



## Case Study

# Modernizing Retail Operations: Harnessing Machine Learning Operations for Efficiency & Agile Decision-Making

**Client:** Premium Apparel Company

## Key highlights



**Streamlined Deployments: 50%** reduction in deployment time, enhancing operational efficiency.



**Effortless Model Management: 90%** decrease in manual tracking efforts with an automated model registry.



**Expanded Model Portfolio: 40%** model efficiency boost through automated monthly retraining of **20 ML** models in production.



**Timely Decision Support: 500K** daily forecasts generated across geographies, facilitating agile decision-making.



**Enhanced Experimentation Capabilities: 25%** increase in model accuracy achieved through facilitating hundreds of parallel experiments and over a thousand simultaneous hyperparameter tuning jobs.



## Background

In the dynamic realm of retail, where staying ahead of the curve is paramount, a premium apparel company's Merchandising & Planning team recognized the pressing need to harness advanced technology. Their goal was clear: to refine decision-making across Assortment, Procurement, Replenishment, and Sales strategies, crucial for seasonal and in-season sales across diverse regions and warehouses.

Teaming up with Altimetrik, they embarked on a collaborative journey to integrate Machine Learning Models seamlessly into their operations. This partnership wasn't just about streamlining processes; it was about infusing their decision-making with continuous, reliable support to optimize inventory management across all Distribution Centers, Stores, and Retail Shops.

The integration of Machine Learning Models into the fabric of the premium apparel company's Planning Lifecycle and Data Ecosystem marked a pivotal moment. It wasn't merely about efficiency; it was about enhancing their competitive edge through data-driven insights and informed decisions. This strategic initiative underscores the company's unwavering commitment to innovation and excellence, ensuring they meet and exceed the ever-evolving demands of the athletic apparel industry.

## Pain Point

Previously, the ML forecasting modules operated independently, disconnected from the company's broader data ecosystem. As a result, these modules remained underutilized, yielding inefficient predictive models due to limited data availability.



The experimental cycle suffered from prolonged durations and lacked flexibility in adapting to different ML algorithms. Additionally, challenges arose from the absence of model artifact lineage tracking and scalability issues with growing data volumes.



Moreover, the Model Development Lifecycle (MDLC) diverged from the standard CI/CD process, leading to bottlenecks in transitioning models to production for inference. Notably, there was a lack of robust systems for monitoring data and model drifts, as well as assessing feature importance.



Furthermore, the system lacked the capability for local prediction explainability, impeding effective communication of predictions to end-users.



## Key Objectives



Create a cohesive platform that seamlessly integrates with the existing data ecosystem, elevating business processes with clear, timely forecasts.



Improve model precision, inference speed, and forecast reliability.



Facilitate ease of experimentation and streamline model artifact tracking with enhanced observability.



Establish structured workflows for model assessment, approval, and feedback integration into business operations.



Enable seamless ML model productionalization with provisions for effortless switching between models for A/B comparison.



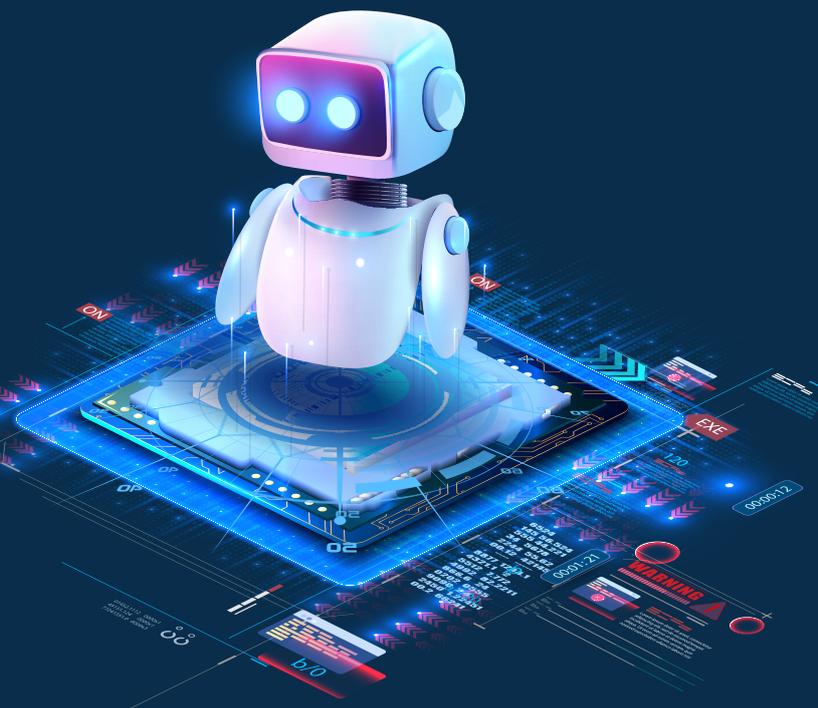
Implement robust model monitoring capabilities to identify and address model / data drifts.

## Solution

Altimetrik's practitioners conducted a thorough assessment of the client's existing platform, collaborating closely to devise a state-of-the-art cloud-native architecture.

This architecture, featuring a modular core AI engine in Python, was tailored to the client's needs, and implemented using robust tools (AWS SageMaker and Snowflake), alongside advanced AI/ML libraries, ensuring both scalability and adherence to InfoSec standards.

At the heart of the solution lay a configuration-driven microservices architecture, enabling the creation of scalable Training, Inference, and Analytics Pipelines. This setup also facilitated rapid model evaluation in dedicated experimentation environments, significantly reducing time to market.



A groundbreaking approach was adopted to seamlessly integrate MLOps with a CI/CD pipeline, simplifying operational complexities. Now, with processes triggered with a single click, data retrieval, processing, and result delivery have never been more streamlined!

To further enhance efficiency, an extensive notification framework was devised, incorporating Human-in-the-Loop functionalities, and providing timely alerts for Model Drift and Data Drift remediation.

The system's sophisticated resource monitoring capabilities ensure resilience in the face of disruptions, while its metadata-driven and configurable nature adds adaptability, enhancing overall flexibility and scalability.



## The Outcomes

- ▶ Successful integration of advanced ML models into client operations through collaborative effort and co-creative approach
- ▶ Streamlined model deployment for effortless transition to production with a single click
- ▶ Implemented automated model registry and robust drift tracking/reporting mechanisms
- ▶ Currently managing 20 ML models in live production, with automated monthly retraining based on set thresholds
- ▶ Daily generation of 500K forecasts across diverse geographies
- ▶ Rapid transfer of 3 million local explainability insights to downstream supply chain systems in under an hour
- ▶ Platform supports extensive experimentation: hundreds of parallel experiments daily, over a thousand simultaneous hyperparameter tuning jobs, with zero downtime
- ▶ Future enhancements include integration of advanced features - Feature Store, LLMOPS, GenAI, and Vector Database capabilities

This partnership has ushered in enhanced decision-making processes, improved operational efficiency, and a competitive edge in the ever-shifting retail landscape.

As we move forward, the client is ready to leverage our unified platform to drive innovation, adaptability, and sustained growth in the dynamic athletic apparel market.

### About Altimetrik

Altimetrik is a pure-play digital business services company. We focus on delivering business outcomes with an agile, product-oriented approach. Our digital business methodology provides a blueprint to manage data and develop, scale, and launch new products to market faster. Our team of 6,000+ practitioners with software, data, cloud engineering skills help create a culture of innovation and agility that optimizes team performance, modernizes technology, and builds new business models. As a strategic partner and catalyst, Altimetrik quickly delivers results without disruption to the business.