculated	Excess+Stranded
Value ($)	20,430.01K	21,971.77K	-1,541.76K
Value (LC)			
Volume (CS)	6,307.95K	6,248.29K	59.66K
Days	18.24	19.61	-1.38

Component Overview Value ($)

Sector: ESSA - Country : All - Location Type: All - Location: All - UOM: Value ($) - Brand: All - SKU: All - Market ID: All



Component	Inventory Value ($)	Days
Excess + Stranded	-1,541.76K	-1.38
Innovation	169.17K	0.15
Pre-Build	421.16K	0.38
Other Hold	2,557.37K	2.28
Quality Hold	826.44K	0.74
In- Transit	1,207.45K	1.08
Cycle + MOQ	7,512.36K	6.71
Safety Stock	9,277.83K	8.28
Calc. Inventory	21,971.77K	19.61

Home

Scenario Analysis

Last Tableau Data Refresh: 28-06-2016 20:21:28

Location	Sector	All	Region	All	Market ID	All	Country	All	Location Type	All	Location All
Material Attributes	Product Line	All	Brand Group	All	Brand	All	Sub Brand	All	Pack	All	SKU All
Others	Proc. Type	All									

Safety Stock Scenarios

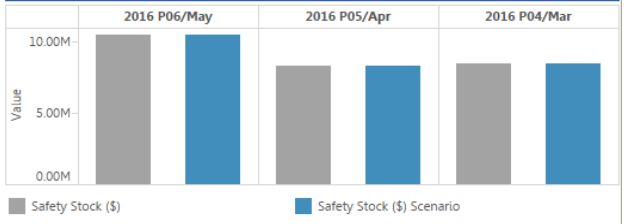
	A	B	C	D
Set Forecast MAPE to (%)	0.00%	0.00%	0.00%	0.00%
	33.91%	34.92%	42.09%	43.66%
+/- Forecast MAPE by (%)	0.00%	0.00%	0.00%	0.00%
	33.91%	34.92%	42.09%	43.66%
Set Forecast Bias to (%)	0.00%	0.00%	0.00%	0.00%
	-14.48%	-11.40%	-11.50%	-9.25%
+/- Forecast Bias by (%)	0.00%	0.00%	0.00%	0.00%
	-14.48%	-11.40%	-11.50%	-9.25%
Input Lead Time (days)	0.00	0.00	0.00	0.00
	5.30	5.29	4.21	5.33
+/- Lead Time (Days)	0.00	0.00	0.00	0.00
	5.30	5.29	4.21	5.33

Cycle Stock Scenarios

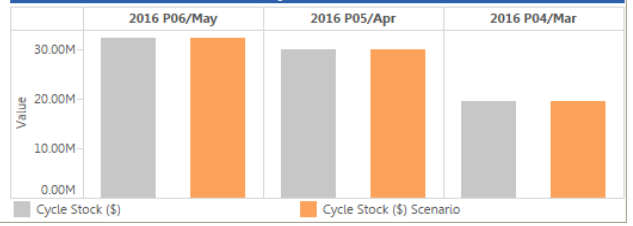
	A	B	C	D
Set Production Interval to (days)	0.00	0.00	0.00	0.00
	7.17	15.66	18.06	29.20
+/- Production Interval by (days)	0.00	0.00	0.00	0.00
	7.17	15.66	18.06	29.20
Set Inbound Shipment Interval to (days)	0.00	0.00	0.00	0.00
	46.92	27.92	27.24	28.67
+/- Inbound Shipment Interval by (days)	0.00	0.00	0.00	0.00
	46.92	27.92	27.24	28.67
Set Outbound Shipment Interval to (days)	0.00	0.00	0.00	0.00
	1.48	1.92	3.44	5.28
+/- Outbound Shipment Interval by (days)	0.00	0.00	0.00	0.00
	1.48	1.92	3.44	5.28

	Current	Scenario	Difference
Safety Stock ($)	9,275.68K	9,275.68K	0.00K
Safety Stock Cases	2,430.37K	2,430.37K	0.00K
Safety Stock DOH	9.57	9.57	0.00
Cycle Stock ($)	28,050.66K	28,050.66K	0.00K
Cycle Stock Cases	6,905.40K	6,905.40K	0.00K
Cycle Stock DOH	28.95	28.95	0.00

Safety Stock



Cycle Stock



Go Back

Demo

Improving Production line Throughput for leading Snack company- PepsiCo

Key Issue: A plant producing ~3000 lbs chips an hour have lower Operational Equipment Efficiency (OEE) due to impact of packaging segment stops contributing to fryer downtime / throughput reduction

Approach: Identifying key factors to predict downtime / throughput reduction on hourly basis. Building a real time visualization tool to monitor the key factors and take necessary mitigating actions

I Data Understanding

1 *Data Sources :*

- Packaging Stops
- Through put change
- Processing Stops
- Operational Variables

II Data Preparation

2 *Interleaved Master Database*

- Extracted only 1 hour data prior to target event
- Defined Non-Event and Applied various conditions on 1-hour time frame

Event Subset file + *Non-Event File*

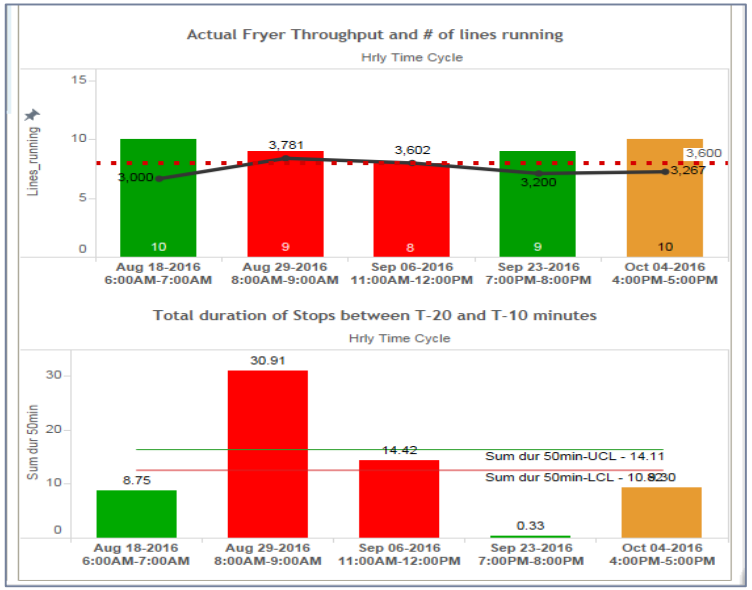
- i. Collated file in Time series format
- ii. Converted time –series data into cross sectional form

3 *Data Mart for Model building*

III Model Building

4 *Logistic Regression to predict downtime and throughput reduction and to identify Key Factors*

IV Real Time Dashboard



Impact:

- *Additional output gained by predicting downtime ~13000 lbs / month*
- *Incremental wastage reduction ~4500 lbs / month **

** - In pilot phase*

LatentView Actionable Insights • Accurate Decisions

Case studies - Sell

LatentView

Actionable Insights • Accurate Decisions

Recommendation System to Increase Share of Wallet

Largest Food Distributor in US - Sysco

The Problem: In an industry where customer acquisition is fairly expensive, this company's repeat orders were at a low 4%

The "Before" State

Sales teams tried to sell new products to existing customers based on shallow analysis of previous transactions and 'gut' feel

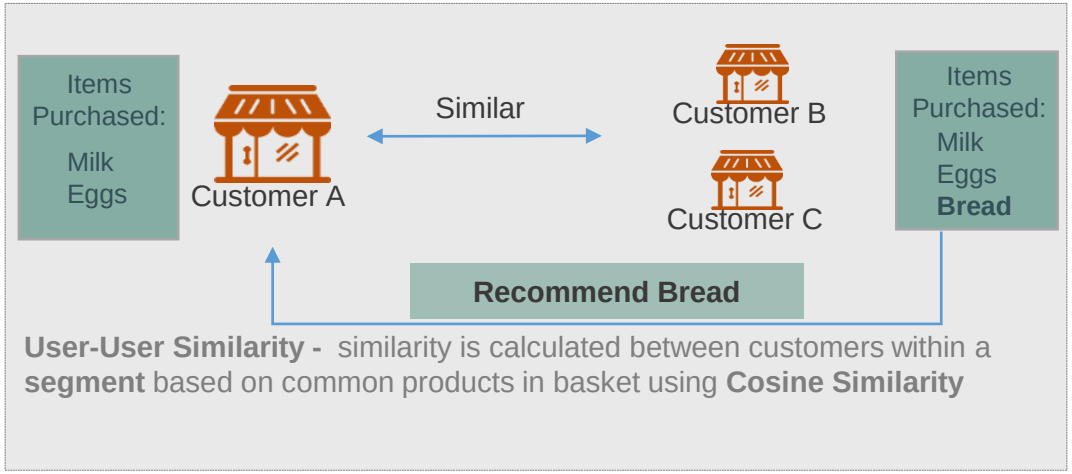
LatentView Solution

Build an innovative recommendation engine that combined customer segmentation, user-based collaborative filtering and market basket analysis

The "After" State

20% increase in value of new orders from existing customers. Higher customer satisfaction due to precise recommendations

Collaborative Filtering



User-User Similarity - similarity is calculated between customers within a **segment** based on common products in basket using **Cosine Similarity**

Market Basket Analysis

Market Basket Analysis performed for all products bought by customers in a segment. Select the product with highest likelihood to co-occur in the basket

Recommended Bread

	MILK	EGGS	OLIVES	BREAD
TRX1	■	■	■	■
TRX2		■	■	
TRX3	■	■		■
TRX4		■		■

Recommendation Engine

Combine the recommendations from the 2 algorithms to generate the final recommendation

For a Customer who purchases Milk & Eggs, the product with highest affinity is Bread

22

latentview
Actionable Insights • Accurate Decisions

Personalized Targeting using Look-Alike Modeling

The Problem: Lack of a scientific data-driven approach to targeting customers for new campaigns - PayPal

The "Before" State

The marketing team targeted customers based on pre-set rules which did not take into account past behavior, thus having a negative impact on campaign effectiveness

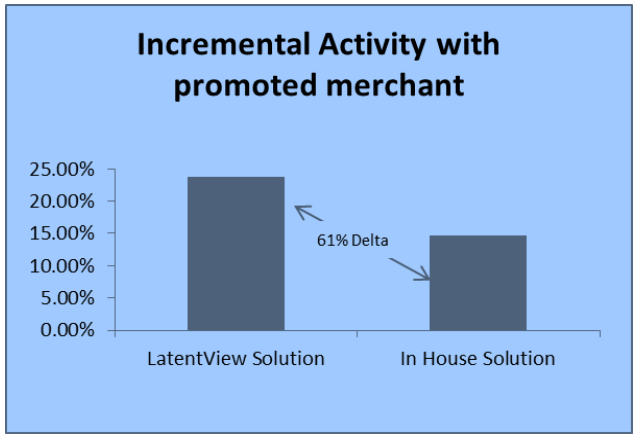
LatentView Solution

Created look-alike models using logistic regression techniques so as to target the right customers for campaigns

The "After" State

Identification of target population who have a higher propensity to respond to specific campaigns on large merchant offers drove incremental revenue of $0.5 million

Model performance



Who are more likely to respond?

- Purchased previously in Fashion vertical
- Opened their emails in the last 3 months
- Active in more than 6 of the last 12 months
- Females with age between 20 and 40 years

Campaign performance

Metrics	Value
Target Size	950K
Incr. Rev per Account	$ 0.57
Incr. Rev %	2%
Total Incr. Rev	$555,236

latentview
Actionable Insights • Accurate Decisions

Contact Optimization to Improve Campaign Response Rates

Large International Airline Company – United Airlines

The Problem: For email campaigns, an important communication medium, the open rates among loyalty customers were 3%

The "Before" State
Customers received a certain number of emails as defined by business rules, once in 6 months. Lack of personalization resulted in low open rates

LatentView Solution
Dynamic segmentation based on customer's past behavior helped optimize the number of emails sent per week. Collaborative filtering techniques were used to personalize email content for customer segments

The "After" State
2% increase in email open rates, 5% higher clicks per customer, which led to an increase of 3% in air revenue

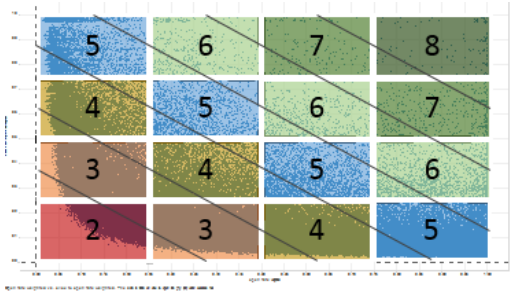
Member Capacity Optimization

Customer engagement data → Open rate → Click through rate

Member Content Optimization

Customer profile data → $f(x)$ Propensity Model → Collaborative Filtering

Optimized Member Capacity



Optimized Content

Product	Propensity
Fare Sale	0.734
Bundles	0.562
AirMiles Club	0.323
Chase	1
Hotel	2

Social Insights Platform for Fashion Trends Spotting

Leading US Cosmetics Company - Revlon

The Problem: Understanding the make-up and personal care needs of the women in the 18-34 age range is critical in the cosmetics industry

The "Before" State

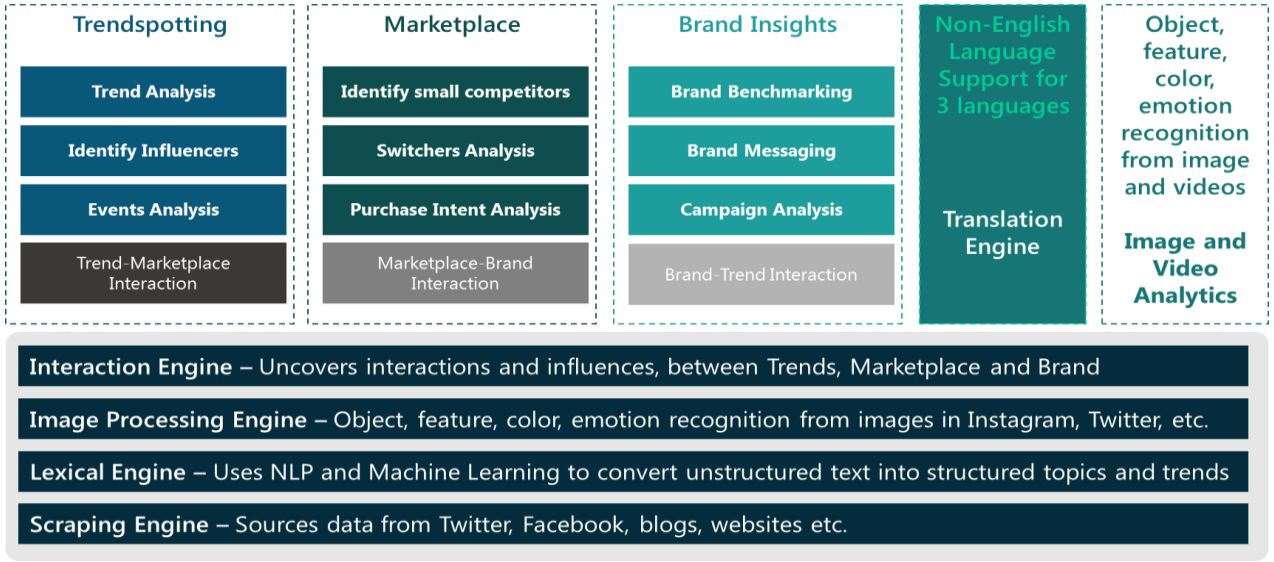
Loyal consumers of the client's cosmetics line was aging and the impression of the brand had been in steady decline among younger women for the past few years

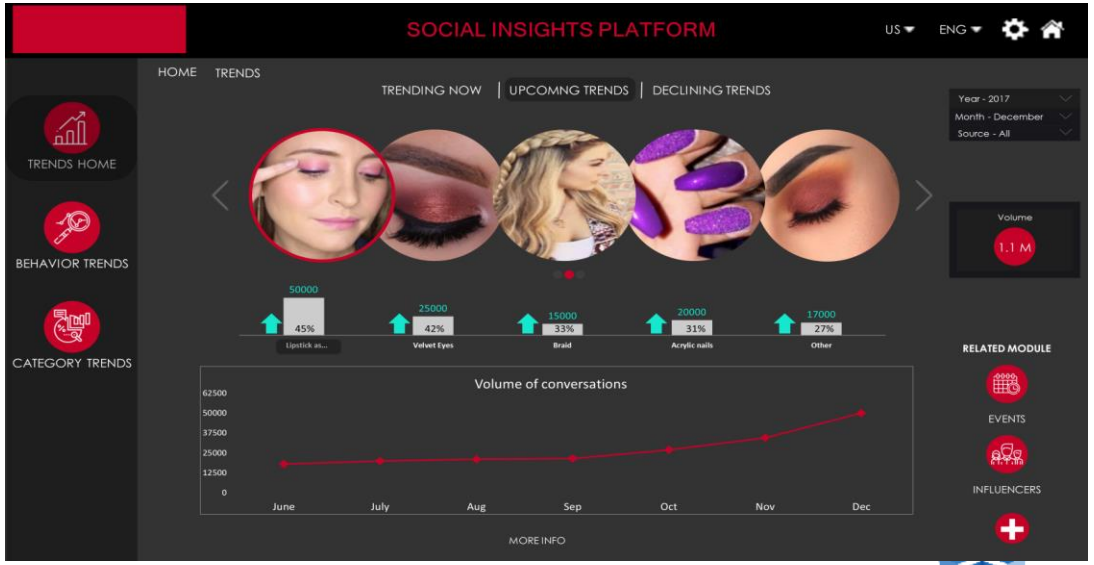
LatentView Solution

Building a social insights platform to mine the rich data of the target demographic available in social media to spot trends, rate influencers, identify upcoming competitors, refine campaign messaging and understand drivers of purchase

The "After" State

Ability to score trends that could become mainstream ahead of time helped the company to improve their product launch success rate by 5% in the first 6 months





LatentView
Actionable Insights • Accurate Decisions

latentview

Actionable Insights • Accurate Decisions

Thank you

www.latentview.com