TEXTILE INSPECTION
INDUSTRY OVERVIEW
COGNEX VIDI DEEP LEARNING TECHNOLOGY ALLOWS THE AUTOMATIC INSPECTION OF COMPLEX FABRICS

No tedious software development is required. The software algorithm trains itself on a set of known good samples to create its reference model. Once this training phase is completed, the inspection is ready to go. Defective areas on the fabric can quickly be identified and reported while tolerating large but irrelevant variations in its appearance. Best of all, there is no need for extensive defect libraries.

Cognex ViDi is the first deep learning-based image analysis solution dedicated to the machine vision market.

This novel approach combines the human performance and flexibility in visual inspection with the reliability and consistency of a computerized system. It finally offers a way to precisely and repetitively inspect all sorts of natural and man-made textiles.

Cognex ViDi™ radically differs from traditional machine vision solutions since it is:

- **Self-learning**  No software development required
- **Human-like**  Outperforms the best quality inspectors
- **Powerful**  Solves hard to tackle or even impossible to program inspection challenges
CHALLENGES IN TEXTILE INSPECTION

Complexity
The fabric pattern can be highly complex, and position variants can preclude the use of simple methods based on spatial frequency analysis.

Natural variability
Visual appearance varies drastically due to the stretchable nature of the fabric and other variations such as yarn thickness.

Countless forms and types
Defects in textiles come in countless forms and types and explicitly searching for all defects is not an option.

AS SIMPLE AS 1-2-3

1. Collect images of "known good parts"
2. Let Cognex ViDi train on those samples and create its reference model
3. Proceed with testing and start detecting anomalies

ViDi Blue-Locate finds complex features and objects by learning from annotated images. Self-learning algorithms locate parts, count translucent glass medical vials on a tray, and perform assembly verification checks on kits and packages.

ViDi Red-Analyze is used to detect anomalies and aesthetic defects. Be it weaving, knitting or braiding problems, incomplete or improper stitching or even printing alignment errors; the red tool can identify all of these and many more problems simply by learning the normal appearance of an object including its significant but tolerable variations.

The Red-Analyze tool is also used to segment specific regions such as defects or other areas of interest. Be it a specific foreign material on a medical fabric or the cutting zone on lace; the red tool can identify all of these regions of interest simply by learning the varying appearance of the targeted zone.

ViDi Green-Classify is used to classify an object or a complete scene. Be it the identification of printed pattern families, the wear-and-tear rates on textile samples or the separation of acceptable or unacceptable defects; the green tool learns to separate different classes based on a collection of labeled images.

ViDi Purple-Read deciphers badly deformed, skewed, and poorly etched codes using optical character recognition (OCR). The pre-trained font library reads most text out of the box and minimizes training steps for fast, easy implementation. This robust tool can be retrained to adjust to specific OCR application requirements—no vision expertise required.
WEAVING
Cognex ViDi distinguishes unacceptable defects on seat belt and tire fabric while tolerating naturally occurring variations.

KNITTING
Cognex ViDi identifies a broken needle in thick yarn as well as knitting loops in warps and wefts despite the complex pattern.

BRAIDING
Cognex ViDi is able to find various types of defects such as gaps or misalignments despite the reflectivity of the carbon fibre fabric. The second example below shows the detection of a broken wire on a braided metal sleeve.
**FINISHING**

Cognex ViDi can detect anomalies like soil or ink spots on garments as well as defects in highly critical stitching such as on airbags. It also excels at verifying embossed characters on medical fabrics.

**PRINTING**

Cognex ViDi allows the inspection of printed webs. It is able to identify problems in printing quality such as misalignment of different color channels (black outline versus filling) while the motifs can be highly complex.
BUILD YOUR VISION

2D Vision Systems
Cognex machine vision systems are unmatched in their ability to inspect, identify, and guide parts. They are easy to deploy and provide reliable, repeatable performance for the most challenging applications.

- Industrial grade with a library of advanced vision tools
- High speed image acquisition and processing
- Exceptional application and integration flexibility

www.cognex.com/machine-vision

3D Laser Profilers
Cognex In-Sight laser profilers and 3D vision systems provide ultimate ease of use, power, and flexibility to achieve reliable and accurate measurement results for the most challenging 3D applications.

- Factory calibrated sensors deliver fast scan rates
- Industry-leading vision software with powerful 2D and 3D tool sets
- Compact, IP65-rated design withstands harsh factory environments

www.cognex.com/3D-laser-profilers

Image-Based Barcode Readers
Cognex industrial barcode readers and mobile terminals with patented algorithms provide the highest read rates for 1-D, 2-D, and DPM codes regardless of the barcode symbology, size, quality, printing method, or surface.

- Reduce costs
- Increase throughput
- Control traceability

www.cognex.com/BarcodeReaders

www.cognex.com/3D-laser-profilers