EDGE LEARNING APPLICATIONS GUIDE

AI for Everyone and Every Industry

COGNEX

EDGE LEARNING
AI FOR EVERYONE AND EVERY INDUSTRY

From the products we use everyday at home and in our jobs, as well as the distribution systems used to get them from the manufacturer to our homes and businesses, the consumer economy has started to tap into the human-like processing power of artificial intelligence (AI). Within the AI realm is edge learning. This easy-to-use and simple-to-setup automation technology is now migrating into advanced manufacturing and logistics practices for quality inspection and task automation.

Edge learning is a versatile technology that can be trained to identify, detect, and classify product defects, components, labels, and other features, lending itself to endless industrial applications. Leveraging pre-trained AI algorithms, edge learning expedites the system training process without compromising performance. Edge learning technology simplifies automated defect detection, assembly verification, classification, character reading, and similar applications that would be too complex for traditional machine vision or too costly for manual labor.

## EDGE LEARNING APPLICATIONS BY INDUSTRY

Dirty
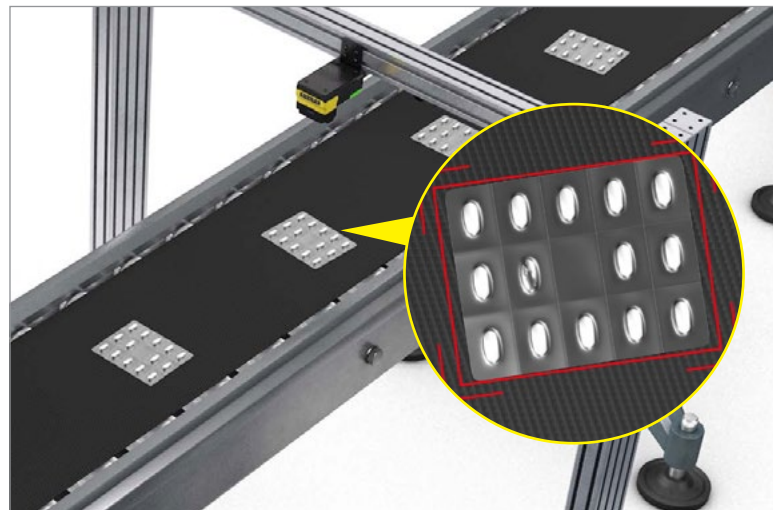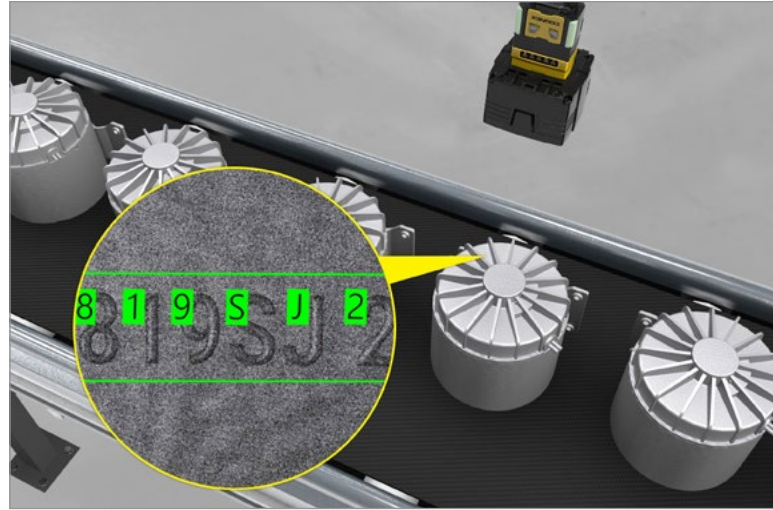
AUTOMOTIVE

Automakers and their suppliers are competing on a global scale, driving manufacturers to reduce costs, implement advanced features, and safeguard their products. As traditional automakers transition into the electric vehicle market, more companies are competing for a limited quantity of rare, expensive metals and personnel. Edge learning technology alleviates these burdens, reducing costs and optimizing workforce utilization by automating complex tasks such as inspection, part classification, as well as reading direct part markings (DPM) and label-based codes.
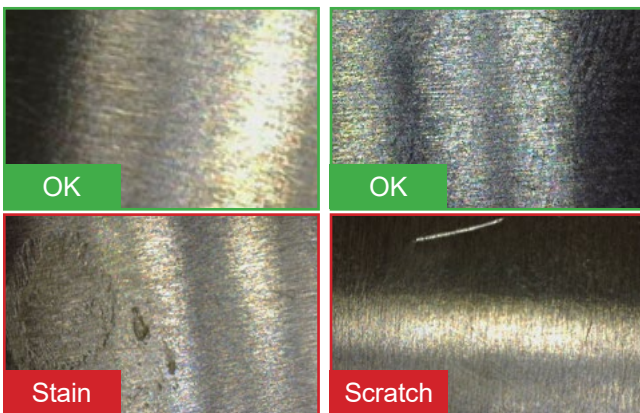
Optical character recognition
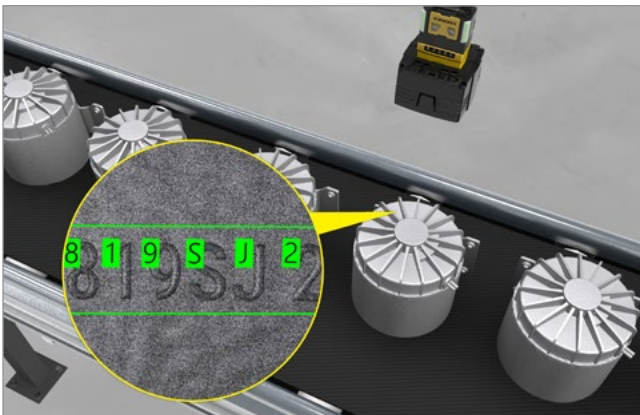
Vision systems with edge learning instantly read codes and direct part markings, even in low-contrast conditions and when the code is damaged.

Connector insertion check
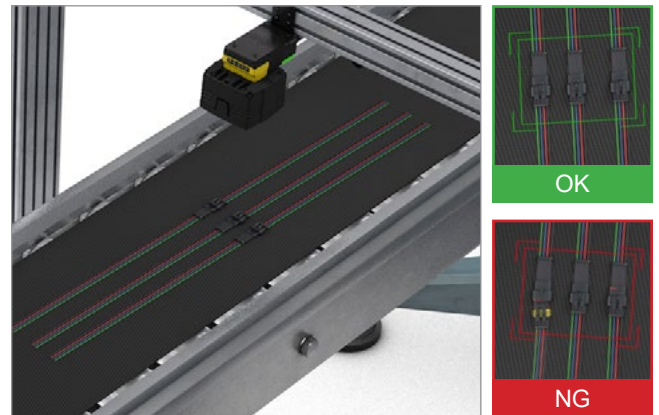
Vision systems embedded with edge learning can verify if connectors have been properly inserted in wiring harnesses.

Textured metal sheet

Leverage edge learning technology and machine vision to detect and classify imperfections, as well as differentiate between flaws and acceptable anomalies.

Inspection and presence/absence
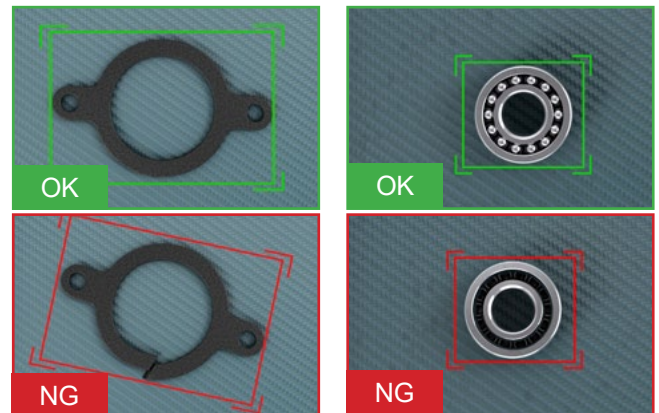
Confirm the presence or absence of specific components with edge learning tools.

ELECTRONICS

Edge learning technology is ideal for use in automated inspection processes by electronics manufacturers and assembly facilities. Cognex edge learning solutions are easy to use and quick to deploy for high-volume component quality checks or assembly verification.
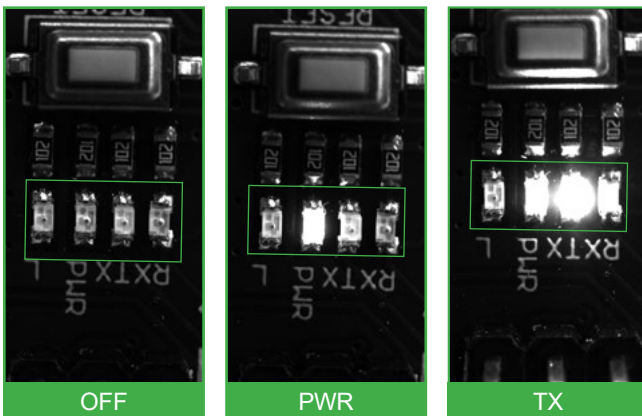
PCB component assembly verification

OK

NG
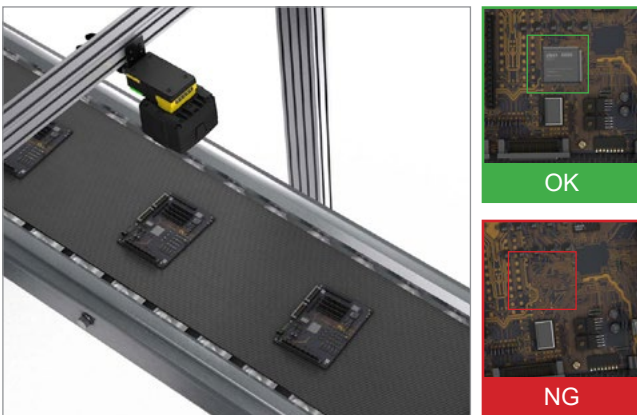
Vision systems embedded with edge learning verify correct assembly of PCBs.
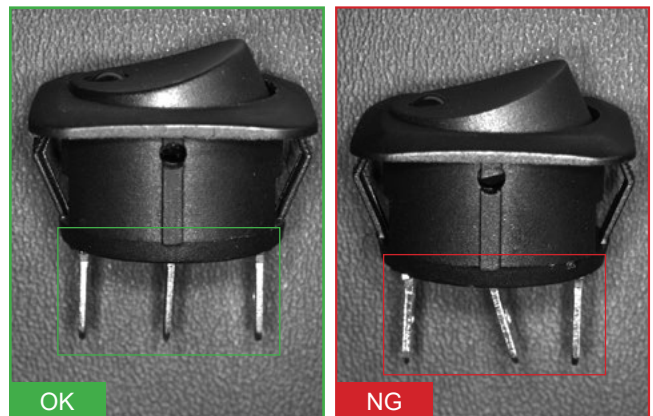
Resistor quality check

OK

NG
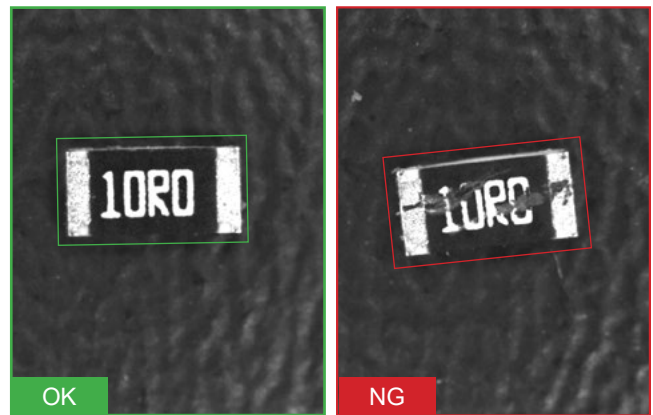
Inspect resistors and classify them as NG (damaged or scratched) or OK with edge learning tools.

LED quality check

OFF

PWR

TX

Edge learning technology verifies proper operation of LEDs on PCBs by classifying the different statuses as either OFF, ON, or PWR.

Connector prong quality check

OK

NG

Check the quality of connector prongs on electronic components with edge learning tools.

LIFE SCIENCES

Edge learning can automate complex, inefficient tasks in lab diagnostic environments to produce consistent results. Physicians, researchers, and other edge learning novices can train applications and generate valuable data within minutes.

Pathology sample identification

Vision systems with edge learning read and decipher characters on flexible, shiny surfaces.

Test tube classification
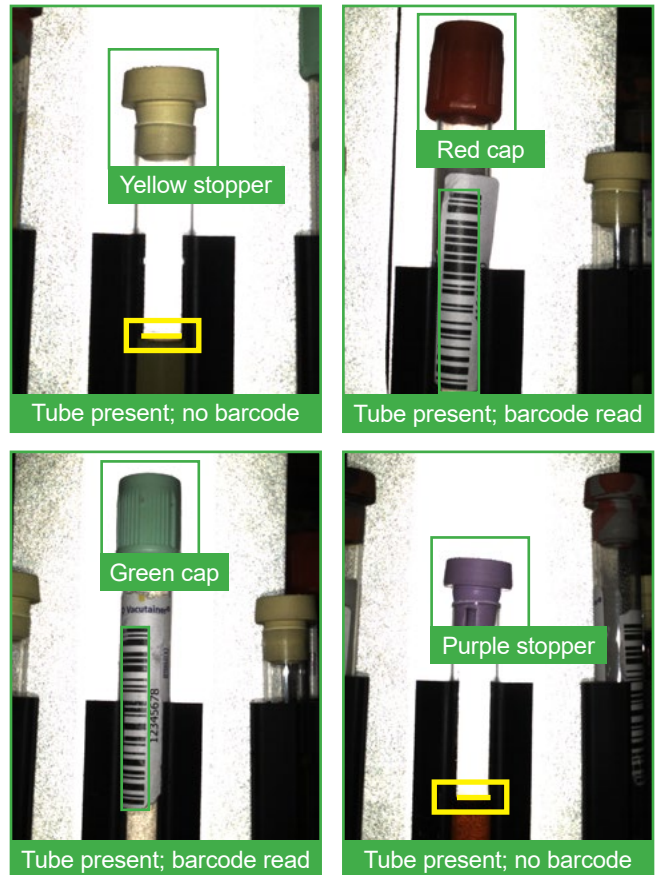
Automatically classify test tubes and cap type along with determining the liquid level.

LOGISTICS

Edge learning technology solves challenging vision applications, including difficult item detection and object sortation. With simple example-based training and AI algorithms, Cognex edge learning solutions enable logistics facilities to elevate the efficiency of sortation processes and handle a wide variation of item and packaging types.

Presence/absence detection
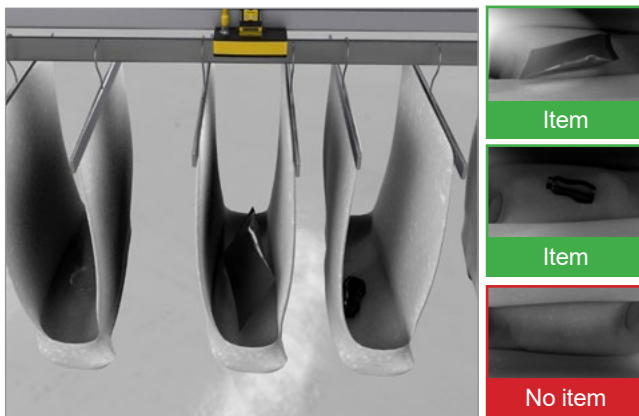
Cognex's vision systems embedded with edge learning detect the presence or absence of challenging items on varying background on totes or trays.

Sortation
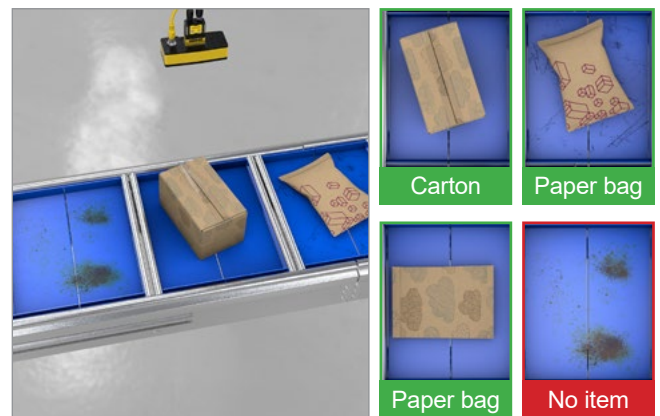
Edge learning can be trained on any packaging type to ensure items are routed correctly.

Process issue detection
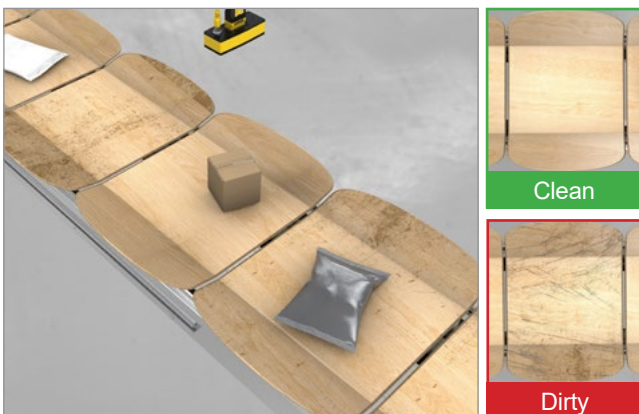
Vision systems with edge learning detect the hygiene of trays, as well as items stuck within cross-belt sorters or conveyors. These insights help prevent equipment damage or delays in processing.

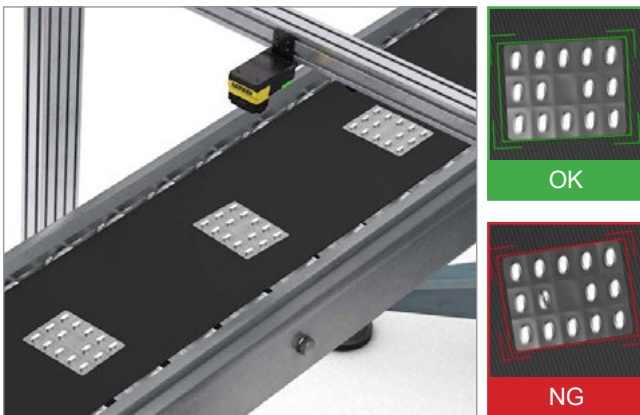# PACKAGING

Edge learning technology simplifies automated inspections for packaging manufacturers. With unmatched ease of use, Cognex edge learning solutions are ideal for verifying proper assembly, detecting missing product from packaging, as well as classifying a variety of defects to assist with process optimization.

Blister pack check

Machine vision systems use edge learning to classify how pills are packaged in blister packs, even under reflective packaging.

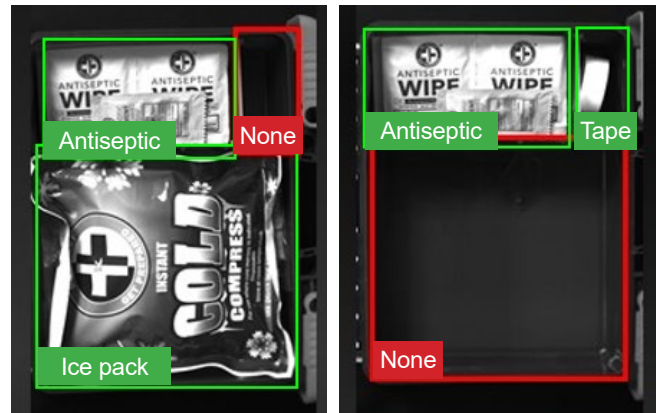## Classification and sortation by size and color
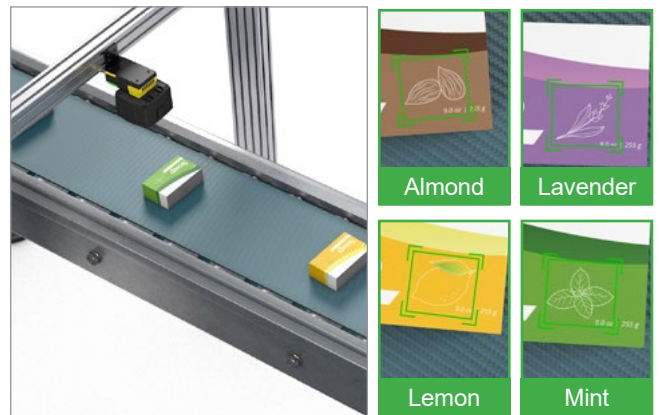
Classify and separate products based on size, color, and visual characteristics using edge learning tools.

Missing product detection

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

Medical kit assembly verification

Edge learning classification tools identify if parts are present in packaged first aid kits.

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.
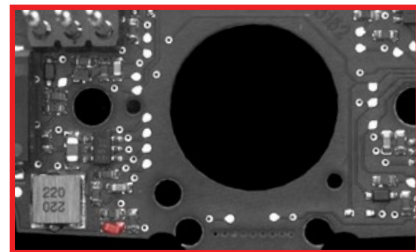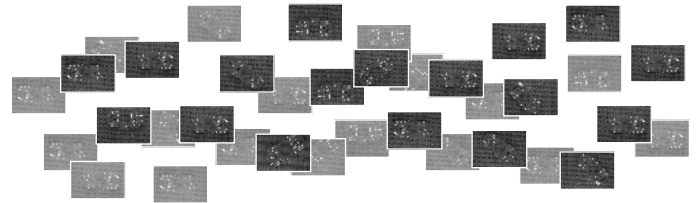
Edge learning:
Designed for ease of use

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.
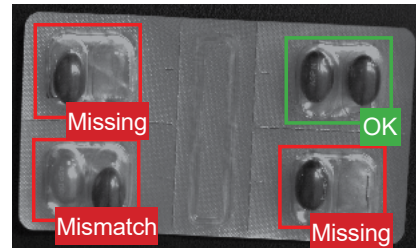
Deep learning:
Designed for complex applications

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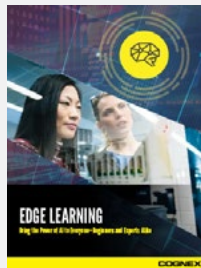
Read *Edge Learning: The Power of AI for Everyone*

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

COGNEX GLOBAL SERVICES

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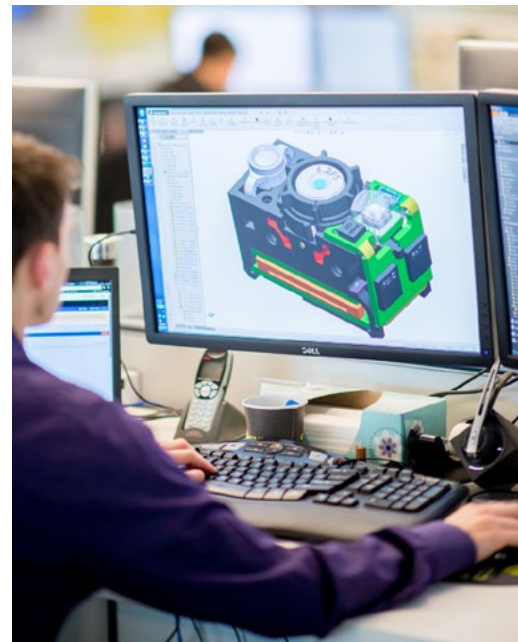
Cognex serves an international customer base from offices located throughout the Americas, Europe, and Asia and through a global network of highly-trained partners, system integrators, and distributors.
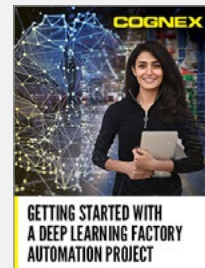
From development to deployment, Cognex is there to get your vision systems up and running as fast as possible. Whether you're considering machine vision for the first time or are already an expert user, Cognex global services provide the expertise to help your organization succeed.

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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 machine vision solutions combine hardware and software to capture and analyze visual information. The company's wide range of solutions automates manufacturing and distribution tasks for customers worldwide, improving efficiency and quality in applications like inspecting, identifying, locating, and measuring components, products, and packaging. Cognex products incorporate advanced technologies including artificial intelligence to simplify implementation, increase accuracy, and deliver a faster ROI.

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$830M+ 2023 revenue

>60% revenue from EU & Asia

25K+ global customers

400+ channel partners

500+ global customer support resources

17% of revenue into R&D

>1,100 technology patents

>8 years developing AI for industrial machine vision

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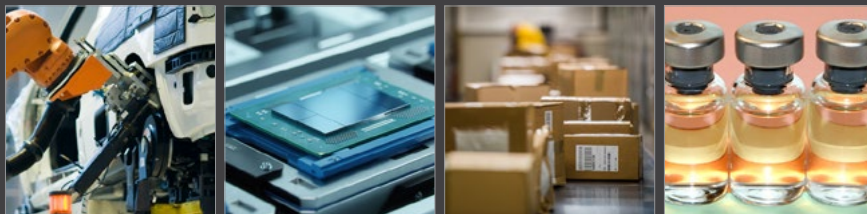
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Industry Solutions

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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