

How does deep learning work in machine vision?

There are various control methods used in the manufacturing process, quality inspection, and traceability. A distinction is made between human visual inspections, conventional machine vision, and machine vision with deep learning. But what exactly are the differences, advantages, and disadvantages of each method? Our graphic illustrates this clearly:

Human Visual Inspection	Conventional Machine Vision	Deep Learning
+ individually adaptable to the environment - Fast learning - flexible - subjective evaluation - can be visually deceived - Unsuitable for high-speed applications - permanent costs - not everything visible - Failure, holiday, illness must be intercepted by substitutes	+ detection of known errors (mathematically defined) - based on rule-based algorithms - consistent quality - reliable with high availability - fast, even high-speed applications, 24/7 in use - automatic connection to higher-level interfaces - adaptation/conversion may be costly - high integration costs/initial expenditure - dependent on environmental conditions (dirt, light, temperature, etc.)	+ also suitable for complex applications, although these are difficult to achieve with rule-based algorithms - easily configurable - adaptation to new shapes and types possible without reprogramming - consistent quality - reliable with high availability - fast, even high-speed applications, 24/7 in use - automatic connection to higher-level interfaces - adaptation/conversion may be costly - high integration costs/initial expenditure - dependent on environmental conditions (dirt, light, temperature, etc.)

Deep learning in complex situations

Deep learning programs work in a similar way to the human brain. They “mimic” the brain in their deep neural networks. Images, texts, and numbers are used to train these neural networks. Differences in the data series are recognized and continuously searched for irregularities and changes. Deep learning offers a decisive advantage over conventional machine vision in complex situations with many exceptions and a large error library, high speed, and reliability. This is precisely where conventional machine vision reaches its limits.

Fields of application for deep learning in machine vision

On our website, we explain the various fields of application for deep learning in classification, anomaly detection, and part localization, as well as deep learning with sophisticated OCR. We also take a closer look at the combination of classic machine vision and deep learning, e.g., for detecting location and determining position.

**We show you how to make optimal use of deep learning to
improve quality while reducing costs:**

Get a no-obligation consultation now: sales@ait.de