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Optimizing Department Store Operations and Enabling Exceptional Customer Experiences with the Pathr.ai®* Spatial Intelligence Solution

Pathr.ai®* is helping a major US big box retailer chain improve operational efficiency, customer experiences, and store profitability leveraging Intel® processors, technologies, and support.

About Pathr.ai

Founded in 2019, Pathr.ai is headquartered in Mountain View, California and is the industry's first AI-powered spatial intelligence software company. Pathr.ai utilizes anonymous location data from available and existing infrastructure to observe human behavior in any physical space.

Their sophisticated technology turns raw behavioral and spatial data from existing sensors into actionable and applied business learnings—allowing companies to drive the business results that matter most to their growth in near-real time.

The Obstacle of Collecting Successful Retail Insights in Physical Spaces

Unlike their online counterparts, brick-and-mortar retailers face significant difficulties when it comes to gathering useful data from their customers. While online retailers can easily track and analyze customer behavior in real-time, monitoring factors like the number of customers shopping at any given moment and popular product interests, brick-and-mortar retailers have struggled to achieve comparable insights while respecting customer privacy. The challenge is twofold: Not only do stores find it difficult to collect and analyze near-real-time data in physical spaces, but they also encounter obstacles related to the upfront purchase of expensive hardware and sensors. Unfortunately, this expense often proves prohibitive for many retailers, depriving them of the potential competitive advantage that valuable customer insights can provide.

To compete with online shopping alternatives, department store operators recognize the need to optimize operations and deepen their understanding of customer preferences to provide the same seamless experiences customers are accustomed to in their online shopping journeys. The key component to achieving these results is through data-driven insights that inform product strategy, placement, and in-store experiences; however, they have historically been difficult for retailers to acquire.

Enter Pathr.ai's Spatial Intelligence solution. Leveraging existing data sources and security video cameras, it provides real-time, AI-powered analysis of customer and staff movement within stores, respecting customer privacy by ensuring all data is anonymized.

Integrated into a retailers' existing business systems, Pathr.ai delivers customized dashboards that provide a deep understanding of consumer behavior. This aids strategic decision making, drives revenue growth, and enhances the in-store experience. This case study explores how Pathr.ai is helping to level the playing field for a US big box department store retail chain, equipping them with actionable insights previously exclusive to their online counterparts.

Challenge: Tracking Performance and Maximizing Resources Across Store Locations

A US big box department store was facing multiple challenges. First, they're dealing with industry-wide labor shortages and struggle to effectively allocate their limited resources, as well as determine the optimal staffing levels for checkout, sales floor, and other areas in the store. Second, they lacked granular visibility into customers' in-store shopping behaviors, such as preferred zones, time spent in each department, and overall shopping patterns. They wanted to understand their conversion rates across different stores, identify the highest and lowest performing stores nationwide, and learn from these benchmarks to improve underperforming locations.

Additionally, they aimed to assess the performance of their "shop within a shop", a specialty retailer hosted within their stores, to better understand customer engagement with specific fixtures and measure the "attach rate" of the shop-in-shop to the store. This holistic understanding would enable them to assess the impact of the shop-in-shop to the overall store performance by leveraging sales and foot traffic data, improve merchandise placement, and assist in determining how to allocate labor most effectively.

Solving Strategic Challenges for Retailers

The retail chain sought a powerful AI-based solution that could provide answers to questions like these:

- How can we use real-time entrance data to adjust staffing and improve resource allocation and employee efficiency?
- Which displays are driving the most traffic and dwell time?
- How do shop-in-shop conversions impact overall store conversion rate?
- What are current average queue lengths at staffed checkout stations, and what are they projected to be in 30 minutes?
- Where does traffic flow need to be improved?
- Are people shopping in groups or individually? How large is each group?

Pathr.ai's Spatial Intelligence solution provided detailed insights into the retailer's store, going beyond just traffic counting.

The Spatial Intelligence solution:

1 Analyzed customer behavior throughout the store from entrance to checkout

2 Anticipated accurate queue wait times with fluctuations in store traffic

3 Evaluated traffic and dwell times across different departments

4 Provided deeper understanding for the effectiveness of product placements, store layouts, and marketing strategies in both the retail store and the shop-in-shop

The retailer leveraged behavioral and customer-staff interaction analytics to examine customers' in-store behavior, enabling store operators to make data-driven decisions that better aligned with real-time shopping patterns, ultimately improving sales across locations. One of the solution's key features was its focus on store operations, specifically around checkout staffing and how to maximize use of employees to minimize wait time. The retailer reduced labor hours and mitigated over-staffing with accurate predictions regarding checkout queue length, as well as effectively aligning schedules with labor forecasts based on foot traffic. At scale, this boost in operational efficiency would be estimated to result in labor savings of $45M annually for 1,200 stores (assuming 10% inefficient labor staffing reduced).[1]

Empowered with these high-level insights, the retailer was able to assess which promotions, displays, and product mixes yielded the most engagement to assist with decisions related to merchandise optimization and marketing strategies. This data also helped store management understand which customer-staff interactions led to more conversions in order to augment staff training based on these findings.

Another benefit offered from this deployment was cross-location benchmarking, which provided a comprehensive overview of store performance across the country. This allowed the department store operator to identify high and low-performing stores and shop-in-shops and devise strategies accordingly to improve each one based on regional sales conversions and wait times. For instance, suppose a US-based retailer operating over 1,000 stores were to increase their sales by 5%. This would result in an annual increase of $250M sales by using Pathr.ai's Spatial Intelligence solution.[2]

Intel® Technology Optimizes the Performance of the Spatial Intelligence Solution

The Spatial Intelligence solution can be adapted for use across diverse retail environments, including department stores, big-box stores, grocery stores, and specialty shops. Intel® technology helps optimize the Spatial Intelligence performance across deployment scenarios, small or large. Intel® Xeon® processors and the Intel® Distribution of OpenVINO™ toolkit provide the optimized performance, scale, and efficiency necessary for translating physical space data into valuable insights for end users. With the help of these Intel® technologies, the big box department retailer achieved a 94.98% average accuracy rate in measuring foot traffic and customer flow at the main entrance of 13 different stores.[2]

The Intel® Distribution of OpenVINO™ toolkit: Pathr.ai relies on the Intel® Distribution of OpenVINO™ toolkit to accelerate AI model training and deep learning inference. The free, downloadable toolkit helps developers and data scientists fast-track development of high-performance computer vision and deep learning into vision applications. The toolkit enables deep learning on hardware accelerators and streamlined heterogeneous execution across multiple types of Intel® platforms.

OpenVINO™ Model Server made it easy for Pathr.ai to deploy new model versions quickly and measure latency on each. It also provided support for AI accelerators.

Intel® Xeon® Processors: Open Intel® architecture and reliable optimized performance help to elevate business productivity. The Intel® Xeon® processor delivers scale and efficiency across a broad range of data centers, edge, and workstation workloads. With support for higher memory speeds and enhanced memory capacity, these processors deliver improved performance, enhanced memory capabilities, hardware-enhanced security, and workload acceleration.

> " Today, it's critical to deliver exceptional customer experiences and drive efficient store operations in a competitive retail landscape. Pathr.ai delivers a scalable solution that integrates with our existing camera infrastructure and produces actionable insights that help us better understand how our customers are behaving inside our stores. These levels of insights are critical as we continue to make data-driven decisions that positively and financially impact our business.
>
> **VP of Store Operations, major US department store retailer**

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Key Benefits

Reduce labor costs by optimizing staffing levels at checkouts

Assess true sales conversion rates by identifying groups or families as single customer units

Drive incremental revenue by optimizing merchandising and displays and improve the customer experience

Use existing cameras, sensors, and other infrastructure, reducing the need for capital investments

Track anonymized human behavior as it happens in physical spaces

Maintain privacy with GDPR and CCPA compliance

Visualize insights on preferred business intelligence software or custom dashboards

"As more and more brick-and-mortar operators are turning to spatial analytics for their day-to-day decision making, it's been critical for us to deliver those insights in real-time as the event is happening. We use edge servers with Intel CPUs and OpenVINO to do that and ensure that we deliver our computer-vision based analytics as the event unfolds. Store managers and store operations executives use this data to drive decisions about their staffing, improve conversions, and optimize shopper flows in their stores."

George Shaw,
Founder and CEO, Pathr.ai

Data-Driven Insights Help Retailers Optimize Operations and Improve Customer Satisfaction

To help brick-and-mortar retailers compete with online shopping alternatives, Pathr.ai offers an AI-powered spatial intelligence solution that uses anonymous location data to observe shopper behavior and deliver actionable insights in near-real time, with full GDPR and CCPA compliance. Equipped with these insights, department store operators can optimize staffing levels, improve customer service, understand in-store traffic patterns, and analyze the impact of merchandising and shelf placement choices across various store locations.

For its recent deployments, Pathr.ai relied on models and optimizations made possible by the Intel® Distribution of OpenVINO™ toolkit and Intel® Xeon® processors. The powerful, cost-efficient solution works with existing hardware and sensors and can be deployed in weeks.

Learn More

To learn more about the Pathr.ai Spatial Intelligence Solution visit:

- Pathr.ai Website
- Pathr.ai Demo
- Intel & Pathr.ai Grocery Solution Brief
- Intel & Pathr.ai Optimizing Lease Rates Solution Brief

To learn about Intel® technologies visit:

- Intel® Core™ Processors Product Page
- Intel® Xeon® Scalable Processors Product Page
- Intel® Distribution of OpenVINO™ Toolkit Product Page

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Sources

1. Retail sales associate salary in United States, Indeed, 2023

2. Data from internal tests results of Pathr.ai. Intel does not control or audit third-party data. Please review the content, consult other sources, and independently confirm if the data provided is accurate.

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