LANDING AI™

Get Started with Deep Learning in Electronic-Devices Inspection

With trends in connected technology such as IoT and Industry 4.0, manufacturers are collecting more data than ever before. Some facilities struggle to figure out how to get the greatest ROI from the data they collect. Fortunately, connected dashboards and machine vision can turn data into usable information. For inspection applications, machine vision can validate quality-control parameters. However, defining, classifying, and labeling defects is challenging for traditional, rule-based machine-vision solutions.

*"The platform has **shortened our development time** and **increased the accuracy** of the inspection system."*

Foxconn

Rule-Based Machine-Vision Challenges

Defining defects mathematically is its own challenge, and in some manufacturing processes, the types of defects to define are many. For example, in the electronics industry, conducting failure mode and effects analysis for each wafer, pin, joint, and environment change is a staggering task.

Rule-based machine vision might make defining defects difficult or even impossible. For example, organic and inconsistent parts might benefit from some wiggle room, so tight rules can lead to a high number of false negatives. But if defects are not clearly defined, this could lead to a high number of false positives. To better train vision systems, manufacturers are integrating more AI and deep-learning (DL) solutions.

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Getting Started with AI and Deep Learning

Many companies do not have the resources to develop complex machine-vision systems with AI/deep learning, flexible dashboards, or easy-to-use interfaces. Although many businesses have introduced different types of software tools to build deep-learning-based visual-inspection solutions, finding the right product is still challenging.

To start, look for AI and deep-learning solutions that:

- **Easily integrate into your current workflow.** Remember that long installation times and retraining can reduce your ROI before a system is even up and running.

- **Work with current technology.** Solutions may include various technologies. Make sure the solution does not interfere with and adds value to what already works. For example, machine vision can detect the height of a pin on a PCB, while an AI solution can detect mismatched pins. No single solution can provide everything.

- **Centralize project management and standardize processes across departments.** AI/deep-learning platforms streamline and centralize data and system management across multiple departments in multiple locations.

Deploying Deep Learning in Electronic Devices Inspection

In the electronics industry, machine vision can use deep learning to detect and classify deviations. If a line already has technology such as automated optical inspection (AOI), the LandingLens deep-learning platform from Landing AI can be easily integrated into current solutions to add value. If visual or statistical data are lacking, users can take advantage of platform tools to develop AI models to test various conditions and process changes to ensure that goals and ROI are obtainable before deployment.

LandingLens lets quality teams or subject-matter experts create a Digital Defect book, where they can upload, browse, and manage multiple media and label images. Users can then train and evaluate a model. If the results are close to the desired goals, the team can deploy the model. If not, the platform helps users quickly identify disagreement on defects and track them over time to improve the inspection results.

The LandingLens platform also enables recognition of possible variations and accounts for environmental factors. For example, LandingLens can determine whether lighting changes are different enough from the original training environment to affect inspection accuracy and then notify the user. The platform also serves as a centralized database with standard parameters to streamline various equipment management systems within a single, user-friendly software package, giving authorized users across departments access to deep-learning training and project information.