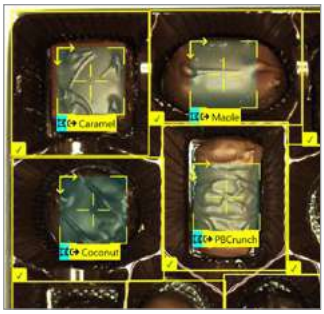
VISIONPRO DEEP LEARNING

Graphical programming environment for deep learning-based image analysis

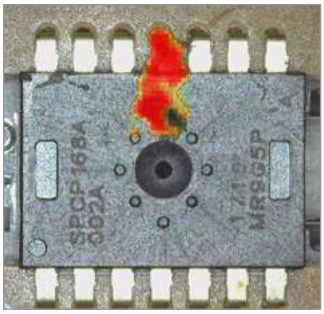
VisionPro® Deep Learning is the best-in-class deep learning-based image analysis software designed for factory automation. Its field-tested algorithms are optimized specifically for machine vision, with a graphical user interface that simplifies neural network training without compromising performance. VisionPro Deep Learning solves complex applications that are too challenging for traditional machine vision, while providing a consistency and speed that aren't possible with human inspection. When combined with VisionPro's rule-based vision libraries, automation engineers can easily choose the best the tool for the task at hand.

Part location and assembly verification



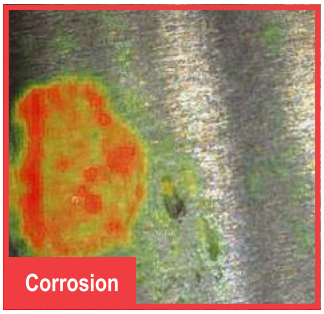
Locate

Defect detection



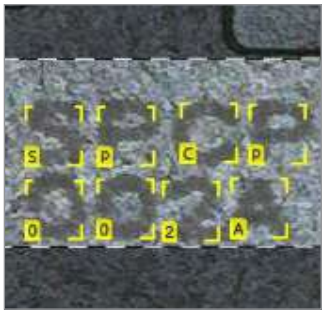
Analyze

Object and scene classification



Classify

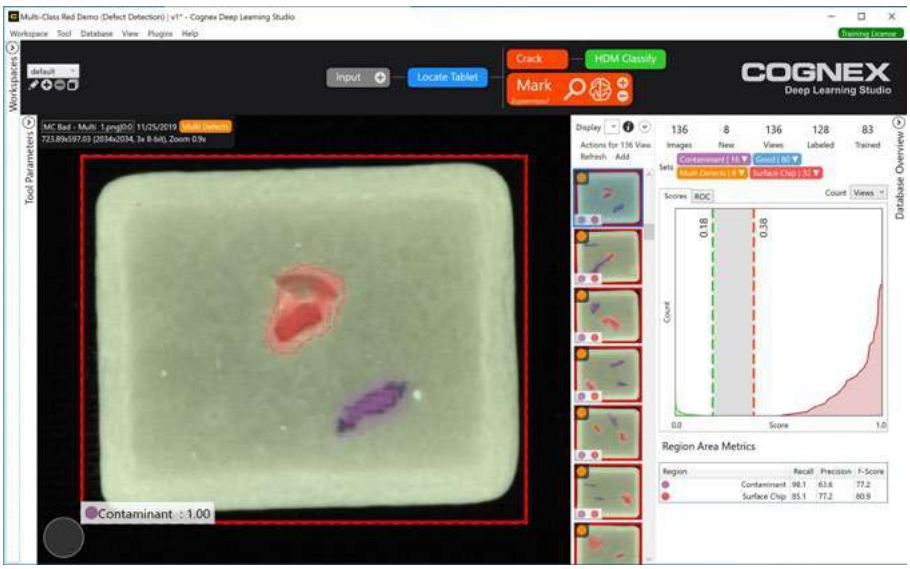
Character reading



Read

Intuitive graphical training

VisionPro Deep Learning's graphical training interface simplifies the task of collecting images, training the neural network, and testing it on a variety of image sets. The unique tool-chaining capability lets users break down their problem into smaller steps, making it easier to optimize and requiring fewer training images.



Simplified integration in a common environment

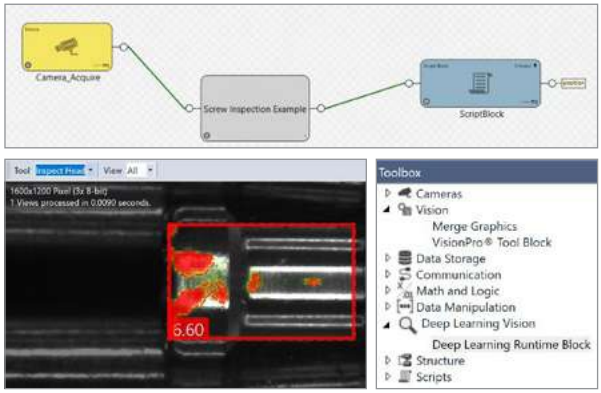
Users can take advantage of the extensive selection of traditional machine vision tools alongside innovative deep learning tools. VisionPro Deep Learning provides access to deep learning toolsets through programmatic integration, as well as through the Cognex Designer™ graphical development interface. From low-level machine integration to deploying an application-specific HMI using Cognex Designer, VisionPro Deep Learning provides flexibility in how you develop and integrate the vision inspection to your production environment.

Programmatic integration

Easy conversion of images, graphics, and results between VisionPro and VisionPro Deep Learning.

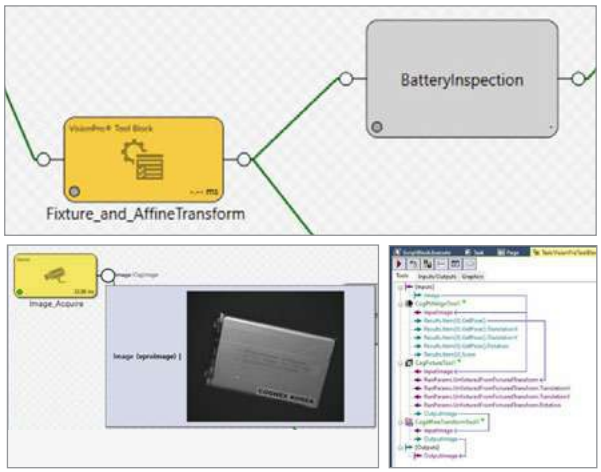
Graphical prototyping

Integrate Deep Learning workspaces into Cognex Designer applications to simplify image acquisition, results processing and I/O.



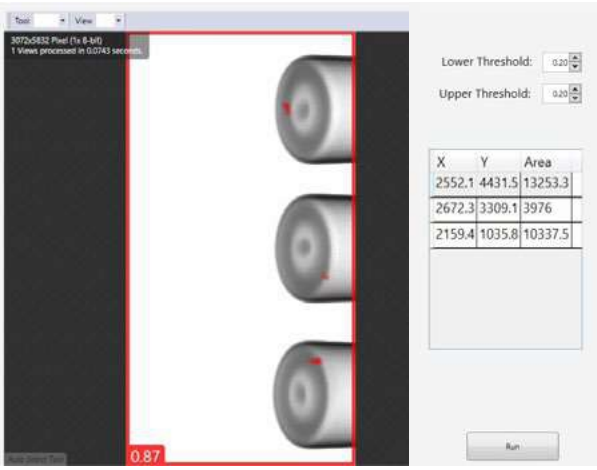
PatMax fixturing for deep learning

Combine PatMax accuracy and one-step training with VisionPro Deep Learning inspection, classification and OCR tools.



Fully deployable application

Create and deploy VisionPro and Deep Learning applications using Cognex Designer.



Deep learning toolset

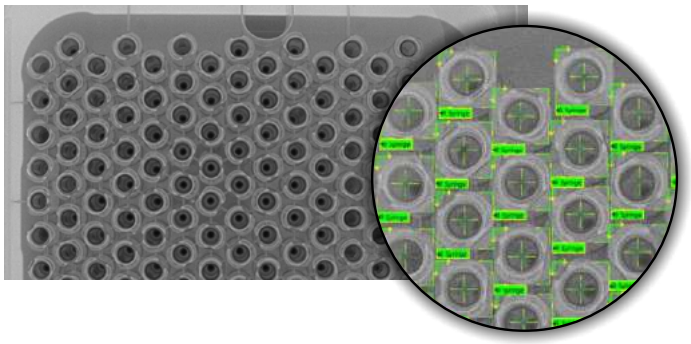
VisionPro Deep Learning tools are trained by example, unlike traditional rule-based vision algorithms. These tools are optimized for factory automation vision inspections and require smaller image sets for quicker training. The user-friendly GUI also provides a simple environment to manage and develop your applications. Choose between Blue Locate, Red Analyze, Green Classify, and Blue Read tools to solve applications that are too complex for traditional rule-based machine vision approaches.

Locate Blue Locate for fixturing, counting, and assembly verification

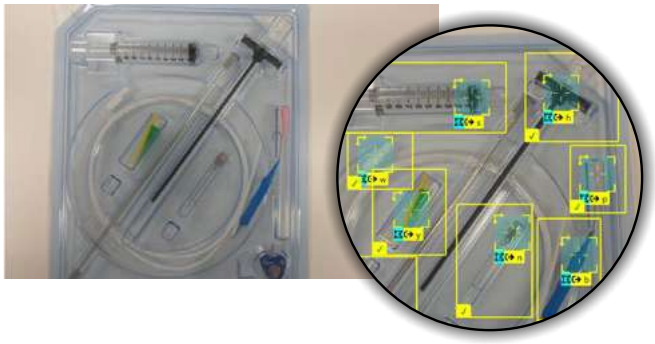
The Blue Locate tool finds parts with variable appearance. It detects features on noisy backgrounds, in poorly lit environments, on low contrast parts, and even parts that flex or change shape. Blue Locate locates parts despite variations in perspective, orientation, luminance, glare and color by learning from the samples provided by the user.

Blue Locate is also a reliable solution for automated assembly verification. The tool can be trained to find a variety of components, even if they appear different or vary in size, to create an extensive component library. By creating layouts based on the product being inspected, the tool checks multiple feature locations and component types simultaneously, while adjusting to varying layouts.

Counts translucent glass medical syringes



Ensures kits are assembled correctly

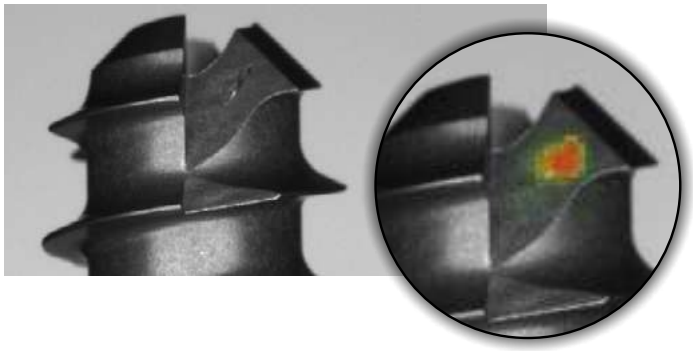


Analyze Red Analyze for defect detection and segmentation

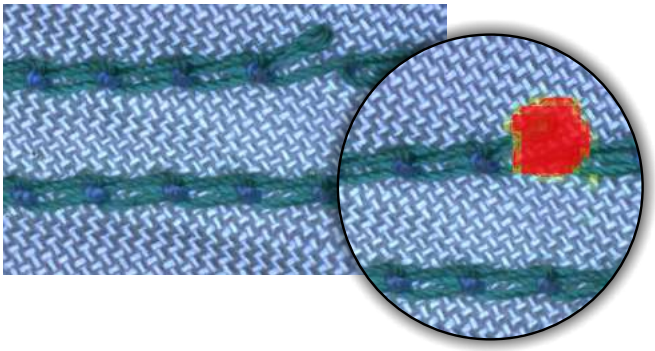
The Red Analyze tool finds subtle defects on a wide variety of part backgrounds and surface textures. By showing it examples of good and bad parts, it can be trained to tolerate normal variations in lighting and part positioning, while detecting flaws, contamination and other defects. For situations where it's not practical to collect defect images, or where the defects are highly inconsistent, Unsupervised mode can be trained from just good images and identify cases that deviate from the normal part appearance.

Red Analyze can also be used to segment specific variable areas in an image. These might be weld seams that are passed to a Green Classify tool; glue or paint regions whose coverage is then measured with traditional vision tools, or background features that are dynamically masked out of the image to simplify other inspections.

Detects imperfections on medical screws



Isolates stitching problems in textiles



Classify

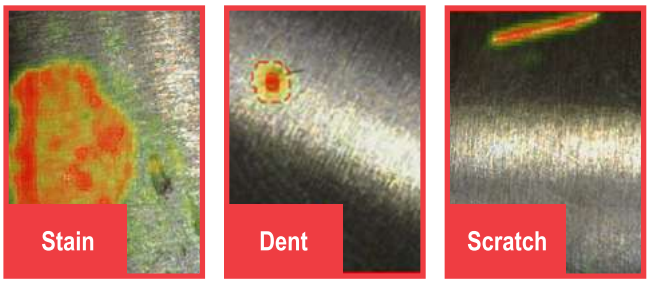
Green Classify for object and scene classification

The Green Classify tool is a robust classifier that can be used to distinguish between different types of objects, identify defect types, and even inspect images. Learning from a collection of labeled images, Green Classify identifies and sorts products into classes based on their common characteristics such as color, texture, materials, packaging, and defect type.

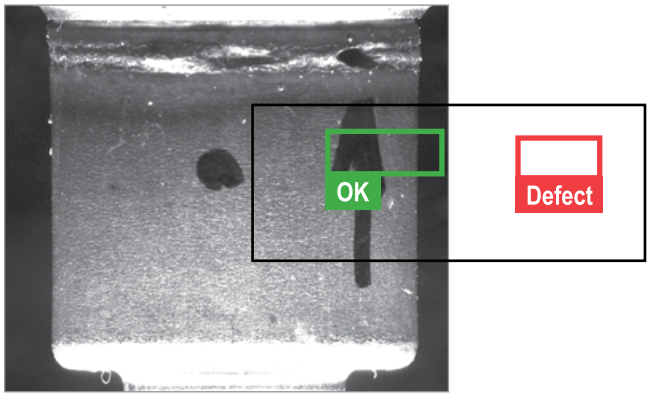
The tool tolerates natural deviation within the same class and reliably distinguishes acceptable variation from different classes. Green Classify solves complex classification tasks very quickly, eliminating complicated and time-consuming programming.

Classifies objects by type

Classifies defects by type



Distinguish true defects from tolerable abnormalities

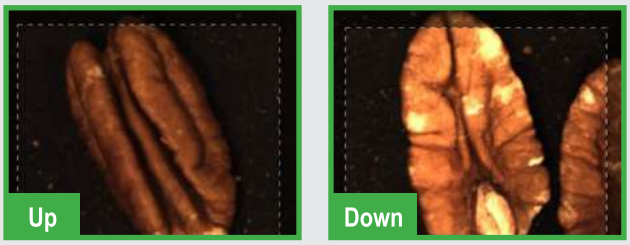


Two modes depending on application need

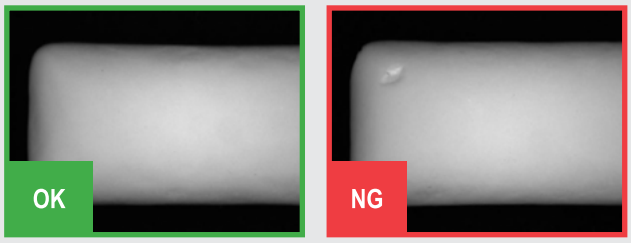
The Green Classify tool can be used on two different settings: focused mode or high detail mode.

Focused mode is ideal for simpler applications where robust results are needed quickly.

High detail mode is a powerhouse classifier for the most challenging and complex applications, which demand maximum accuracy. High detail mode also comes with a visual feedback feature to help further tune the neural network.



HDM can accurately classify parts even when differences are subtle and there is a lot of variation.



HDM is very powerful at picking up subtle characteristics.

Users can change between modes without re-labelling images. Unlike most deep learning-based software, which require thousands of training images, the Green Classify tool trains on tens to hundreds of images in just minutes. Both modes can be further refined with additional images, directly on the factory floor, until it segments classes perfectly.

Blue Read for text and character reading

The Blue Read tool deciphers badly deformed, skewed, and poorly etched codes using optical character recognition (OCR). Blue Read works right out of the box, dramatically reducing development time, thanks to the deep-learning pretrained font library.

The easy-to-use interface eliminates complex programming. Simply define the region of interest, set the character size, and label the characters in the image set. In just a few steps, without vision expertise, the robust tool can be retrained to read application-specific codes that traditional OCR tools are not able to decode. Plus, the visual debug feature identifies mis-reads that can be easily corrected.

Reads embossed characters on injection molded products

Reads label-based codes on packaging

SPECIFICATIONS

Graphical & application programming interfaces		Windows based graphical user interface (GUI) with plugin support C library (Windows DLL) for runtime and/or training Microsoft .NET library (Wrapper for C library and WPF GUI components)
Hardware & OS Requirements	CPU	Intel Core i7 or higher (recommended)
	GPU	Cognex only supports NVIDIA GPUs. Recommend GPU memory of 11GB or higher (GTX 1080Ti, RTX 2080Ti). Note: VisionPro Deep Learning performance — in terms of processing time — will depend on hardware selection.
	RAM Memory	32 GB or more (recommended)
	USB	1 free USB port (for the license dongle)
	OS	Windows 10 64-bit Windows Server 2016 64-bit
	Storage	Solid-state drive (SSD) with 100 GB or more of free space (recommended)
Supported image file formats		PNG, BMP, TIFF, JPEG
Supported image properties		1–4 channels, 8 or 16 bits

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