PRICER

ShelfVision

Machine learning, computer vision and autonomous cameras enable a wide range of use cases to optimize in-store work and drive valuable actions for improving retail performance.

Stores all over the world are losing revenue daily due to products being out of stock. Some research says the average retailer loses 4.1% of annual revenue due to out-of-stock products. When customers leave the store without finding what they are looking for, not only does it entail a loss of revenue; it is also detrimental to the brand when customers can't find what they need. The result will be a preference to shop at competitors' stores.

> What would happen if you lowered your out-of-stock losses by 4.1%?
>
> How much money would that be annually?

The ShelfVision camera can solve a whole range of issues such as out-of-stock products, planogram compliance, or misplaced products. The future-proof technology will be able to support whatever shelf monitoring needs the future will bring.

ShelfVision in Short

The ShelfVision solution combines machine learning and computer vision with a sophisticated wide-angle camera that uses both Pricer’s Infrared (IR) optical wireless system and Wi-Fi to send and receive information. The camera is capable of automatically detecting and identifying Electronic Shelf Labels (ESLs). This information and captured images are processed according to the store's defined use cases.

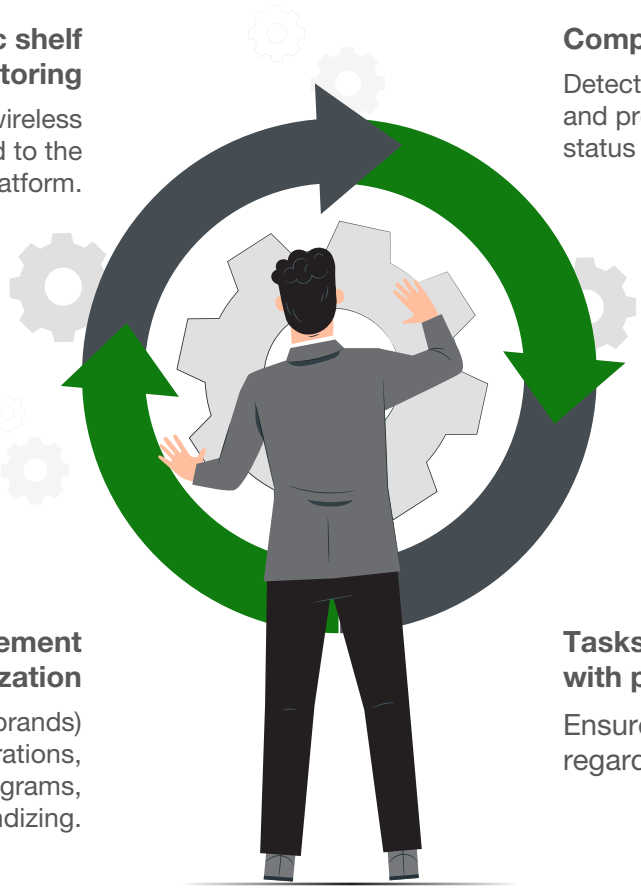
How it works:

Automatic shelf monitoring

An autonomous wireless camera, connected to the ESL platform.

Computer vision

Detect labels, gaps, and products to monitor store status and activity.



Central management and optimization

Retailer HQ and/or CPG (brands) use data to optimize operations, supply chain, planograms, and merchandizing.

Tasks are sent to store staff with priorities

Ensure consistent operations regardless of staff experience.

Use cases

There are many potential use cases for ShelfVision. Availability & GAP detection and planogram compliance are two extremely useful ones that can be implemented as soon as the cameras are installed in the store. From day one, they will improve in-store processes.

Shelf availability and gap detection

For HQ: ShelfVision enables easy access to data that can be used to understand store and supply chain performance. The collected data are used to make decisions on how to drive shelf availability improvements, and to analyze campaign implementation and performance.

For store: The cameras enable improved shelf availability with intra-day granularity by detecting missing items during peak hours and providing staff with alerts. Automatic detection saves significant time. Typical out-of-stock values are 5-10% of SKUs. One rule of thumb is a loss of sales for the store of 35-50% of that, multiplied by total sales. For a store with sales of EUR 15m and a gross margin of 25%, this amounts to a net profit loss of EUR 120,000 annually.

Planogram compliance

ESL positioning is critical to store efficiency and shelf optimization. Every store has a planogram that shows how the shelf positioning has been designed. Alterations, updates, or changes to the planogram can cause issues with merchandizing, vendor rebates and promotion performance. Visual images play a major role in ensuring compliance with the planogram and enabling adjustments and changes to ensure that compliance.

Ensuring ESL Positioning:

- Every label generates a code to transmit its unique identification number.
- Flash position gives precise position of label on shelf. (See Automatic ESL Identification)
- Easily mapped to planogram to monitor changes, shelf creep or non-compliance.

Other ways ShelfVision contributes to store cost efficiency.

ShelfVision makes it possible to reduce or eliminate the need for roving "robot" cameras, or it can work in concert with these devices to provide low-cost, dedicated coverage to specific, high-traffic, high-concentration or high-value areas that require constant monitoring.

Integration and installation

ShelfVision is compatible with most third-party sales and ERP systems and the ESL and product information can be used for services that are already in the store. The automatic ESL detection enables quick and easy installation.

GDPR

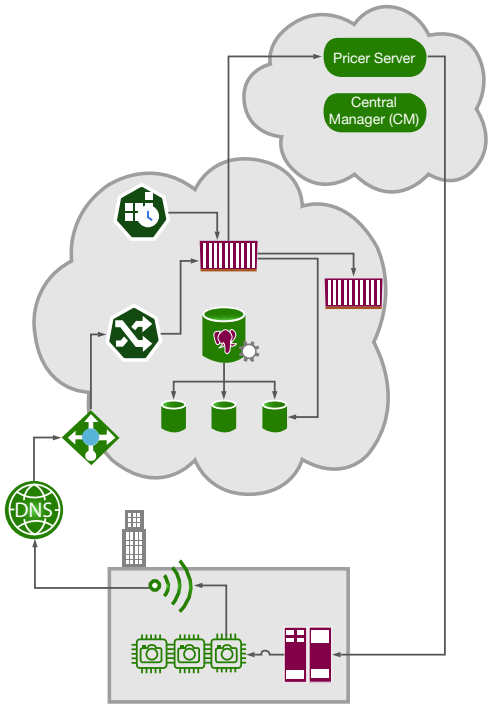
When using cameras in a store it is important to consider GDPR regulations. The ShelfVision camera features a sensor that eliminates the risk of GDPR and other privacy compliance issues by avoiding capturing images while people are present.

Scalable camera deployment

Pricer ShelfVision can be used in all store formats specific departments or full stores. The battery-powered camera is capable of capturing and uploading several thousand images. The combination of both IR and Wi-Fi contributes to a long battery lifetime.

Key Functionality

- Automatic shelf edge scanning.
- Pricer IR infrastructure and Wireless IoT support for full-store coverage.
- GDPR compliant – no customers or personnel can be photographed using PIR sensor and human detection AI algorithm.
- Only **scalable** approach to storewide shelf monitoring (see specifications for shelf coverage options).
- Automatic ESL detection for ease of setup and accurate information integration.

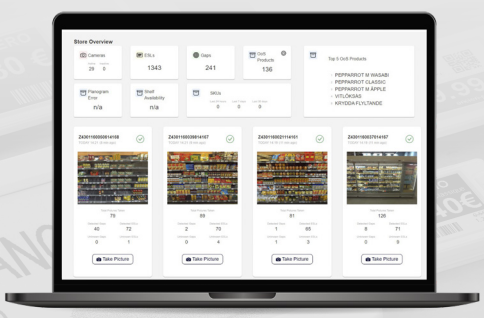


Functional flow, operational mode:

- A request for CamControl to acquire image is generated from a job scheduler (or external application).
- CamControl deals a job and sends a request to Pricer Server.
- Pricer Server sends a request through the in-store infrastructure using IR for maximum battery efficiency to the camera to capture an image.
- The camera captures the image and uploads it to CamControl over in-store Wi-Fi network.
- The camera's PIR sensor and a human detection AI algorithm ensure that no people are present in uploaded and saved picture. This is done before the image is stored or forwarded.
- ShelfVision AI processes and analyzes the images.

System overview

ShelfVision combines dependable in-store hardware with Pricer Plaza cloud computing services. The cloud-based system allows image and product recognition artificial intelligence (AI) systems to interact with the camera, using the resulting images to deliver information to the other systems in the retail management system.



Automatic ESL detection capability

The camera is capable of automatically detecting and identifying the ESLs within its field of view. This saves significant time during setup and also ensures the accuracy of the information passed to the cloud by enabling precise and accurate identification of each ESL's unique ID and the information it is displaying to be requested from the Pricer ESL management system. This saves significant cycles and ensures greater accuracy of results as the cloud system does not need to try to analyze the image to capture the information on the ESL.

Automatic ESL detection procedure

- ShelfVision camera uses IR to request ESLs to self-identify using flash.
- ShelfVision camera uses images captured during approx. 10 seconds to capture the flash sequences of all ESLs within its field of view.
- ESLs use flash to self-identify:
  - 3 initial flashes to sync
  - PPM-modulation-based visible light flash sequence to flash unique ESL ID
- ShelfVision camera sends the ESL identification and position to the cloud.

Specifications

The camera contains two main sensors:

- An optical lens with a field of view shown below.
- A PIR sensor that is used to ensure GDPR and privacy rule compliance by avoiding taking pictures of people.

Image Specifications

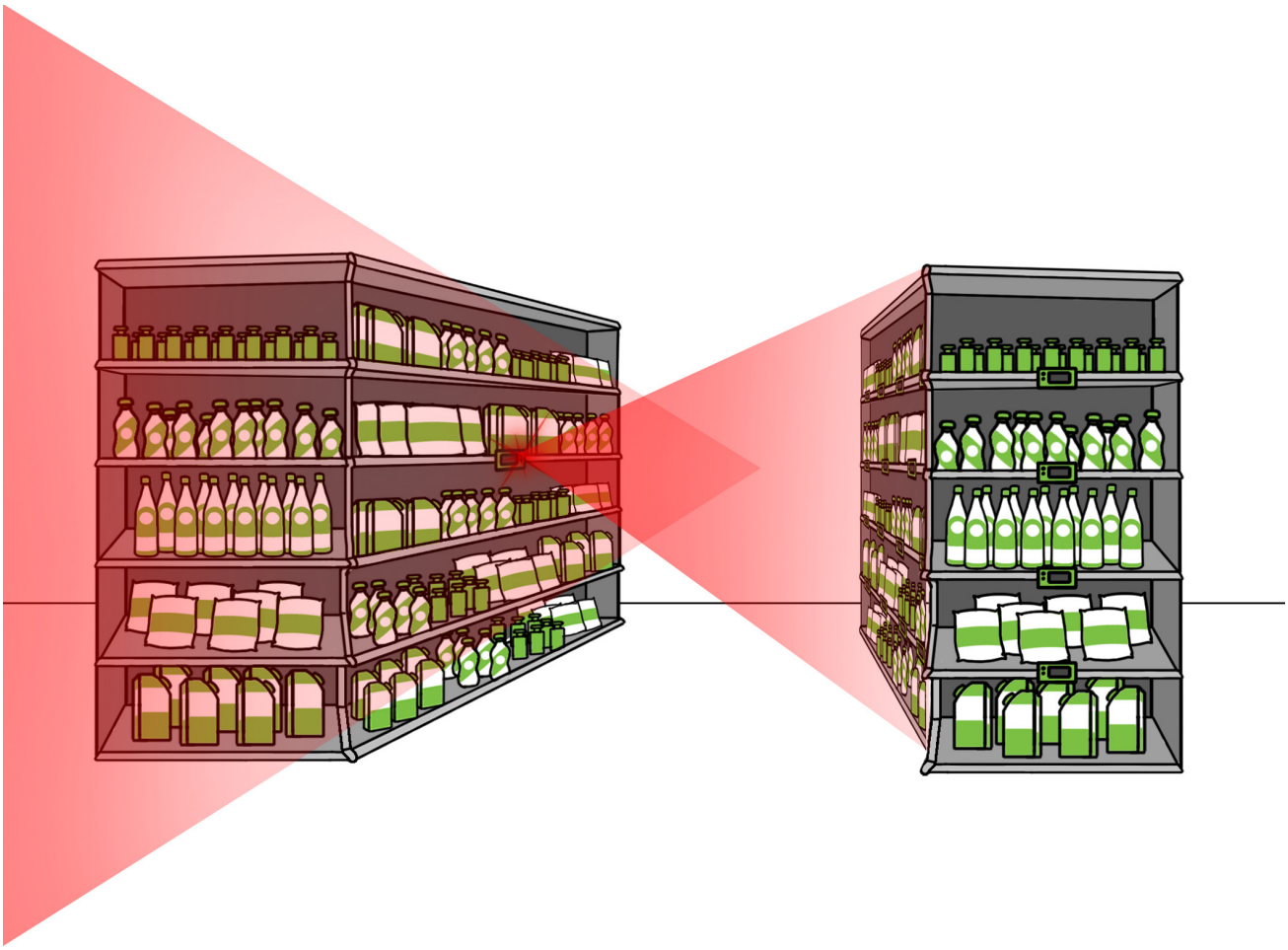
- **Resolution:** 16 Megapixel
- **Picture format:** JPEG
- **Image Size:** varies based on lens.
- **Time to capture image:** 6-8 seconds, includes camera initiation, picture acquisition and upload time (assuming available bandwidth).
- **Sensor stabilization period:** up to 30 seconds from initiation to ensure accurate sensing of human presence.

Dimensions

86 x 34 x 28 mm (Width x Height x Depth)

Attachment: The camera is designed to be able to attach to the same rail as a Pricer SmartTAG or PowerTAG ESL. However, the camera can be installed in multiple locations to ensure best results and safest location for installation.

Field of view and shelf coverage



Typical working distance, i.e. distance between camera and ESLs, is 1.5 to 3.5 meters. Image aspect ratio is 4:3. Consult with your local sales engineer for more information.

Camera Hardware Specification

Parameter	Data
Operating temperature range	+5°C to +40°C
Storage and shipment temperature range	-25°C to +55°C
Transportation temperature range	-45°C to +70°C
Battery replacement	Replaceable batteries - AA
Battery estimated life (before replacement)	Up to 4,000 images depending on environment
Camera resolution	16 megapixels

Wi-Fi

Supported Wi-Fi bands: 2.4GHz and 5GHz

Supported Wi-Fi standards: IEEE 802.11 a/b/g/n/ac

Supported Wi-Fi security: Open, WEP, WPA, WPA2 and WPA2/WPA3 mixed AP

Västra Järnvägsgatan 7
111 64 Stockholm
Sweden

+46 8 505 582 00 | info@pricer.com
www.pricer.com

@Pricer AB Pricer