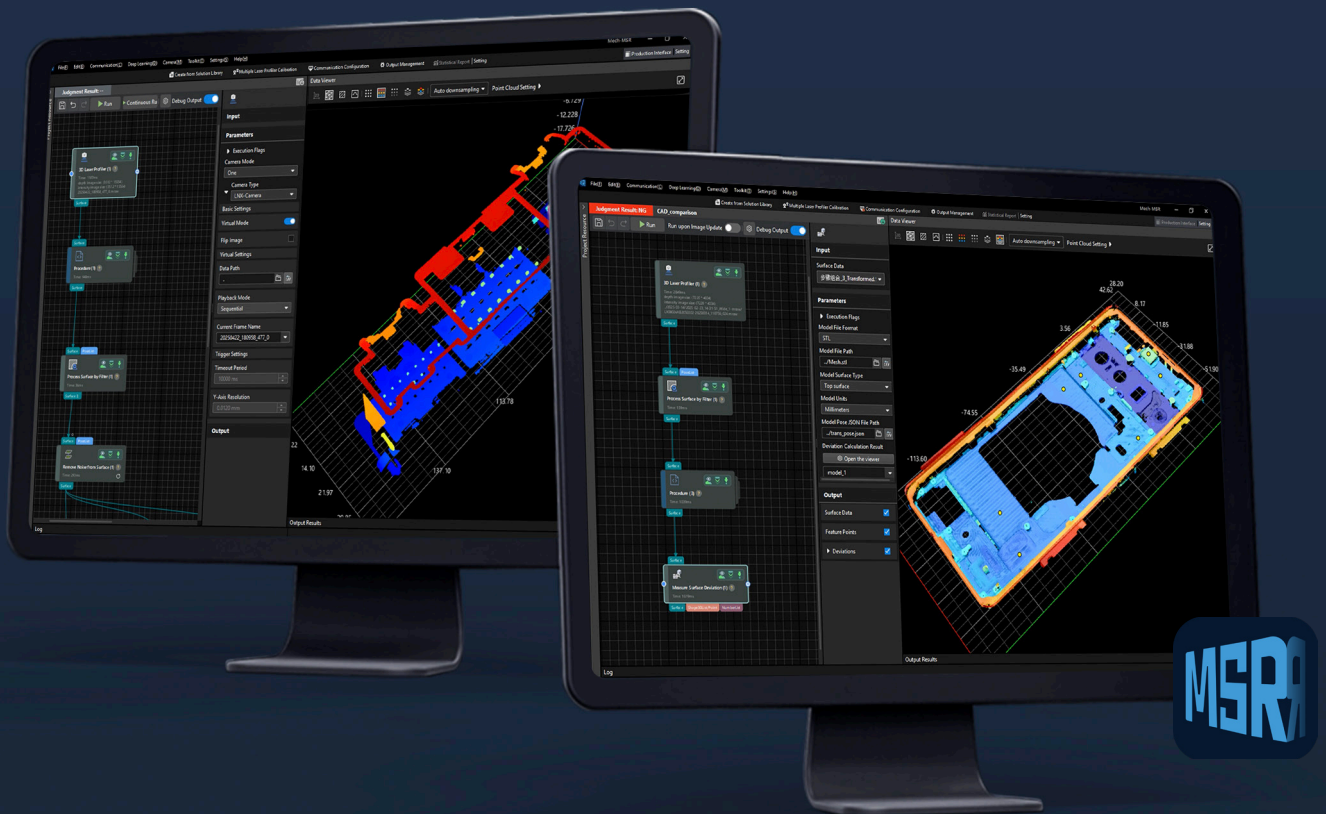# Mech-MSR
3D Measurement and Inspection Software

Leveraging robust AI and multi-sensor networking, Mech-MSR enables rapid, end-to-end deployment of 2D/3D quality inspection applications.

Easy-to-Use GUI Design

Creates measurement and inspection solutions with an intuitive interface and intelligent configuration tools in a fast and easy way, even for those without expert 3D vision knowledge and experience.

Robust AI + Deep Learning Algorithms

Utilizes our built-in algorithms for one-stop deployment of 2D/3D measurement and inspection applications, including intelligent defect inspection, accurate positioning, character recognition, and more.

Versatile Functions and Flexible Deployment

Implements seamless end-to-end deployment in as little as two hours using multiple networking methods, e.g., multi-sensor networking, fulfilling the needs of a wide range of complex quality inspection scenarios.

Versatile Functions for One-Stop Deployment of 2D/3D Inspection Tasks

SCAN »» **ALIGN** »» **PROCESS** »» **MEASURE/INSPECT** »» **EVALUATE** »» **COMMUNICATE** »» **DEPLOY**

Scan

Easily connects to a single or multiple Mech-Eye LNX 3D laser profilers for easy setup and real-time data collection.

Align

Aligns objects for quick positioning and ensures all are at the reference position for accurate and efficient measurement.

Process

Preprocesses and optimizes depth map, 3D data, and other image data to create the best point clouds.

Measure (2D/3D)

Accurately measures the 2D profiles/geometric dimensions, driven by robust 2D/3D measurement algorithms and tools.

Inspect (2D/3D)

Comprehensively inspects the shape, defects of the target object, and the characters on it, meeting various requirements of quality inspection.

Evaluate

Provides measurement result evaluation and correlation compensation tools, and support customized evaluation logic for diversified needs.

Communicate

Communicates with external devices (e.g., PLCs), supports industrial communication protocols (e.g., TCP ASCII, EtherNet/IP), and enables user-defined communication scripts.

Deploy

Production interface offers quick export of statistical reports for statistic analysis, realizing refined production management.

Multiple Sensor Networking and Scanning Methods

- **Multi-sensor networking**: Supports side-by-side, reverse, opposite, and angled layouts, meeting diverse needs across different scenarios.

- **Scan stitching**: Delivers complete and detailed 3D data when a single sensor's field of view is limited.

- **Tilt correction**: The calibration tool can correct the tilt of image data caused by sensor rotation.

Mech-MSR supports both Mech-Eye 3D laser and structured-light sensors, addressing a wide range of application requirements.

Robust AI Algorithm Toolbox for One-Step* Setup

Mech-MSR offers a suite of AI-driven tools—including multiple laser profiler calibration, deviation analysis against CAD model, glue bead inspection—that greatly improve setup efficiency and make it easy for non-experts to get started.
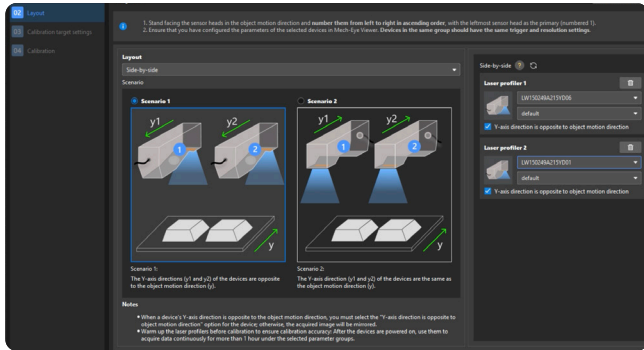

Multiple Laser Profiler Calibration

Supports calibration of multiple laser profilers to scan the same object—delivering wider FOV and blind-spot-free imaging.


Before / After
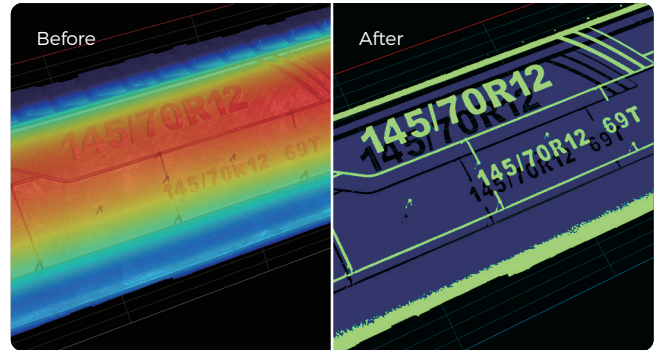
Intelligent Preprocess

Removes noise of point clouds caused by blind spots, high reflectivity, and complex backgrounds, while accurately capturing subtle deformation features.
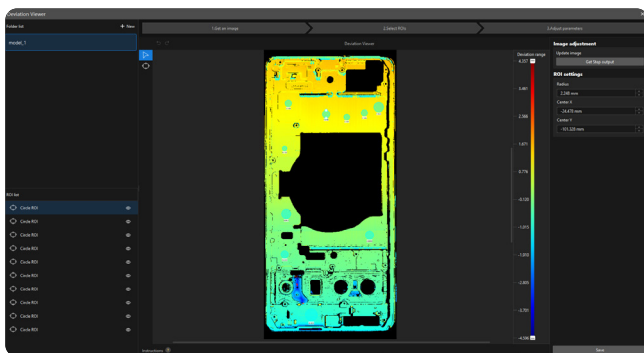

Off-center / Tilt / Off-center
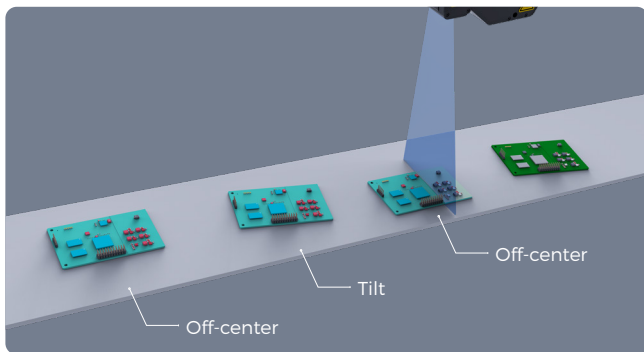
Intelligent Alignment

Automatically adjusts input images of moving parts and parts with positional offsets to stably inspect the features in the inspection region.
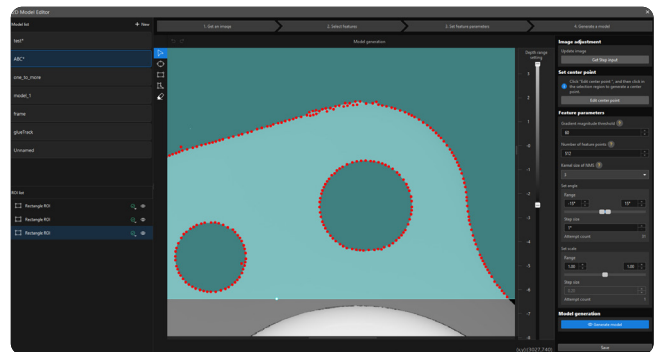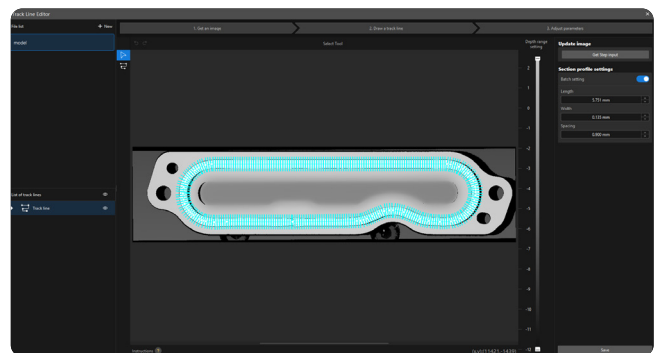

Matching Model Editing

Customizes matching models and quickly adjusts model features, achieving sub-pixel data alignment and accurate locating.

Deviation Analysis Against CAD Model

Supports full-data comparison between input images and CAD files, delivering intuitive and precise analysis of subtle part deviations.

Glue Bead Inspection

Configures complex glue bead track line in 1 minute*— measuring length, width, height, cross-sectional area, etc., in a single step.

* In accordance with the actual project circumstances

AI-Powered All-in-One 2D/3D Measurement and Inspection Solution

Leveraging robust AI capabilities, Mech-MSR addresses challenging scenarios—such as subtle features, variable shapes, and high reflectivity—while enabling rapid deployment of diverse 2D/3D quality inspection applications.

▶ Advanced Deep Learning Algorithms for Complex Challenges

Leveraging robust deep learning algorithms, Mech-MSR effectively tackles positional shifts, shape variations, and subtle differences in complex scenarios, meeting practical production needs.
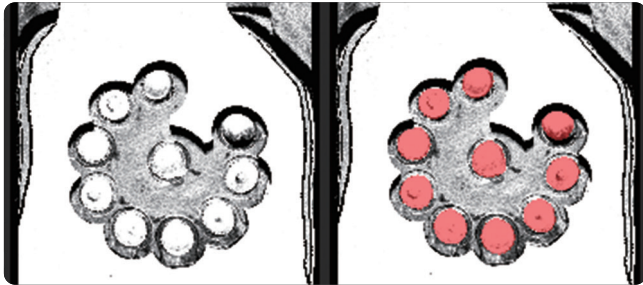
Rough Locating

When the feature shape/position varies, deep learning allows for effective rough locating of the features.
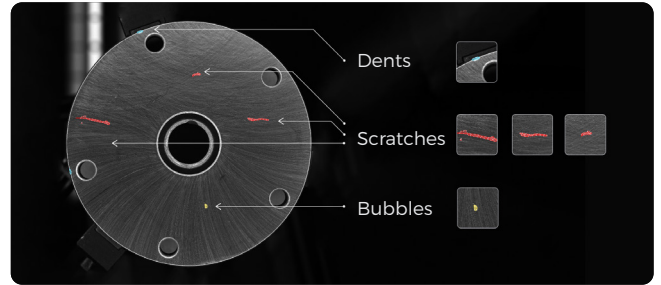
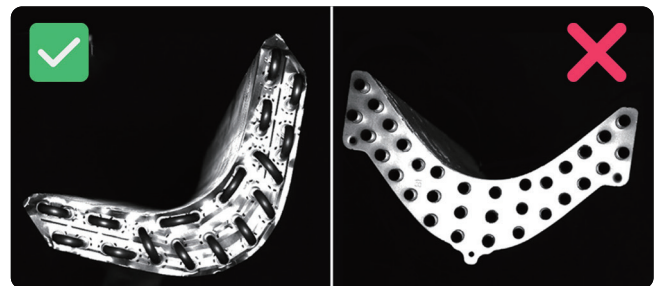### Defect Inspection

Accurately detects pixel-level defects and outputs precise defect images and classifications, achieving high-precision inspection.
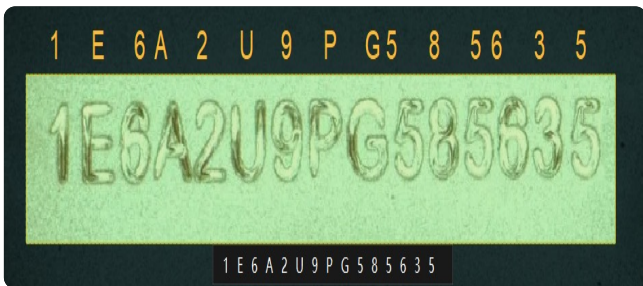
Character Recognition

Accurately recognizes characters even in challenging scenarios—blurred, skewed, or low-contrast characters.

Mistake-Proofing Check

Detects part presence and orientation errors to prevent assembly mistakes—ensuring each step's accuracy and consistency.

▶ Intelligent Denoising Algorithms for Superior Inspection Stability

With 10+ built-in preprocessing filters and 3 self-developed denoising algorithms, Mech-MSR can effectively handle noise interference caused by blind spots and high reflectivity, significantly improving inspection stability.
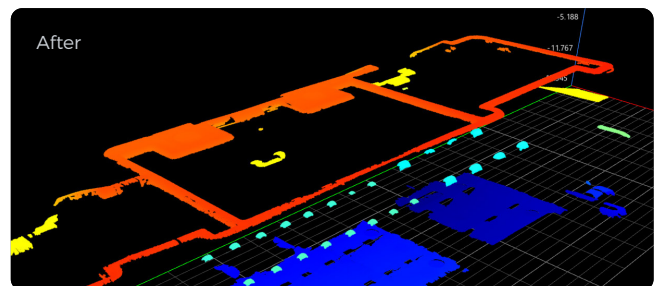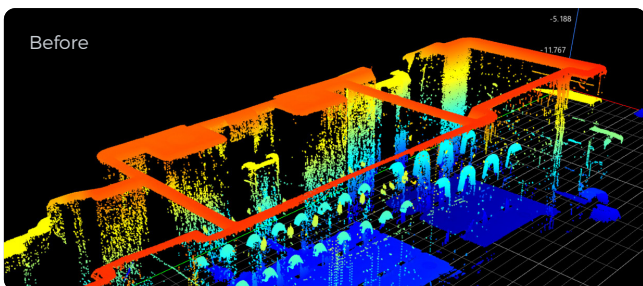
Intelligent denoising algorithms remove up to 99% of noise, ensuring reliable and stable inspection in challenging scenarios.

Proven in a Variety of Delivered 2D/3D Quality Inspection Applications

Powered by advanced AI algorithms, Mech-MSR is deployed in diverse 2D/3D measurement and inspection solutions at scale across automotive, electronics, EV-battery, photovoltaics, and other industries.
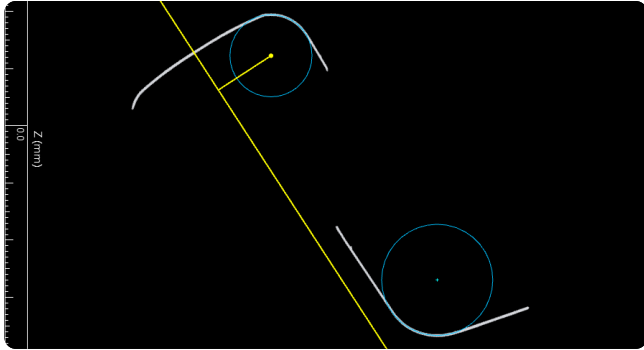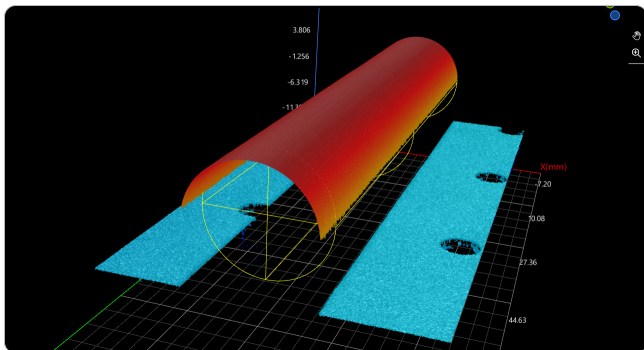

2D Profile Measurement

Extracts section profile features based on surface data and inspects parameters such as gap and flush with high accuracy.
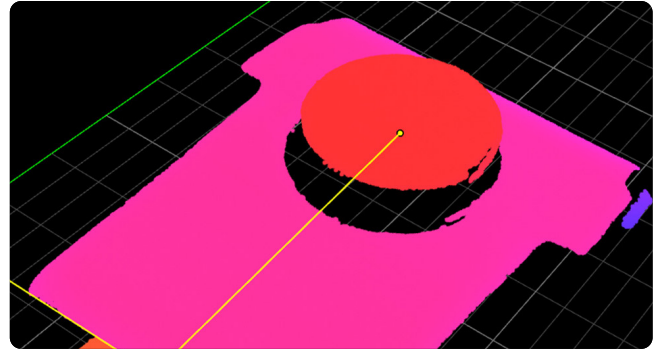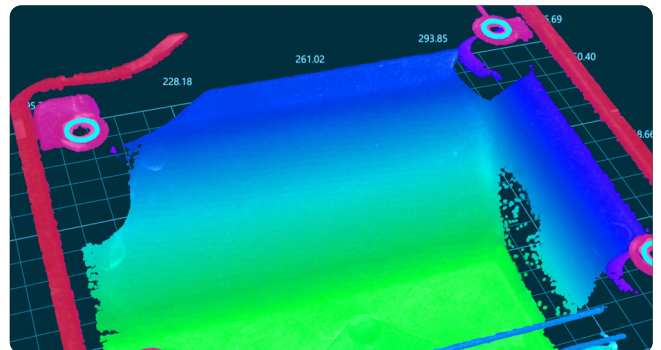

Dimensional Measurement

Measures length, width, height, and diameter of the targets. Supports complex tasks such as opposed-sensor thickness measurement.
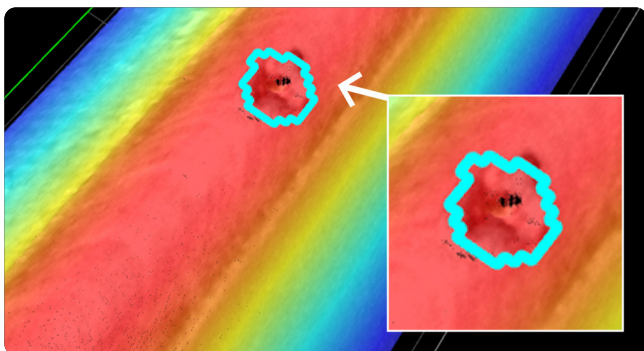

Geometric Measurement

Inspects shape features such as flatness, roundness, curvature, and contour of components.
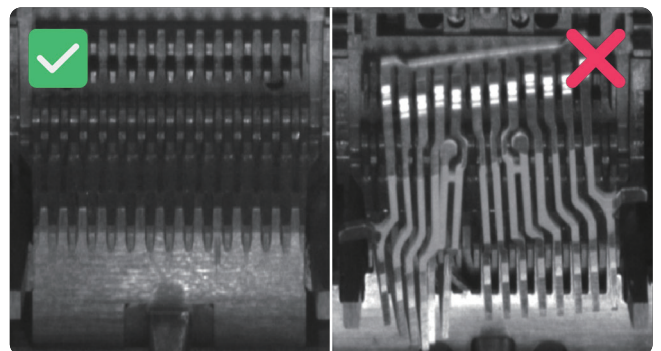

Assembly Inspection

Inspects positional accuracy, coplanarity, spacing, height differences, and other key features in assembly.
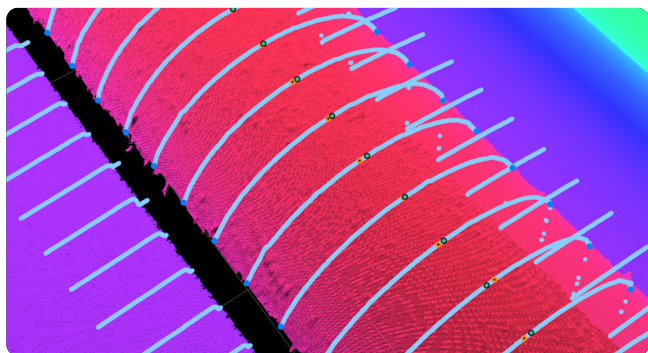

Defect Inspection

Detects common surface defects based on the depth map, such as cracks, scratches, dents, and protrusions.
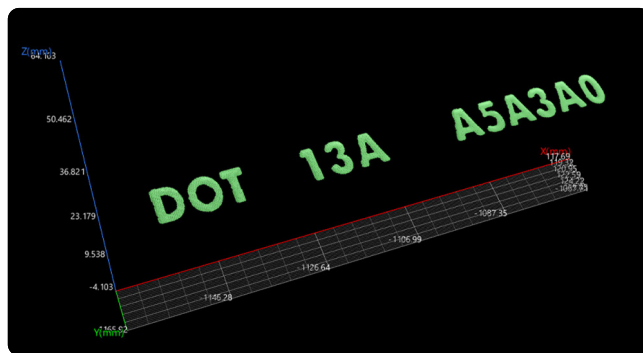

Mistake-Proofing Check

Intelligently detects part presence, orientation and other common position errors to prevent assembly errors.
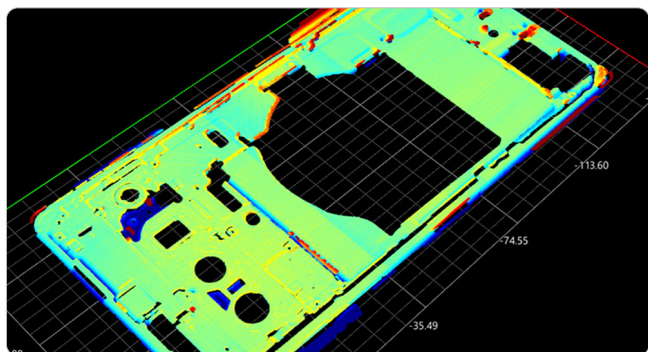
Glue Bead Inspection

Checks the presence of beads, measures their relative volume or cross-sectional area, and inspects defects such as voids, bubbles, and gaps.
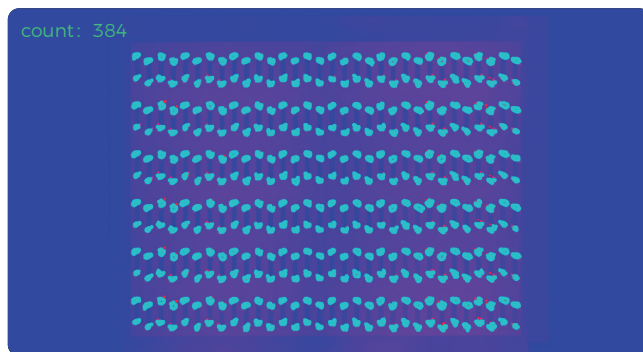

Optical Character Recognition (OCR)

Accurately locates and recognizes characters, effectively dealing with complex image backgrounds, fuzzy/randomly positioned characters, and other situations.

Deviation Analysis Against CAD Model

Performs complete data comparison between input images and CAD files to accurately analyze tiny errors of the parts.

Object Counting

Counts objects and their features in the production line in real time. Adapts to objects with various sizes and shapes.

3D VISION & AI FOR ROBOTS AND MORE

Get the most from Mech-Mind's 3D vision - get in touch with us!

Website: www.mech-mind.com
E-mail (business): info@mech-mind.net
E-mail (PR & marketing): marketing@mech-mind.net

Learning guidance to deploy your vision application STEP BY STEP, please visit

Documentation: docs.mech-mind.net
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