

Artificial
Intelligence
Applied to
AOI

Delvitech Company and Technology Presentation

03 April 2023

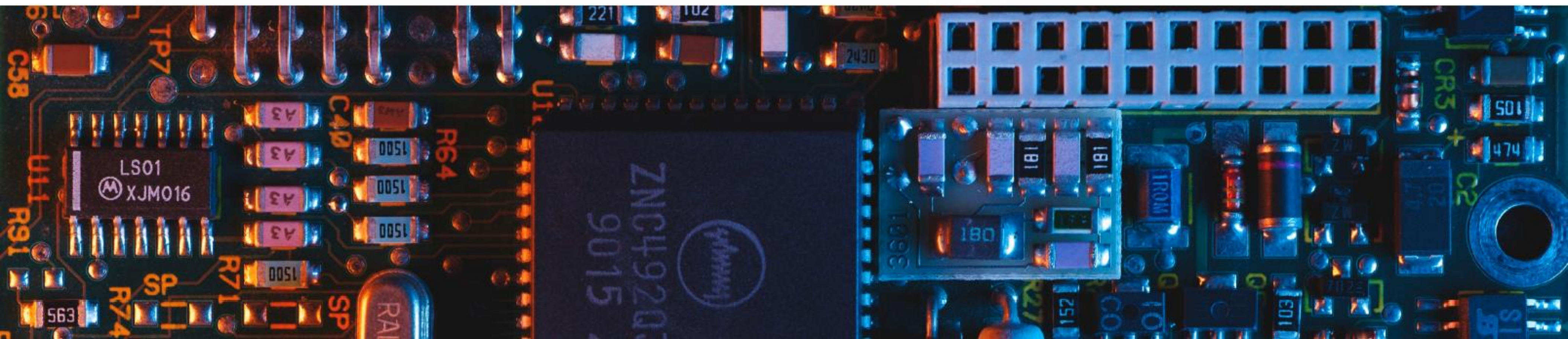
Octavian Ungureanu – EMEA Sales Manager



Delvitech **designs, manufactures** and **supplies** 3D automated optical inspection systems for Printed Circuit Board Assembly (PCBA) in both SMT and THT processes. **R&D** and **innovation** are at the heart of everything we do.

Our technology is based on agnostic **artificial intelligence** software to offer **self-programming** features and **outstanding inspection** capabilities according to IPC.

Thanks to our **global team** and **exclusive** partners, Delvitech aims to provide clients in diverse markets with **revolutionary** solutions based on AI that stand out in **quality** and **performance**.



Number of Global Employees





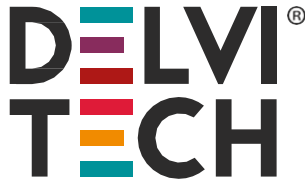
Delvitech has a widely global team and officially collaborates with SUPSI - Department of Innovative Technologies, Dalle Molle Institute for Artificial Intelligence USI-SUPSI (IDSIA).



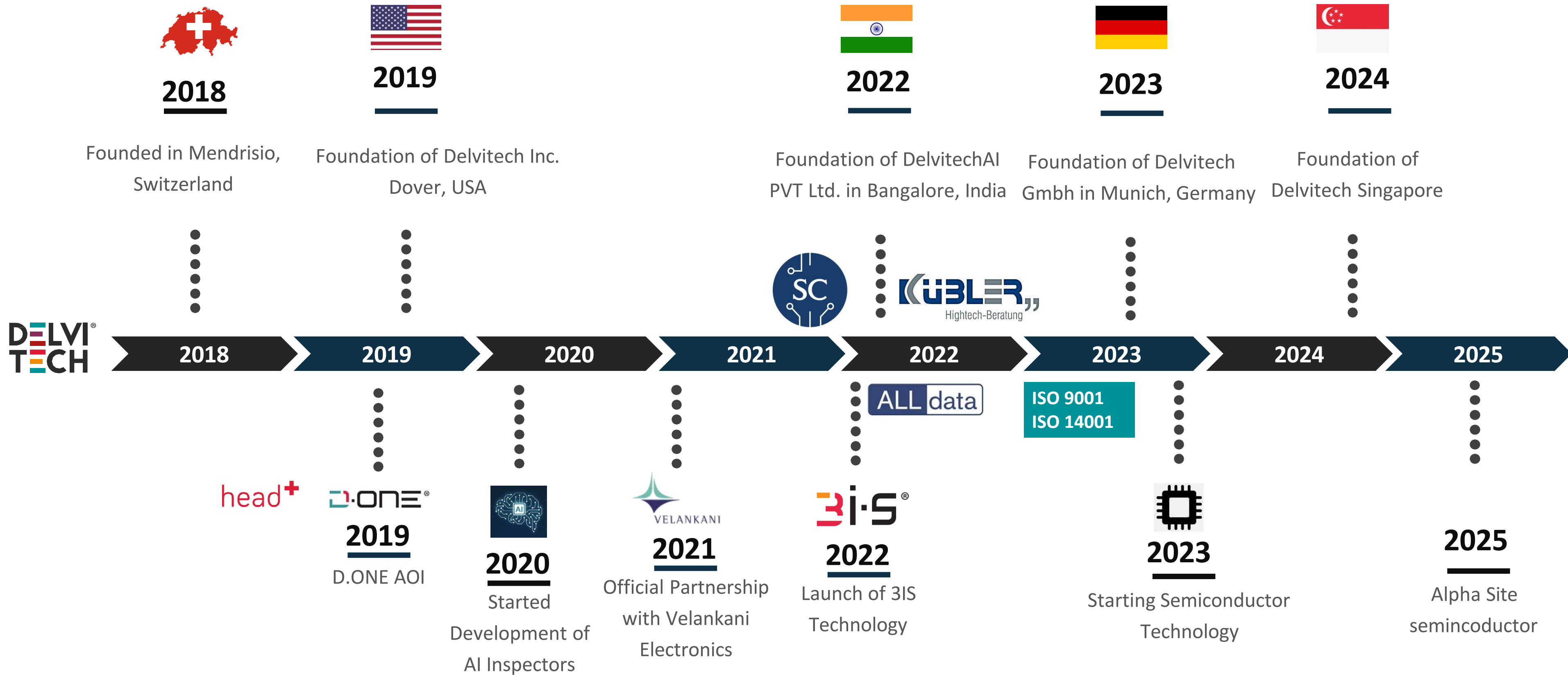
Scuola universitaria professionale
della Svizzera italiana

SUPSI

Hardware & Software Revolution



Company History and Business Plan



Delvitech

Our Sustainable Commitment

THE GREENEST
È PROPRIO ORA DI PIANTARLA!

With the aim to reduce CO2 emissions, Delvitech joined **THE GREENEST** initiative.

We support reforestation projects around the world and have planted:



1.000

TREES PLANTED

Positive impact of our actions:



30

TON OF CO2 ABATED
PER YEAR



35

CULTIVATORS
INVOLVED



250

WORKING
HOURS



Create a company
aqueduct



Engage employees
and consumers with
our online platform



Raises awareness of
responsible use of
water



Change your way of
drinking in the
company



We joined a **water-balancing** initiative launched by Wami.

Delvitech can balance its corporate water consumption and the impact of its products, by donating drinking water to many families in some of the countries with the greatest water needs.

OUR SOLUTION

3iS Ecosystem

Innovative Intelligent Inspection Solution

An AI-based
Solution for
Smart Production
& Quality Control



DELVI
TECH

Artificial Intelligence Applied to AOI

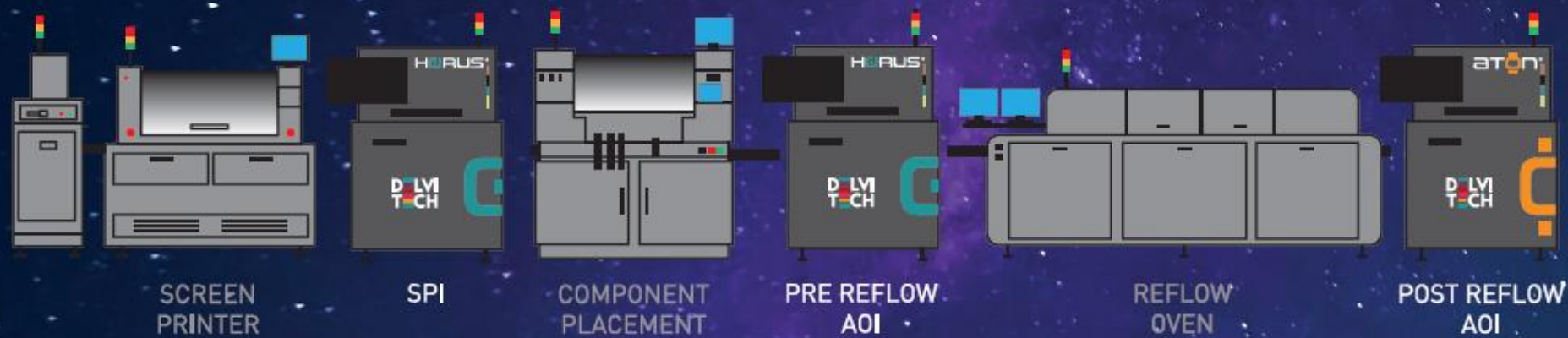
One technology,
one solution

Discover the new generation
of 3D AOI driven by AI

THT-LINE



SMT-LINE



Patented Optical Technology by **DELVI TECH**

Integrated FPGA
Polarization Technology
RGB 3D Projectors
Empowered by AI

AI Self-Programming

Pre-trained Neural Network Models
3D Package Library by IPC
AI-based Inspectors



Challenges

With the increased complexity of modern manufacturing, OEMs and manufacturers are facing challenges to be able to rapidly adapt to the short life-cycle of products and maintain a consistent level of high quality with currently available Automated Optical Inspection (AOI) machines.

Issue	Challenge	Common Solution	Delvitech AI
<p>Skilled Labor</p>	<p>AOI machines require highly skilled engineers to deliver intended performance.</p>	<p>Suppliers must provide extensive support for customers. Customer must invest large effort to train employees.</p>	<p>Pre-trained AI models for highly automated self-programming and inspection.</p>
<p>Improving Efficiency</p>	<p>Complex product portfolio creates challenges for manufacturers to rapidly change over to the new product.</p>	<p>AOI suppliers provide package library which must be controlled by the engineer for every product.</p>	<p>Shared library concept on the cloud to adapt to every new program created which can be used by any machine connected to the cloud.</p>
<p>Quality Control</p>	<p>Quality varies from batch to batch, production line to production line or one manufacturer to another.</p>	<p>Highly skilled quality personnel is required to invest time to define quality standard and control.</p>	<p>Cloud-based solution enables OEMs and EMS companies to have a consistent inspection quality with the AI-based inspectors.</p>
<p>Defect Predictivity</p>	<p>The process of optimizing the production can improve the defect rate but it lacks a systematic and effective approach.</p>	<p>AOI machines are capable to detect defects that already occurred, and customers must analyze the data manually to understand the cause.</p>	<p>Delvitech AI model will allow defects on the production to be predicted before it occurs. This prevents unnecessary repairs and waste to be produced.</p>

Aton & Horus

Moving Conveyor

Flexible Product Handling

120mm PCB Height

Post-Reflow & Through-Hole

Easy Maintenance

Highly Precise Linear Motor



Moving Optical Head

Single Track & Dual Track

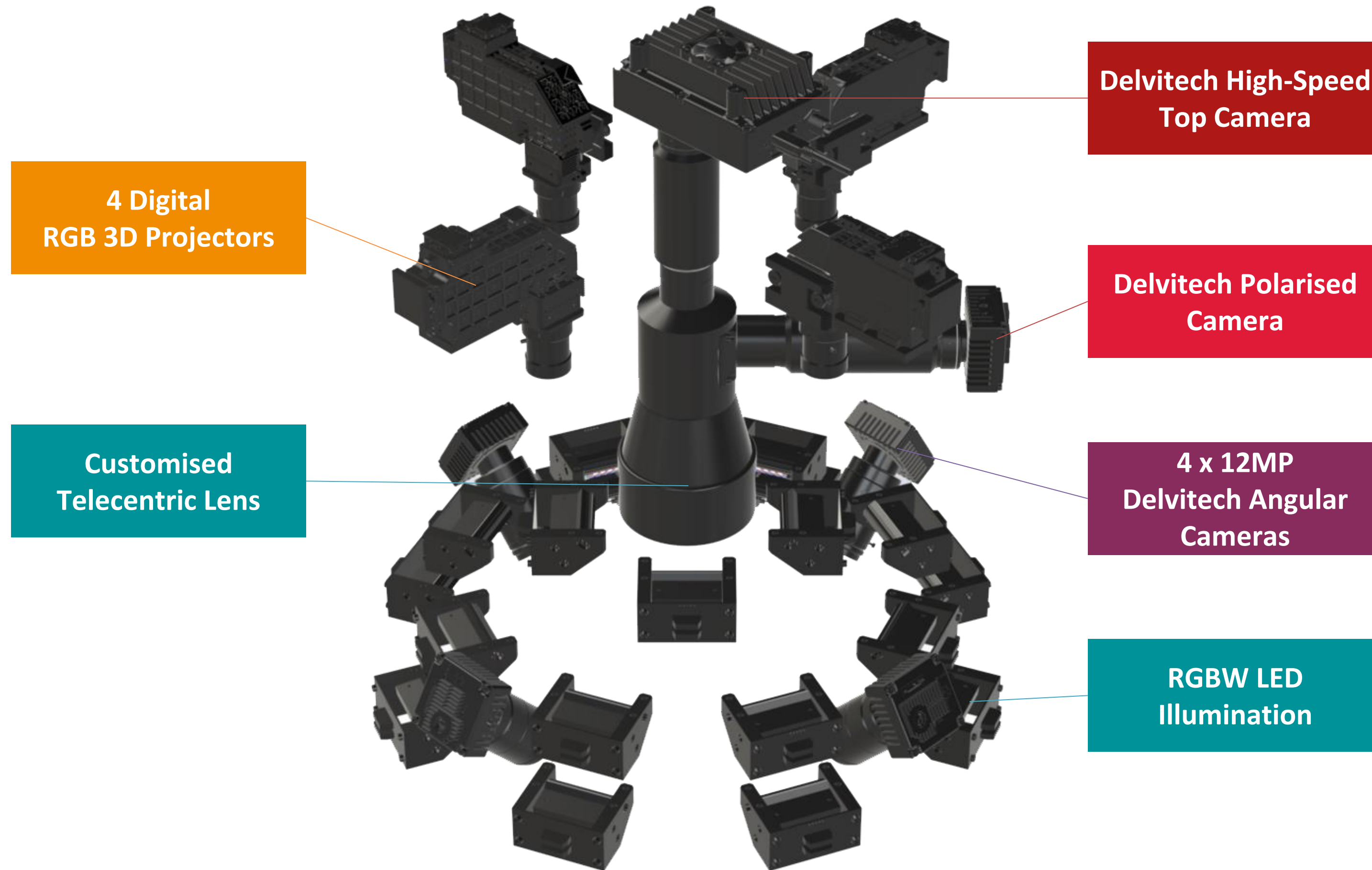
50mm PCB Height

Solder Paste & Pre-Reflow

Easy Maintenance

Highly Precise Linear Motor

3IS Optical Technology



Software Features and Benefits



Manages Large Orders Easily

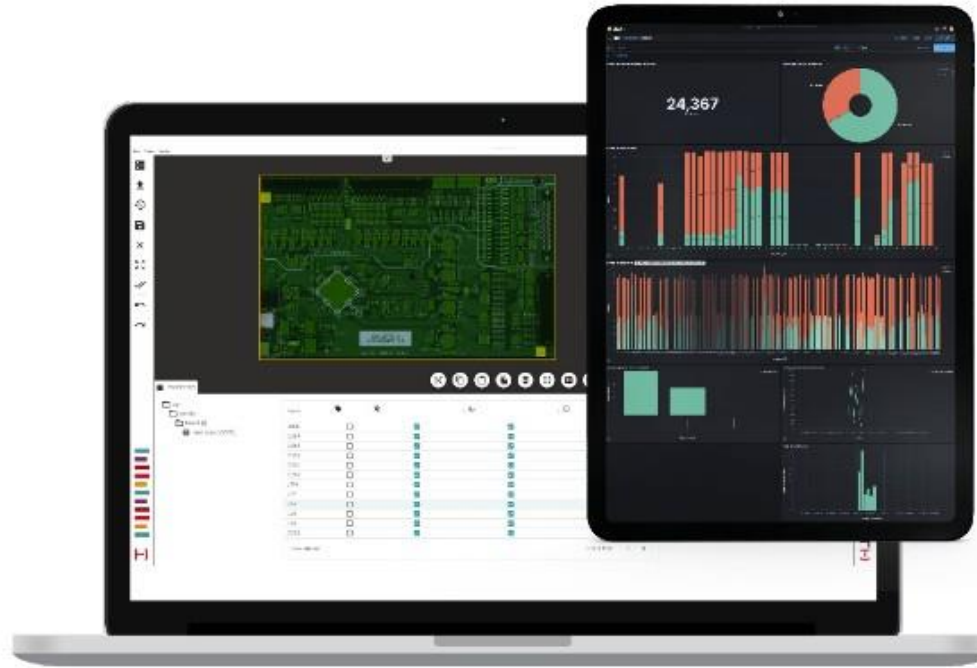
WEB BASED

USED ON MULTIPLE DEVICES



Efficient Production Scaling

CLOUD SYSTEM



USER FRIENDLY



High Customization

API PROTOCOL

FEEDBACK OF THE STATUS - 4.0 INDUSTRY



Shared Package Library

MICRO-SERVICE ARCHITECTURE



Up to Date Technology

ONE PLATFORM FOR ALL MACHINES

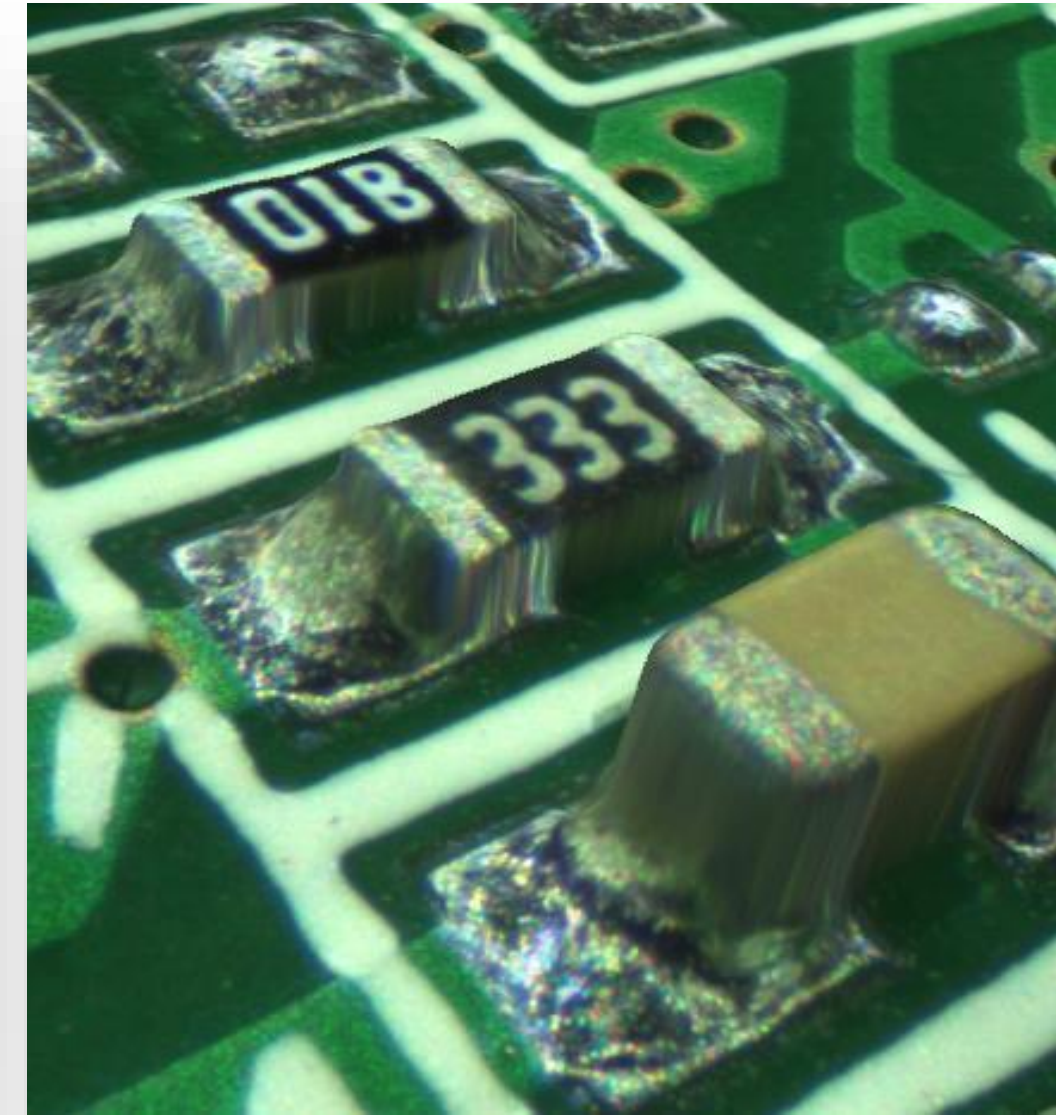
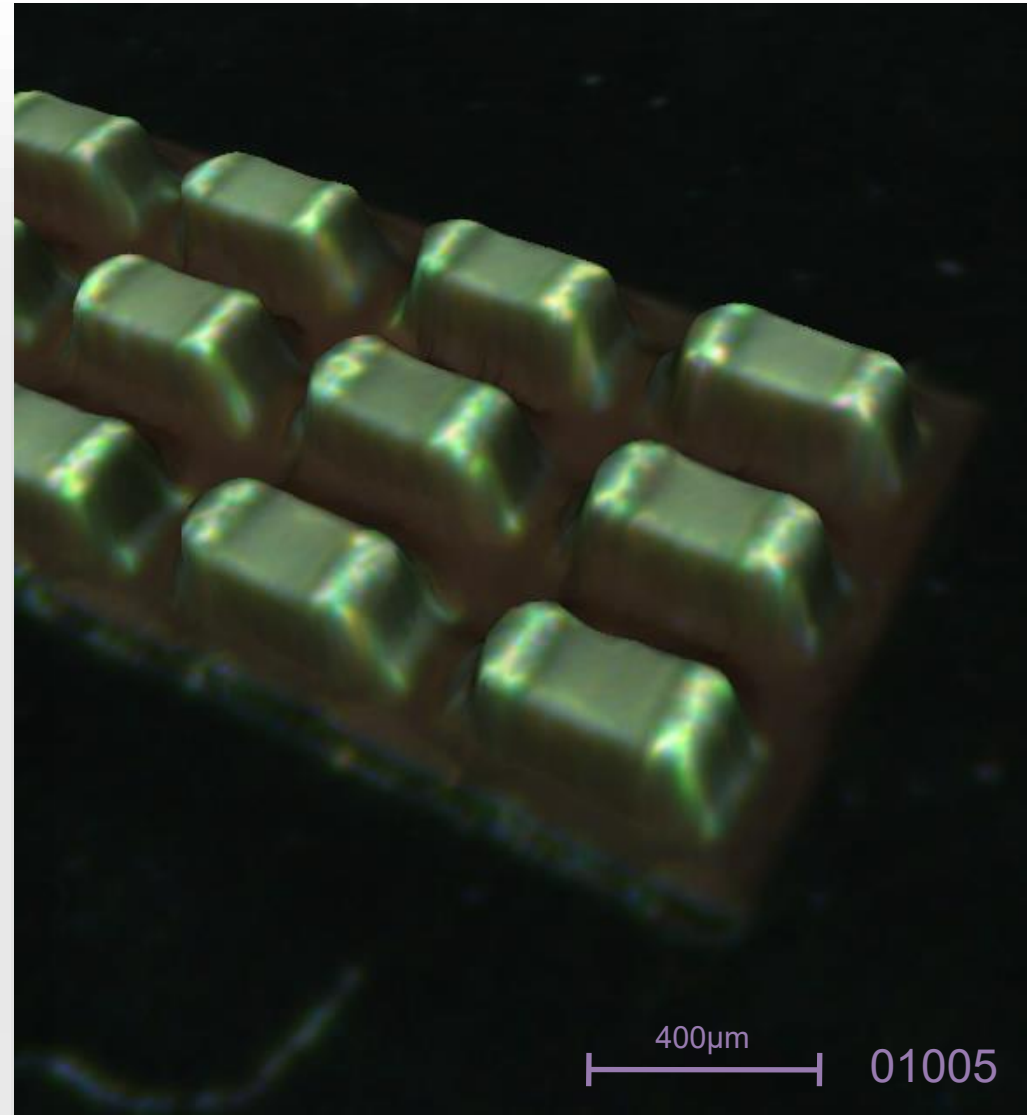
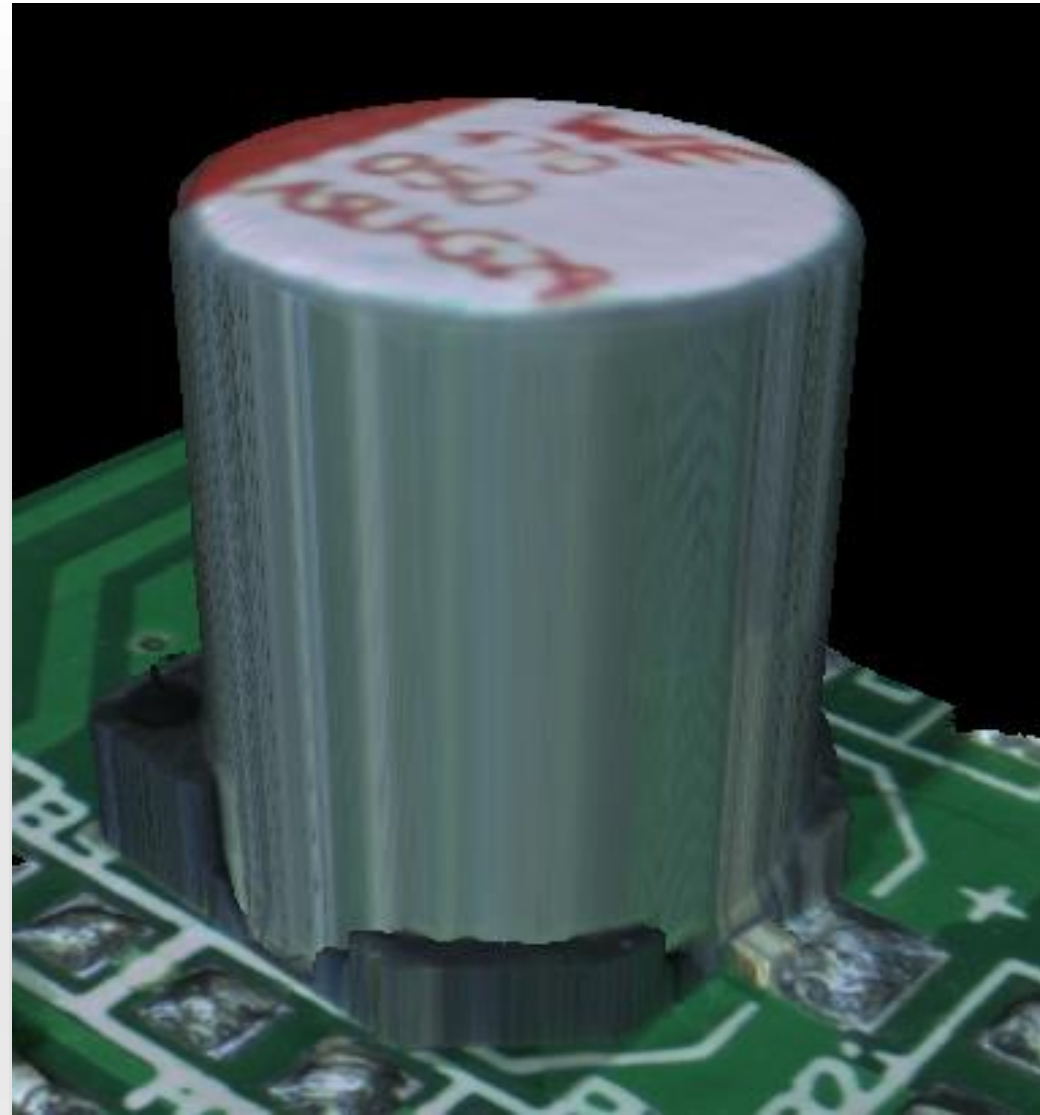
SUITABLE FOR ALL AOI SECTOR



Problem Solving Skills

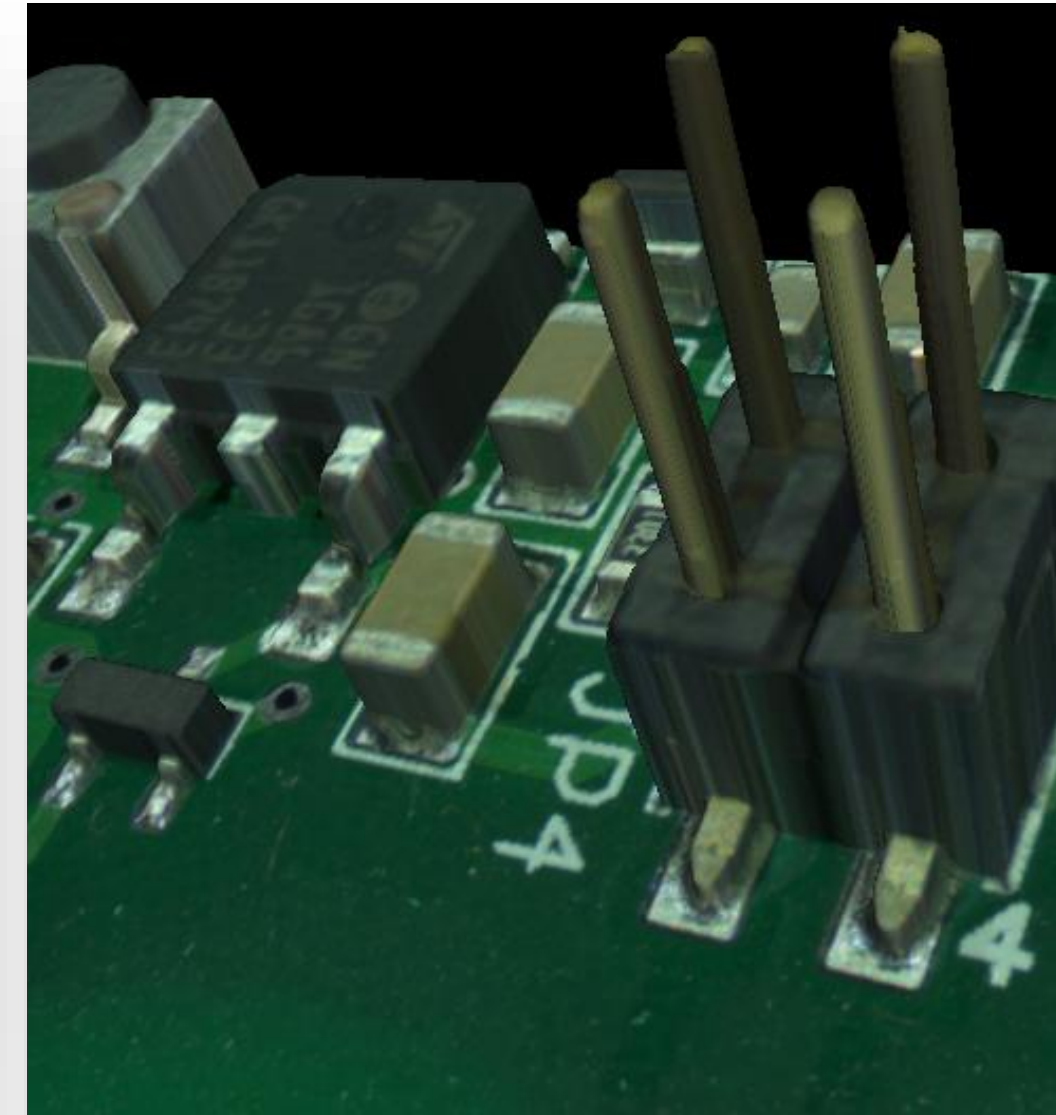
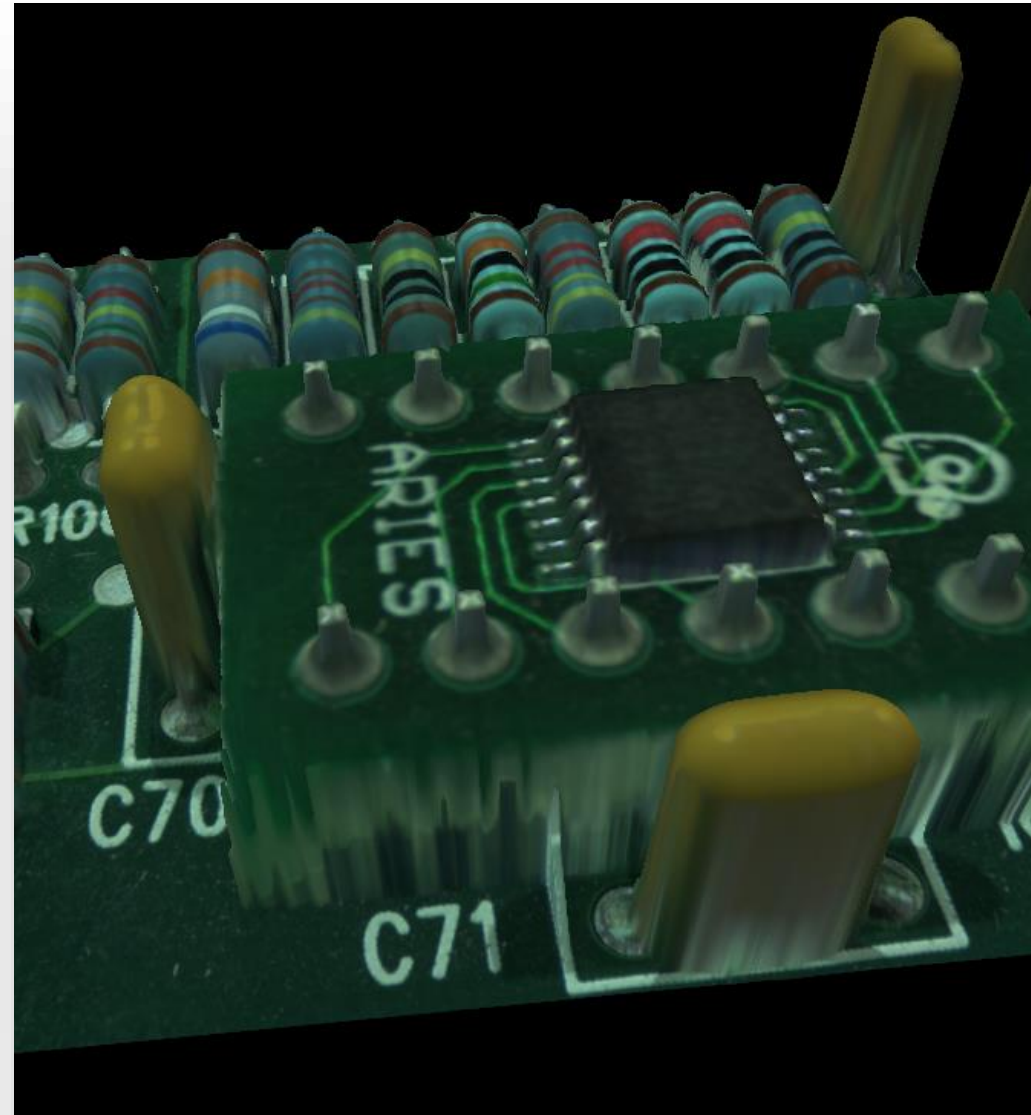
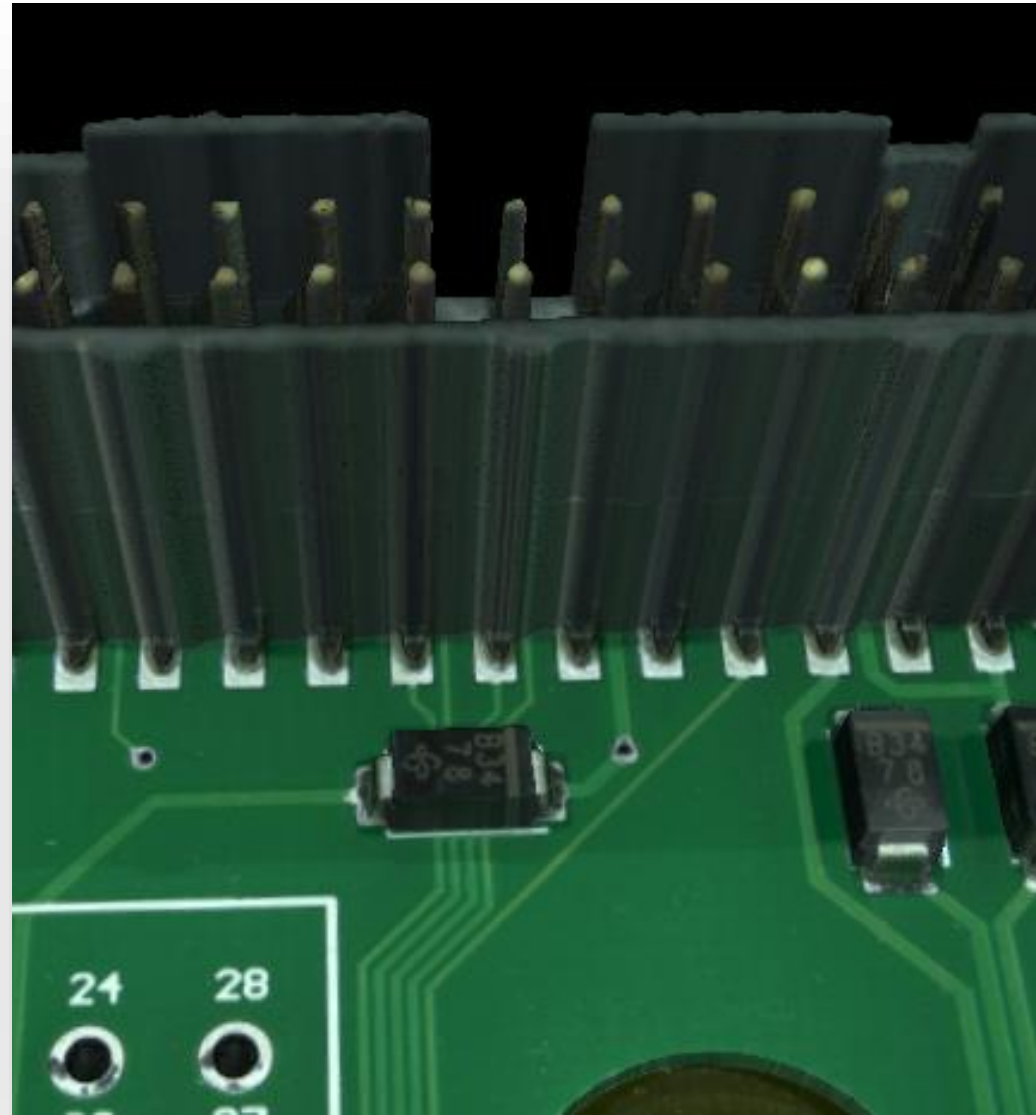


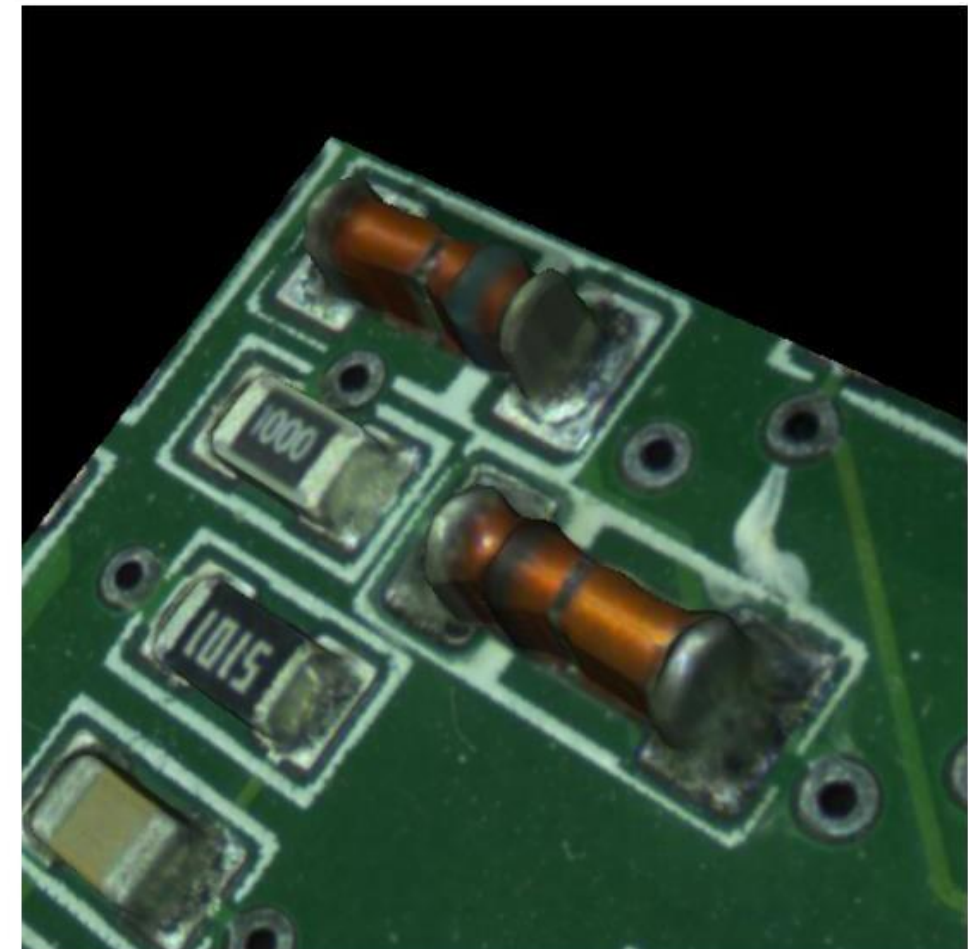
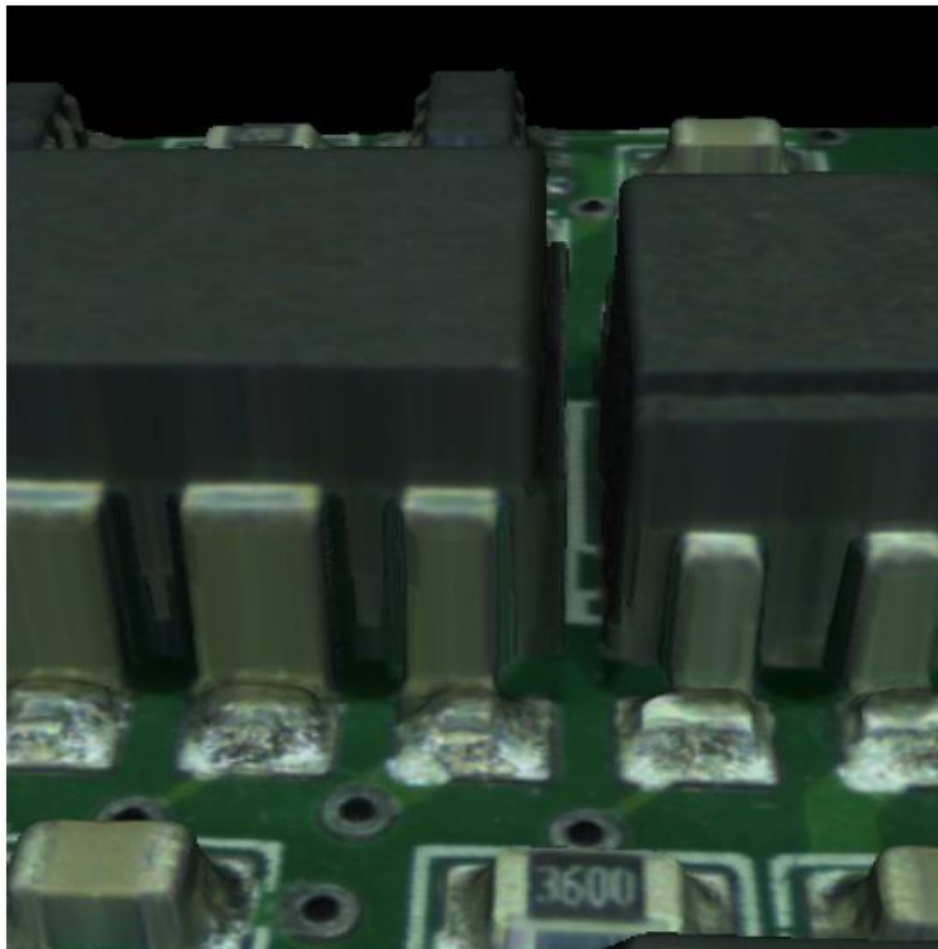
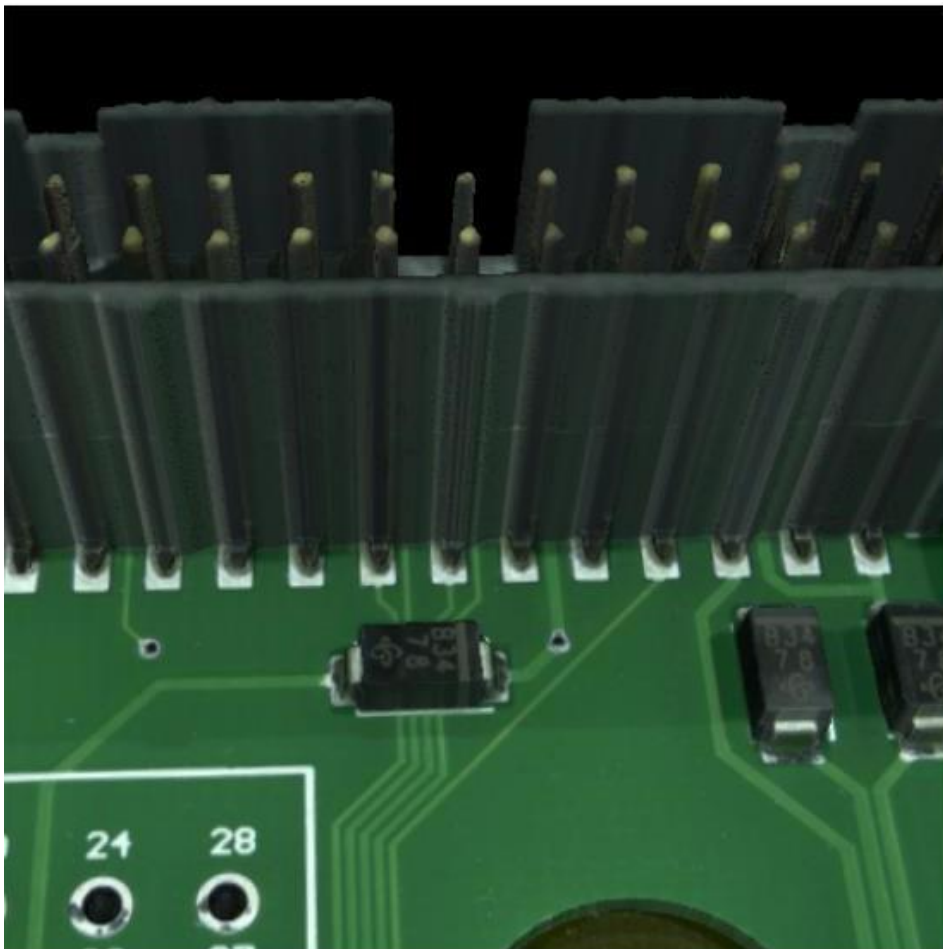
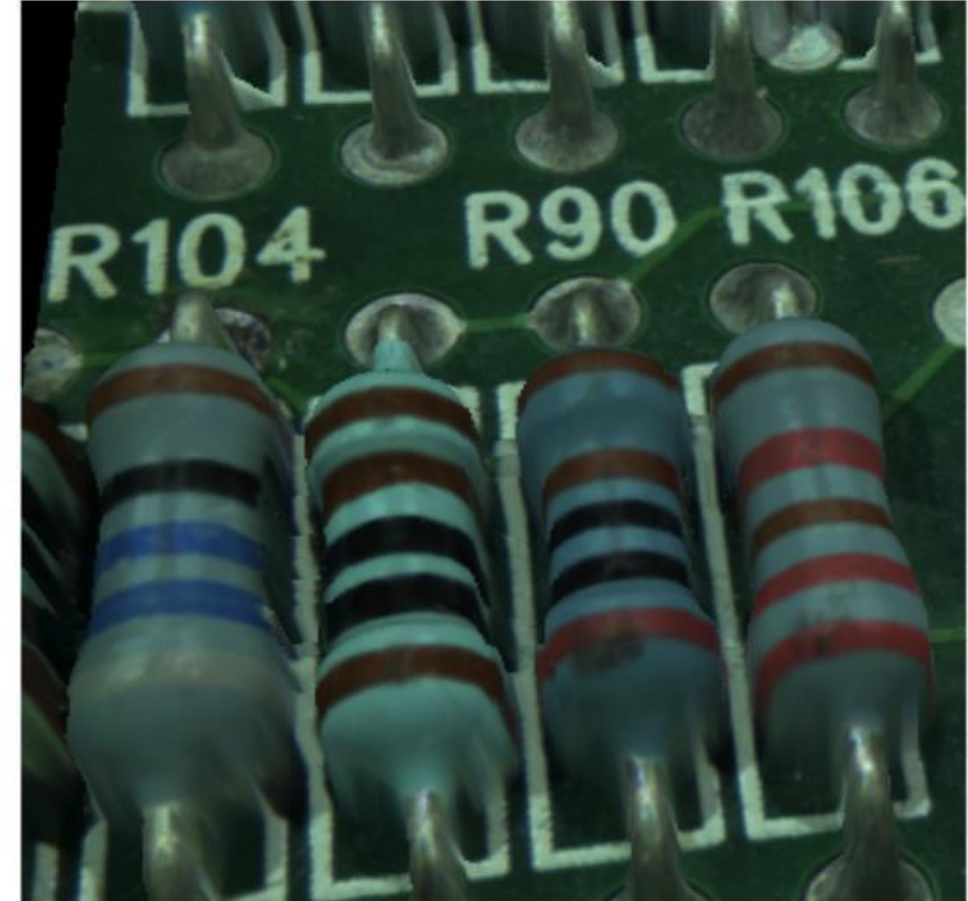
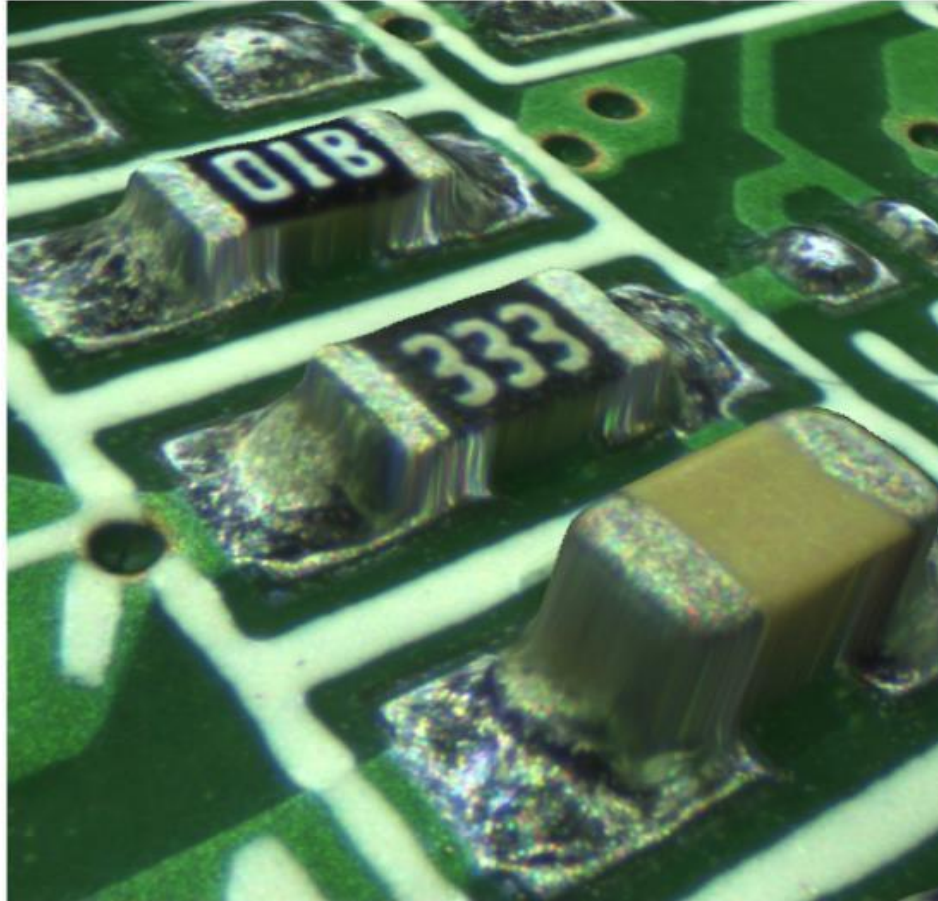
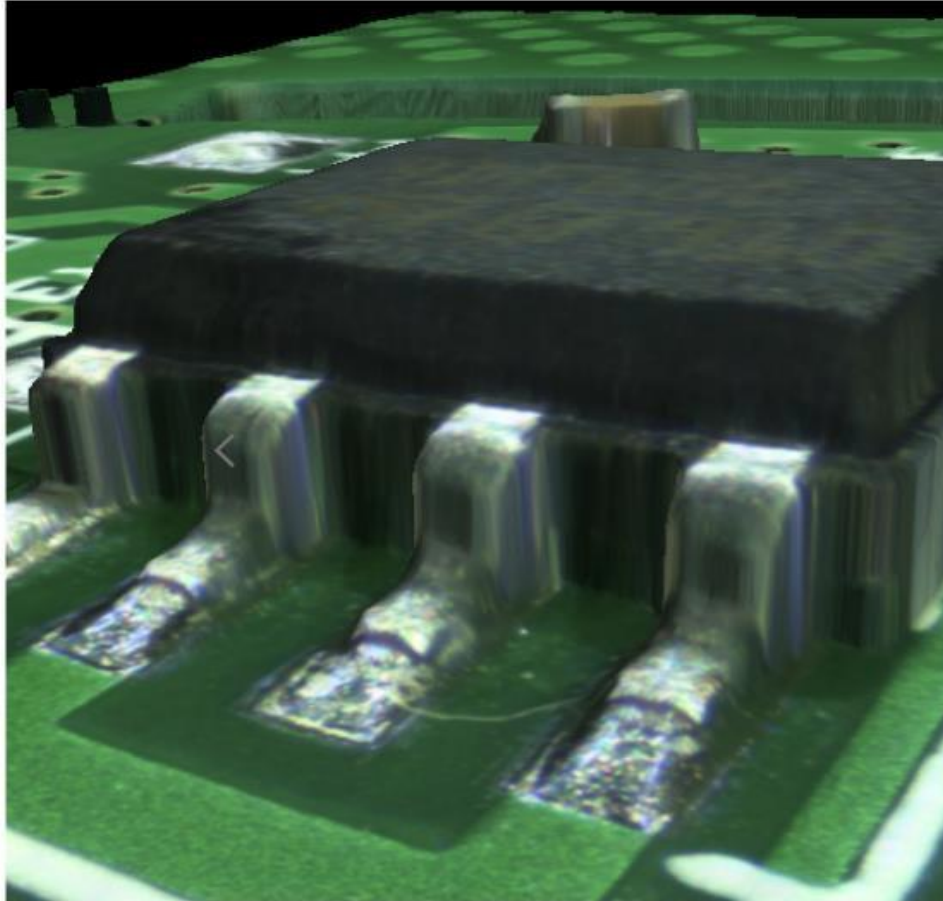
Examples of 3D Images

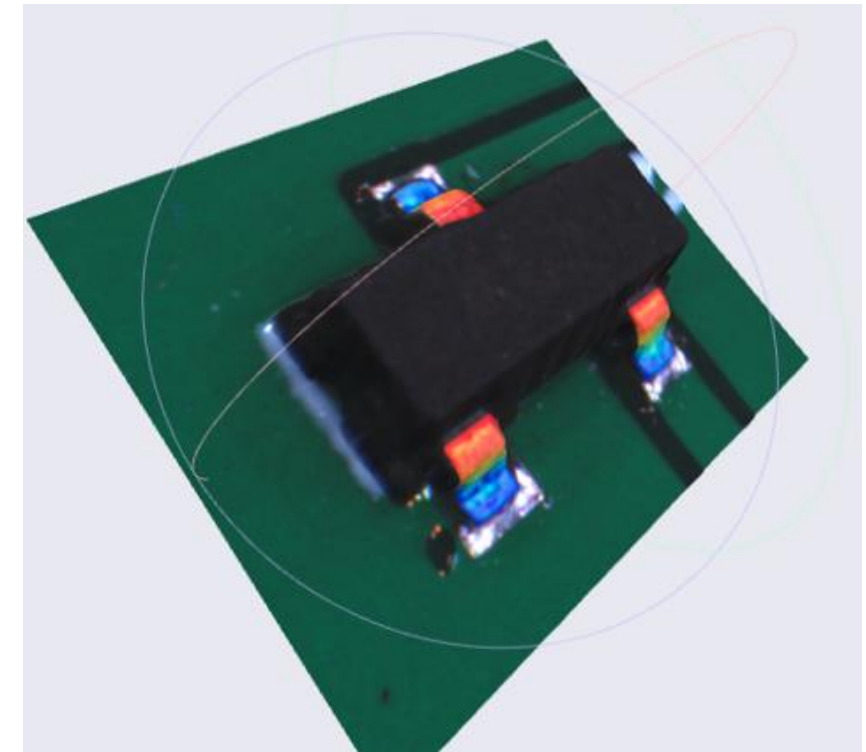
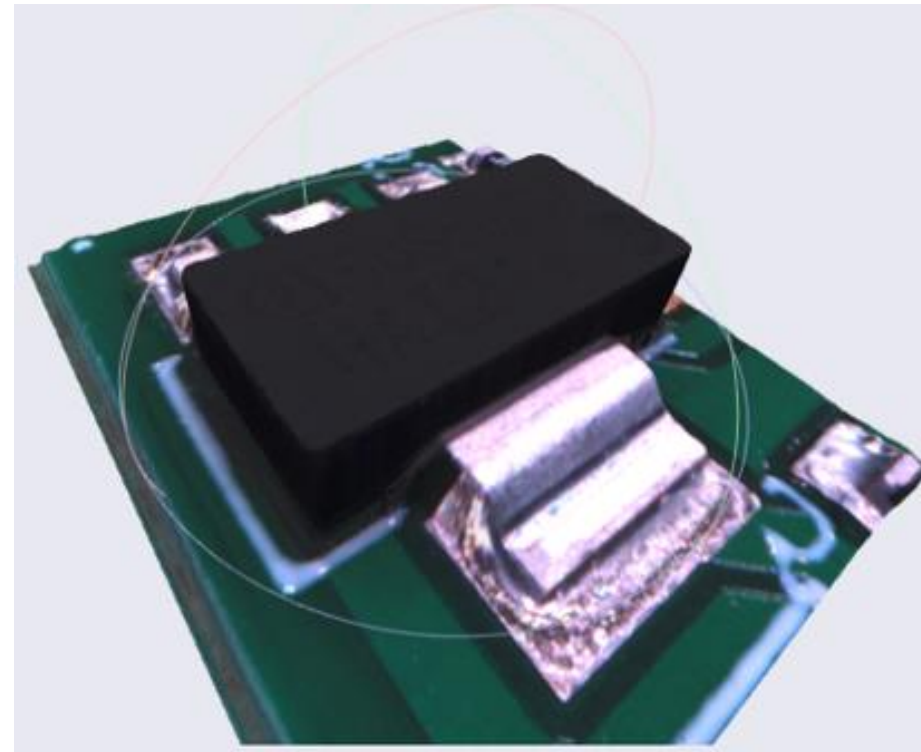
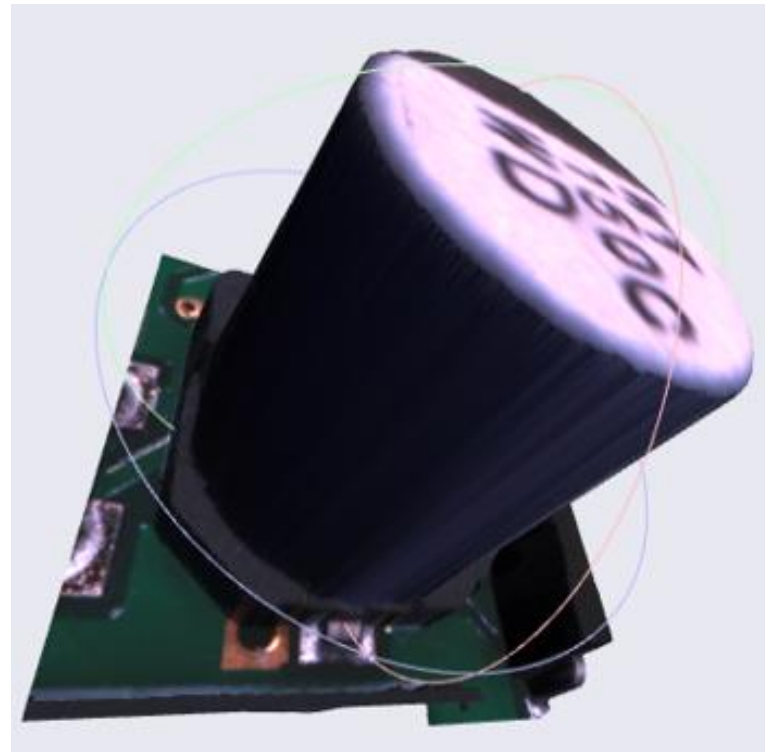
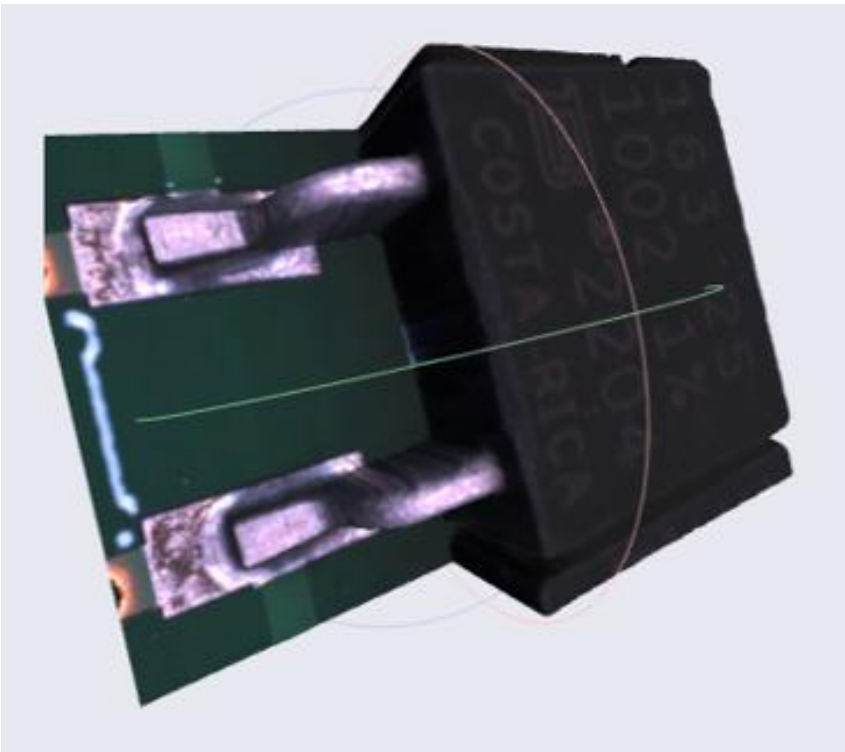
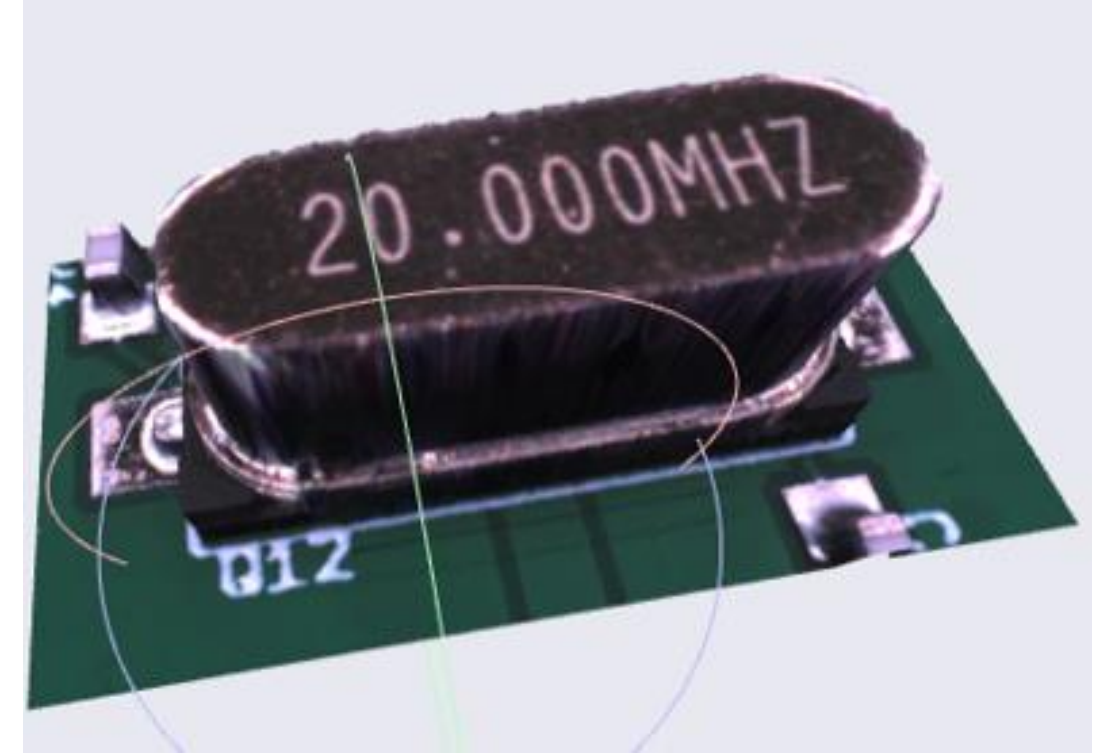
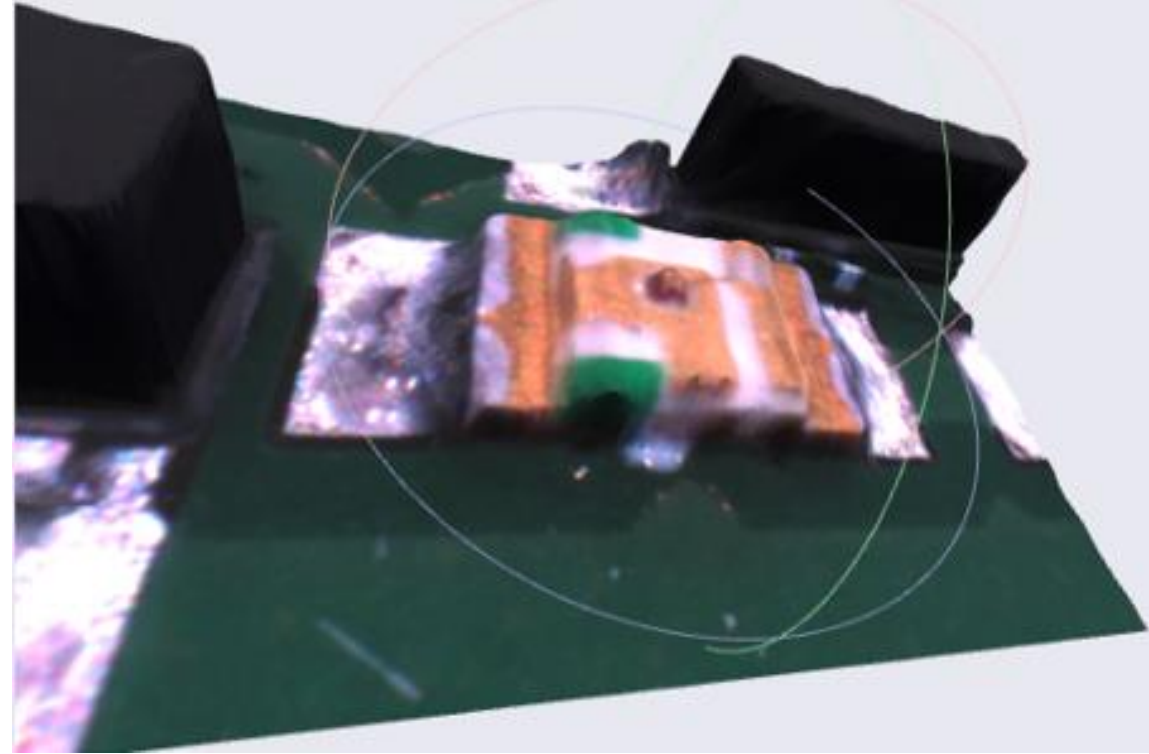
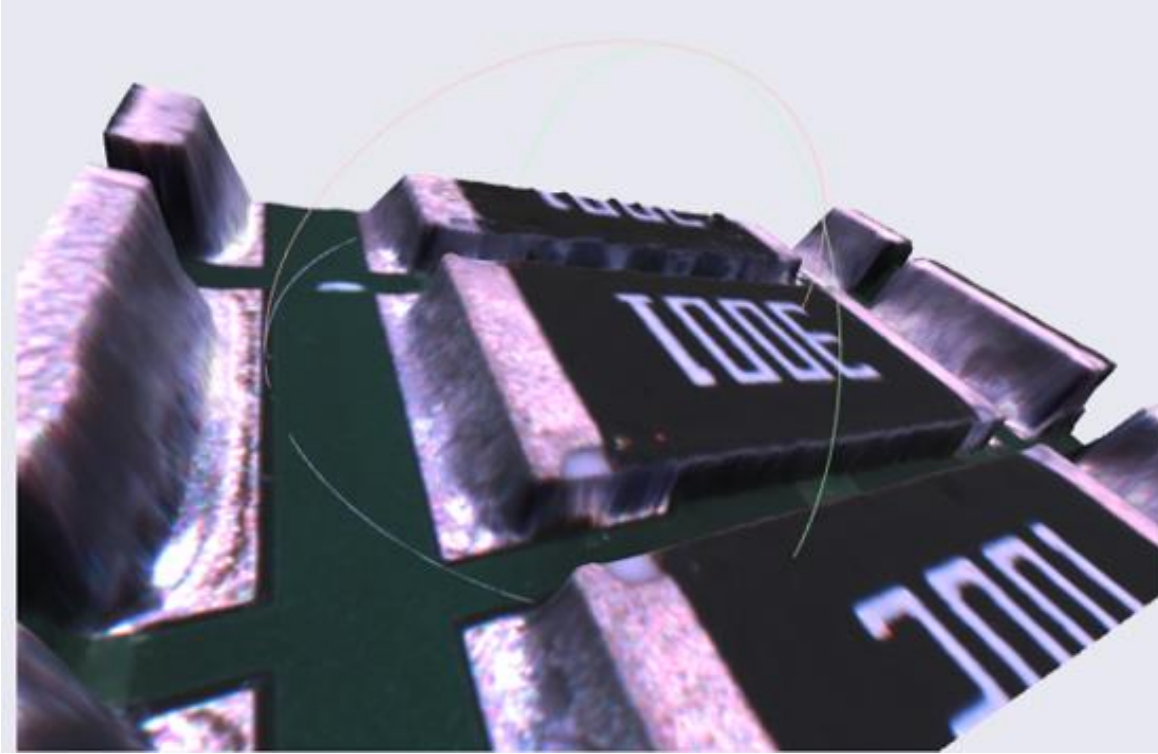




Examples of 3D Images









How is AI helpful for AOI?

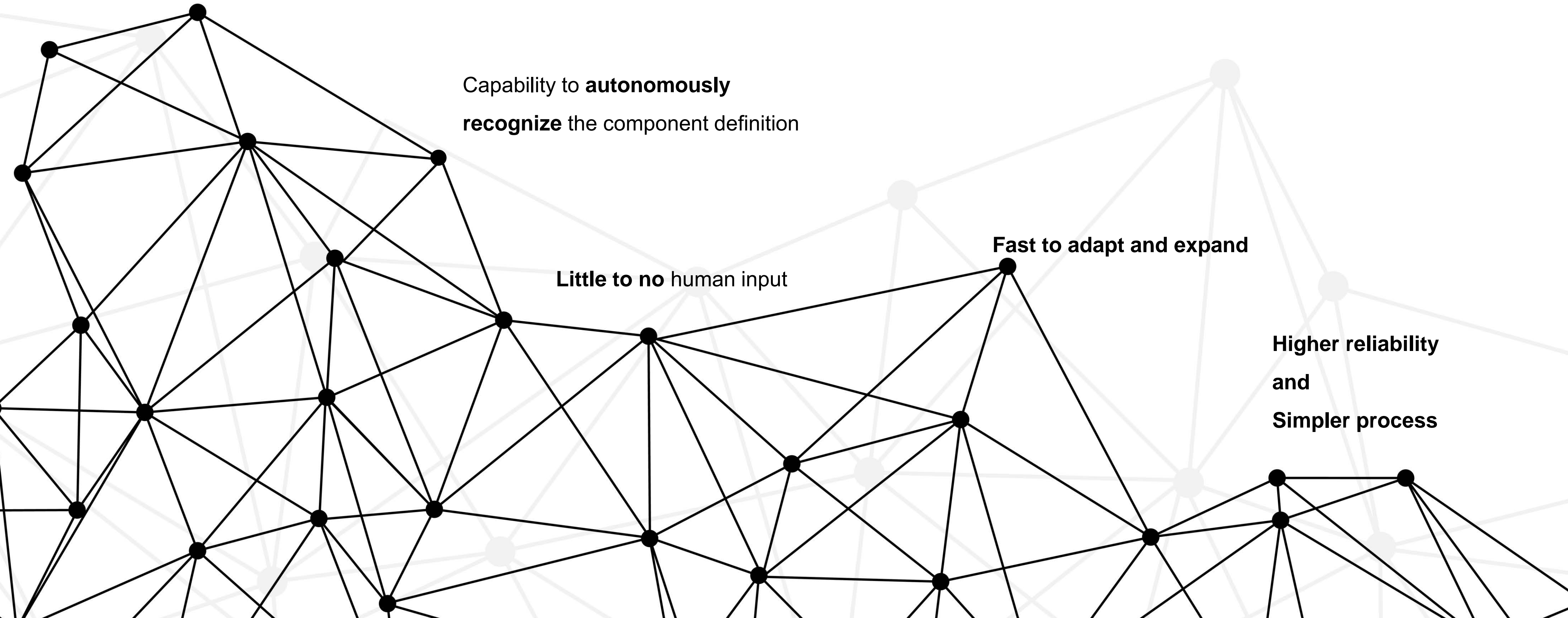
Neural Network Models

Capability to **autonomously recognize** the component definition

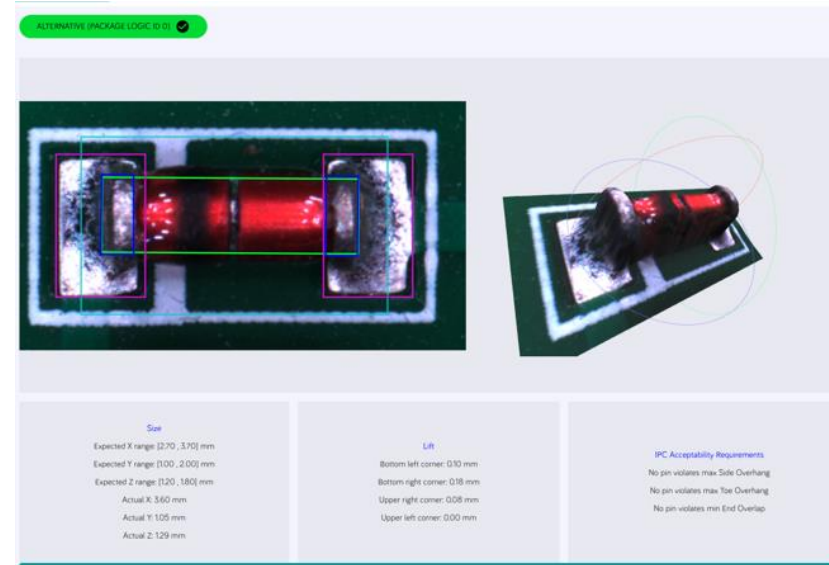
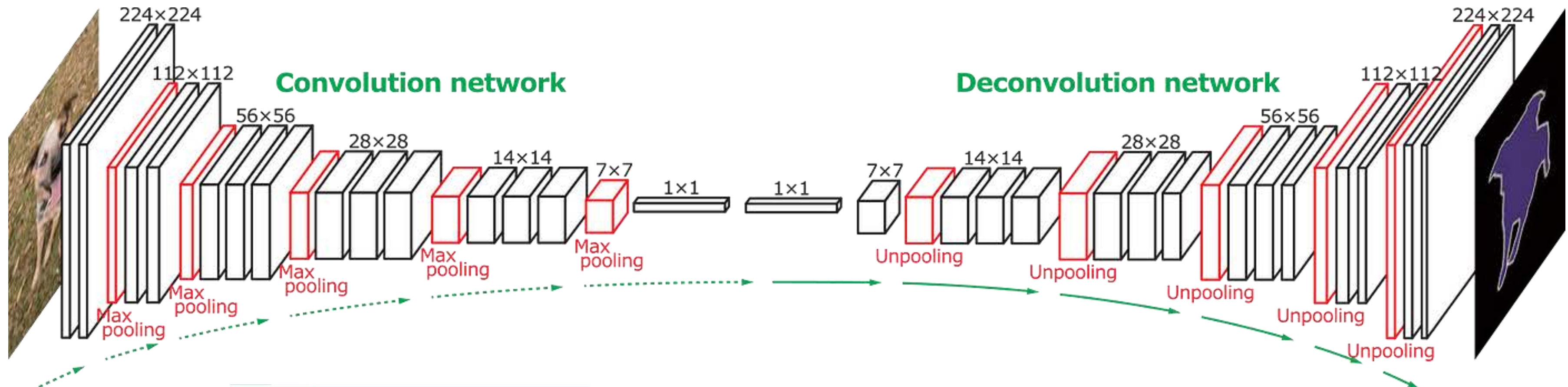
Little to no human input

Fast to adapt and expand

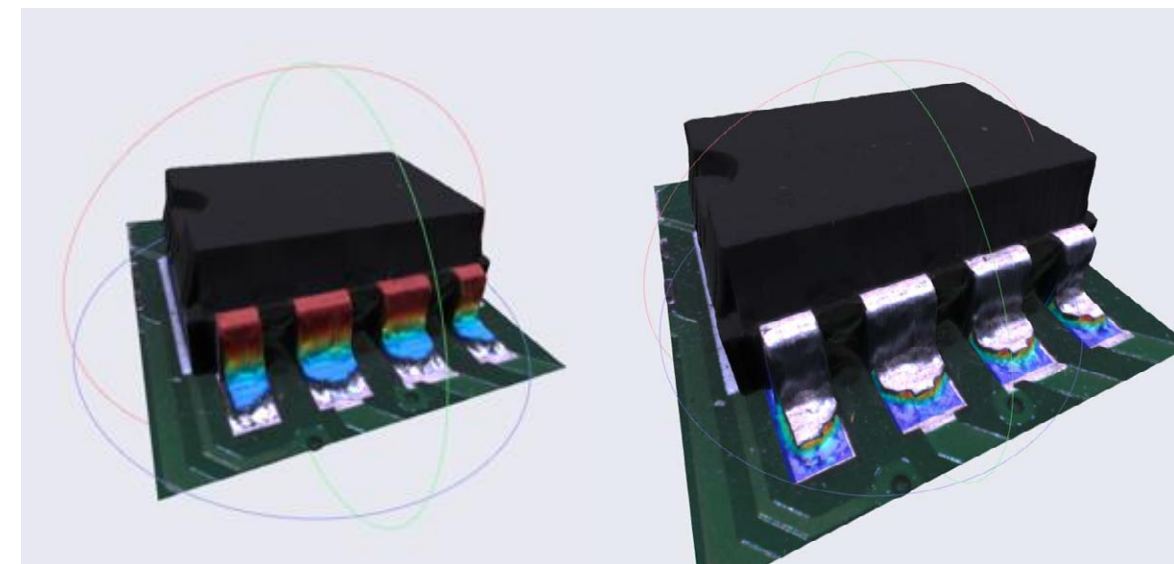
Higher reliability and simpler process



Delvitech Neural Networks – Convolutional Network

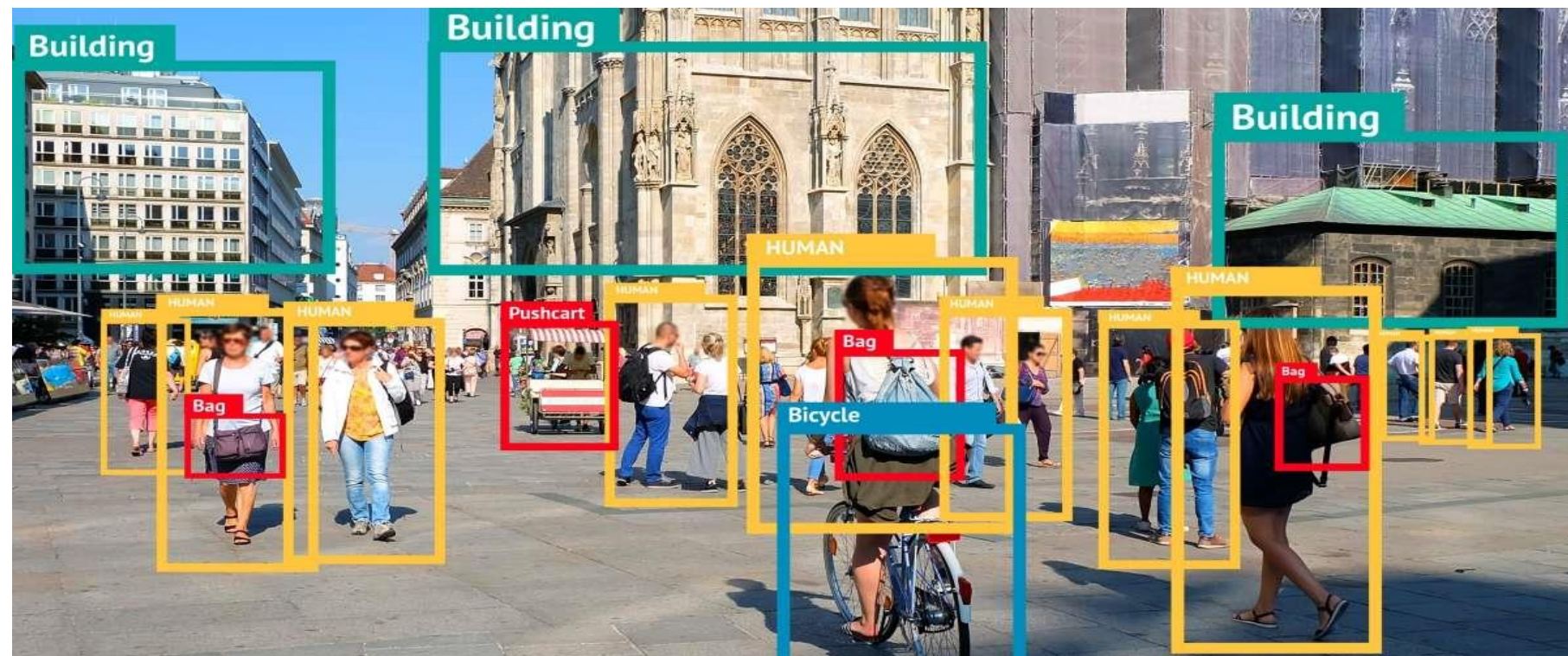


Location Inspector

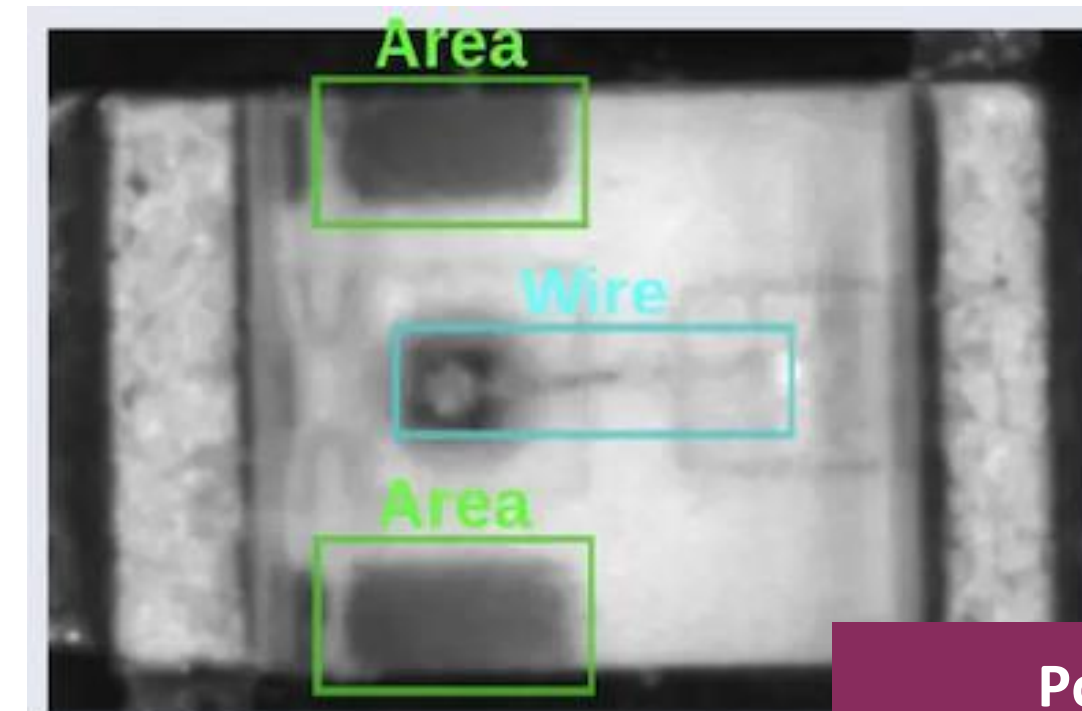


Pin Inspector

Delvitech Neural Networks – Object Detector and Recognisor



OCR



Polarity

AI 1: Easy and fast programming with Delvitech Neith



The screenshot displays the Delvitech Neith web-based software interface for AI-based inspection. It is divided into several main sections:

- Top Left:** A 2D view of a PCB with a component highlighted. A 'View Modes' panel on the right shows settings for 'camera' (CAMERA_TOP), 'ring layer' (RING_LAYER_1), 'ring color' (RING_COLOR_RGB), and 'direction' (DIRECTION_MULTI). There are also 'Lights' and 'Projector' buttons and an 'Enable auto capture' checkbox.
- Top Right:** A teal header bar with 'DAIE Component ref des: U1', 'Online mode' and 'Daie Alignment' toggle switches, and a 'Save Single Component In Recipe' button.
- Middle:** A list of inspection parameters: 'location3d.nn', 'bridge.3d', 'pin.coplanarity.3d', 'pin.lifted.3d', 'sj.3d', and 'ocr.nn'. Below this is a green button for 'ALTERNATIVE (PACKAGE LOGIC ID 1181)'.
- Bottom Left:** A 'Recipe info' section for 'AOI_NET_5V' and a table of components.
- Bottom Center:** Two 3D views of a component. The left view shows the component on the PCB, and the right view shows a 3D model of the component with a color-coded inspection overlay.
- Bottom Right:** A 'COMMONS PARAMETERS' panel with settings for 'Tolerance mode' (TOLERANCE_CUSTOM_PERCENTAGE), 'Solder volume threshold' (15,250), 'Minimum fillet height threshold [% of pin height]' (50), and 'Minimum fillet width threshold [% of pin width]' (50).

Ref D...	Cad Package	Part Num.																		
C291	CAPC0603	100nF_1																		
C292	CAPC0603	100nF_1																		
C293	CAPC0603	100nF_1																		
C294	CAPC0603	100nF_1																		
C295	CAPC0603	100nF_1																		
C296	CAPC0603	100nF_1																		
C297	CAPC0603	100nF_1																		
C298	CAPC0603	100nF_1																		
C299	CAPC0603	100nF_1																		
C3	CAPC0603	100nF_1																		
C30	CAPC0603	220nF																		

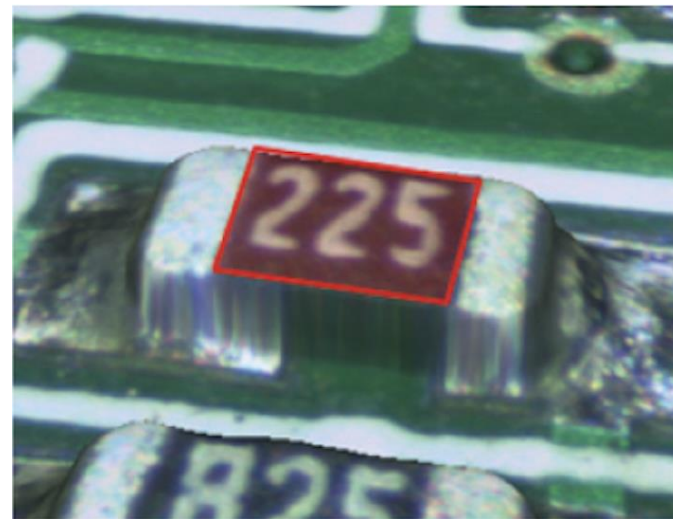
Delvitech Neith web-based SW provides a clean and easy to program user interface with AI-based inspectors

AI 2: Implementation of Trainable AI Neural Network Model

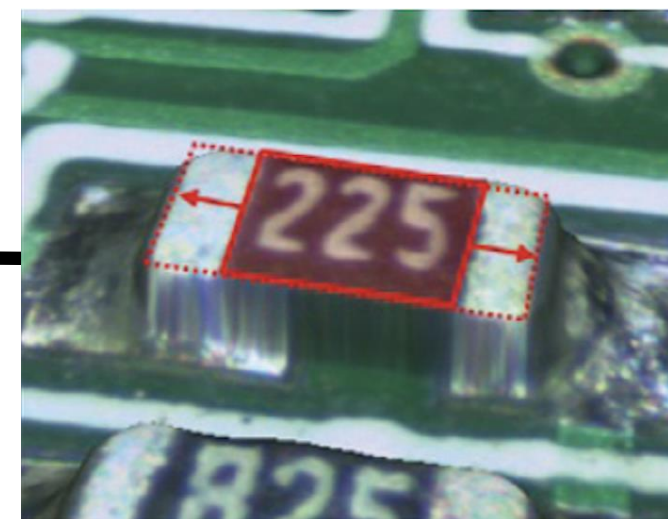
Training Manager

Training manager allows the user to train the Neural Network directly on the machine.

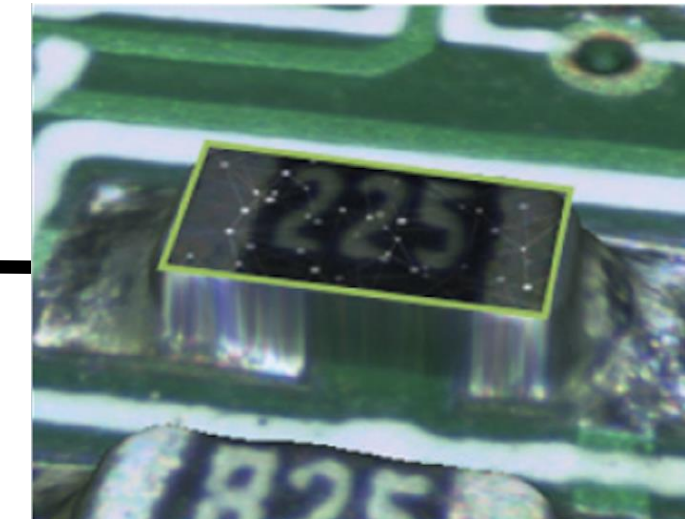
An example of training the NN Model:



- Label -



- Train -



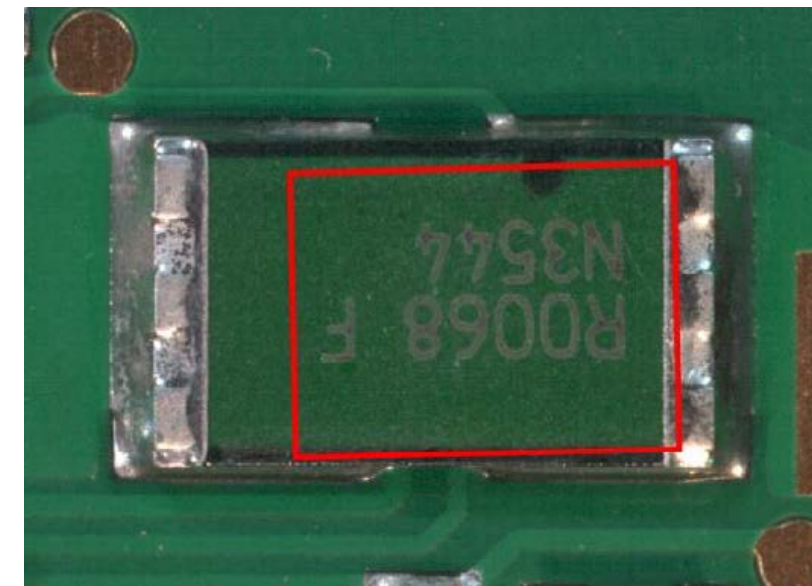
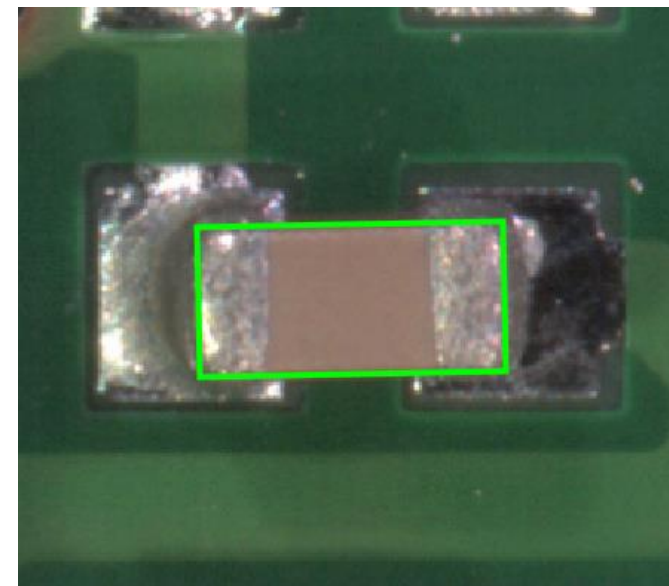
In this case, the NN model fails to look for a component.

The user defines the area around the component body.

The final output: the NN Model has learned to locate the component correctly.

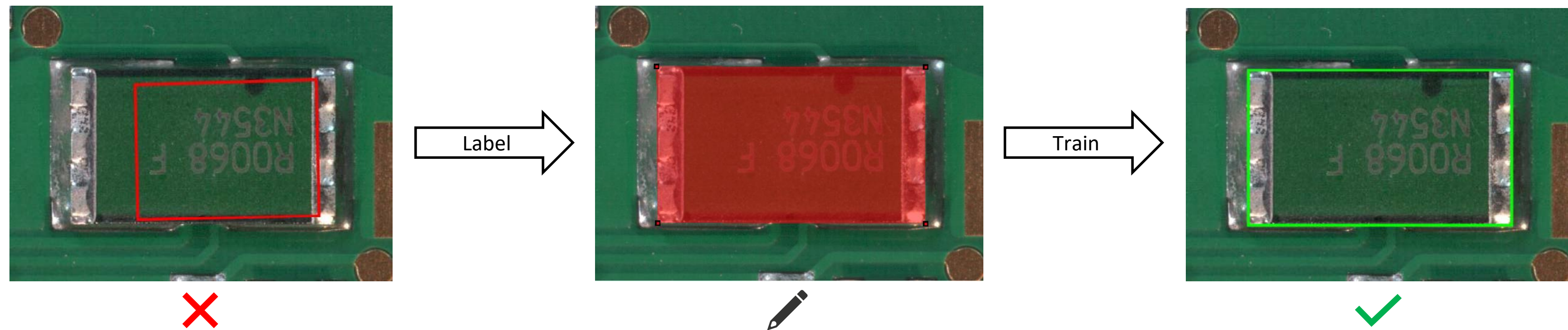
AI 2: Implementation of Trainable AI Neural Network Model

- Neural Networks are a powerful tool, but sometimes they can fail, especially when they are used with data they have never seen



- **Training Manager** allows the user to train the Neural Network directly on the machine.
- It's possible to achieve impressive results on new data, preserving the performance on the old ones.

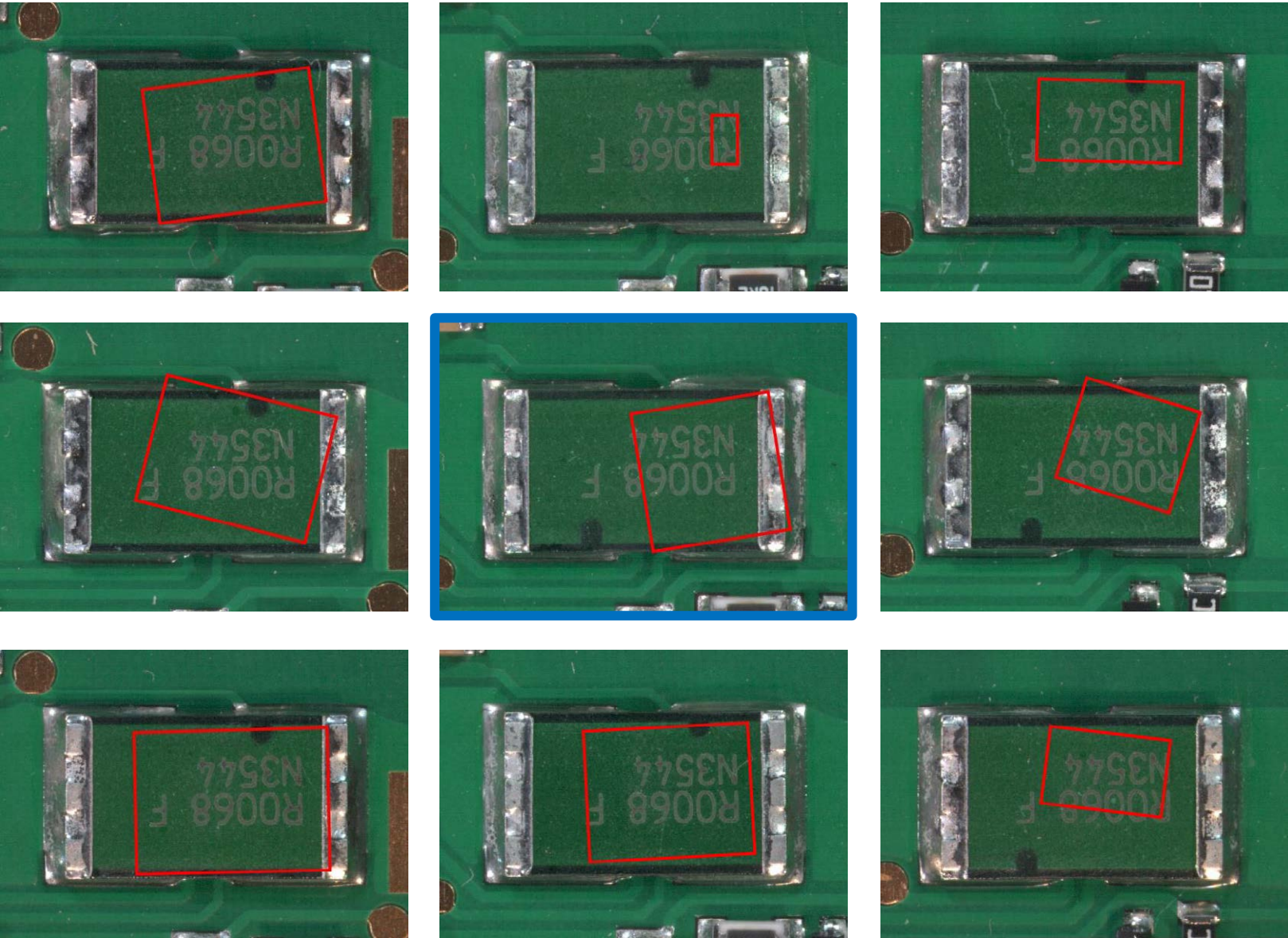
AI 2: Implementation of Trainable AI Neural Network Model



AI 2: Implementation of Trainable AI Model

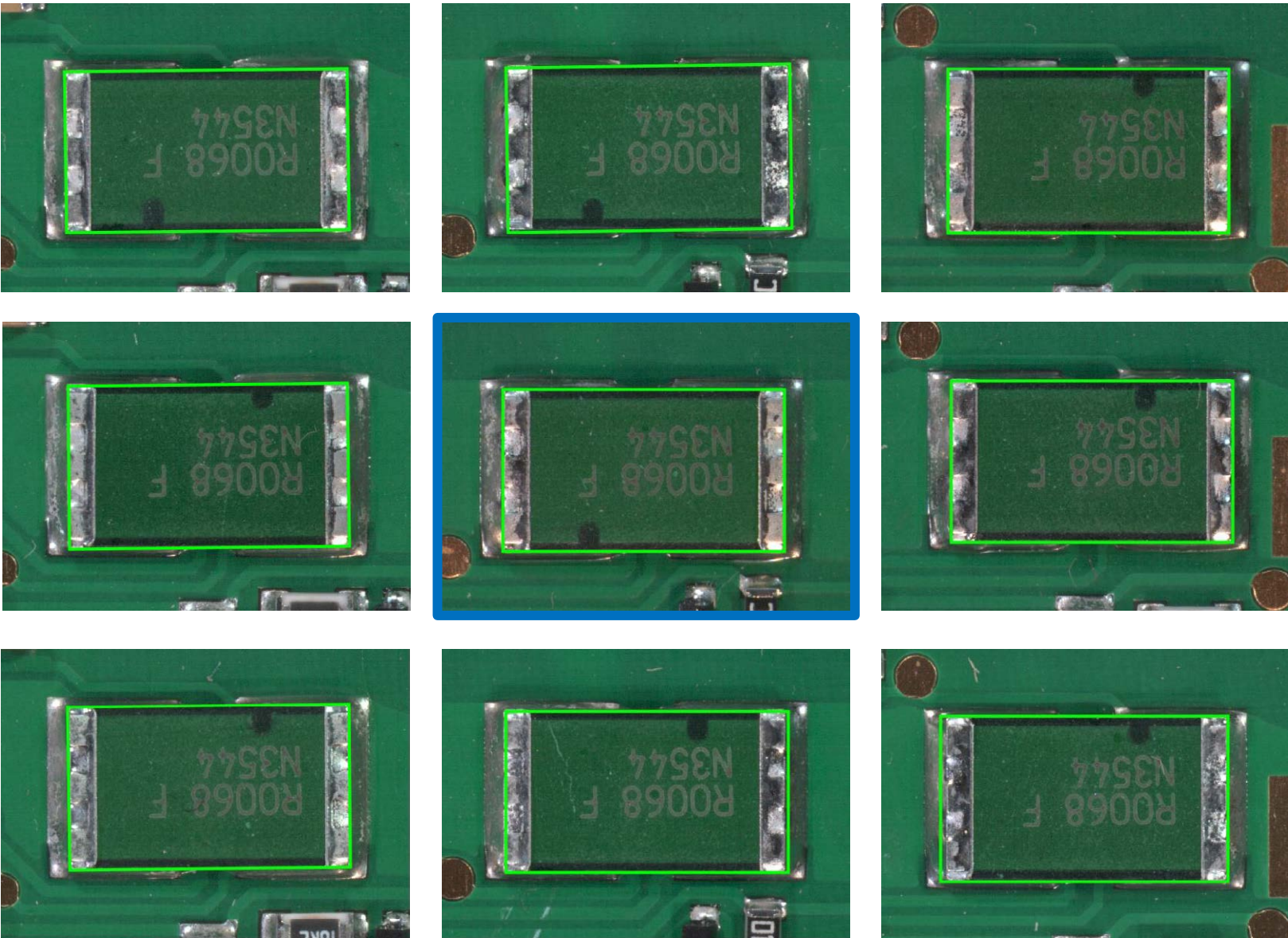
Learning without Forgetting

BEFORE



Location accuracy: 81.2%

AFTER

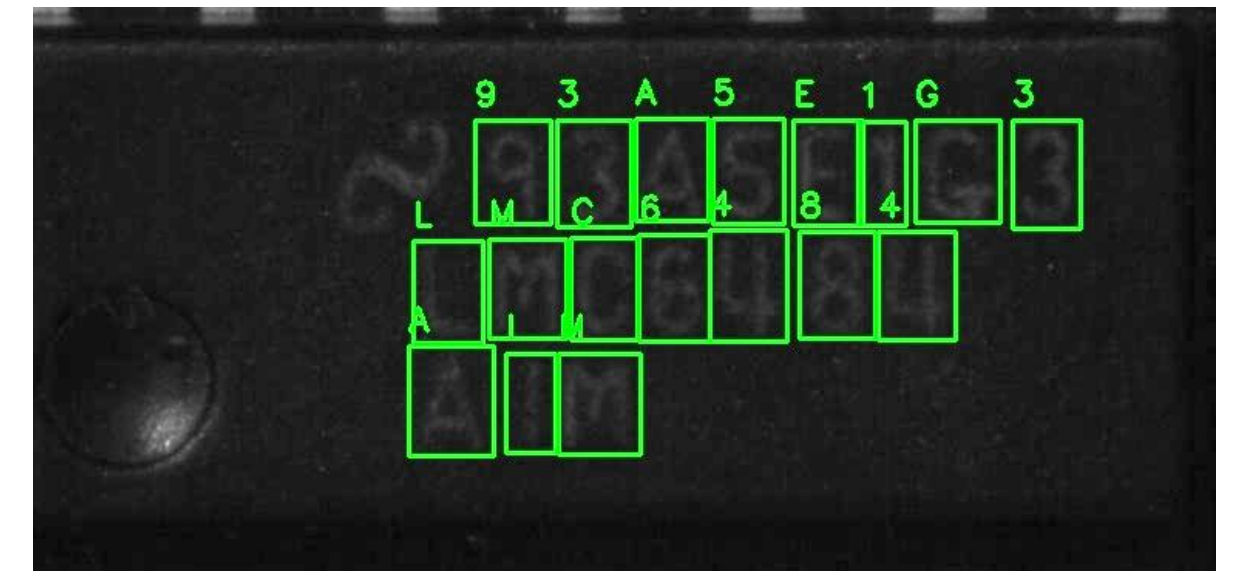
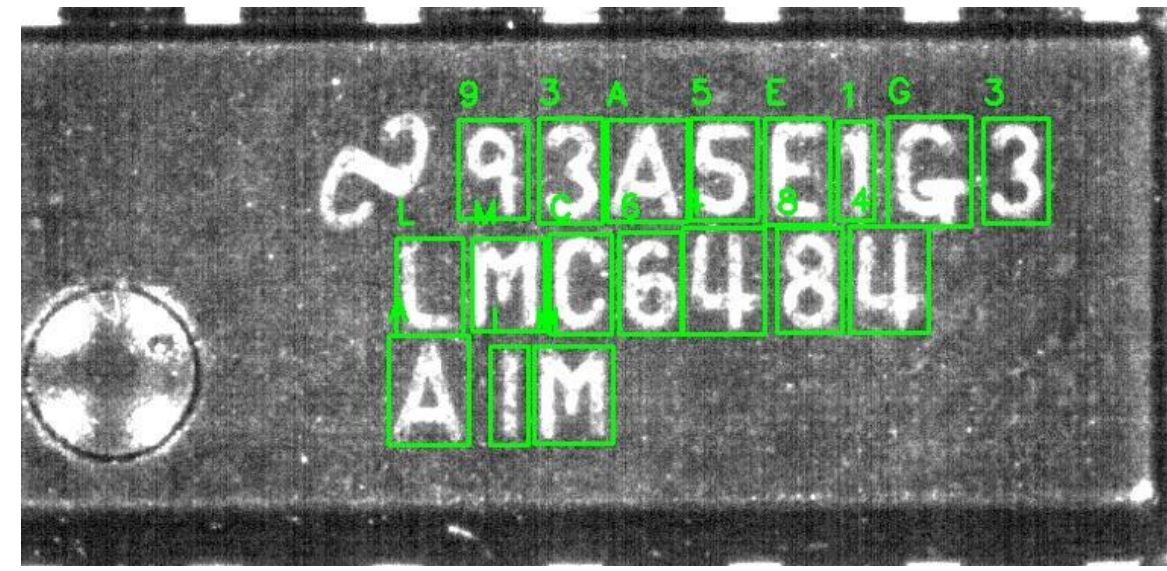
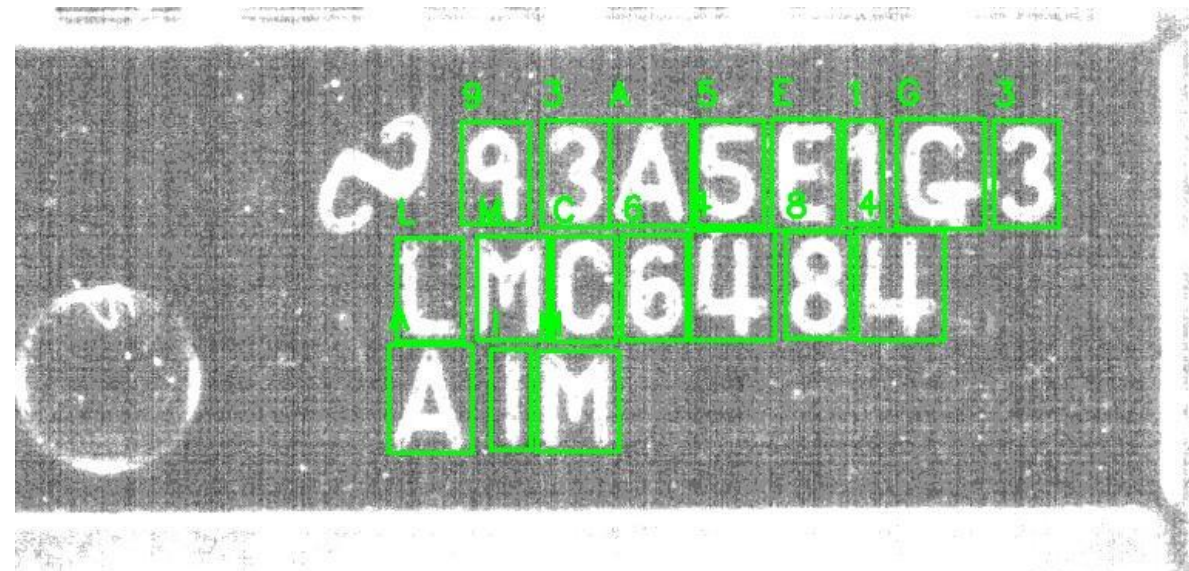


Location accuracy: 99.7%

AI 3: Extensible & Robust Optical Character Recognition (OCR)

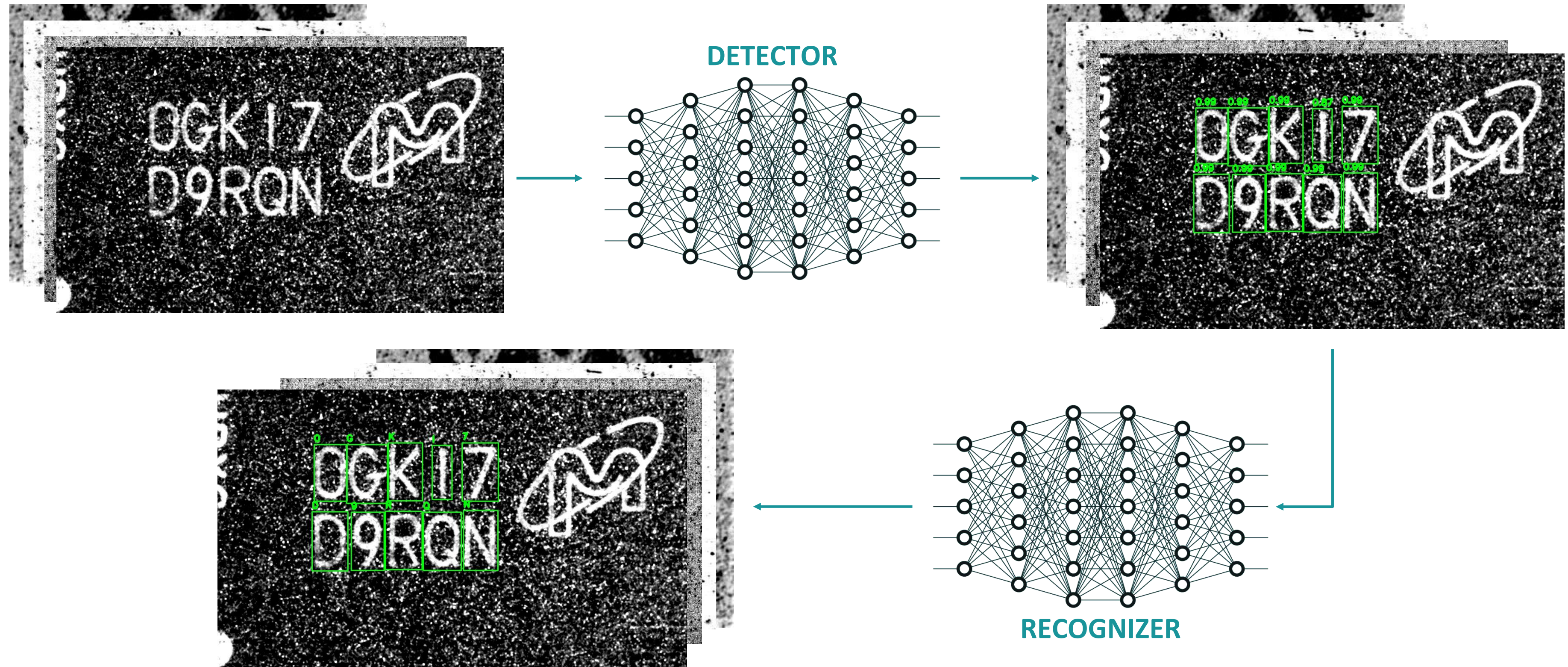
Two-step parallelized Recognition

- Advanced system composed by two deep neural networks.
- Multi **Character Detector** and **Siamese Recognizer**.
- 99.98% accuracy with any kind of illumination and component conditions.
- Architecture easily adaptable and customizable with new fonts.



AI 3: Extensible & Robust Optical Character Recognition (OCR)

Two-step parallelized Recognition



AI 3: Extensible & Robust Optical Character Recognition (OCR)

Delvitech OCR Example

The screenshot displays the Delvitech OCR software interface. At the top, there are toggle switches for 'Online mode' and 'Daie Alignment'. A red warning banner indicates 'ALTERNATIVE (PACKAGE LOGIC ID 0)'. The main area shows a camera feed with green bounding boxes around the text 'ONRP06' and 'B540'. To the right of the camera feed are four stacked callout boxes: 'Auto ROI detection' (purple), 'Auto illumination combination' (teal), 'Auto character location detection' (orange), and 'Accurate character recognition' (red). Below the camera feed are three view mode panels, each showing the same text with different background treatments: '1_WHITE', '2_WHITE', and '3_WHITE'. On the right side, there is a settings panel with 'COMMONS PARAMETERS' including 'expected_text' (set to '*B540'), 'OCR ROI angle' (set to 0), and toggle switches for 'Polarity check' and 'Allow 180 deg rotation'. Below that is a 'View Modes' section with a 'Used for acquisition' checkbox and several camera and ring layer options.



AI 3: Extensible & Robust Optical Character Recognition (OCR)

Daie - D13 ID 1675411384852

Online mode Daie Alignment

ALTERNATIVE (PACKAGE LOGIC ID 0) ⚠

Reliable OCR even in barely visible situation!

Found text: ""
Viewmode: 1_WHITE

Found text: 'T4'
Viewmode: 2_WHITE

Found text: 'T4'
Viewmode: 3_WHITE

COMMONS PARAMETERS

expected_text: *T4*

OCR ROI angle: 0

Polarity check

Allow 180 deg rotation

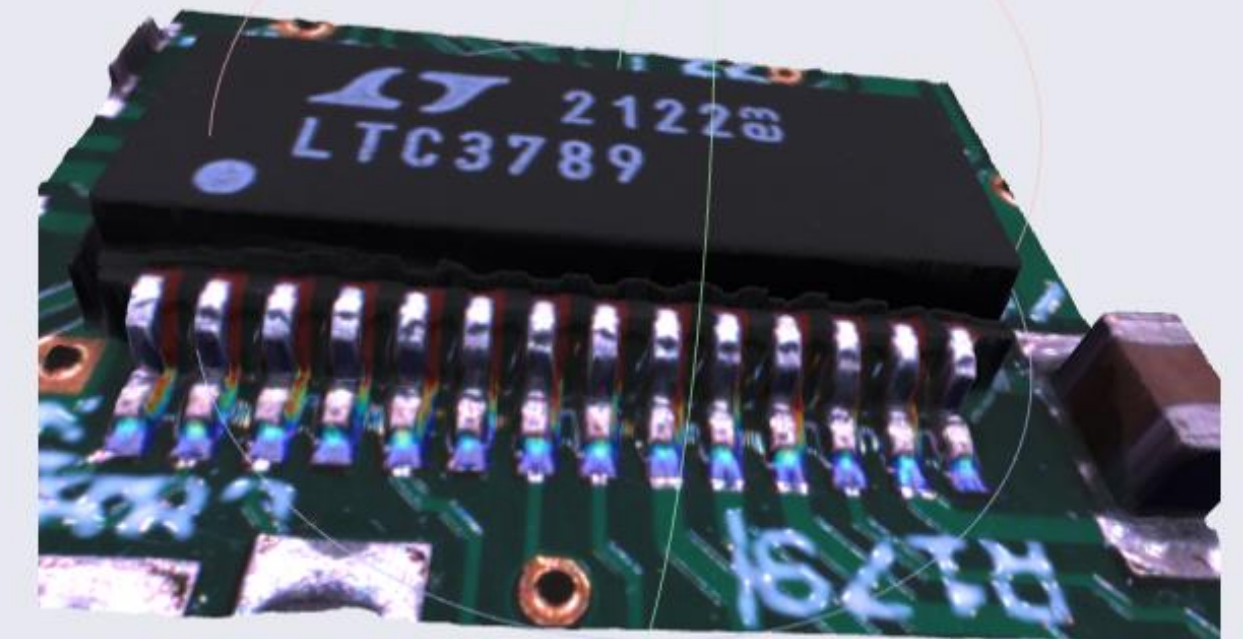
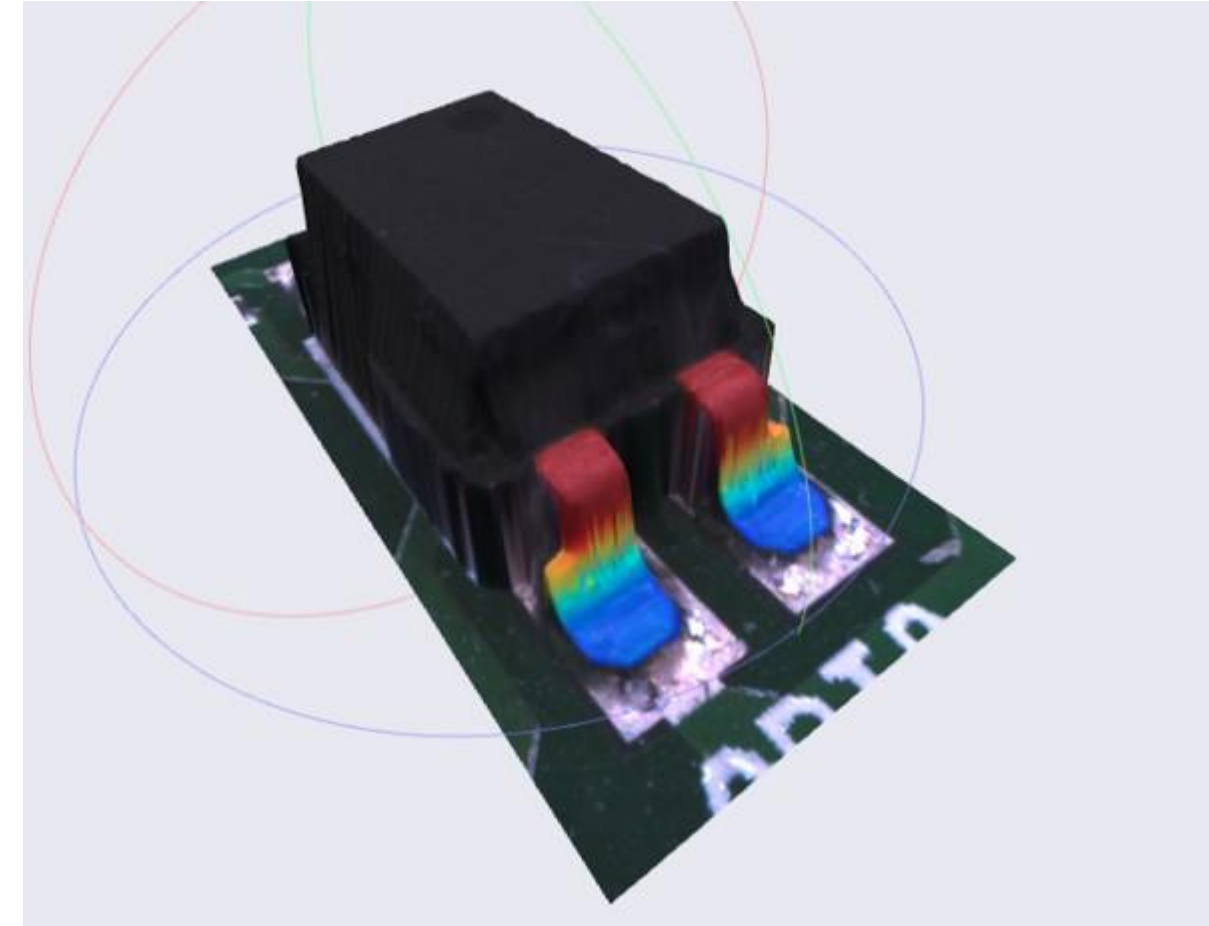
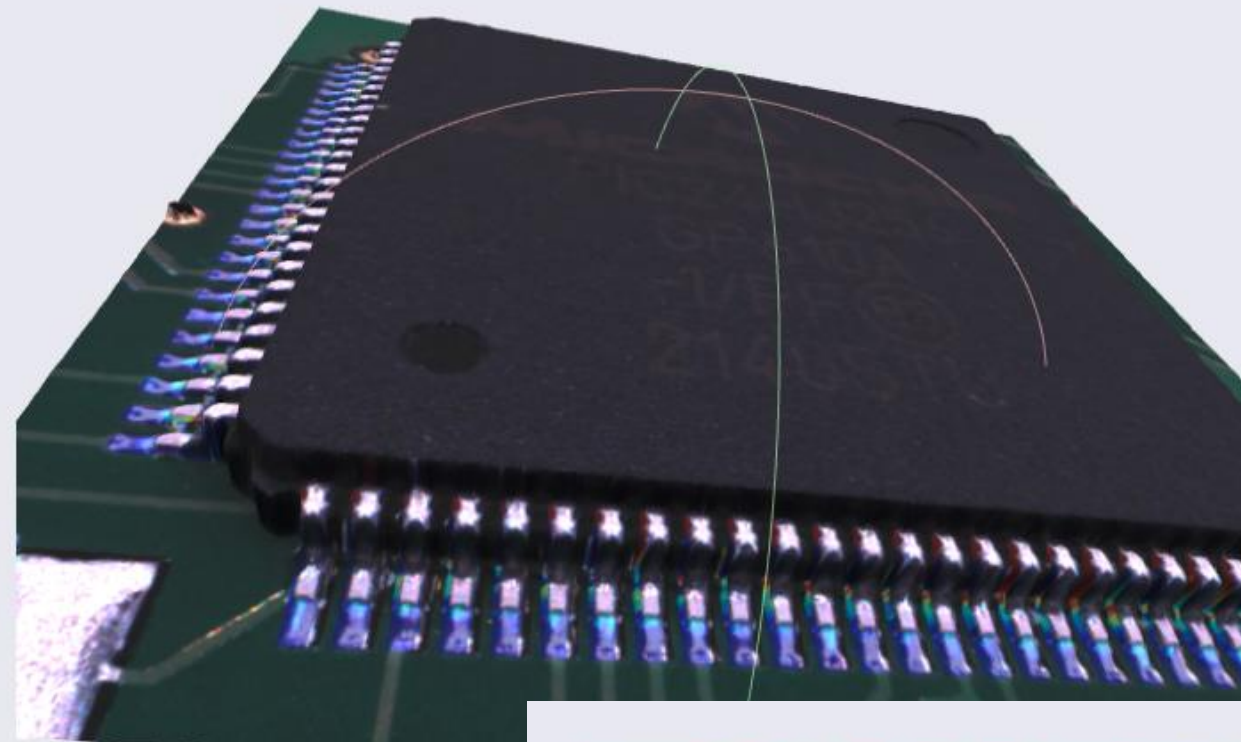
View Modes

- Used for acquisition
- CAMERA_TOP
- RING_LAYER_1 RING_COLOR_WHITE
- DIRECTION_MULTI
- RING_LAYER_2 RING_COLOR_WHITE
- DIRECTION_MULTI
- RING_LAYER_3 RING_COLOR_WHITE
- DIRECTION_MULTI



AI 4: Reliable and Flexible Pin Inspection

Neith Pin Detection based on AI-Model



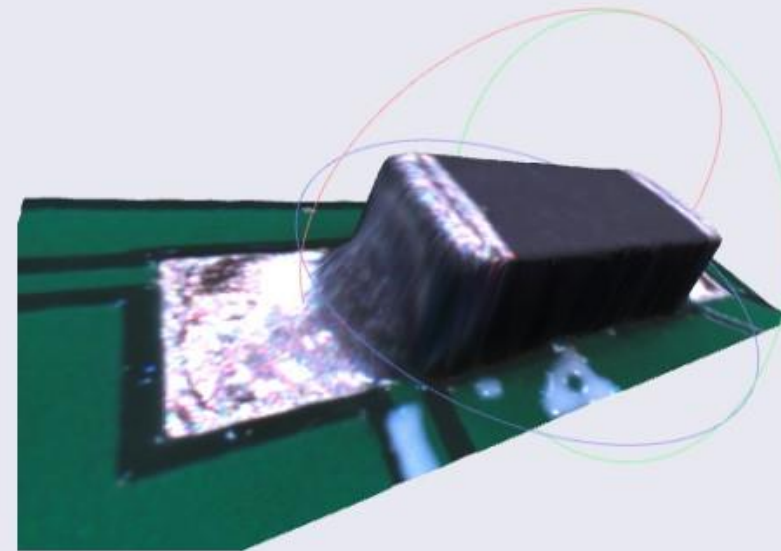
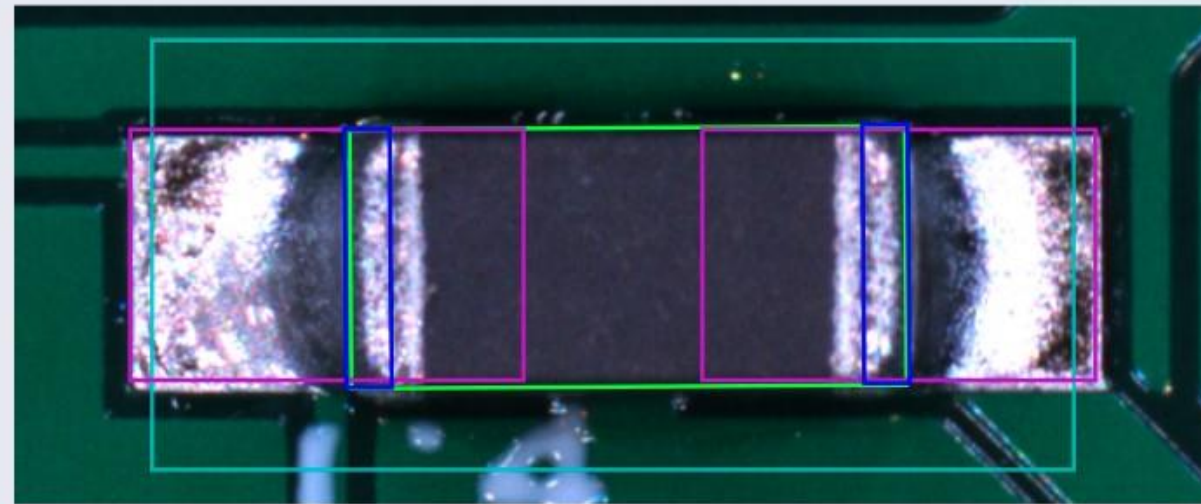
Neith Location Detection based on AI-Model

Daie (Ref Des: L2 Id: 1684227654934)

location3d.nn ✓ sj.3d ✓

Online mode Daie Alignment

ALTERNATIVE (PACKAGE LOGIC ID 1199) ✓



Size

Expected X range: [2.70 , 3.30] mm

Expected Y range: [1.20 , 1.80] mm

Expected Z range: [0.70 , 1.30] mm

Actual X: 3.11 mm

Actual Y: 1.45 mm

Actual Z: 0.99 mm

Lift

Bottom left corner: 0.01 mm

Bottom right corner: 0.03 mm

Upper right corner: 0.02 mm

Upper left corner: 0.00 mm

IPC Acceptability Requirements

No pin violates max Side Overhang

No pin violates max Toe Overhang

No pin violates min End Overlap

Save Single Component In Recipe

COMMONS PARAMETERS

Tolerance mode

TOLERANCE_IPC_2

Enable Pin Detector

Body rotation Threshold [deg]

Threshold 0.4

10

Height Level Cut

90

Max rectangle refinement iterations

70

Lift Threshold [μ m]

100

Enable 2D location



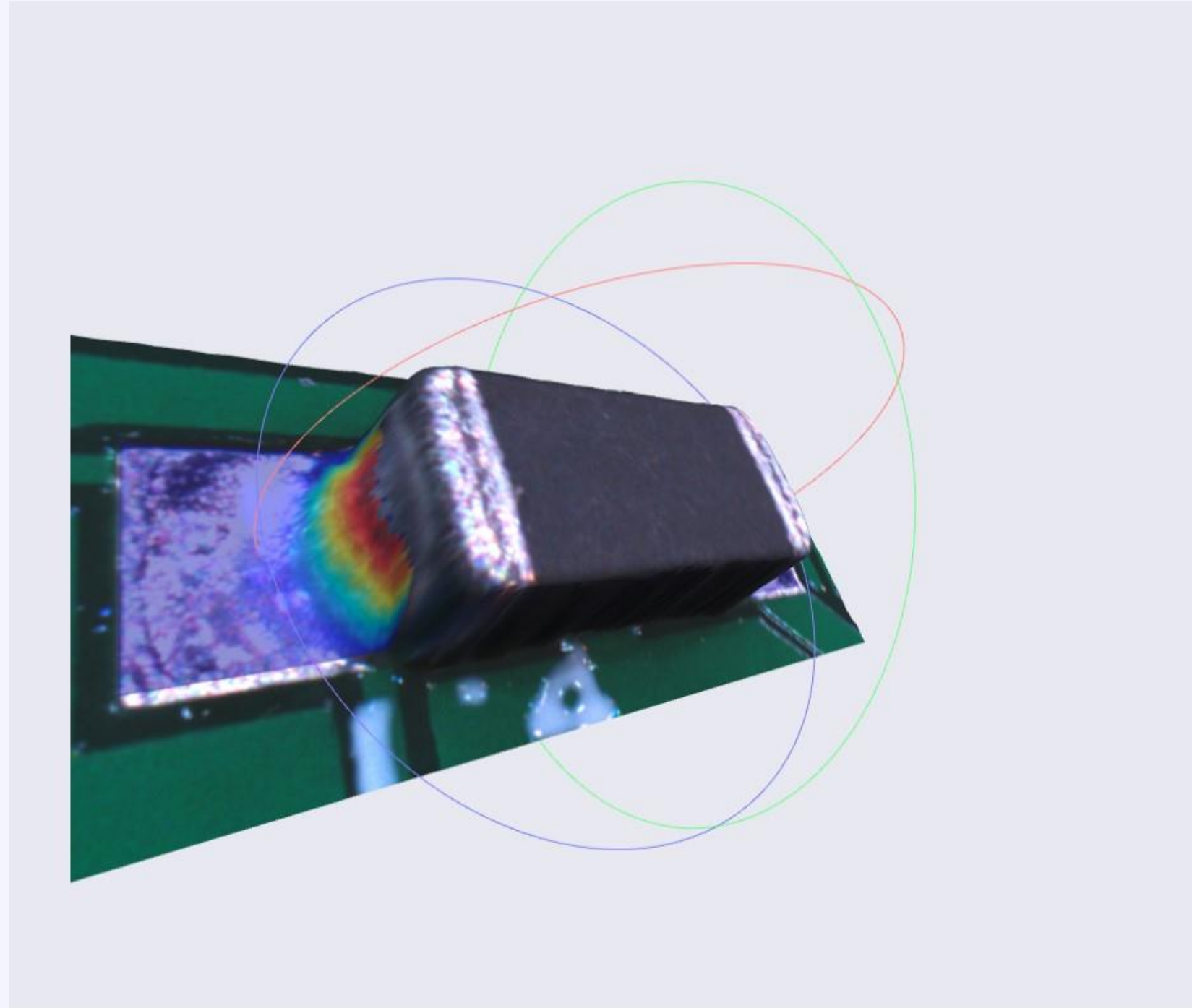
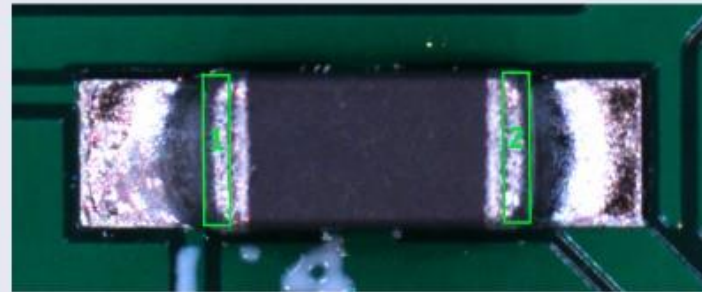
Neith Solder Joint Inspection

Daie (Ref Des: L2 Id: 1684227654934)

location3d.nn ✓ sj,3d ✓

Online mode Daie Alignment

ALTERNATIVE (PACKAGE LOGIC ID 1199) ✓



Save Single Component In Recipe

COMMONS PARAMETERS

Tolerance mode

TOLERANCE_UNSPECIFIED

Solder volume threshold

35,250

Minimum fillet width threshold [% of pin width]

50



Neith AL Cap location Inspection

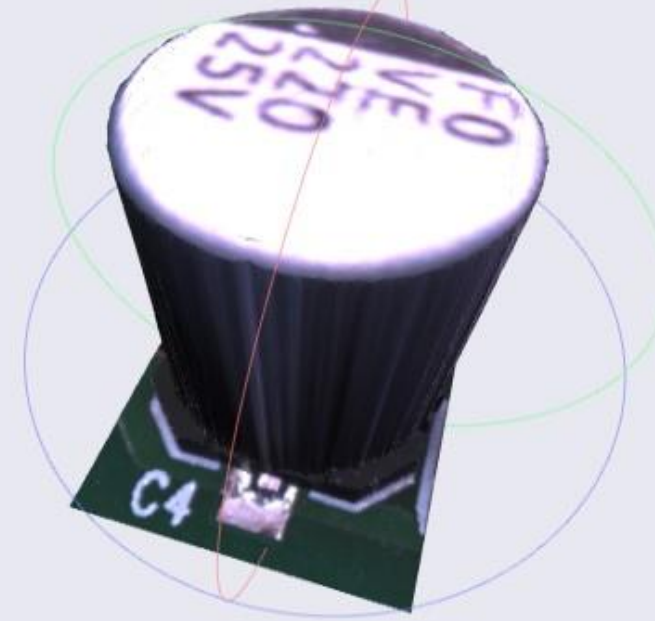
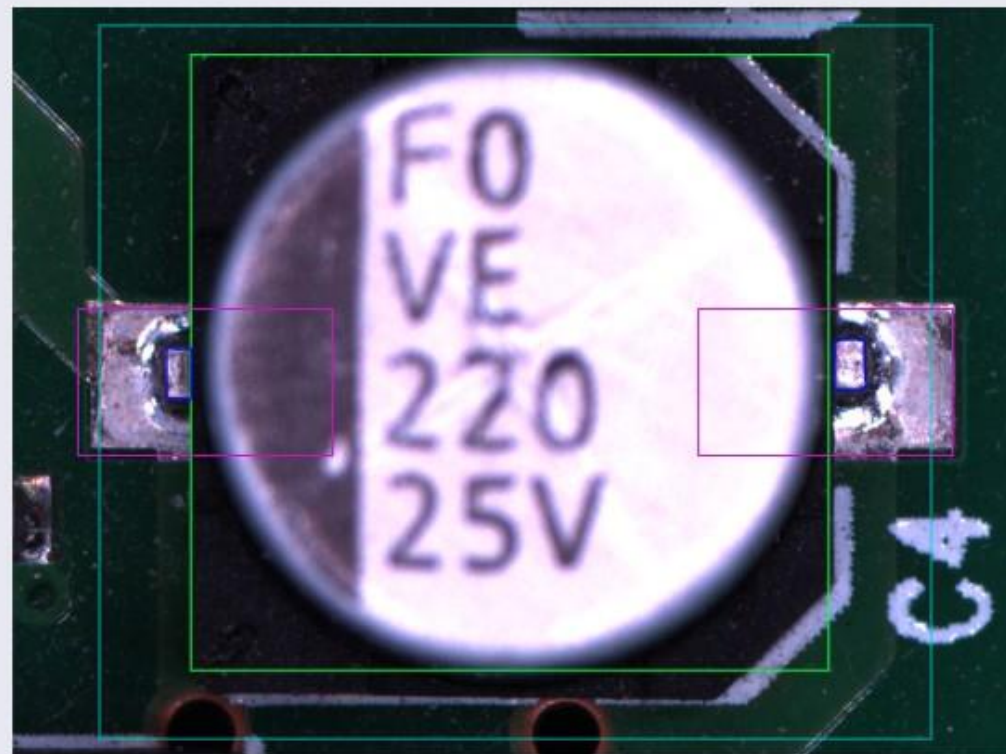
DAIE Component ref des: C4

Online mode Daie Alignment

Save Single Component In Recipe

location3d.nn ✓ sj.3d ✓ ocr.nn ✓

ALTERNATIVE (PACKAGE LOGIC ID 1201) ✓



Size

Expected X range: [7.30 , 8.70] mm
Expected Y range: [7.30 , 8.70] mm
Expected Z range: [10.10 , 10.70] mm
Actual X: 8.24 mm
Actual Y: 7.95 mm
Actual Z: 10.40 mm

Lift

Bottom left corner: 0.09 mm
Bottom right corner: 0.09 mm
Upper right corner: 0.00 mm
Upper left corner: 0.00 mm

IPC Acceptability Requirements

No pin violates max Side Overhang
No pin violates max Toe Overhang
No pin violates min End Overlap

COMMONS PARAMETERS

Tolerance mode
TOLERANCE_IPC_3

Enable Pin Detector

Body rotation Threshold [deg]
Threshold 0

Component section to Level Cut
Body

Height Level Cut

Max rectangle refinement iterations

Lift Threshold [µm]

Enable 2D location



Neith AL Cap solder joint inspection

DAIE Component ref des: C4

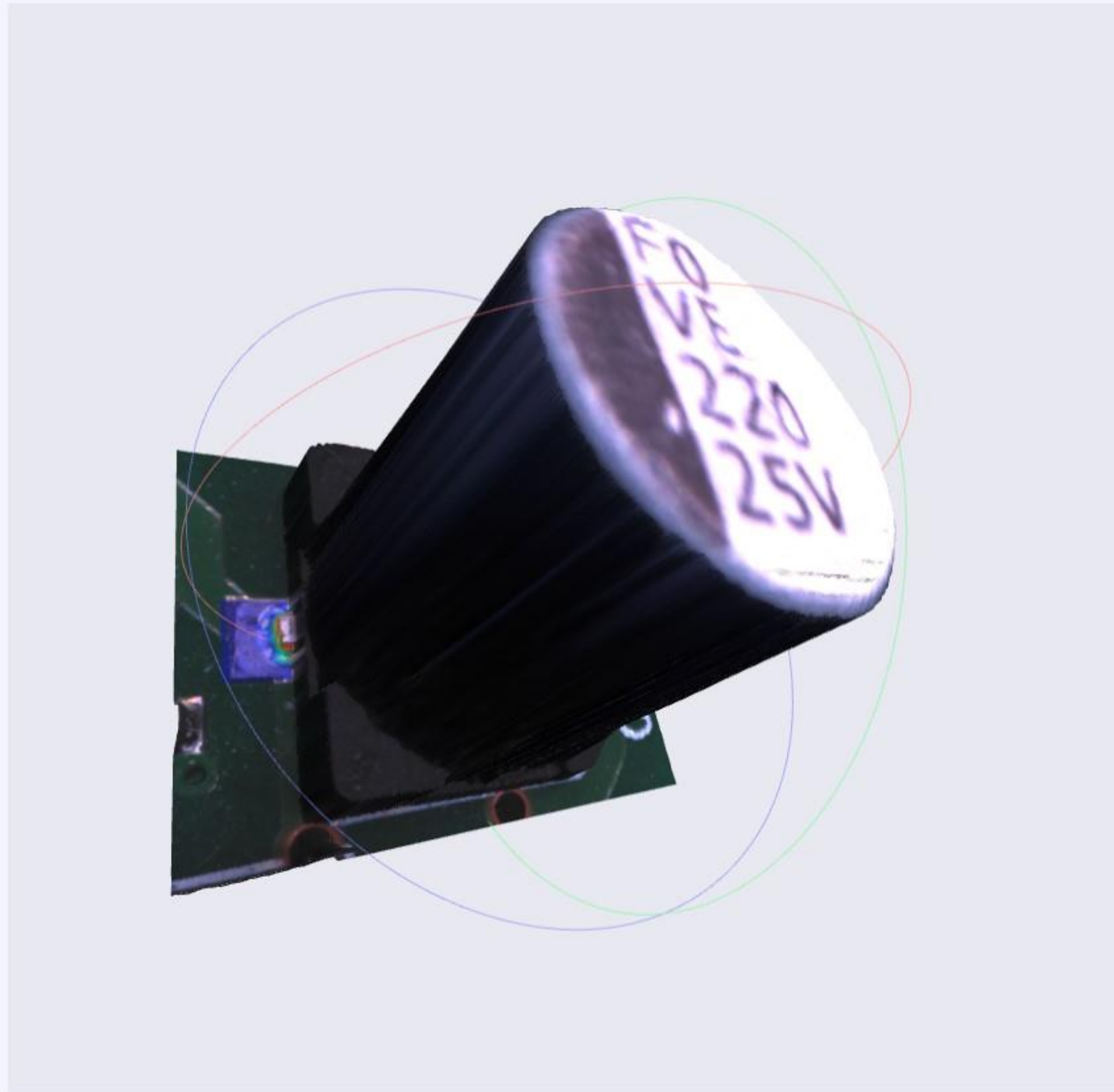
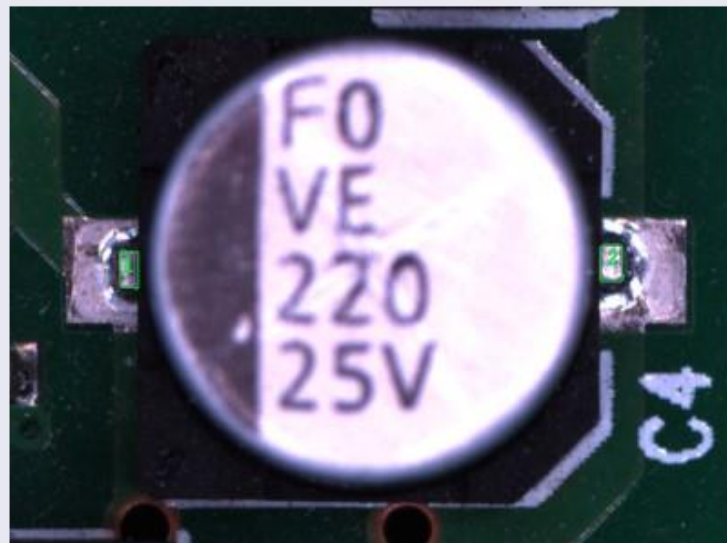
Online mode

Daie Alignment

Save Single Component In Recipe

location3d.nn ✓ sj.3d ✓ ocr.nn ✓

ALTERNATIVE (PACKAGE LOGIC ID 1201) ✓



COMMONS PARAMETERS

Tolerance mode
TOLERANCE_UNSPECIFIED

Solder volume threshold
5,250

Minimum fillet width threshold [% of pin width]
50



Neith AL Cap OCR inspection

DAIE Component ref des: C4

Online mode

Daie Alignment

Save Single Component In Recipe

location3d.nn ✓ sj.3d ✓ ocr.nn ✓

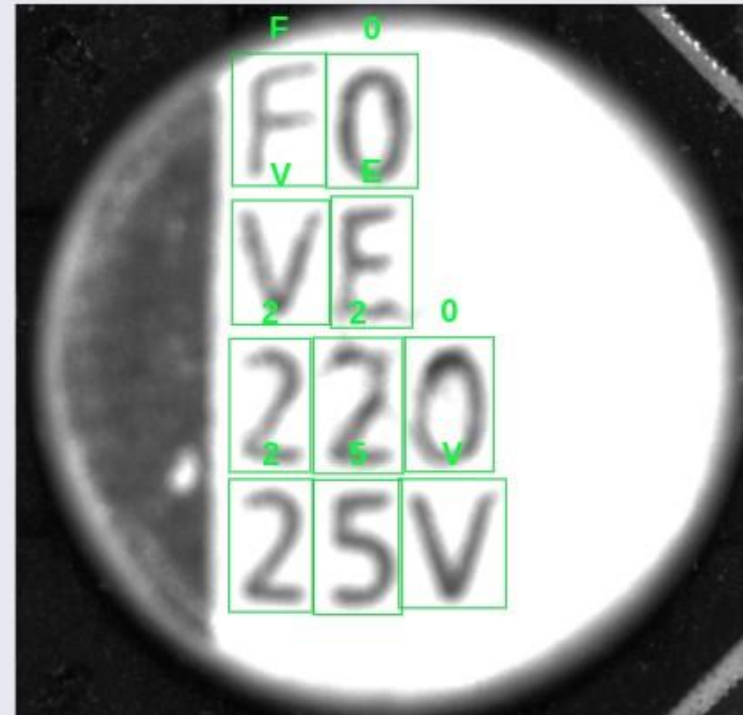
ALTERNATIVE (PACKAGE LOGIC ID 1201) ✓

Best match:

'FO
'VE
220
25V'

Viewmode:
WHITE

NO POLARITY DEFECT



Found text:
'0
25V'
Viewmode:
1 WHITE

Found text:
'FO
'VE
220
25V'

Found text:
'FO
'VE
220
25V'

COMMONS PARAMETERS

expected_text
22025V

Expected text

OCR ROI angle

0

Polarity check

Allow 180 deg rotation

Open PARAMETER_TYPE_BOUNDBOX_PICKER

View Modes

Used for acquisition

CAMERA_TOP

RING_LAYER_1 RING_COLOR_WHITE

DIRECTION_MULTI

RING_LAYER_2 RING_COLOR_WHITE

DIRECTION_MULTI

RING_LAYER_3 RING_COLOR_WHITE

DIRECTION_MULTI

Used for acquisition

Inspection Completed ✕



Neith automatic body and pin detection

DAIE Component ref des: U1

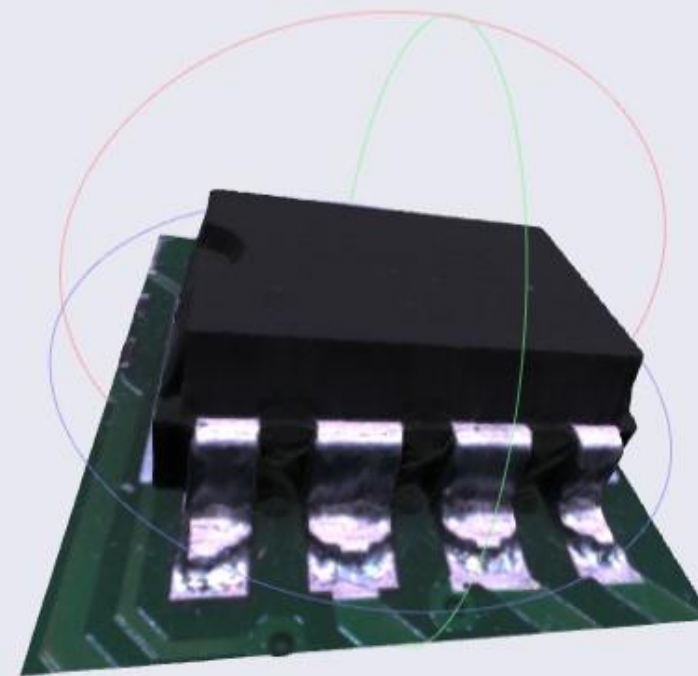
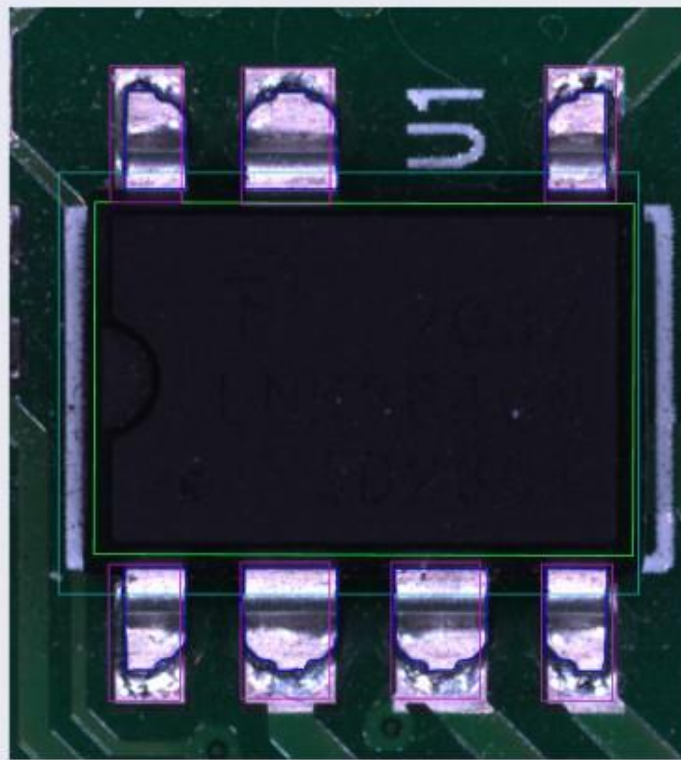
Online mode

Daie Alignment

Save Single Component In Recipe

location3d.nn ✓ bridge.3d ✓ pin.coplanarity.3d ✓ pin.lifted.3d ✓ sj.3d ✓ ocr.nn ✓

ALTERNATIVE (PACKAGE LOGIC ID 1181) ✓



Size

Expected X range: [8.45 , 10.45] mm
Expected Y range: [5.35 , 7.35] mm
Expected Z range: [3.30 , 3.70] mm
Actual X: 9.09 mm
Actual Y: 5.93 mm
Actual Z: 3.51 mm

Lift

Bottom left corner: 0.01 mm
Bottom right corner: 0.03 mm
Upper right corner: 0.02 mm
Upper left corner: 0.00 mm

IPC Acceptability Requirements

No pin violates max Side Overhang
No pin violates max Toe Overhang
No pin violates min End Overlap

COMMONS PARAMETERS

Tolerance mode
TOLERANCE_IPC_3

Enable Pin Detector

Body rotation Threshold [deg]

Threshold 0.2

Height Level Cut

Max rectangle refinement iterations

Lift Threshold [μ m]

Enable 2D location



Neith automatic pin coplanarity inspection

DAIE Component ref des: U1

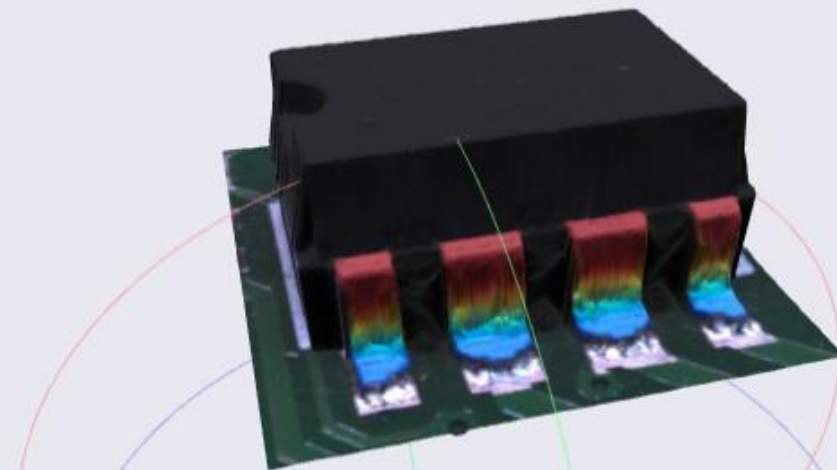
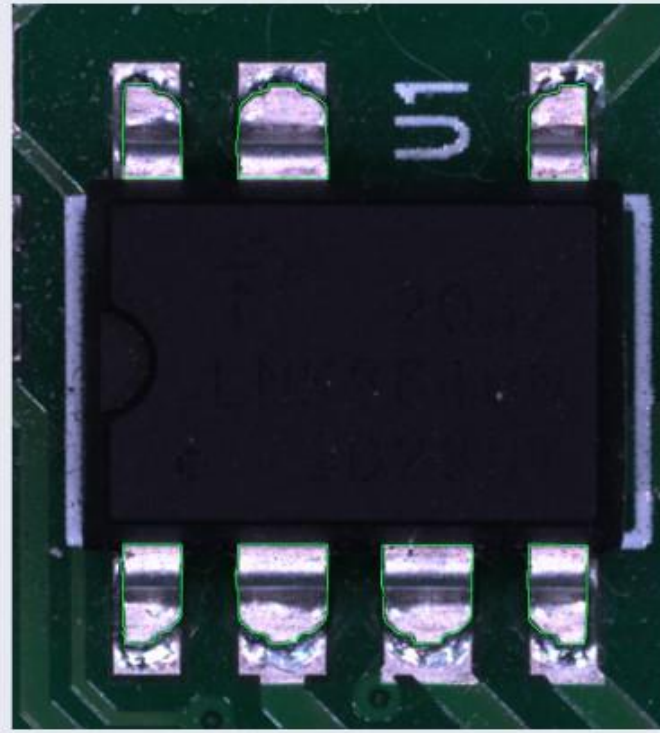
Online mode Daie Alignment

Save Single Component In Recipe



location3d.nn ✓ bridge.3d ✓ pin.coplanarity.3d ✓ pin.lifted.3d ✓ sj.3d ✓ ocr.nn ✓

ALTERNATIVE (PACKAGE LOGIC ID 1181) ✓



COMMONS PARAMETERS

Pin Lift Threshold [mm]

0.2



Neith automatic solder joint inspection

DAIE Component ref des: U1

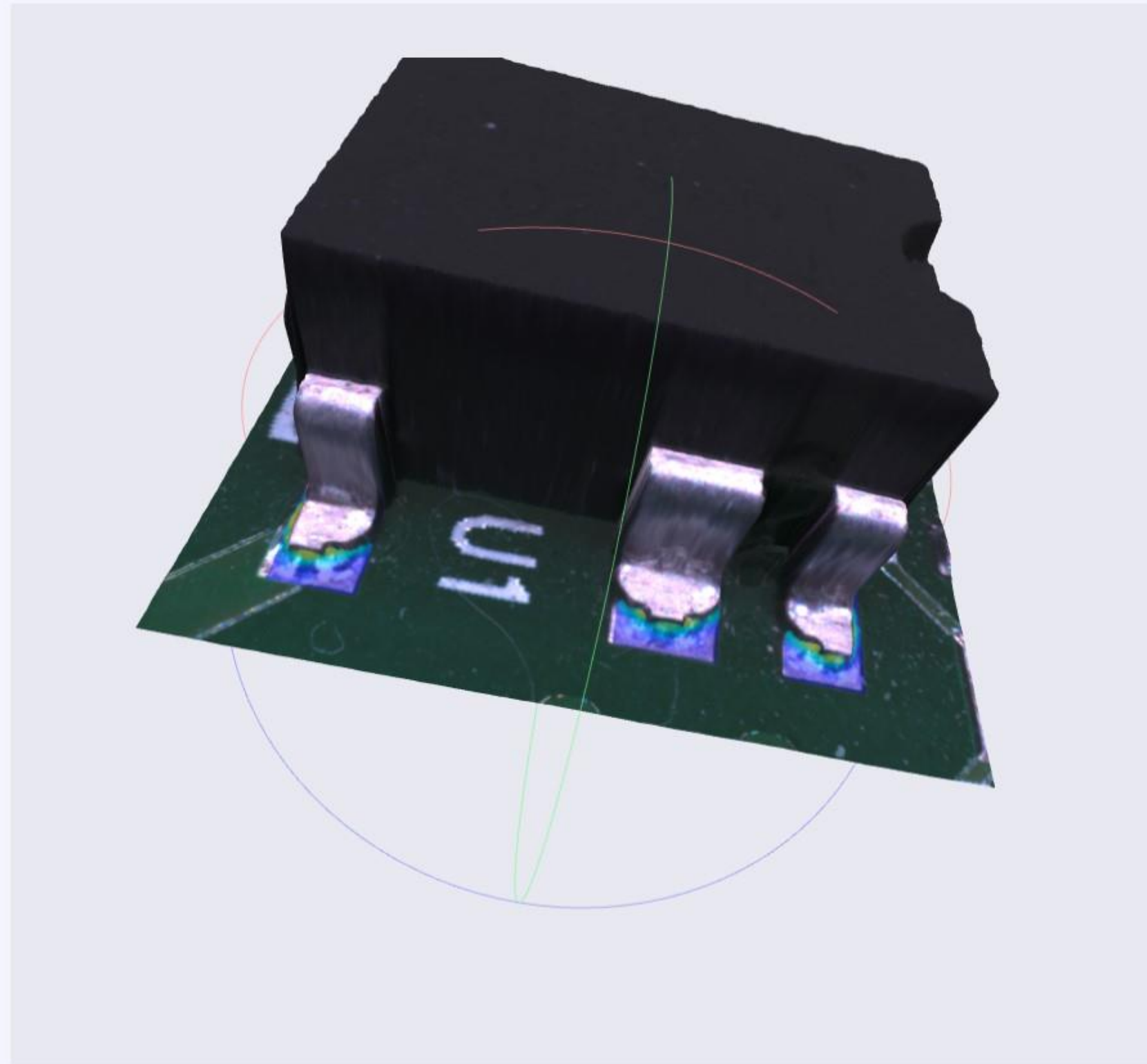
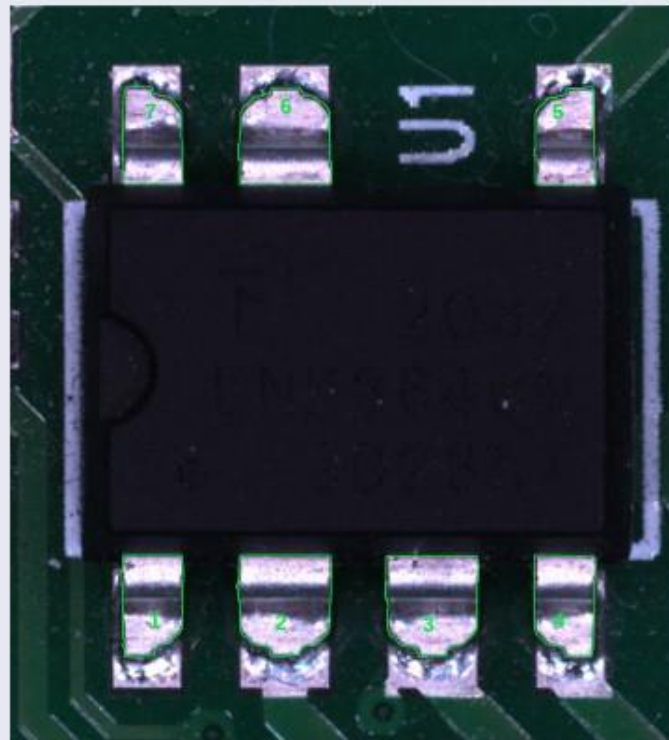
Online mode

Daie Alignment

Save Single Component In Recipe

location3d.nn ✓ bridge.3d ✓ pin.coplanarity.3d ✓ pin.lifted.3d ✓ sj.3d ✓ ocr.nn ✓

ALTERNATIVE (PACKAGE LOGIC ID 1181) ✓



COMMONS PARAMETERS

Tolerance mode

TOLERANCE_CUSTOM_PERCENTAGE

Solder volume threshold

15,250

Minimum fillet height threshold [% of pin height]

50

Minimum fillet width threshold [% of pin width]

50



Neith automatic OCR inspection

DAIE Component ref des: U1

Online mode

Daie Alignment

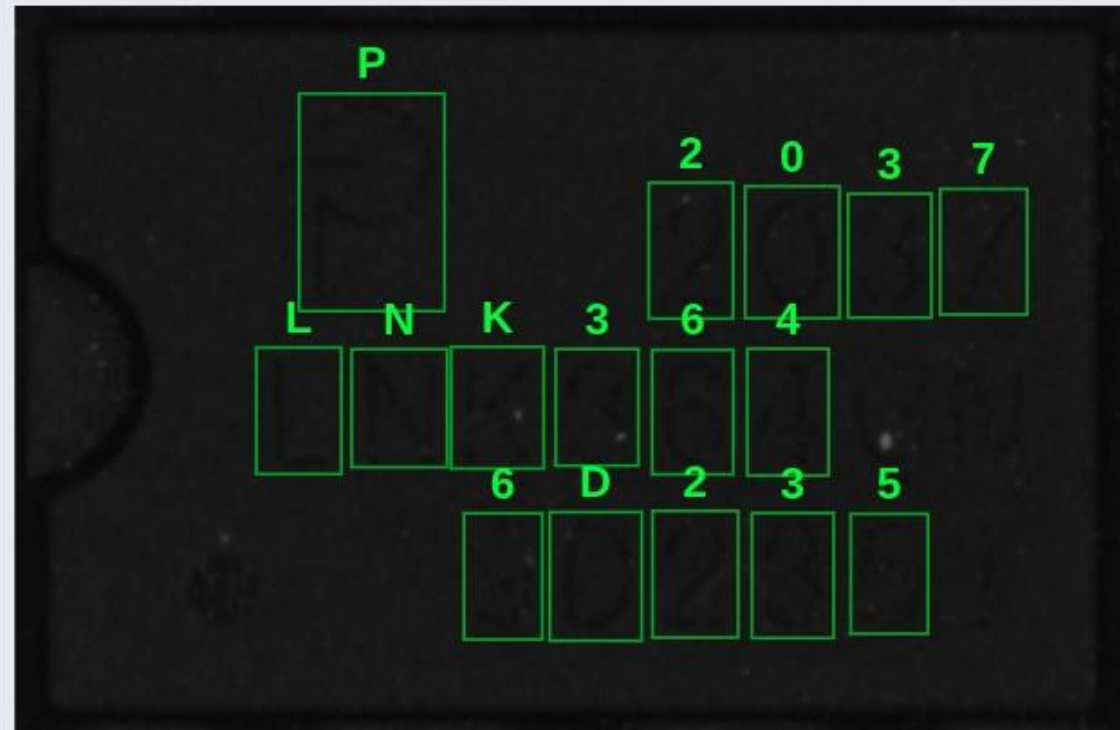
Save Single Component In Recipe

location3d.nn ✓ bridge.3d ✓ pin.coplanarity.3d ✓ pin.lifted.3d ✓ sj.3d ✓ ocr.nn ✓

ALTERNATIVE (PACKAGE LOGIC ID 1181) ✓

Best match:
'P'
2037
LNK364
6D235'
Viewmode:
WHITE

NO POLARITY DEFECT



Found text:
'P'
2037
LNK364GN
9D235'

Found text:
'20
LN C2
CD28'
Viewmode:

Found text:
'20E7
XNK3646N
90205'
Viewmode:

COMMONS PARAMETERS

expected_text
2037

Expected text

OCR ROI angle

0

Polarity check

Allow 180 deg rotation

Open PARAMETER_TYPE_BOUNDBOX_PICKER

View Modes

Used for acquisition

CAMERA_TOP

RING_LAYER_1 RING_COLOR_WHITE

DIRECTION_MULTI

RING_LAYER_2 RING_COLOR_WHITE ✓

DIRECTION_MULTI

RING_LAYER_3 RING_COLOR_WHITE

DIRECTION_MULTI

Used for acquisition



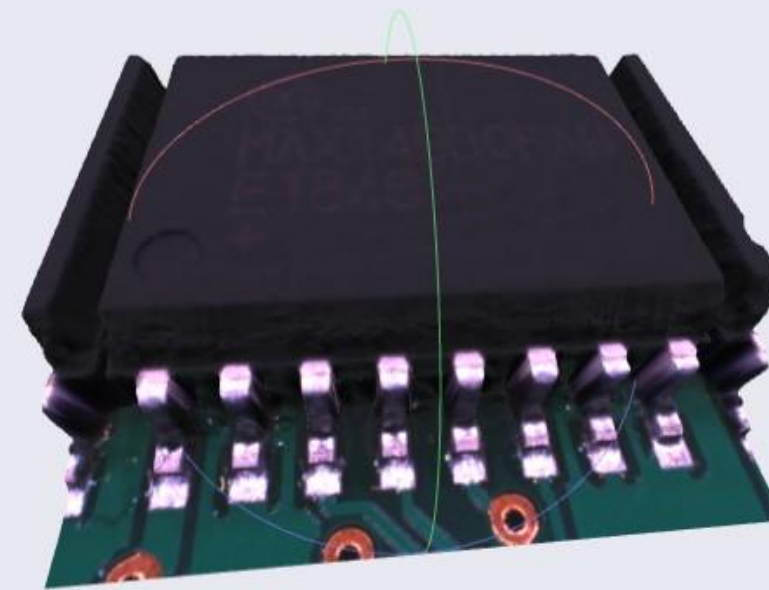
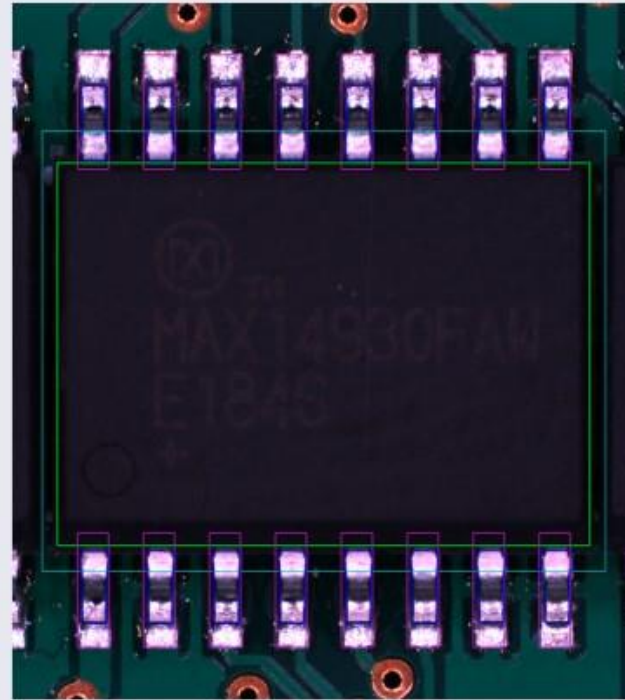
Neith IC automatic body and pin detection

Daie (Ref Des: IC2 Id: 1684243288468)

location3d.nn ✓ pin.coplanarity.3d ✓ pin.lifted.3d ✓ sj.3d ✓ ocr.nn ✓

Online mode Daie Alignment

ALTERNATIVE (PACKAGE LOGIC ID 1205) ✓



Size

Expected X range: [9.00 , 11.00] mm
Expected Y range: [6.00 , 8.00] mm
Expected Z range: [2.20 , 2.80] mm
Actual X: 10.25 mm
Actual Y: 7.36 mm
Actual Z: 2.50 mm

Lift

Bottom left corner: 0.02 mm
Bottom right corner: 0.01 mm
Upper right corner: 0.00 mm
Upper left corner: 0.00 mm

IPC Acceptability Requirements

No pin violates max Side Overhang
No pin violates max Toe Overhang
No pin violates min End Overlap

Save Single Component In Recipe

COMMONS PARAMETERS

Tolerance mode
TOLERANCE_UNSPECIFIED

Enable Pin Detector

Body rotation Threshold [deg]
Threshold 0

Height Level Cut

Max rectangle refinement iterations

Lift Threshold [μ m]

Enable 2D location



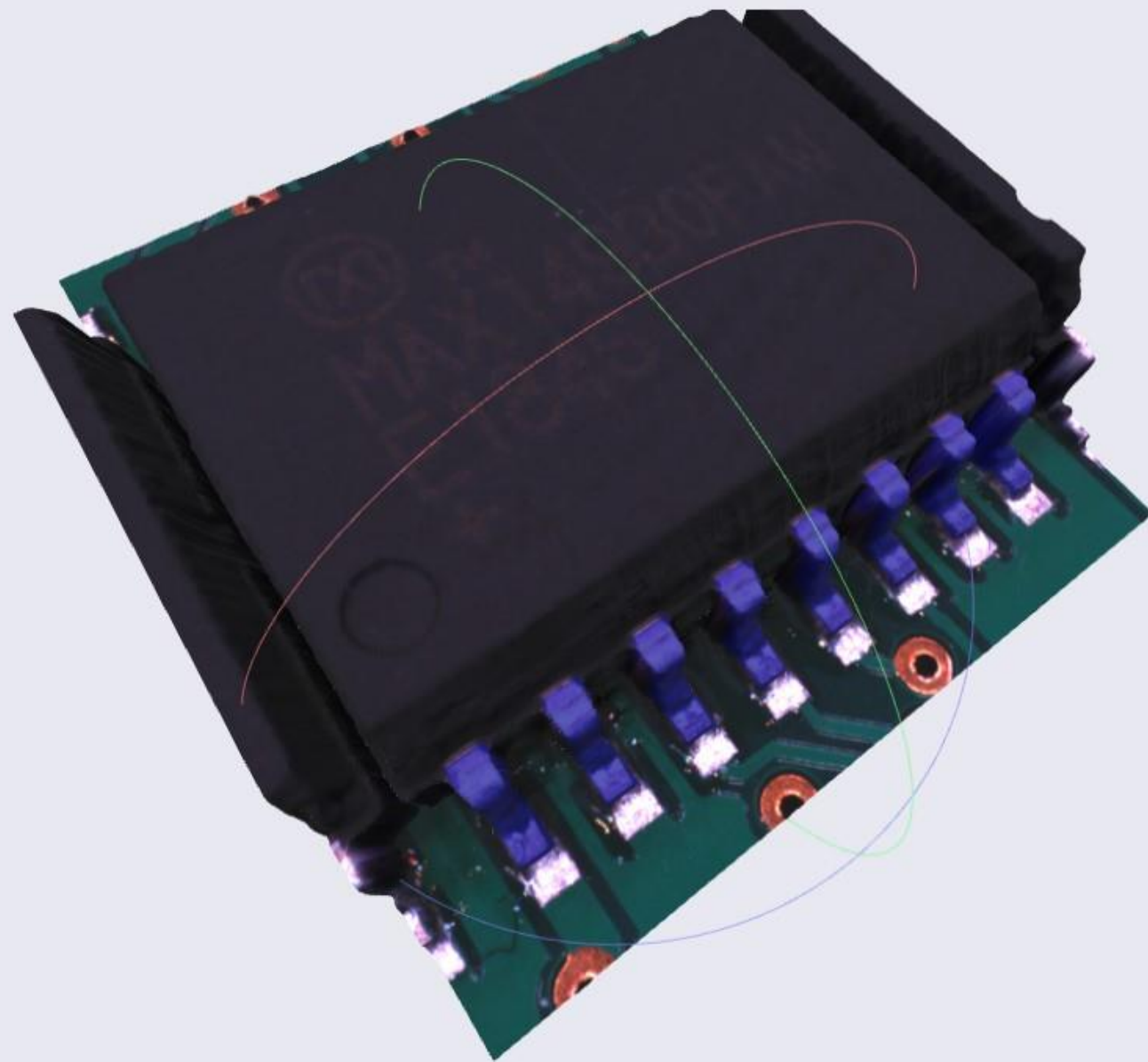
Neith IC automatic pin coplanarity inspection

Daie (Ref Des: IC2 Id: 1684243288468)

location3d.nn ✓ pin.coplanarity.3d ✓ pin.lifted.3d ✓ sj.3d ✓ ocr.nn ✓

Online mode Daie Alignment

ALTERNATIVE (PACKAGE LOGIC ID 1205) ✓



Save Single Component In Recipe

COMMONS PARAMETERS

Pin Lift Threshold [mm]



0.1



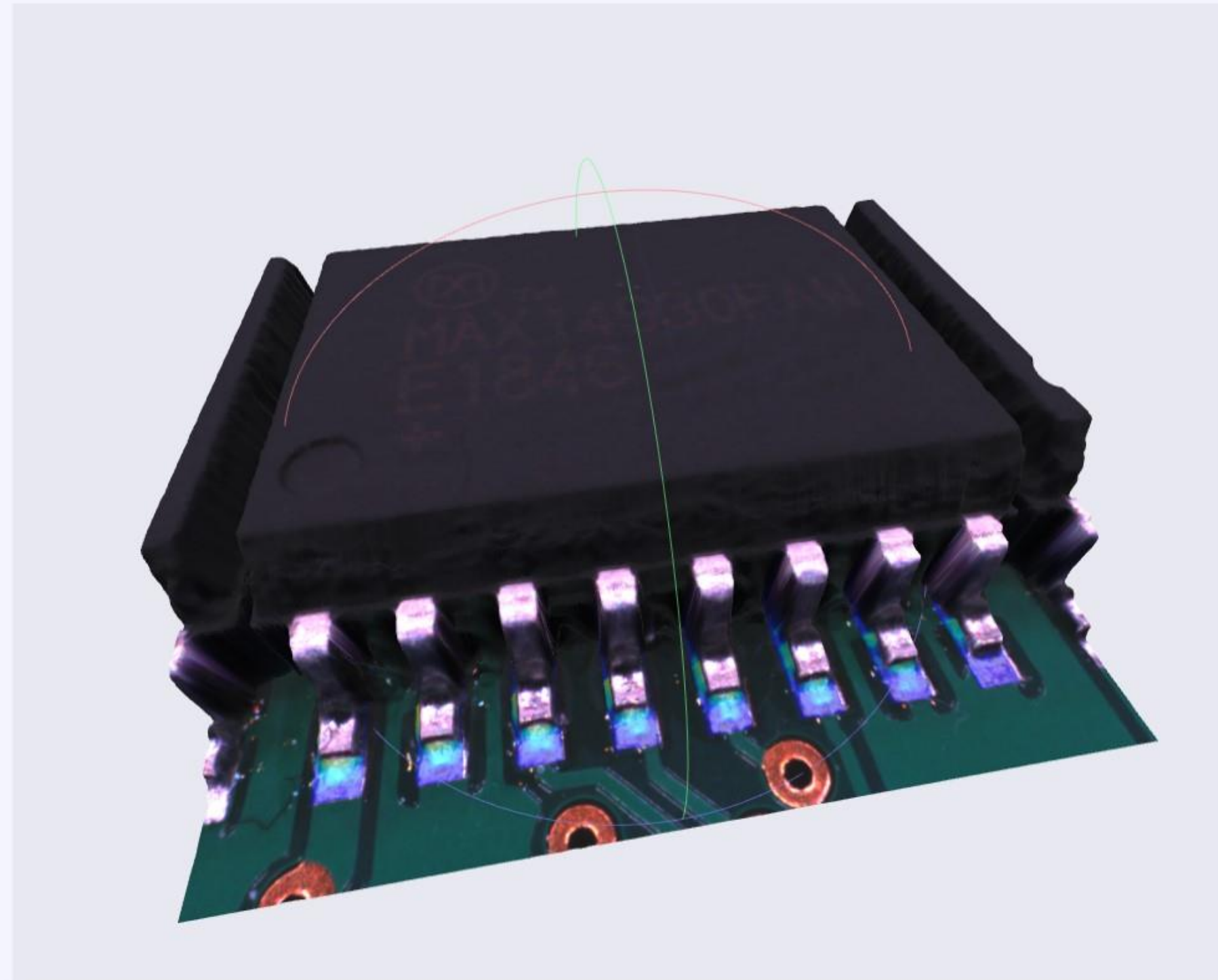
Neith IC automatic solder joint inspection

Daie (Ref Des: IC2 Id: 1684243288468)

location3d.nn ✓ pin.coplanarity.3d ✓ pin.lifted.3d ✓ sj.3d ✓ ocr.nn ✓

Online mode Daie Alignment

ALTERNATIVE (PACKAGE LOGIC ID 1205) ✓



Save Single Component In Recipe

COMMONS PARAMETERS

Tolerance mode
TOLERANCE_CUSTOM_PERCENTAGE

Solder volume threshold

15,250

Minimum fillet height threshold [% of pin height]

0

Minimum fillet width threshold [% of pin width]

0



Neith IC automatic OCR inspection

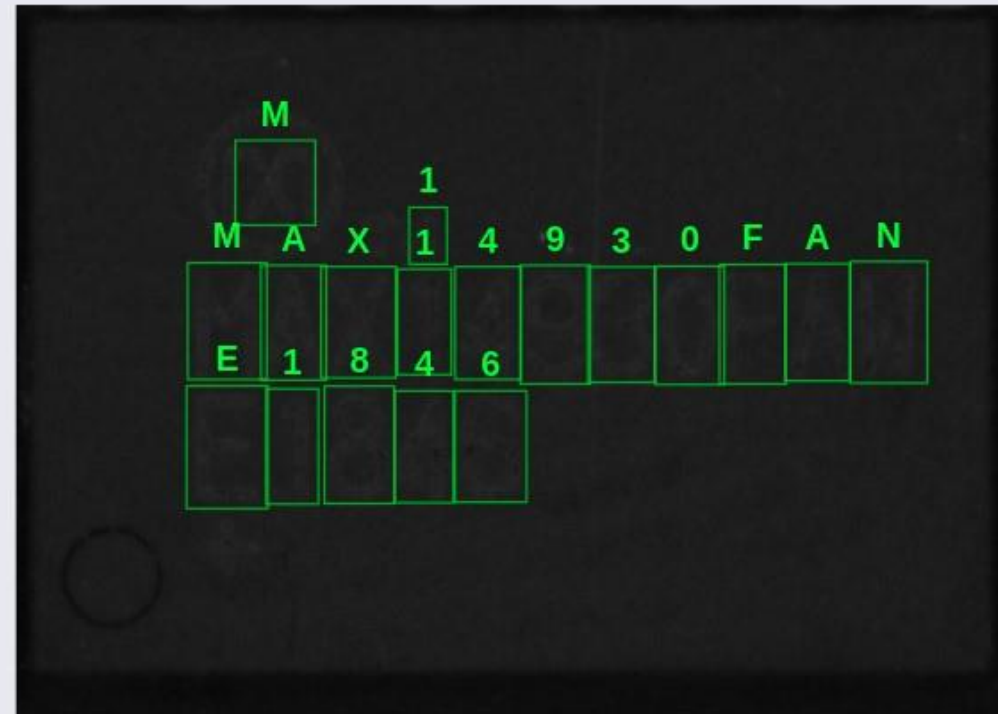
Daie (Ref Des: IC2 Id: 1684243288468)

location3d.nn ✓ pin.coplanarity.3d ✓ pin.lifted.3d ✓ sj.3d ✓ ocr.nn ✓

Online mode Daie Alignment

ALTERNATIVE (PACKAGE LOGIC ID 1205) ✓

Best match:
'M
MAX114930FAN
E1846'
Viewmode:
WHITE



Found text:
'T
MAX14930FAN
E1846'

Found text:
'X
MAXT1f4930FAW
E1846'

Found text:
'OX
TH
MAX14930FAN

Save In Package Library

COMMONS PARAMETERS

expected_text

14930

Expected text

OCR ROI angle



0

Polarity check

Allow 180 deg rotation

Open PARAMETER_TYPE_BOUNDBOX_PICKER

View Modes

Used for acquisition

CAMERA_TOP

RING_LAYER_1 RING_COLOR_WHITE

DIRECTION_MULTI

RING_LAYER_2 RING_COLOR_WHITE

DIRECTION_MULTI

RING_LAYER_3 RING_COLOR_WHITE



Neith THT Pin and solder in 3D

DAIE Component ref des: T31

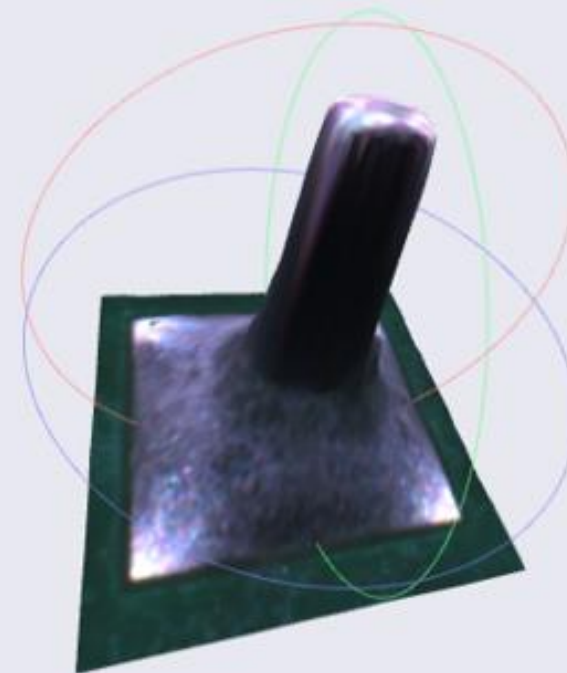
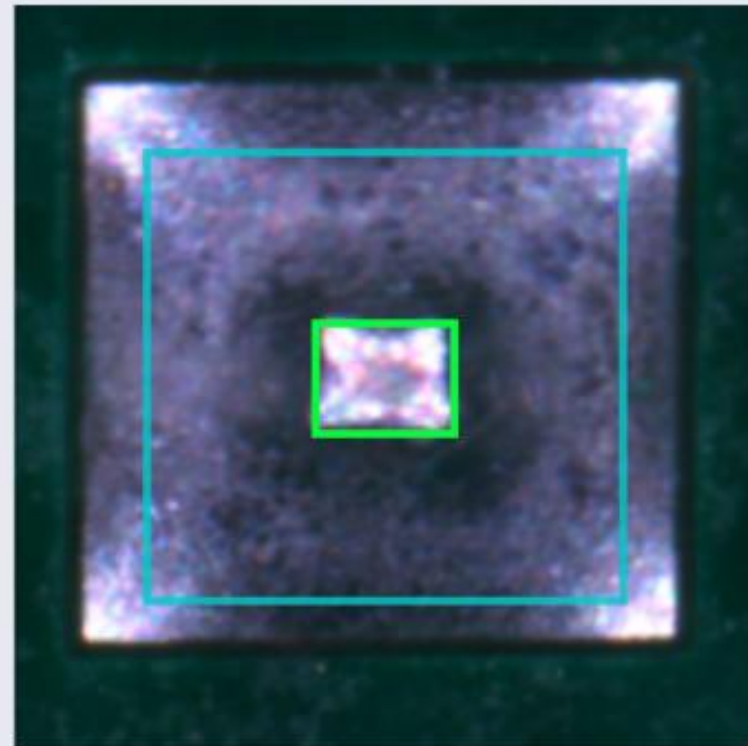
Online mode

Daie Alignment

Save Single Component In Recipe

location3d.nn

ALTERNATIVE (PACKAGE LOGIC ID 0)



Size

Expected X range: [0.30 , 0.70] mm
Expected Y range: [0.30 , 0.70] mm
Expected Z range: [1.50 , 2.10] mm
Actual X: 0.41 mm
Actual Y: 0.33 mm
Actual Z: 1.99 mm

Lift

Bottom left corner: 0.00 mm
Bottom right corner: 0.00 mm
Upper right corner: 0.00 mm
Upper left corner: 0.00 mm

COMMONS PARAMETERS

Tolerance mode
TOLERANCE_CUSTOM_ABSOLUTE

Enable Pin Detector

Max allowed body X translation [mm]
Threshold 0 0.5

Max allowed body Y translation [mm]
Threshold 0.01 0.5

Body rotation Threshold [deg]
Threshold 0 10

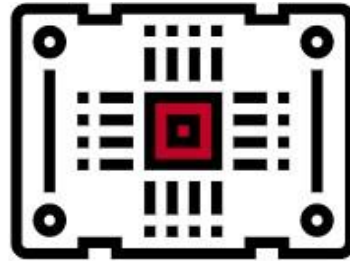
Height Level Cut 91

Max rectangle refinement iterations 70

Lift Threshold [µm] 100



USE CASE: Self- Programming



Optional Placement CAD

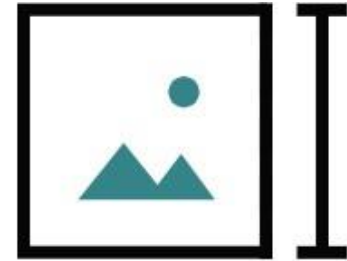
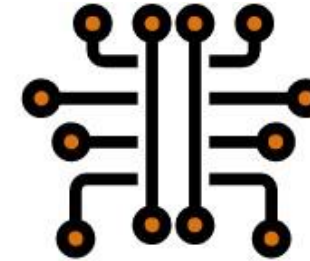
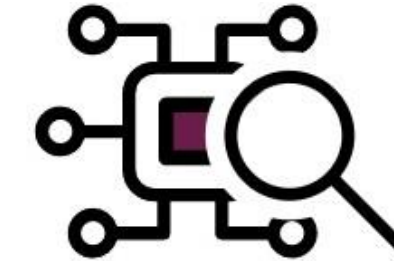


Image Acquisition
and Height Map

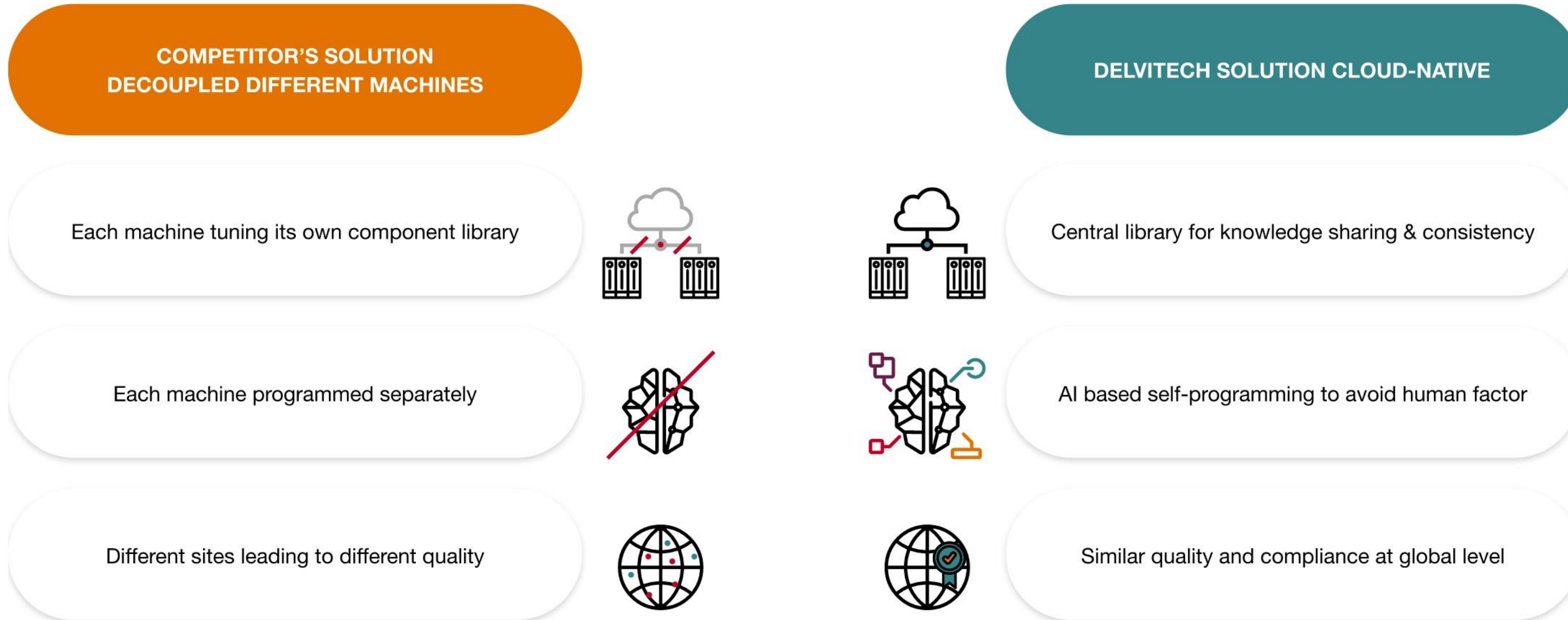


Body Definition
Lead Definition Inspector
Assignment Polarity
OCR



Automatic Component
Definition and
Optimal Inspectors

USE CASE: multi site sharing



USE CASE: predictivity (SUPSI Project)

COMPETITORS



GOOD



GOOD



GOOD



ERROR → WASTE

3IS



GOOD



GOOD

PROCESS DEVIATION?



GOOD

DEVIATION CONFIRMED

→ FIX LINE



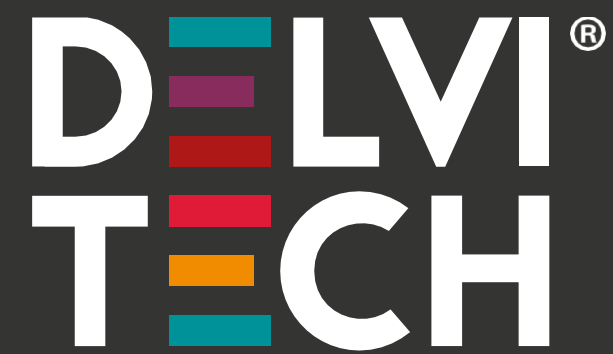
GOOD

Optimal setup


Reduced waste

Increased profitability

Minor CO2 footprint



Artificial
Intelligence
Applied to
AOI

 Delvitech SA
Via Pizzuolo 77
CH-6852 Rancate, Switzerland

 (+41) 91 646 07 78

 info@delvi.tech

 www.delvi.tech

