



CONSUMER PRODUCTS SOLUTIONS GUIDE

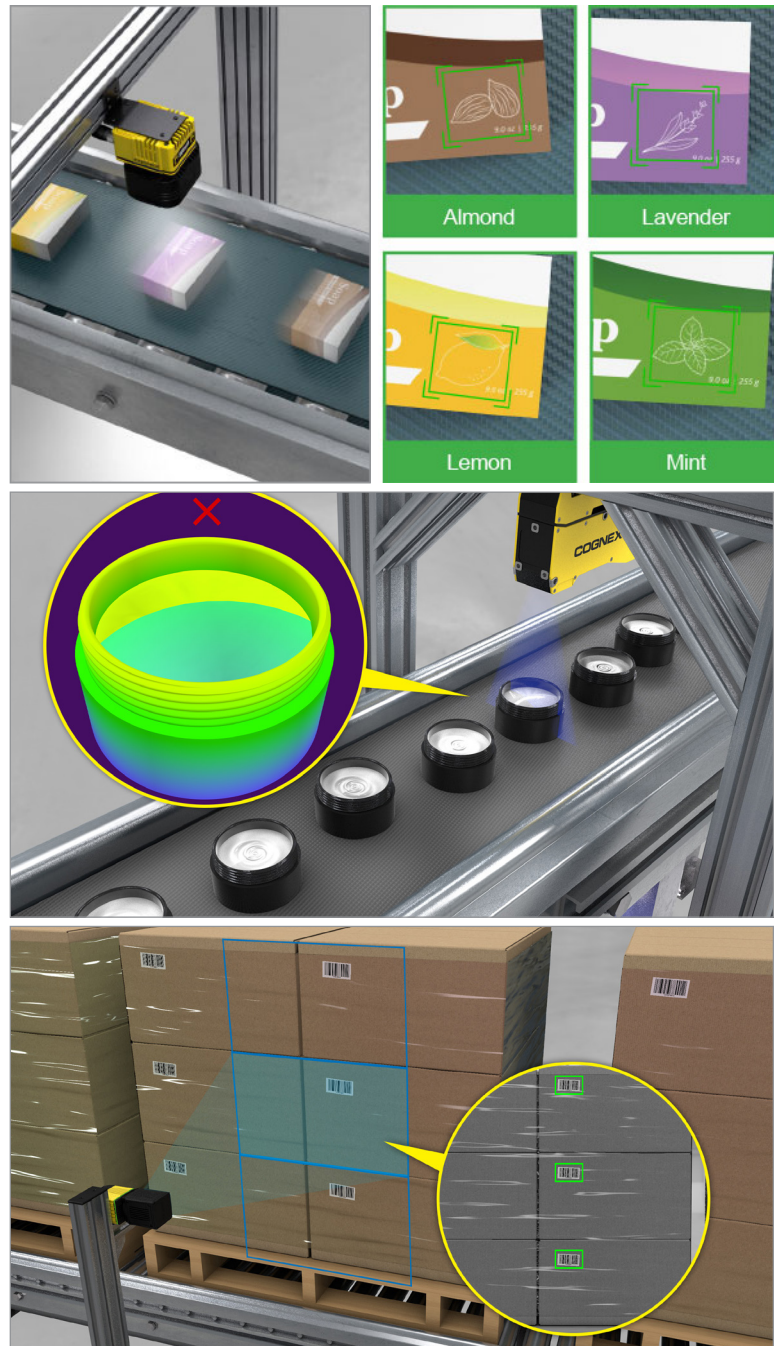
Breakthrough Machine Vision, Barcode Reading, and AI Technology

COGNEX

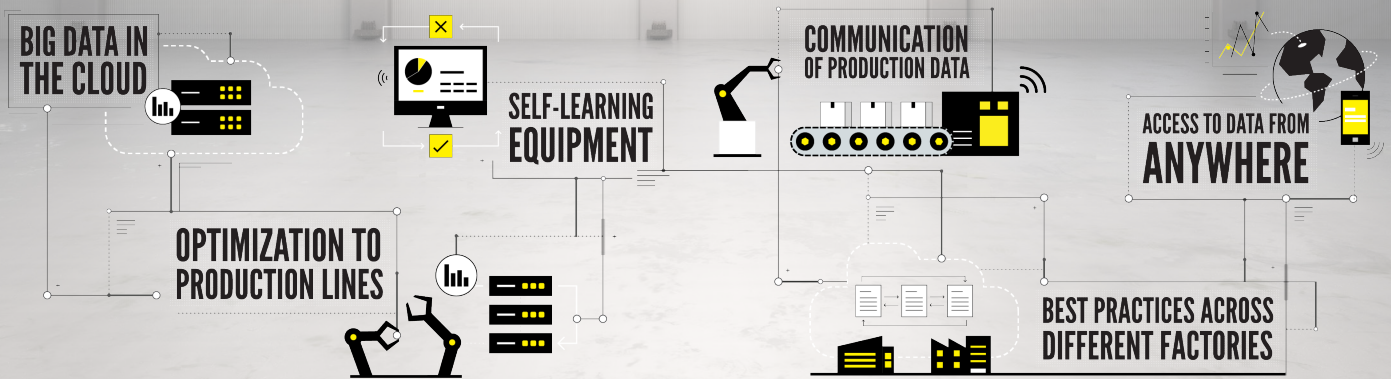
THE RIGHT CHOICE FOR CONSUMER PRODUCTS APPLICATIONS

The consumer product and packaged goods industry demands high throughput, cost efficiency, and accuracy for its material handling, inspection, labeling, and assembly needs. Cognex is uniquely positioned to deliver the highest level of performance in product safety, product quality, and productivity improvements for consumer packaged goods (CPG) manufacturers and the machine builders and systems integrators that serve them. Our machine vision, barcode reading, and AI-based products provide solutions for every application, helping manufacturers maximize gross margin and customer satisfaction by improving product quality and protecting their brand.

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DIGITALIZATION AND SELF-REGULATION

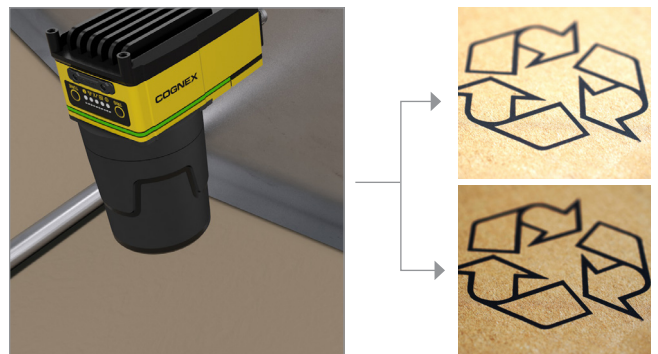


Industry 4.0 is driving change in the packaging industry as manufacturers seek to capitalize on emerging innovations in advanced automation. Machine vision, Big Data, cloud computing, and machine learning are revolutionizing manufacturing processes. Moving along the journey to Industry 4.0 presents an opportunity to digitalize processes that bolster productivity, reduce waste, improve product quality, enhance manufacturing flexibility, and decrease operating costs. Implementing a digitalization strategy also presents an opportunity to address ongoing labor shortage challenges.

As Industry 4.0 compatible edge systems and devices, Cognex machine vision and AI-based solutions create valuable digital data that serves two purposes. First, these systems capture real-time information such as inspection and measurement data that facilitates automatic in-line quality decisions. In addition, companies see great value in either feeding this data back into the process in real time or aggregating this data over time, performing off-line analytics, and using the resulting insights to drive process improvement and predictive maintenance. Cognex vision systems facilitate the digitalization of quality control processes through easy integration into industrial networks via standard communication and file transfer protocols such as TCP/IP, PROFINET, EtherNet/IP, SLMP, OPC/UA, and FTP.

SAMPLE USE CASE

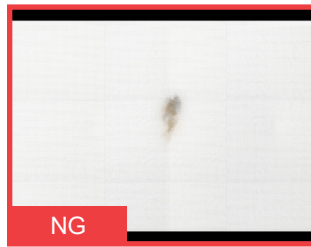
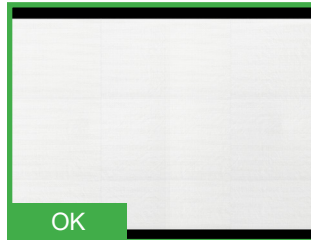
The packaging industry is trending towards increased use of sustainable or recycled materials, which can be highly variable in their composition and appearance within a given production run. Given these variations, it is challenging to maintain consistent printing quality and contrast of valuable label information, such as regulatory codes and ingredients. To overcome this challenge, a machine vision or AI-based system can provide inspection data in a closed loop process with the marking system so it can automatically respond to the variations in contrast by adjusting the marking pressure in real time.



MATERIAL HANDLING

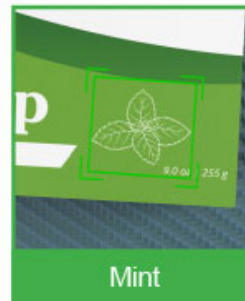
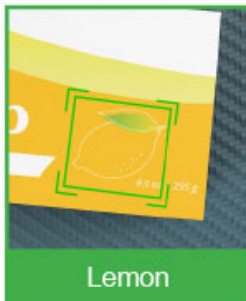
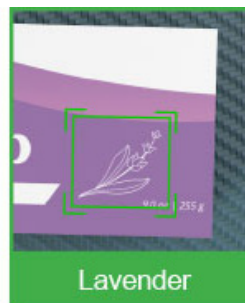
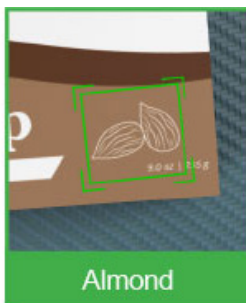
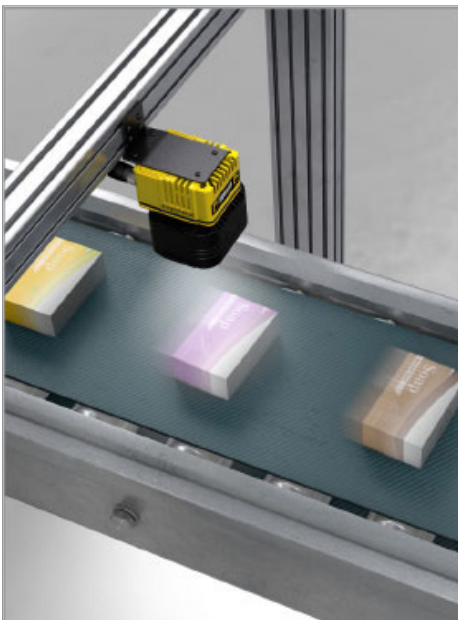
Manufacturers are searching for new ways to reduce manufacturing waste, such as scrap and defective product, by inspecting products more quickly and accurately. Many quality control tasks are being shifted from manual inspectors to automated systems in order to increase reliability and decrease labor costs.

Quality Inspection



Machine vision systems inspect materials, such as diaper padding, for defects and inconsistencies in size, shape, color, and texture.

Sortation

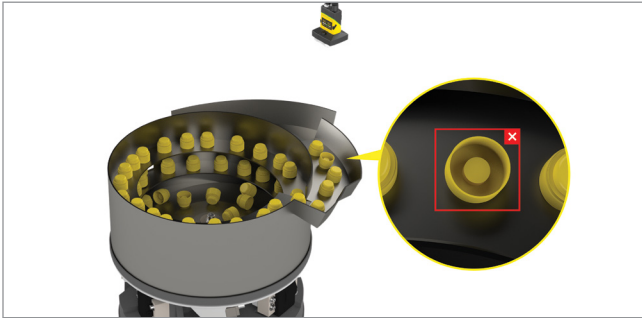


Machine vision systems use edge learning to classify and separate products based on size, color, and visual characteristics.

AUTOMATED ASSEMBLY

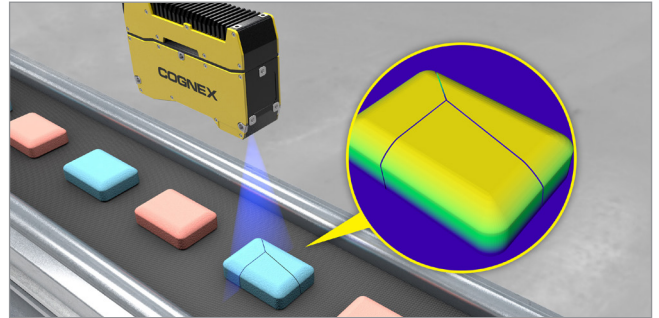
Cognex machine vision, barcode reading, and AI-based solutions help automate industrial processes and verify that consumer products and packaged goods are defect-free. Cognex solutions handle challenging inspection and verification applications to guarantee maximum reliability and precision assembly, minimizing the need to recall product and scrap faulty goods.

Part Orientation Verification



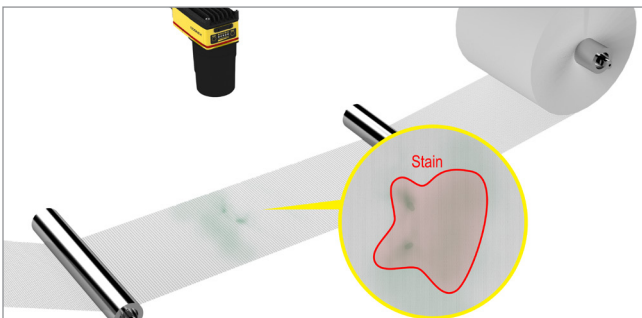
Vision sensors verify part orientation prior to assembly.

Product Inspection



3D laser displacement sensors inspect parts for damage and confirm dimensions.

Quality Inspection



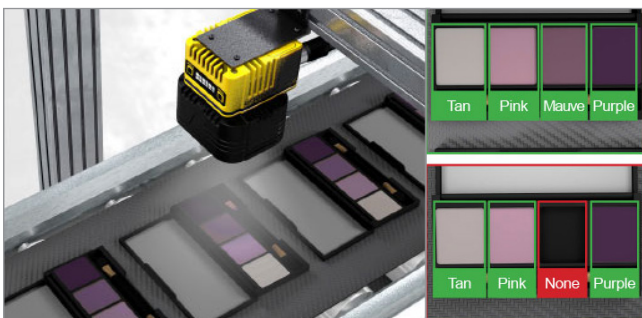
Line scan cameras perform discrete inspections of continuous materials.

Defect Inspection



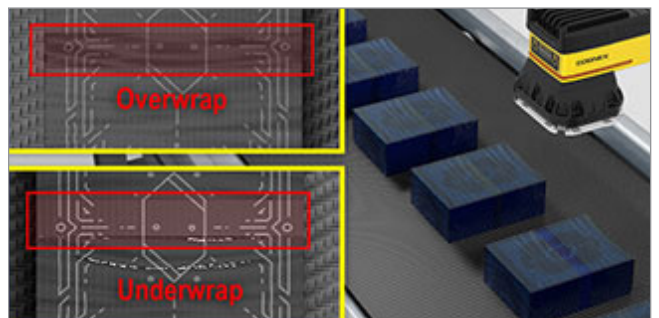
AI-based image analysis detects unpredictable defects.

Assembly Verification



AI-powered tools distinguish subtle variations in color and positions of assembly components.

Cosmetic Defect Inspection



AI-enabled solutions capture defects on rough and textured surfaces as reliably as human inspectors.

PACKAGING

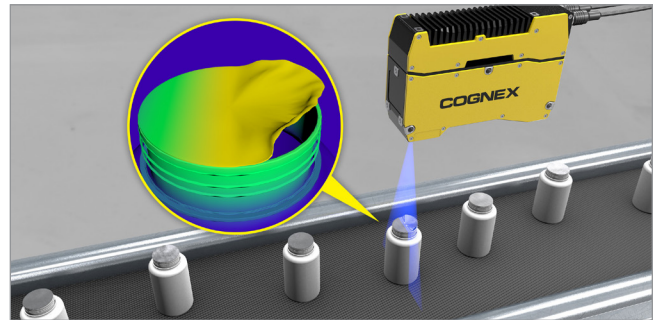
Faulty or damaged packaging adversely affects how consumers perceive a product's quality, safety, and value. In order to avoid damage and preserve brand loyalty, consumer packaged goods (CPG) manufacturers rely on machine vision and AI-based technology to inspect primary and secondary packaging to ensure it is correctly assembled, tamper-proof, and defect-free. This assures manufacturers that only their highest quality products reach customers.

Kitting Inspection



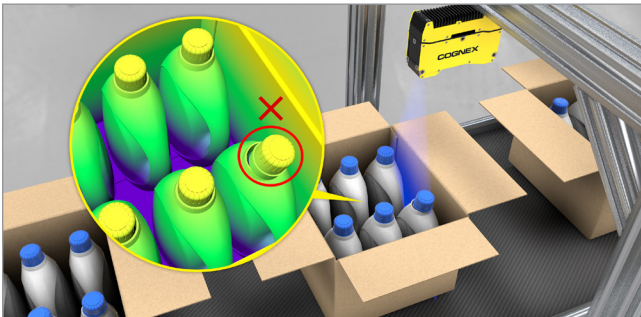
Cognex AI-based technology locates and classifies various components in a multi-pack.

Tamper and Safety Seal Inspection



3D laser displacement technology verifies seal integrity.

Cap Inspection



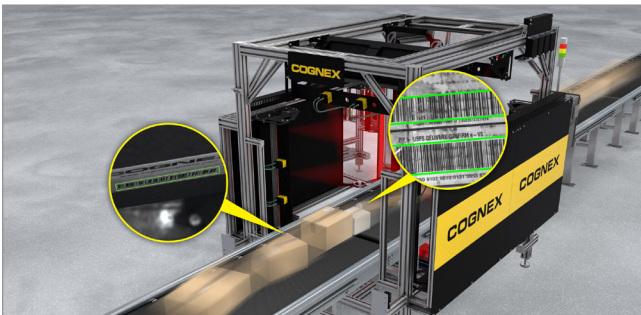
3D laser displacement technology checks that caps are properly seated.

OCR Code Reading



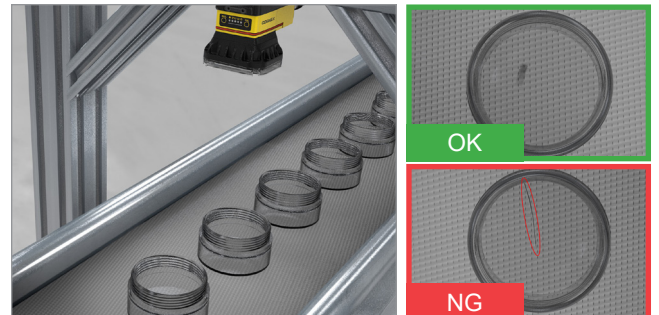
Reliably read text on packaging that changes in size, color, and orientation with AI-based OCR tools.

Packaging Traceability



Track and trace goods throughout the supply chain with image-based barcode readers.

Defect Inspection

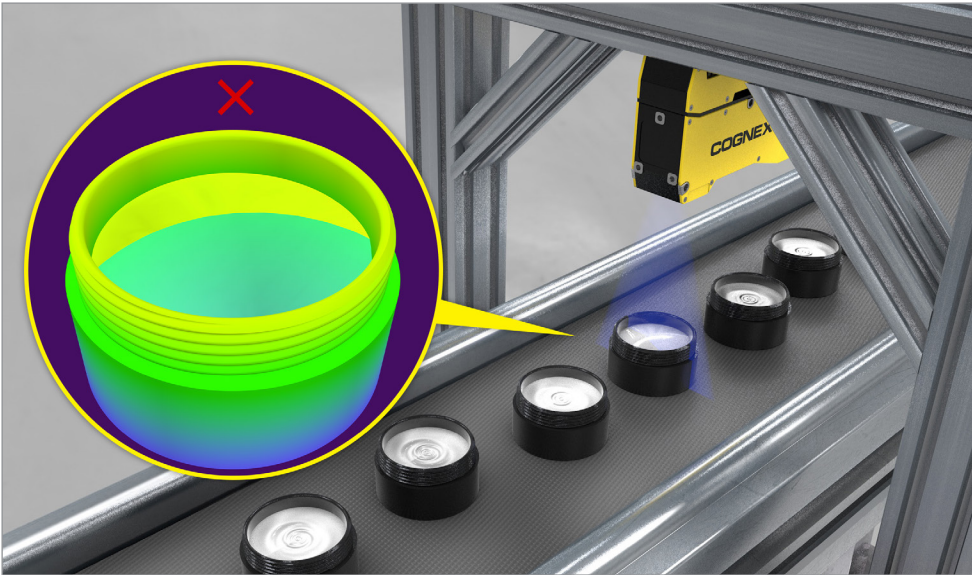


AI-powered technology ensures packaging is properly shaped and defect-free.

FILLING

Machine vision is used to improve consumer filling equipment automation by both manufacturers and their equipment suppliers. These applications include inspecting for container flaws, determining package position and orientation, and detecting missing or underfilled product.

Fill Level Inspection



Area scan 3D cameras ensure that containers are properly filled.

Missing Product Detection



Machine vision combined with edge learning technology inspects packages for missing items.

LABELING AND MARKING

Labeling errors which occur during primary or secondary packaging can damage consumers' perception of an item's quality and safety. To meet the expectations of customers, it is important for manufacturers to catch labeling defects before their goods reach the market. Quality inspections using machine vision and AI-based technology help ensure that labels are placed correctly and don't exhibit any folds, rips, or misprints. Results and defect classification data can be used for process improvement.

Label Damage Inspection



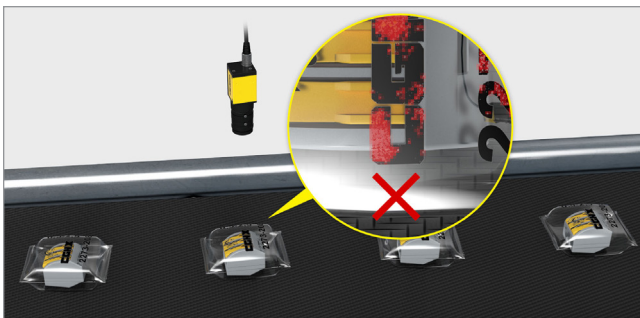
Vision systems identify torn, damaged, and missing labels with defect detection technology.

Final Packaging Inspection



Image-based barcode readers can check that lids and containers match and accurately reflect package contents.

Print Quality Verification



Detect label printing problems in transparent packaging with AI tools.

OCR Code Reading



Vision systems and AI-based OCR tools read low-contrast embossed or inkjet characters on irregular surfaces.

Barcode Quality Verification



Accurately grade label-based codes to ensure product traceability.

Prevent Counterfeit Goods

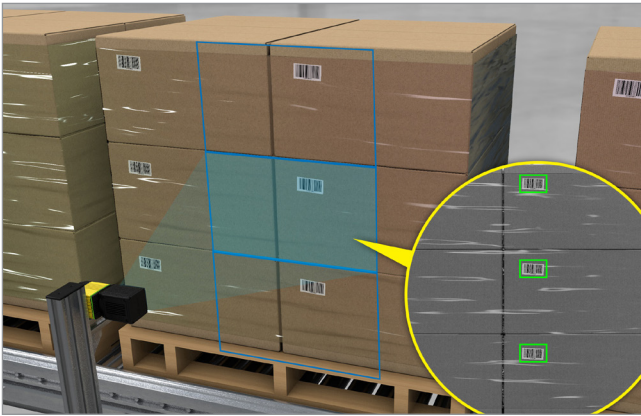


Image-based barcode readers authenticate consumer products using serialization and UV codes.

WAREHOUSING AND DISTRIBUTION

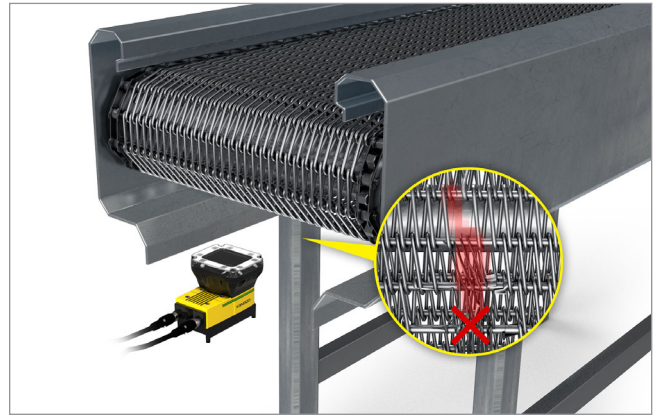
Consumer products manufacturers must optimize not only their production capacity and quality, but also their warehousing and fulfillment operations to meet growing performance criteria and customer demands. Increasingly, these manufacturers are embracing barcode reading solutions to minimize equipment downtime and manual rework while driving throughput, lowering maintenance costs, and guaranteeing traceability. Cognex vision systems and image-based barcode readers decode the most challenging 1D and 2D codes quickly and accurately to help increase the productivity of warehouses and distribution centers. Some of the world's top retail manufacturers and distributors use Cognex image-based barcode readers to ensure sorting, picking, packing, and shipping operations meet or exceed performance requirements.

Pallet Scanning



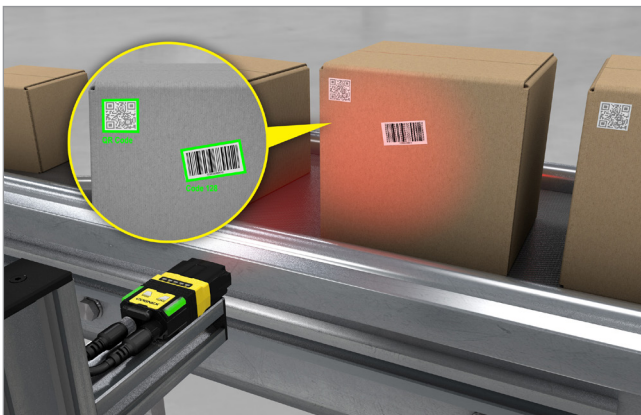
Barcode readers with expanded field of view technology scan pallet labels on arrival.

Conveyor Belt Inspection



AI-based solutions inspect and identify flaws in working conveyor belts.

Automated Sorting



Barcode readers sort packages and track goods through a facility.

Pick and Pack Sorting



Cognex fixed-mount barcode readers improve pick times.

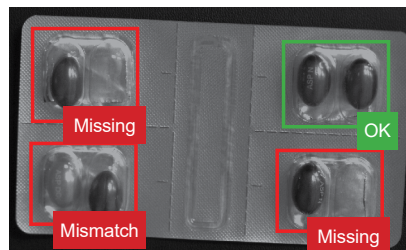
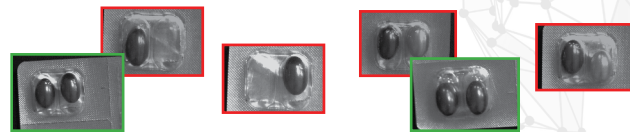
COGNEX AI

Cognex AI learns to spot patterns and anomalies from example images. It solves tasks that are too complicated and time-consuming to program with rule-based algorithms, while providing a consistency and speed that aren't possible with manual inspection.



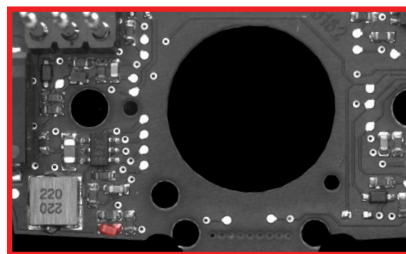
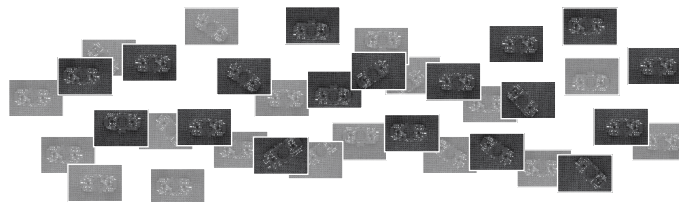
Edge learning: Designed for ease of use

Edge learning is a subset of AI in which processing takes place on-device, or "at the edge," using a pre-trained set of algorithms. The technology is simple to setup, requiring smaller image sets and shorter training and validation periods than traditional deep learning-based solutions.

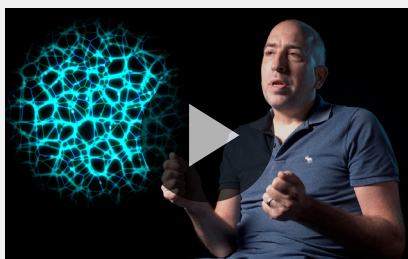


Deep learning: Designed for complex applications

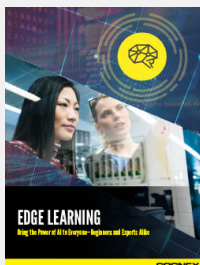
Capable of processing large, detailed image sets, deep learning is designed to automate complex or highly customized applications. The technology enables users to analyze vast image sets quickly and efficiently, while differentiating between acceptable and unacceptable anomalies, to deliver accurate results.



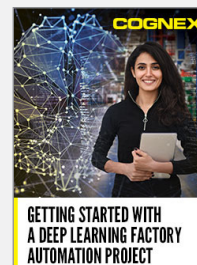
Cognex AI resources



Watch *Machine, Deep, or Edge Learning: What's the Difference?*



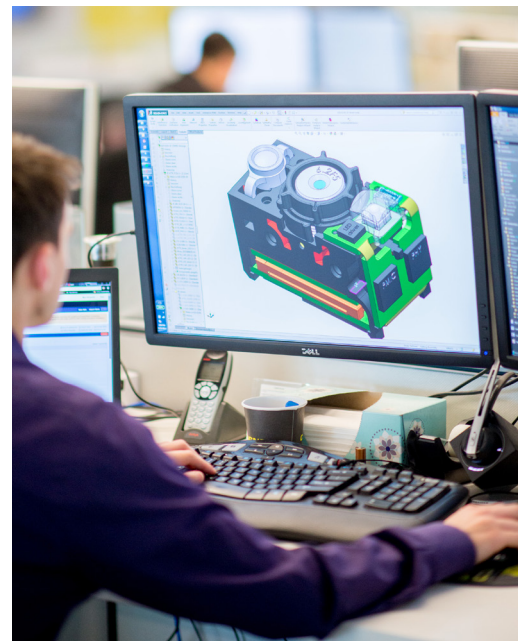
Read *Edge Learning: The Power of AI for Everyone*



Read *Getting Started with a Deep Learning Factory Automation Project*

COGNEX GLOBAL SERVICES

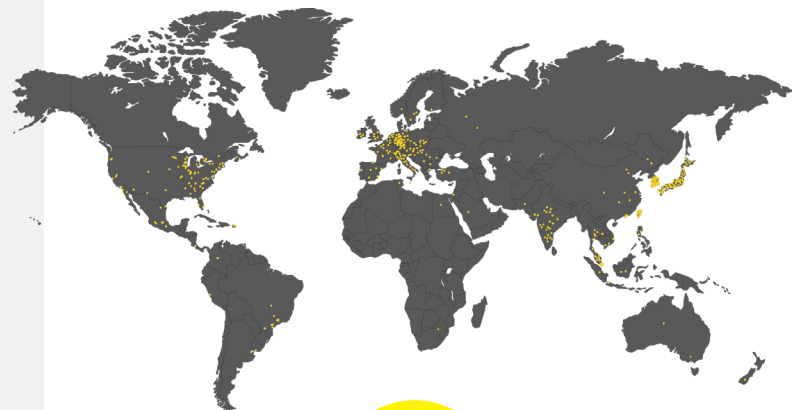
Technical Support ▪ Product Training ▪ Self-Service Portal ▪ Lifecycle Management



Cognex serves an international customer base from offices located throughout the Americas, Europe, and Asia and through a global network of highly-trained partners, system integrators, and distributors.

From development to deployment, Cognex is there to get your vision systems up and running as fast as possible. Whether you're considering machine vision for the first time or are already an expert user, Cognex global services provide the expertise to help your organization succeed.

www.cognex.com/support/cognex-services



Offices in **20+** countries

500+ Global partners in 30 countries

THE GLOBAL LEADER IN MACHINE VISION AND BARCODE READING

For over 40 years, Cognex has helped the world's most innovative companies make their manufacturing and distribution faster, smarter, and more efficient.

Cognex vision systems and barcode readers help customers improve product quality and operational performance by eliminating defects, verifying assembly, and tracking information at every stage of the production process. Using data captured by Cognex vision systems and barcode readers, companies can monitor, update, and change production plans in real-time across global supply chains.

Smarter automation using Cognex products means fewer errors, which equates to lower costs and higher customer satisfaction. And Cognex is constantly applying new techniques, like artificial intelligence, to enable companies to evolve their automation strategy to meet today's and tomorrow's needs.

With a wide range of solutions and a large network of global vision experts, Cognex makes it possible to **Build Your Vision.**[™]

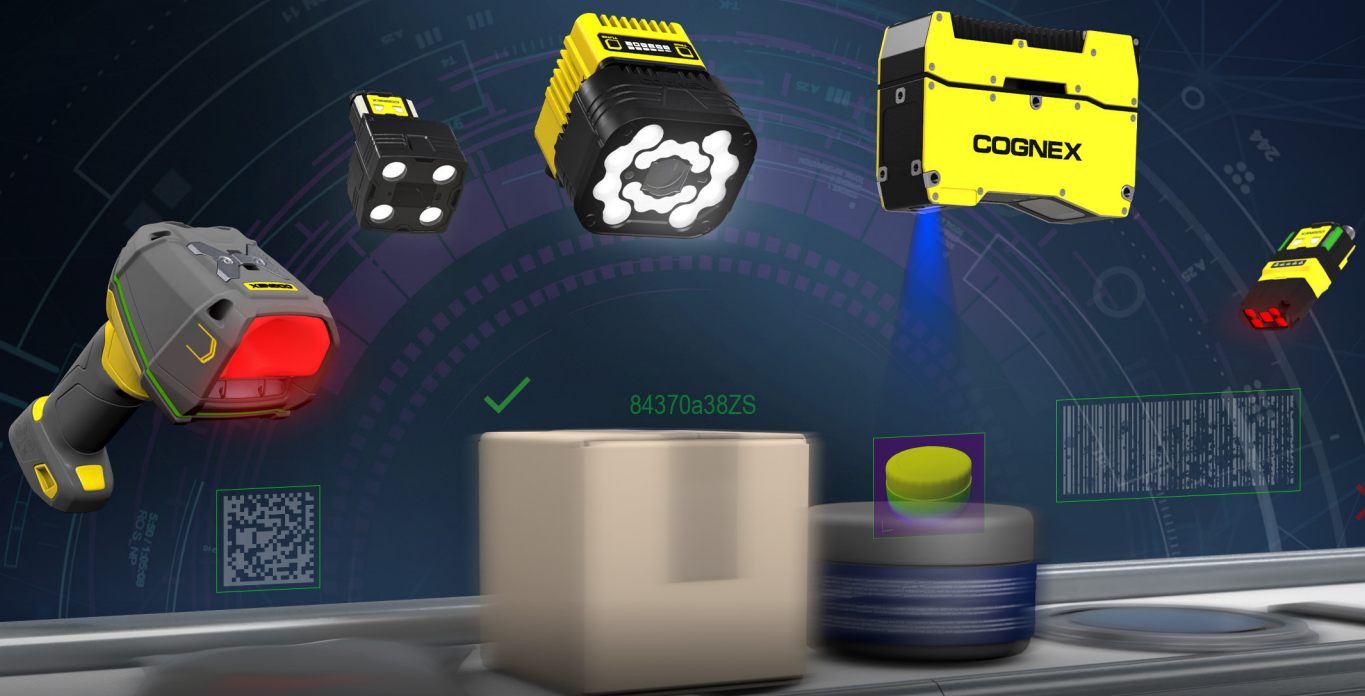
\$1 BILLION
2022 REVENUE

OVER 42
YEARS IN THE BUSINESS

500+
CHANNEL PARTNERS

GLOBAL OFFICES IN
20+ COUNTRIES

4,000,000+
SYSTEMS SHIPPED



BUILD YOUR VISION

Vision Systems

Automate inspection tasks, from defect detection to assembly verification and text reading, with easy to deploy vision systems.

www.cognex.com/machine-vision



Barcode Readers

Track and trace, from the floor to dock door, with powerful readers and verifiers designed to handle any code type.

www.cognex.com/barcodereaders



Industry Solutions

Solve applications across a wide range of industries with flexible and reliable machine vision and barcode reading solutions.

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COGNEX

Companies around the world rely on Cognex vision and barcode reading solutions to optimize quality, drive down costs and control traceability.

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Lit. No. CPSG-04-2023

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