

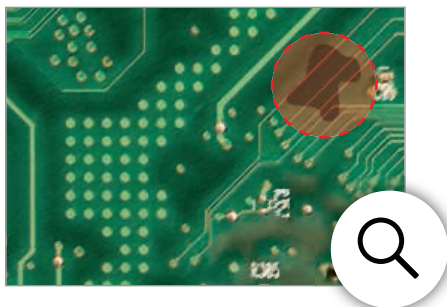
SuaKIT VISION SOFTWARE

Deep Learning Inspection Solution for Machine Vision

SuaKIT™ software performs visual inspection and classification of complex materials and key components for the mobile, semiconductor, electronics, and automotive industries. It also automates manual inspections in the food and beverage, packaging, and raw materials industries.



SuaKIT benefits



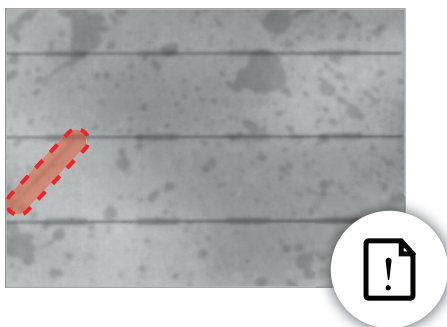
Improves quality and yield

- Highly accurate inspection results reduce overkill and underkill rates
- Optimized inspection results with finetuned deep learning models
- Upstream quality improvement with visualized a deep learning algorithm's internal analysis process



Reduces cost

- Automated system limits dependence on unreliable, manual inspections
- 24/7 inspection operations optimize throughput and improve takt time to satisfy customer demand
- High detection rate reduces the necessity of investment in inspection hardware



Ensures reliable, validated results

- Highly consistent inspections guarantee the same results from line to line, shift to shift, and factory to factory
- Archived images and documented results can be reviewed and validated offline
- Feedback on inspection results helps quality engineers to optimize applications and understand anomalous results

Main features and learning methodology

Key functions



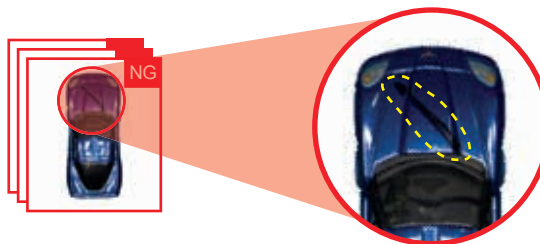
Detection

Detects objects within different classes in a single image



Classification

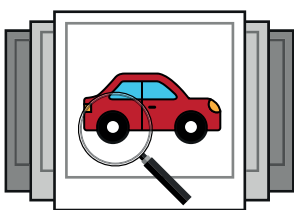
Groups images by multiple predetermined classes



Segmentation

Accurately finds position/area/ shape of defects in the images

Deep learning architectures



Single Image Analysis

Learns each image and identifies defects

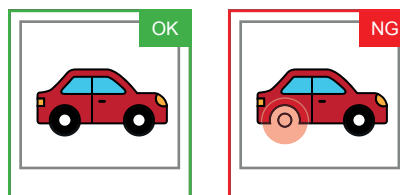
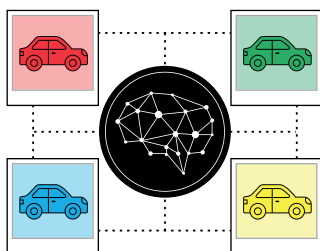


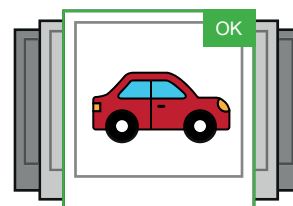
Image Comparison

Learns and detects defects by concentrating on the differences between a set of two images



Multi Image Analysis

Analyzes relationships between images to train defect detection model



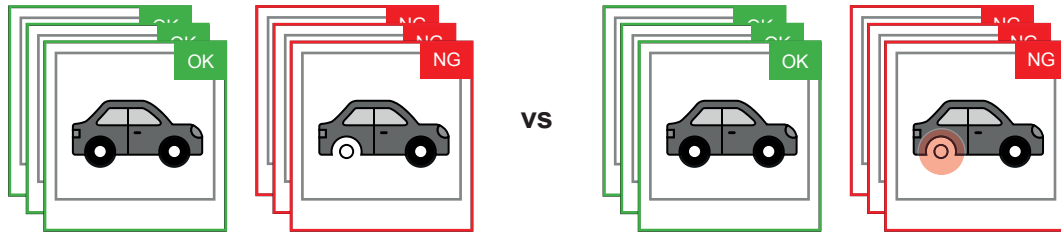
One Class Learning

Identifies defects based on deviations from trained OK images

SuaKIT Features

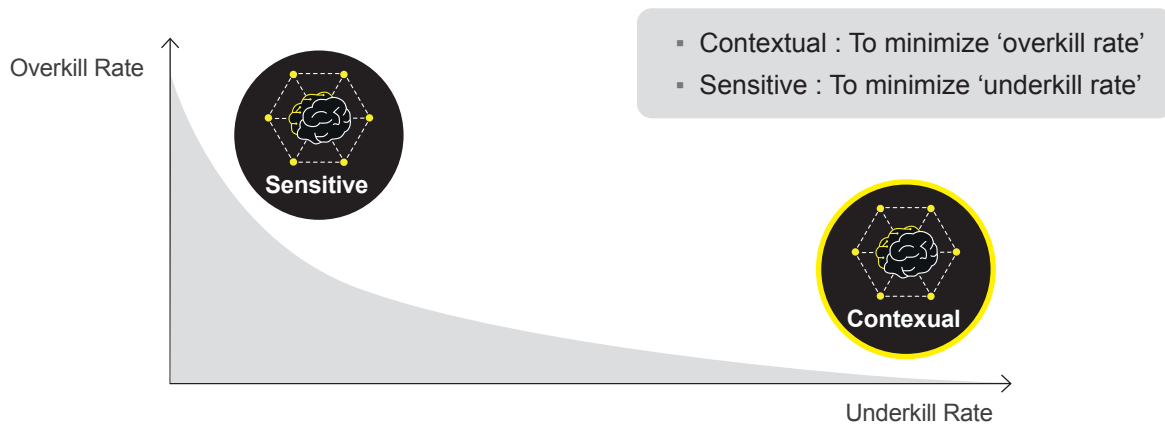
Pixel-wise Labeling (Classification)

Pixel-wise labeling allows defective areas on the images in Classification projects to be labeled to improve inspection accuracy. It is possible to achieve high inspection performance even with insufficient image data.



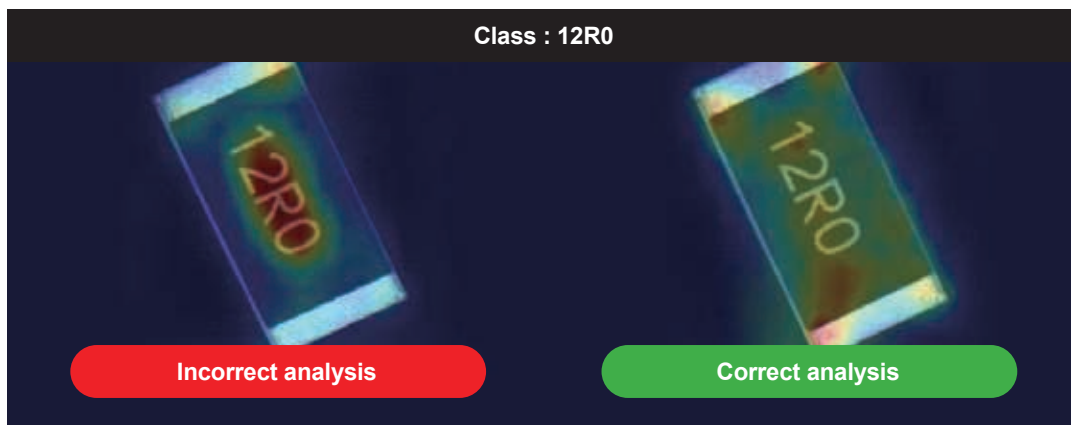
Network Options (Segmentation)

A “contextual network” is a type of segmentation that minimizes overkill rates compared to “sensitive network” that minimizes the underkill rates. By choosing one of these two networks, you can optimize your defect detection results.



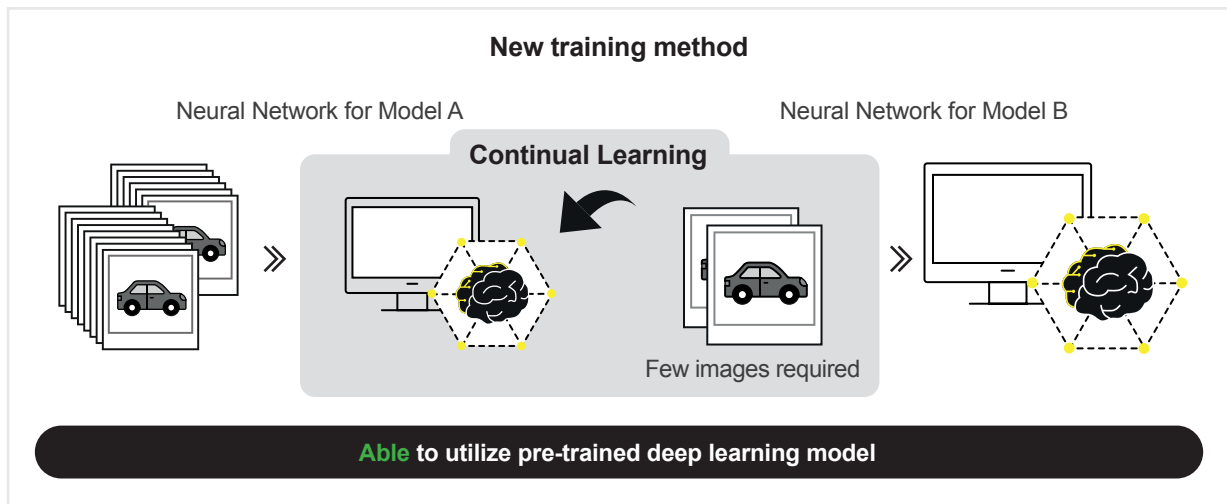
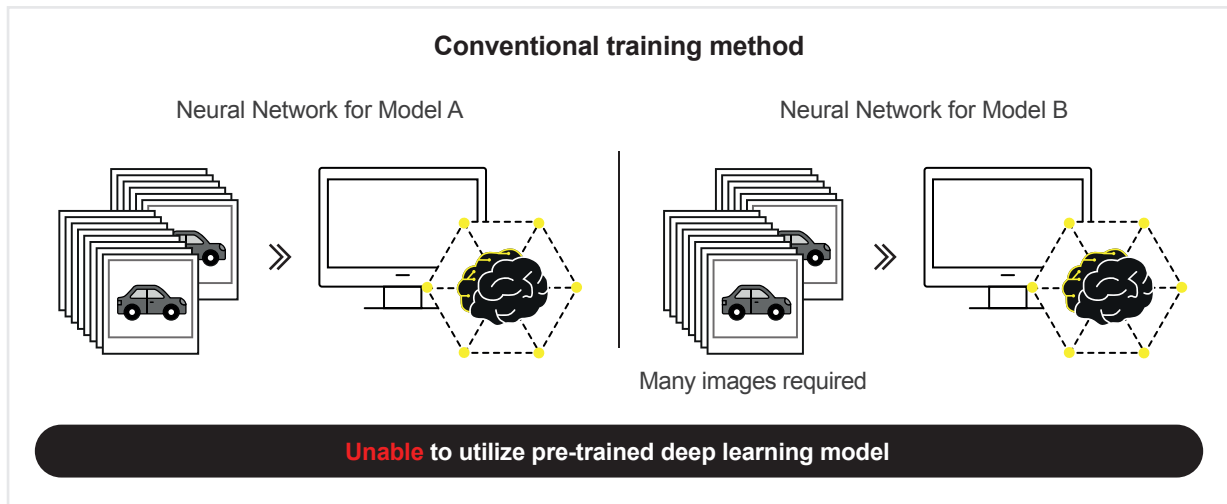
Visual Debugger (Classification)

This visual debugger feature visualizes which areas of the image the deep learning algorithms has focused in on and analyzed. It allows the user to check whether the inspection has been carried out according to the user’s intention.



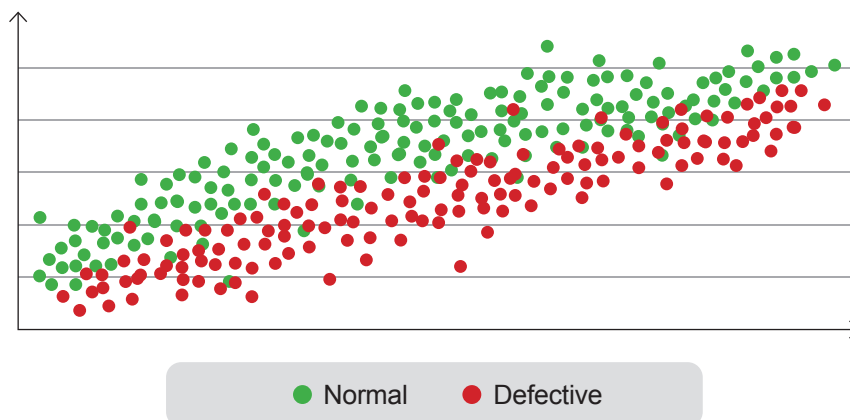
Continual Learning (Single x Classification)

Continual learning is a way to train the deep learning model using the pre-trained neural network in order to minimize the training time and the number of training images required for each new product.



Uncertainty Data Analysis

This function provides an easy way to review training data. It allows the model to analyze and extract vague data that is difficult to classify as OK/NG and easily finds falsely classified images caused by incorrect labeling.



Application examples

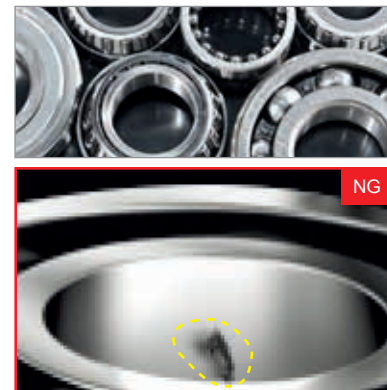
Automobile bearing inspection

Challenges

- Existing machine vision equipment misjudges defective items, resulting in costly re-inspection by human inspectors
- Incur additional costs due to the repetitive inspections, causing affecting overall efficiency

SuaKIT Advantages

- Increases accuracy and reduces defect leakage rates
- Reduces human errors and workloads



Smartphone and case inspection

Challenges

- Rely on 100% visual inspection due to the limitations of the existing machine vision inspection methods
- Experience inconsistent in speed and accuracy due to different levels of proficiency among human inspectors

SuaKIT Advantages

- Accurately detects all types of defects
- Inspects up to 3 times faster than human inspectors



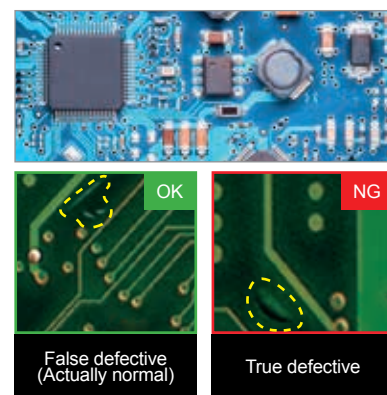
Semiconductor components (Driver IC) inspection

Challenges

- Conventional inspection equipment can not discriminate between tolerable and unacceptable defect types
- False defects or “overkill” results in costly manual re-inspection and increased tact time

SuaKIT Advantages

- Successfully reduces the overkill rate by over 90% through the deep learning inspection
- Improves production capacity and reduces inspectors' workloads



Deep learning inspection

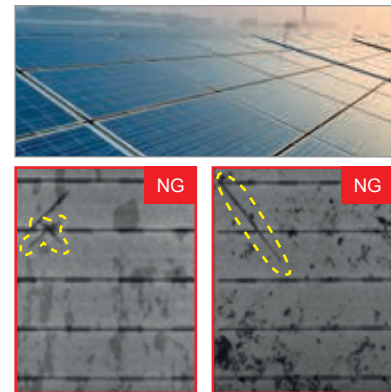
Solar EL panel inspection

Challenges

- Non-standardized and irregular patterns on solar panels require human inspection
- Additional inspection step required to confirm results

SuaKIT Advantages

- Improves classification capability for ambiguous images, and reduces inspectors' workloads



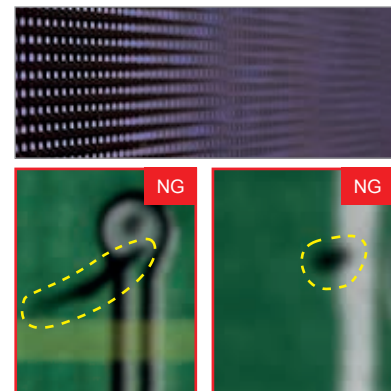
Display TFT surface inspection

Challenges

- Images of 'Open', 'Short', and 'Particle' defects in displays are ambiguous and subjective
- Defects that are hard to detect with the existing machine vision methods need to be re-inspected by human inspectors

SuaKIT Advantages

- Replaces all or some human inspection with the deep learning technology and reduces the workloads of the inspectors



SPECIFICATIONS

		Minimum supported specifications	Recommended specifications
Operating system		Windows 7 64bit / Windows 10 64bit / Windows 2012 R2 / Windows Server2016 * The 32-bit operating system is not supported Ubuntu 16.04 LTS (Runtime only)	
CPU		Intel® Core™ i5 or higher	Intel Core i7 or higher
RAM		16GB (more than 8 GB of free memory)	32GB or more
GPU	GTX	NVIDIA® GeForce® GTX 980 (more than 4 GB of free memory)	NVIDIA GeForce GTX 1080
	RTX	NVIDIA GeForce RTX 2070	NVIDIA GeForce RTX 2080 Ti
		* Requires updating NVIDIA Graphic Driver to the latest version	
Development environment		Visual studio 2010	Visual studio 2017
Resolution		Full HD (1920*1080) or above * Developer kit only	
Required storage capacity for installation		8 GB or more free space (SSD recommended)	
Media		Installation disc (USB) and digital download	
Security		Only available when a dongle key is plugged in	

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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