A NEW WAY TO SEE RETAIL

The top five computer vision trends and applications in the retail industry

7-10 read for executives and leaders in the retail industry, including heads of retail operations, heads of retail innovation, heads of supply chain and inventory management, and operational managers

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INTRODUCTION

As retailers look ahead, many have already begun exploring and implementing advanced technologies to foster operational efficiency, boost employee performance, and optimize customer buying behavior. There are now many digital solutions and technologies available in the retail space, from artificial intelligence for supply chain logistics and product recommendations to process automation for store planning and inventory management. One technology solution that is repeatedly showing its viability and use in a retailer's digital future is computer vision.

Whereas everything is clear about operational efficiency benefits, the answer to how computer vision helps retailers fight uncertainty can be harder to uncover.

The answer is revealed through the multiple applications and use cases for computer vision. In this white paper, we explore how retailers can best utilize computer vision today as well as provide an overview of computer vision trends to watch for in the coming years.

USING COMPUTER VISION IN RETAIL
WHAT'S NOW

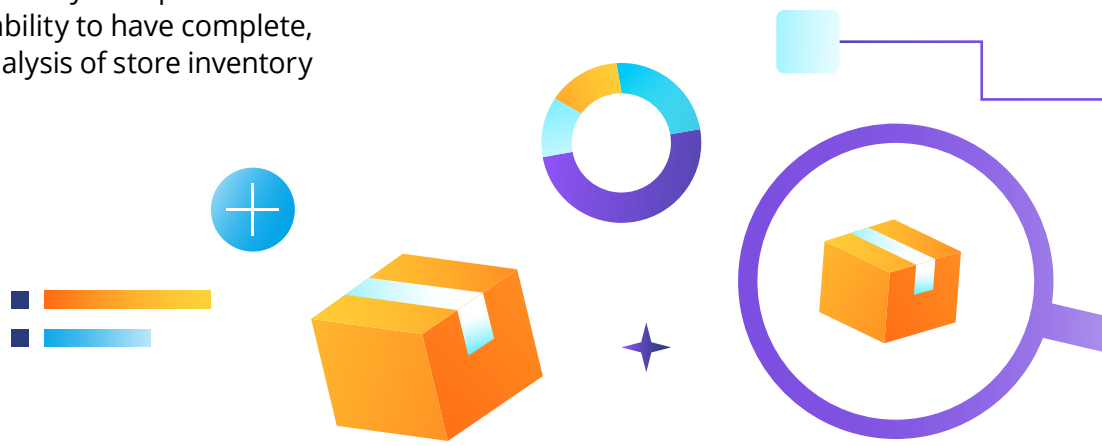
Many industries are looking more to data than ever before, especially with a quick pivot to all-things-digital. The retail industry is no exception and an industry that relies heavily on data for insights into all aspects of the business, from inventory planning to last mile delivery. With the heavy focus on data and its multiple applications, it's no surprise that retailers are continuously looking for better, deeper meaning. This is where computer vision and its capability to provide greater insight comes into play.

Computer vision blurs the lines between physical and digital worlds in retail by reacting much faster and providing thorough analysis with minimal-to-no mistakes, as compared to manual methods. For example, an in-store customer flow solution offers a retailer the ability to gain insight into purchase behavior and have a deep understanding of how visitors navigate and locate items within the store. Store managers are also often responsible for ensuring inventory is available and replenished when necessary. Computer vision offers managers the ability to have complete, accurate, and quick analysis of store inventory

With poor in-store visibility into inventory management and manual errors that lead to costly mistakes, computer vision in retail proves to boost the following operational areas. Here are the top five computer vision trends and applications in the retail industry:

- **Theft prevention**
- **Anomaly detection**
- **In-store compliance**
- **Inventory management and space optimization**
- **Planogram optimization**

Let's look at how each one of these affects and can boost operational efficiency.



THEFT PREVENTION

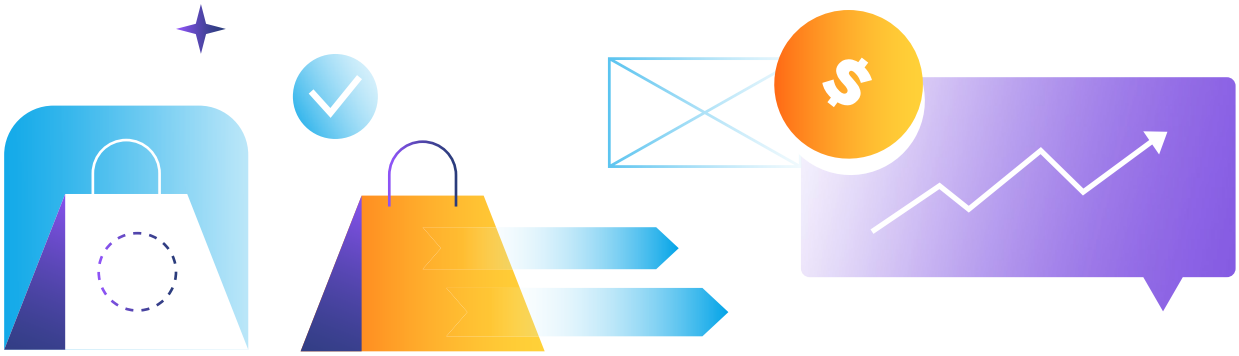
Theft—also commonly referred to as shrink or shrinkage—is a common problem for many retailers. According to the National Retail Federation, theft and shrink cost companies nearly $61.7 billion in 2019. The theft apprehensions came from both employee and visiting customers, with an average of 560 employee theft apprehensions per retailer and 689 shoplifting apprehensions. Cameras are often seen in and around stores, and they can be used to identify people who are trying to steal items from the store. Where retailers can find opportunity in identifying thieves is by integrating artificial intelligence systems into their pre-existing CCTV systems. For example, a person walks into the fitting room with a piece of clothing in their hands. Cameras then capture the items in hand, but when the person exits the fitting room without that piece of clothing or has it on, AI-enabled theft prevention system notifies and alerts staff. Similarly, if a person scans an item at the self-checkout register, and its image does not match the one indicated in the system, the camera sends an alert notifying staff about the potential theft.

ANOMALY DETECTION

When computer vision is implemented, retailers can be agile, make quick business decisions, and avoid costly mistakes. The second trend to look at is anomaly detection, which helps companies identify trends or deviations in data from a dataset's normal behavior. The following are a few of many examples of what anomaly detection can help identify:

1. Low stock or in-store inventory
2. Sudden increase or decrease in sales volume
3. Increase or decrease of average transactional dollar amount

On the store management level, anomaly detection creates an operationally efficient environment. For example, a large, enterprise retailer can track and watch for anomalies across all stores. When a deviation in data is identified, the system can push an alert to whoever is responsible, and a change can quickly be deployed to hundreds-to-thousands of locations within a network.



IN-STORE COMPLIANCE

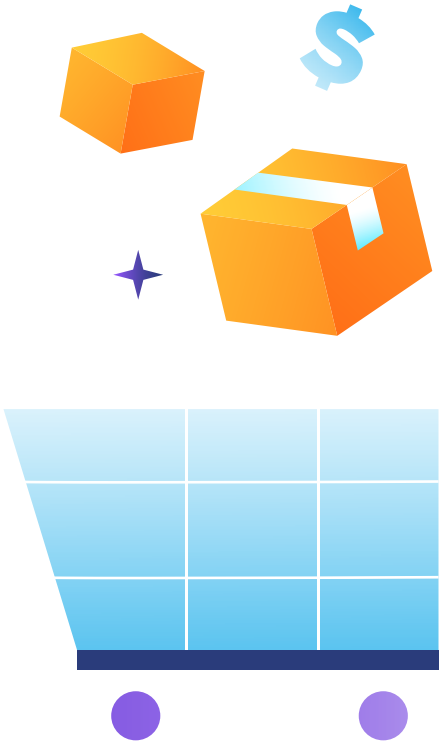
Retailers are widely using computer vision to ensure compliance with safety and merchandising standards. Trained computer vision systems can identify the compliance errors and proactively notify employees that an error needs addressed. Real-time alerts can also be generated to identify if patrons are wearing face masks or the appropriate personal protective equipment (PPE) according to store rules and regulations. For a solution like mask or dress-code detection, retailers can utilize existing IP and CCTV cameras.

INVENTORY MANAGEMENT AND SPACE OPTIMIZATION

When implementing computer vision, businesses can also benefit from A/B testing to dramatically increase operational efficiency. Not only can the technology help with inventory visibility, but a retailer can identify purchase behavior or movement among patrons to optimize the flow of a store and item locations. By changing the color of walls or the layout of shelves in stores, a retailer can get a unified analysis across the stores to then optimize inventory management and improve space on the continuous basis.

PLANOGRAM OPTIMIZATION

Retailers can also significantly increase sales by optimizing planograms. That means that computer vision enhances the product placement by allocating the right shelves for a particular product as well as by analyzing the consumer navigation through the store to optimizing the store management. Like space optimization and inventory management, this can be achieved with the use of heat maps to even see what customers looked at but did not buy for some reason.



CHALLENGES

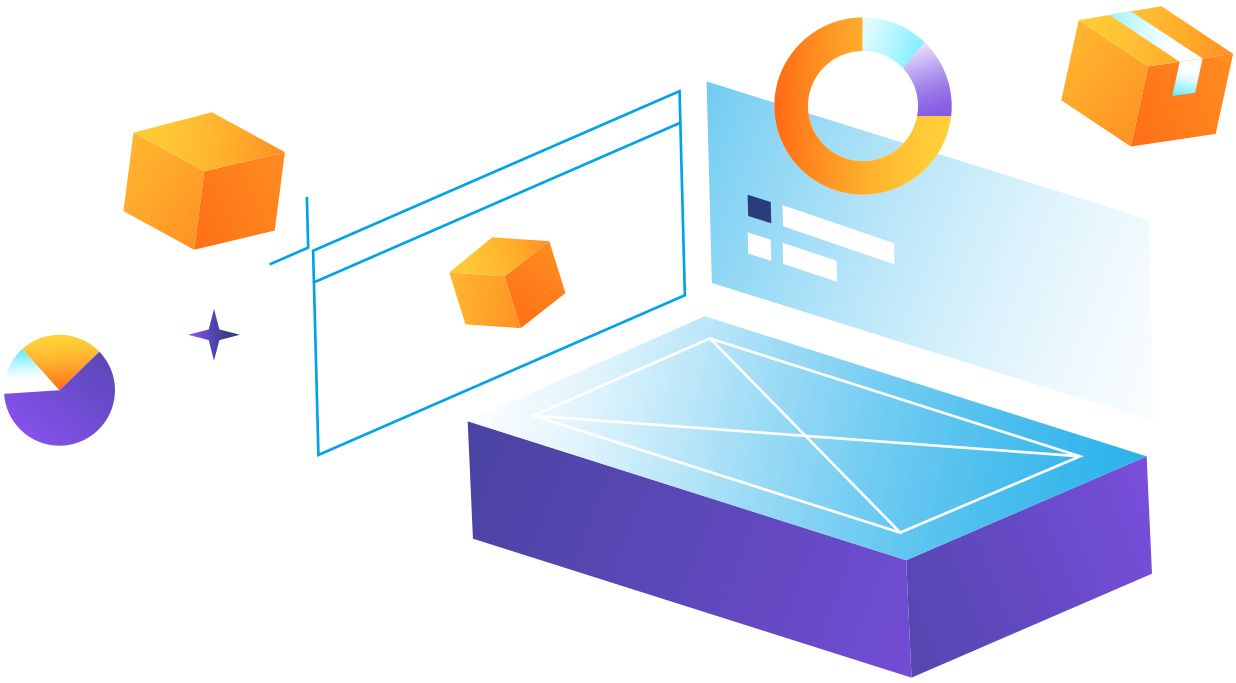
But retailers must thoroughly analyze and consider specific challenges to wisely implement computer vision within their business. Undoubtedly, the first challenge—and likely one of the most important among consumers—is **personal data processing**.

The **personal data** of an individual must be handled ethically and carefully. There is some personal data, as captured by computer vision technologies, that should not be stored. An example of data that should not be stored is credit card information of a person using a self-checkout system. It is common—however—to see retailers storing demographic and loyalty data for analysis. These data points provide a huge opportunity to retailers, as based on the data received—offering the ability to create buyer personas based on their previous brand engagement and purchase behavior.

Another challenge, which is more like an item to check off an implementation checklist, is **training the computer vision model** based on the data obtained: what objects need to be recognized and what actions need to be advised based on the images received and processed. The more the accurate data is, the better results the model will yield.

Lastly, the **in-store lighting condition and location placement of cameras** play a crucial role in yielding accurate results as well. Capturing high-quality images is pertinent for the best insights and results.

These are the common retail computer vision trends we see today, but what does the future hold for it in the years to come!



THE FUTURE OF COMPUTER VISION

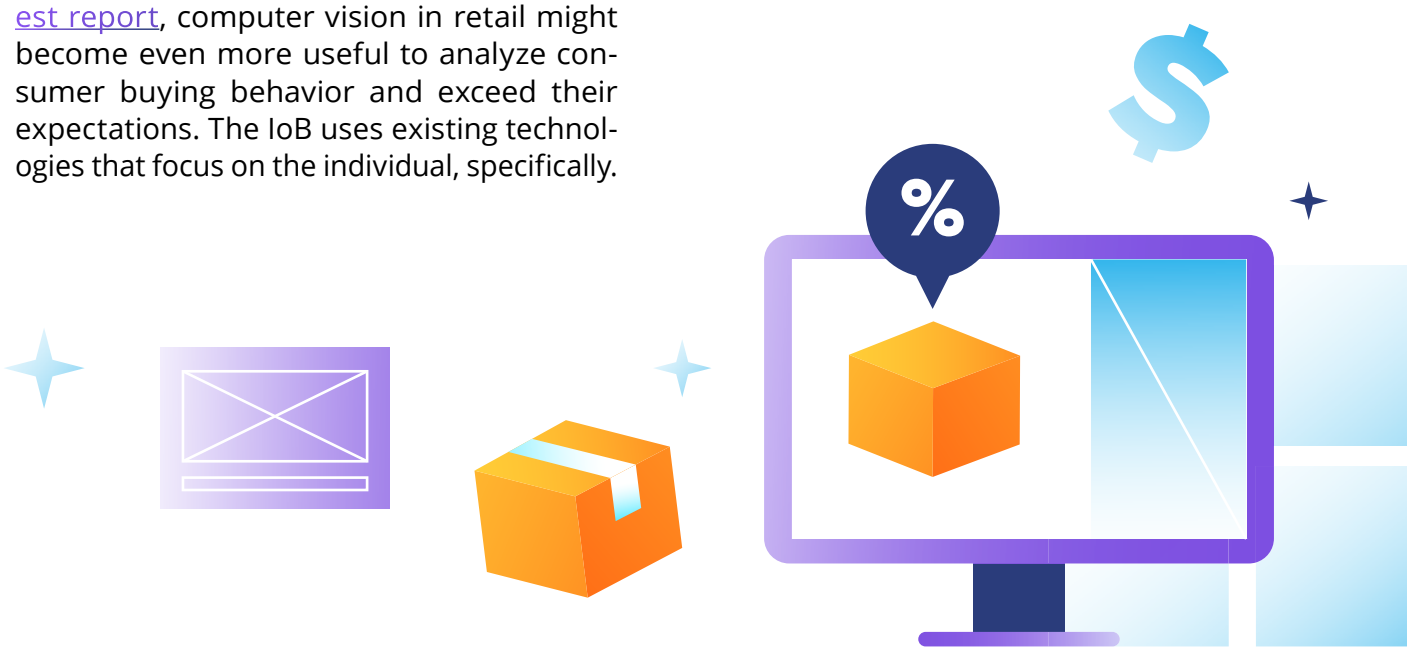
Computer vision in retail is not only a popular technology buzzword, but also a promising trend being implemented by retailers at an accelerated rate, with nearly 40 percent of retailers implementing computer vision by 2022. For example, Amazon Go is a retail computer vision pioneer with its cashier-less stores. With the implementation of computer vision, customers can physically purchase items by scanning their Amazon app upon entering a store, selecting the items they want, and being automatically charged for their items. As a customer travels through the store, the cameras capture items chosen and then automatically charges the visitor for the price of the selected item. This is the revolutionary step, but there's even more innovation to be seen in the future.

With the new trend known as **internet of behaviors** (IoB), listed in Gartner's latest report, computer vision in retail might become even more useful to analyze consumer buying behavior and exceed their expectations. The IoB uses existing technologies that focus on the individual, specifically.

An example of personal information and data that can be included in an IoB analysis includes facial recognition, location tracking, interests, purchase history, and more. Retailers can then use that data to influence customer behavior.

Computer vision in retail will only continue to gain momentum. BusinessWire states that the computer vision market is expected to grow from $2.9B in 2018 to $33.5B by 2025.

Based on the above trends, it's possible to see both how and where retailers can leverage the benefits of implementing computer vision in retail—as the investment in its implementation is minimum and its impact is enormous.



IN CONCLUSION

Are you ready to see computer vision for retail in a new way? Computer vision addresses not only long-term, persistent challenges in retail—in-store analytics, automated payments, and theft prevention—but it also combats uncertainty.

Many retailers are adopting computer vision and the trends currently seen today. Although large, enterprise retailers are pioneering the way and implementing computer vision throughout all operational areas, smaller retailers can also benefit from computer vision in the immediate future by using already-existing solutions and partnering with technology companies.

SoftServe has been delivering enterprise-ready solutions for more than 25 years, and is an advanced expert in AI ML technologies, which is an ideal blend of capabilities for implementing and integrating computer vision in the retail business.

Let's talk about where you are in your computer vision journey and how SoftServe can help you achieve enhanced operational efficiency, increased employee productivity, and optimized customer buying behavior—all at scale.

ABOUT US

SoftServe is a digital authority that advises and provides at the cutting-edge of technology. We reveal, transform, accelerate, and optimize the way enterprises and software companies do business. With expertise across healthcare, retail, energy, financial services, and more, we implement end-to-end solutions to deliver the innovation, quality, and speed that our clients' users expect.

SoftServe delivers open innovation, from generating compelling new ideas, to developing and implementing transformational products and services.

Our work and client experience is built on a foundation of empathetic, human-focused experience design that ensures continuity from concept to release.

We empower enterprises and software companies to (re)identify differentiation, accelerate solution development, and vigorously compete in today's digital economy-no matter where you are in your journey.

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