

White Paper

Intelligent Retail
AI-Based Inventory Management



Improving Customer Experiences and Inventory Management with SHELFIE®: An Intelligent Shelf Monitoring System for Retailers

SHELFIE®

About SHELFIE

SHELFIE is a Retail Shelf Analytics Platform which automates in-store tasks such as gaps monitoring and shelves restocking with an AI-based system consistent across all stores. It delivers automatic out-of-stock alerts at store level and consolidated reports and analysis at head-office level. SHELFIE is an exception-based system that understands the “Perfect Shelf” and identifies anything that is not as it should be.



Combining data with AI vision analytics at the edge and powerful Intel technology, SHELFIE enables retailers to deliver seamless customer experiences, increase sales revenue, and accelerate their business transformations.

Intelligent Shelf Monitoring – Why Do We Need It?

A customer is looking for a specific product and navigates to the corresponding aisle and shelf only to find the product is currently out of stock. The manager pulls up the inventory management system and sees that the product the customer is looking for should have abundant stock in the back, but the staff can't seem to find it. What should only take a couple of minutes to locate turns into a lengthy wait time and the customer leaves empty handed due.

Unfortunately, situations like these are far too common. 67% of global shoppers leave a store empty handed because they couldn't find the product they needed and 66% leave because the store didn't have the items they wanted.¹ Incidents like these cost retailers as much as \$984 billion US dollars annually.²

Many retailers lack visibility and timely intelligence on inventory and rely on inefficient and error-prone manual monitoring methods, which leads to the following challenges:

- ◆ Stock outs
- ◆ Poor customer service
- ◆ Inventory hoarding
- ◆ High overhead costs
- ◆ Margin Shrinks
- ◆ Product misplacement
- ◆ Price and label errors

At the same time retailers are facing these challenges, customer expectations are increasing –looking for fast, convenient experiences, and the ability to easily find what they need in retail stores. When retailers are unable to meet these expectations due to stockouts, product and pricing errors, and busy staff unable to provide customer service, this leads to poor customer experiences. Retailers need to understand why these issues are occurring to decrease lost opportunities for sales, but more importantly, regain lost customer trust and loyalty.

SHELFIE provides a solution to help users solve stockouts, prevent walkouts, and gain profits. With SHELFIE, retailers can not only improve customer experiences, but can also ascertain the impact of marketing efforts, ensure prominent brands are properly displayed and stocked, and extract the most value from their key supplier and manufacturer relationships.

SHELFIE – Simplifying Inventory Management for Retailers with Smart Image Capturing

SHELFIE is a next generation retail solution that combines camera vision systems and artificial intelligence to provide users with automated shelf analytics. Their goal is to help retailers revolutionize inventory management and overcome the common pitfalls of traditional monitoring methods and lack of insight into operations. This software-as-a-service, retail analytics platform leverages smart image capturing using Intel® RealSense™ Technology with depth sensing capabilities to identify missing and misplaced products on retail shelves.

The system captures real-time shelf images with edge-based AI capable of confirming shelf availability, shelf condition, and consistency of product labels for clear price and promotion communication. SHELFIE allows retailers to autonomously monitor and verify inventory placement and automatically send alerts to staff to reduce response times to quickly fix stock and label issues. Powered by Intel® Xeon® Scalable processors, the solution enables powerful inventory analytics and includes a cloud-based analytics platform, image capturing devices, and reporting dashboard. The solution provides a targeted bird's eye view to create a new level of visibility and insight. not only enabling retailers to solve challenges in real-time, but also provide data-driven analytics to improve marketing campaigns, product ordering efficiency, and process improvements.

Combining data with powerful AI at the edge and optimized with Intel® Distribution of OpenVino™ toolkit to accelerate deep learning inferencing, SHELFIE is able to help retailers deliver seamless customer experiences and accelerate business transformations.

Key Features



Automates inventory monitoring



Sends alerts to staff identifying issues



Detects stock outs



Monitors shelf compliance



Enables flexibility with a cloud and camera agnostic solution



Identifies misplaced products and labels



Integrates seamlessly with existing point of sales systems with open APIs



Monitors load limits for cold chain compliance



Ensures safe stacking heights



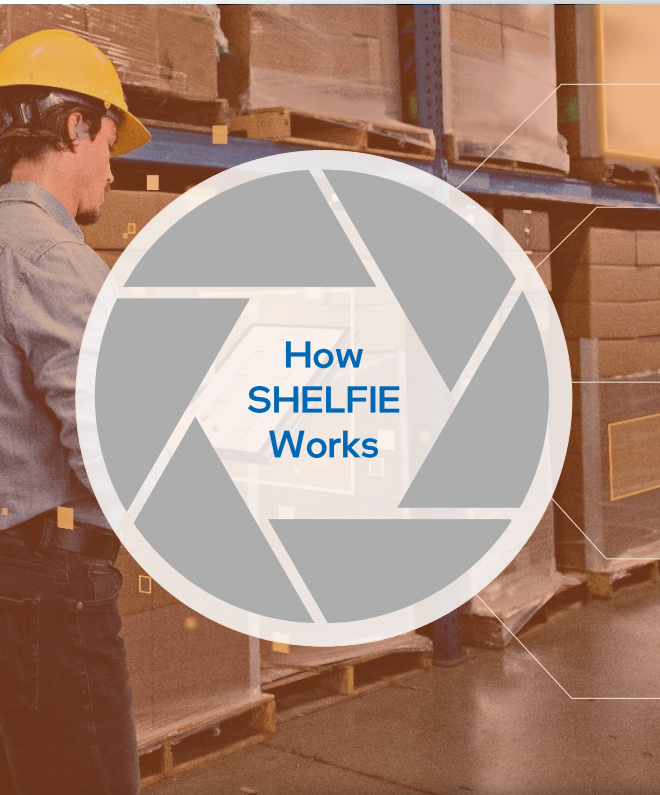
Identifies blocked exits



Provides real-time insights



SHELFIE stands apart from the competition by streamlining infrastructure requirements and the deployment process. Typical intelligent inventory solutions require custom-built, expensive cameras and specific cloud providers. SHELFIE can utilize normal HD cameras and is cloud and camera agnostic, enhancing flexibility and enabling the customer to utilize existing infrastructure and reducing upfront costs. Deploying the solution and getting started is simple.



- Cameras can be mounted on top of any standard retail shelf.
- The Cameras take images of retail shelves every 30 minutes, and these images are then collected and transferred to the cloud.
- A cloud-based advanced machine learning and image processing algorithm is used to analyze the shelf image.
- By optimizing their models with the Intel® Distribution of OpenVINO™ toolkit SHELFIE was able to increase the performance of the model to reduce inferencing time.
- Once an event is detected such as missing or misplaced products and labels, the data is then sent to the dashboard and mobile app.
- Detected events are updated automatically to mobile devices informing floor staff in real-time to take the necessary action, such as re-stocking specific items.

End Customer Benefits



Improve Staff Productivity: SHELFIE automates the tedious and error-prone task of manual inventory monitoring. Not only does this free staff to focus on more meaningful activities, such as helping customers on the shop floor, it also empowers staff to address inventory issues more quickly and efficiently. With real-time alerts sent to mobile devices, staff knows exactly where and what the issue is and can easily navigate to and solve the problem.



Enhance Customer Experiences: When customers have positive experiences at a retail location, they are more likely to return and shop there again. SHELFIE ensures that customers will be able to find what they are looking for on store shelves, building customer trust and loyalty. In addition, with better insight into customer buying behavior, retailers can tailor their products placement and inventory ordering to prioritize the products their customers are looking for and make them easy to find.



Increase Sales Revenue: By reducing stock outs with real-time gap analysis, retailers can ensure customers will find what they need on the shop floor, reducing walkouts and increasing sales. Better understanding of consumer purchasing behaviors also helps ensure best-selling products are highlighted in marketing campaigns on the store floor and reduces overstocking of less popular products.

Intel Solution Components

Intel® RealSense™ Technology: These depth cameras are equipped for long range precision. Developers have the freedom to design vision-based solutions that give devices the ability to see, understand, interact with and learn from their environment. SHELFIE utilizes the 3D depth-sensing capabilities of Intel® RealSense™ technology to help with inventory management, such as identifying low stock on shelves.

Intel® Core™ Processors: Intel's highest-performance CPUs for laptops and desktops, delivering advanced responsiveness, connectivity, and graphics performance.

Intel® Xeon® Processors: These processors are built specifically for the flexibility to run complex AI workloads on the same hardware as existing workloads. With AI acceleration and optimization that goes silicon deep and ecosystem wide, Intel® Xeon® Scalable processors take embedded AI performance to the next level. SHELFIE uses these AI-accelerated processors to run powerful analytics and achieve better performance and reduced inferencing time when combined with models optimized by the Intel® Distribution of OpenVINO™ toolkit.

Intel® Distribution of OpenVINO™ toolkit: The high-performance, deep learning inference provides a full suite of development and deployment tools. The toolkit offers more deep-learning models, device portability, and higher inferencing capabilities to offer minimal disruption and maximum performance. Developers can quickly build, optimize, and scale AI-based computer vision models on Intel® Distribution of OpenVINO™ Toolkit. This makes it easier to convert modules to take advantage of existing Intel processor architectures.

Summary

Retailers need to adapt to a changing technology landscape and ever-increasing customer expectations to maintain competitiveness. SHELFIE offers a next generation retail solution that generates real-time actionable insights for data-driven decision making, helps deliver better customer experiences, ascertains the impact of marketing efforts, and accelerates business transformations to inspire innovation in the retail world.



The solution provides all of the data that I need as a retailer to make decisions about buying, forecasting and optimizing the positioning of goods within a store.

Independent Retail Operator in the UK



Learn More

To learn more about the SHELFIE solution, visit: To learn about Intel® technologies, visit:

- [The SHELFIE Website](#)
- [Intel Customer Spotlight](#)
- [Intel® Core™ Processors Product Page](#)
- [Intel® Xeon® Scalable Processors Product Page](#)
- [Intel® Distribution of OpenVINO™ Toolkit Product Page](#)
- [Intel® RealSense™ Technology](#)



Sources

1. [Study Reveals Why 96% Of Shoppers Leave Stores Empty-Handed](#), retail TouchPoints, 2021
2. [Worldwide Costs of Retail Out-of-Stocks](#), IHL Group, 2018

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