DΛOΛI

DaoAI World
BUILD A VISUAL AI IN 6 STEPS

DaoAI World is an AI machine vision training platform that features well-tuned models for industrial defect inspection.

Users can leverage 9 AI models for tasks ranging from instance segmentation to unsupervised defect segmentation. The platform features smart labeling to reduce annotation time and allows users to import pre-annotated data for a faster transition. DaoAI World enables users to quickly build a reliable vision system that enhances production quality and assurance with minimal human effort.

DaoAI World delivers powerful AI-driven machine vision tools directly to your fingertips. Our comprehensive platform ensures high-speed inference, robust performance, accurate predictions, and overall data tracking, which drives industrial automation success.
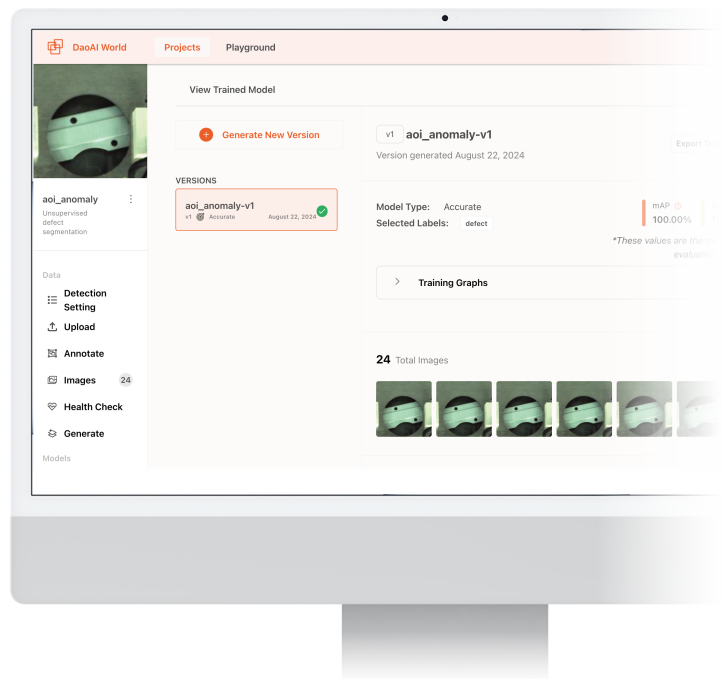
KEY FEATURES

AI Models

9 fine-tuned AI models that adapt to all common industrial machine vision applications.

See page 3

Smart Labeling

Smart labeling leverages AI algorithms to annotate objects with a single click, achieving annotation speeds up to 10 times faster.

See page 7

Unsupervised AI learning

It empowers AI to learn and extract valuable insights from only a few positive samples, eliminating the need for for costly defect data collection.
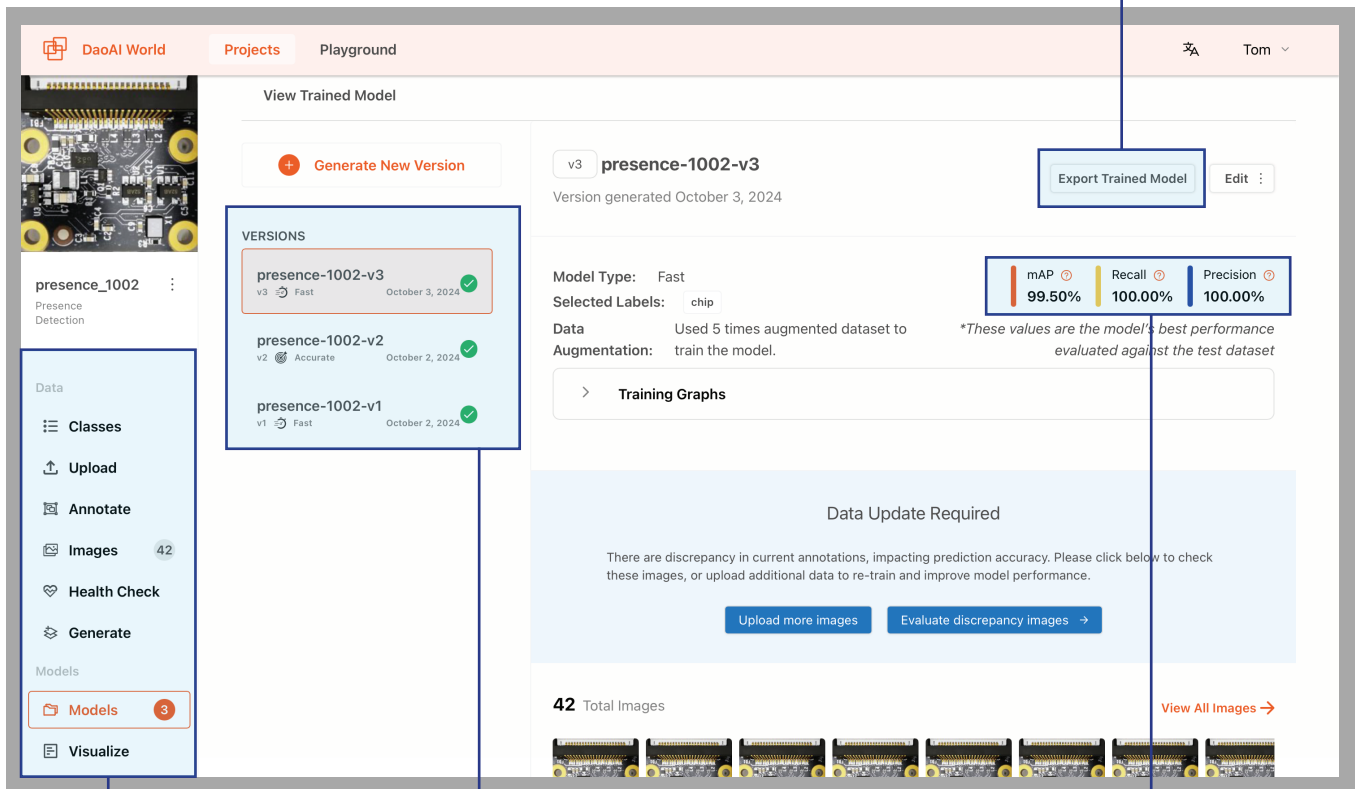
See page 7

Dataset Versions and Collaboration

It unifies training dataset management, enabling collaboration and providing flexible version control and export options.

See page 9

ALL IN ONE PLATFORM - ENABLE INSPECTIONS FROM BASIC TO ADVANCED

One Click to Export:

Easily export your model once training is complete.

Intuitive to Use:

A clear and user-friendly menu providing step-by-step guidance to set up an AI project and generate the model.

Training Versions Review:

View all training version, allowing user to pick the best result for real implementation.

Check Result:

Instantly view metrics such as mAP, recall, and precision during training.

■ AI MODELS

DaoAI World provides 9 fine-tuned AI models that have been verified across tons of real-world in-field applications, offering numerous advantages, including accelerated development, reduced costs, and improved performance.

Unsupervised Defect Segmentation

The AI model learns from defect-free images, enabling it to identify defects as deviations from the norm. This eliminates the need for costly defect data collection or defect sample production. Defect images are only required for testing and verification, making it ideal for detecting anomalies when defects or defects categories are unknown in advance.
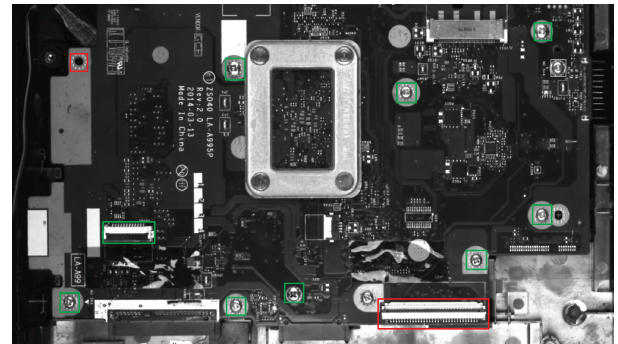

Detection Modes

Unsupervised defect segmentation offers two detection modes. Users can choose 'Image-level' detection for detecting orientation or assembly verification, or 'Pixel-level' detection for identifying defects such as dents and scratches on an item.

Fast Inspection
IMAGE LEVEL DETECTION

▶**Ideal for quick anomaly detection such as detecting oriantation and assembly verification.**
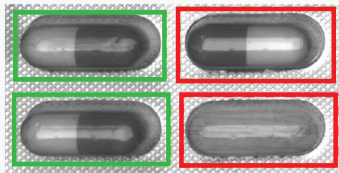
Whole Image
Performs detection on the entire image, indicating if defect is present. Ideal for single-item inspections. (10ms / image)
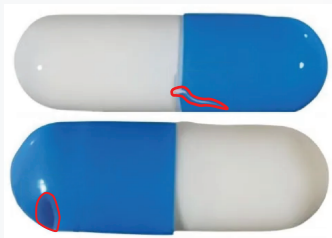
or

Selected Region
Performs detection on the each specified area and indicates if each area has defect or not. (10ms / selected item)

Accurate Inspection
PIXEL LEVEL DETECTION

▶**Ideal for identifying defect such as dents, scratches, unknown parts and openings.**

Whole Image
To optimize performance, DaoAI World offers three types of image processing methods. (40ms / patch)
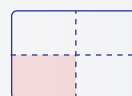
or

Selected Region
Performs detection on the specified area and identifies the defect with greater detail. (40ms / selected region)

▼ Choose image processing method

Single Patch
Compress the image to a 512x512 pixels patch, analyze from the entire patch for fast inspection.
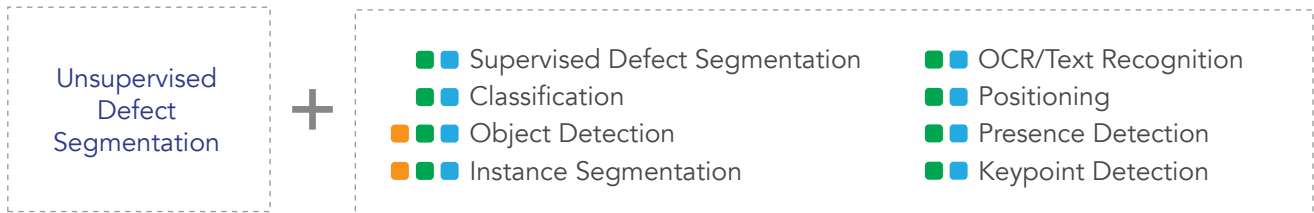
Normal
Slice the image into regions of 512x512 pixels, analyze from each region to gather to improve accuracy.

High Detail
Slice the image into regions of 256x256 pixels, analyze from each region to obtain the highest accuracy.

■ AI MODELS

<table>
<tr><td rowspan="4">Unsupervised
Defect
Segmentation</td><td rowspan="4">+</td><td>■■ Supervised Defect Segmentation</td><td>■■ OCR/Text Recognition</td></tr>
<tr><td>■■ Classification</td><td>■■ Positioning</td></tr>
<tr><td>■■■ Object Detection</td><td>■■ Presence Detection</td></tr>
<tr><td>■■■ Instance Segmentation</td><td>■■ Keypoint Detection</td></tr>
</table>

Provided Training Models

Fast Models: Prioritize speed, suitable for real-time or high- throughput environments. (Quick decision-making) Eg: Assembly Line Quality Control. Robotic Pick-and-Place Operations.

Accurate Models: Emphasize precision and reliability, even if they are slower than their fast counterparts. Used in critical applications where identifying even minute defects or anomalies is crucial. Eg: Surface Defect Inspection.

Rotated Accurate Models: Designed to handle images where objects may appear at various orientations, ensuring consistent performance despite rotations/angular shifts. Critical for scenarios involving irregularly placed items or variable orientations.

Instance Segmentation

Identify and separate individual objects within an image, assigning each a unique label. This method provides the precision needed for applications in object tracking, quality inspection, and robotic vision.
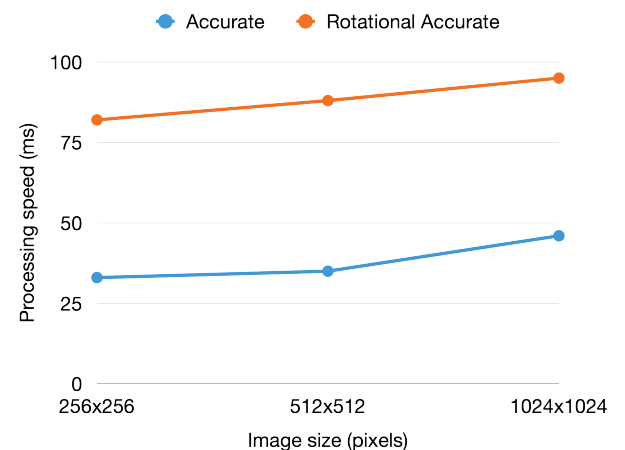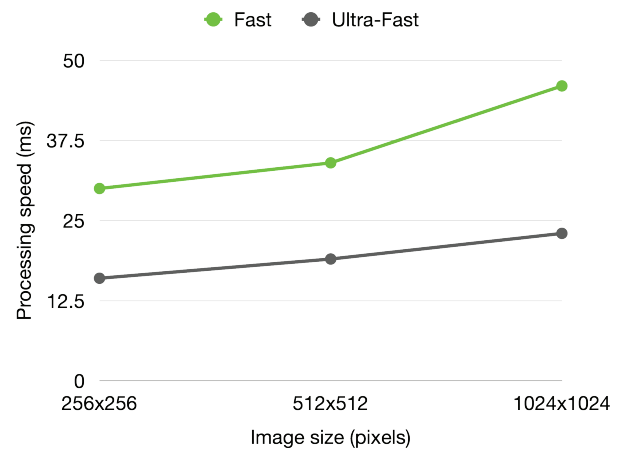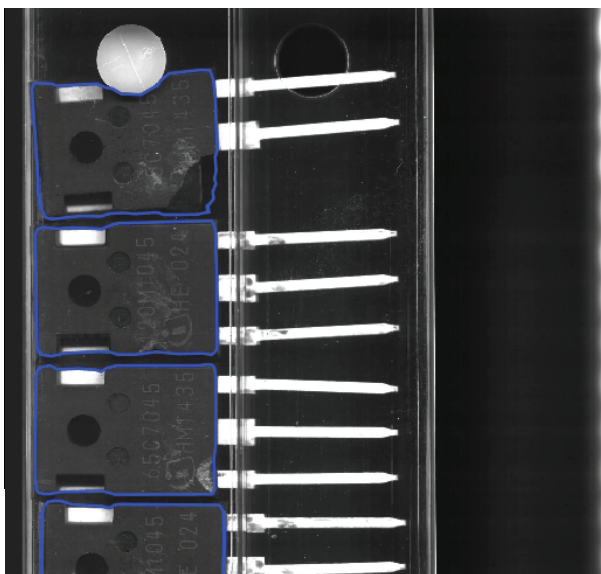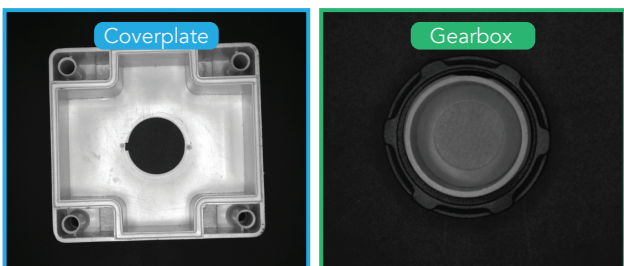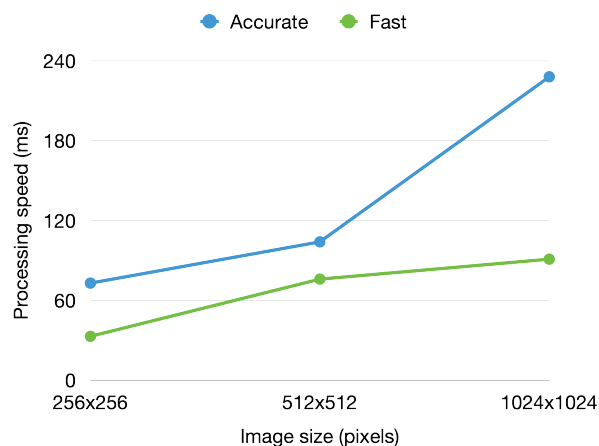
■ AI MODELS
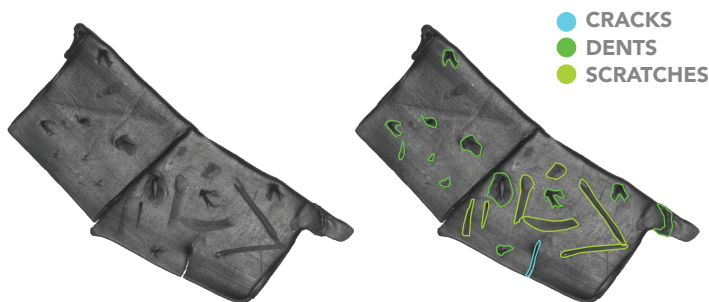
● CRACKS
● DENTS
● SCRATCHES

Supervised Defect Segmentation

Trains a model using both defected and non-defected images. The model learns to classify and segment various types of defects, distinguishing between different defect classes. By relying on labeled defect annotations, this model is ideal when precise defect identification is needed.

Classification

Helps categorize objects within images into specific classes or labels and distinguish between defective and non-defective items.
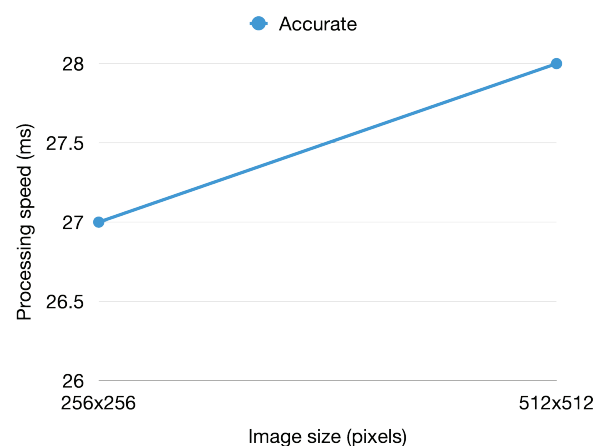
Object Detection

Object Detection can identify and label objects within an image, providing information about their positions, types, and quantity. This technique is useful for applications that need to recognize multiple objects at the same time.

● GOOD   ● BAD

AI MODELS

OCR/Text Recognition

Extracts readable text from images, even deciphering deformed or skewed text. It transforms scanned documents, receipts, license plates, and other text-rich visuals into editable and searchable data.
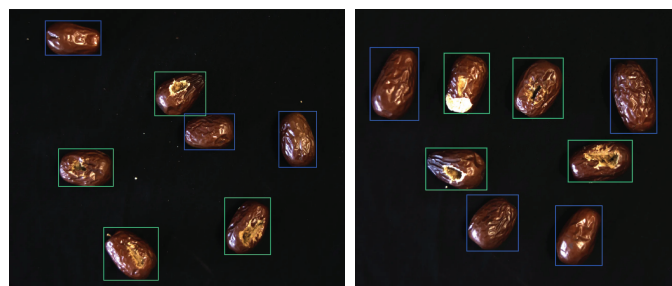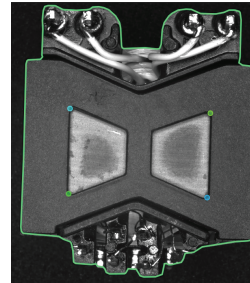

Location (Center Of Keypoints):

X: 1408.86
Y: 922.51

Orientation:

Angle: 1.52

Positioning

Accurately detects and output the location of objects within an image, providing precise spatial data. This capability helps automate processes such as robotic guidance and assembly line monitoring by enabling systems to understand the exact placement of parts and equipment.
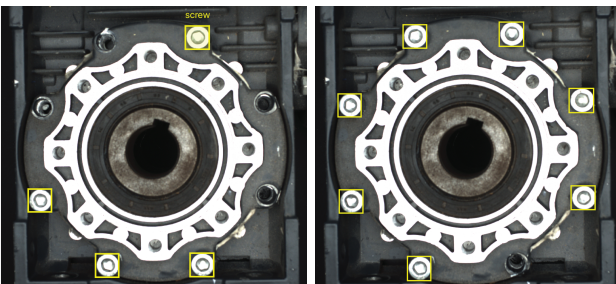
Presence Detection

Identifies the presence of object in the image by searching for each individual item. Commonly used for checking for misplacement and missing parts.
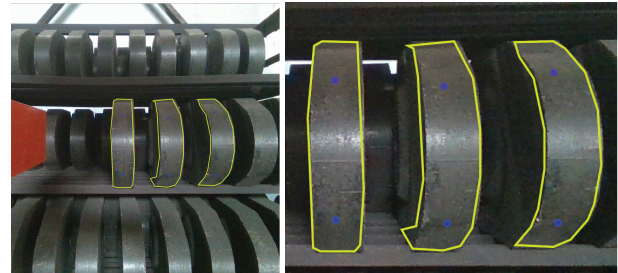
Keypoint Detection

Identify and pinpoint distinctive features or locations in images. These keypoints serve as reference markers for robotic guidance.

■ TRAIN YOUR AI IN A SMART AND FAST WAY FOR OPTIMAL RESULTS

We understand the challenges involved in training AI models—it often requires significant resources, including large amounts of data and substantial human effort. DaoAI World is designed to help you overcome these obstacles with ease.

Unsupervised AI Learning With Few Positive Samples Alone

Unsupervised AI learning empowers AI to learn and extract valuable insights from just a few positive samples, without requiring negative or contrasting examples. By identifying patterns, structures, and relationships within the provided data, AI can generalize knowledge and make accurate predictions or classifications. Through this method, users can harness the power of AI to build smarter systems with less data preparation effort.

	Unsupervised AI Learning	Edge AI	Typical Deep Learning
Data Requirement	1-20 positive samples	Dozens of positive and defect samples.	100+ sample
Learning Time	With-in 1 minute	Several minutes	Several hours to days

Smart Labeling

By combining machine vision with intelligent algorithms, smart labeling allows users to annotate objects with a simple click - eliminating the need to manually trace edges by clicking and dragging.

Smart Labeling
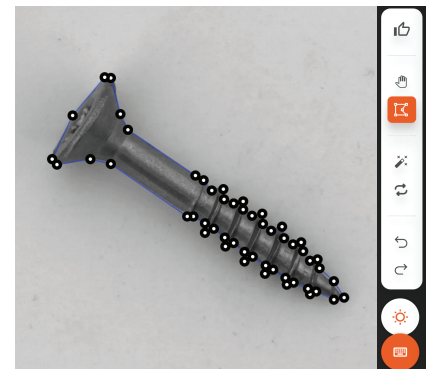
Manual Labeling

COMING FEATURE:
Scaling Up with Edge AI

Enabling real-time on-device data processing, independent decision-making, reduced training time, and minimized data requirements.

■ COMPREHENSIVE ADAPTABILITY AND INTEGRATION

DaoAI World simplifies the transition from your current platform to runtime deployment. We support direct upload of pre-annotated data (.json) files from existing projects and provide software development kits and multiple deployment method to accelerate implementation.

Annotated Data Transition

DaoAI World allows direct upload of pre-annotated data files and data from existing projects. Users can import previous labels, bounding boxes, segmentation masks, and other image annotations to save time and avoid duplicate work.

This means transitioning from your current platform to DaoAI World increases accuracy and expands on available tasks without requiring additional effort to manage your existing data chain.

DaoAI World also supports exporting annotated files in JSON format for seamless workflow integration, simplifying data management across multiple tools without redundant effort.

Support format:
- COCO JSON
- Pascal VOC
- YOLO v8 Pytroch
- YOLO v5 Pytroch
- VGG Image Annotator JSON (VIA)

Flexible, Scalable Solutions for Seamless Integration

DaoAI offers versatile and efficient solutions to meet the varying needs of users with different computational and operational requirements.

Standard SDK
Supports C++, C#, and Python. This method involves downloading pre-trained models from the DaoAI World server and performs efficient inference locally using your device's resources. It offers flexibility and complete offline autonomy.

Self-Hosted Inference Server
Built upon the Standard SDK, this method enables setting up a local inference server that communicates via HTTP requests. The key advantage is that it eliminates the need to integrate the SDK environment directly into your application, ensuring complete decoupling between the inference service and your program for greater flexibility and modularity.

DaoAI World Hosted Inference Server (Only Available For DaoAI World Enterprise)
This method supports Python and utilizes HTTP API calls to perform inference using models hosted on the DaoAI World server, enabling simultaneous training and inspection. It is ideal for scenarios with limited local computational resources, offering fast, seamless integration and deployment.
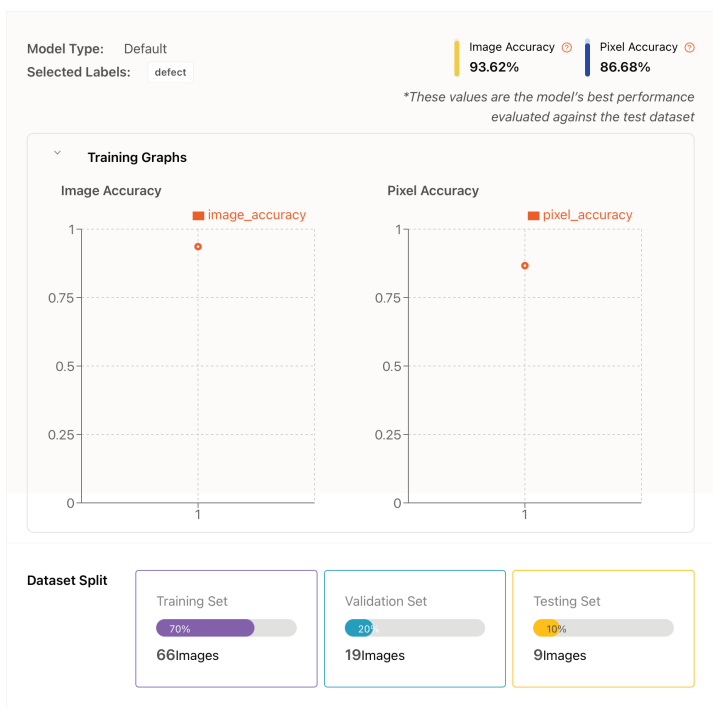
EASE OF USE AND DATA MANAGEMENT

DaoAI World provides machine learning with real-time collaboration and centralized data management. Its integrated features, including unsupervised AI learning, smart labeling, and dataset versioning, ensure efficiency, accuracy, and scalability for AI-driven production workflows.

Allows Seamless Data Sharing and Real-time Data Monitoring

Supports real-time collaboration that enables team members to work on the same project. Allowing multiple users to annotate data, adding new training sessions or fixing errors, simultaneously. Bring consistency and efficiency in the annotation process.

Entire machine learning pipeline exists in one central repository for data monitoring. Shared accounts (*"Workspaces"*) house all source images, annotations, datasets and trained models (both ready to be deployed, and actively in-deployment).

Model Type: Default Selected Labels: defect	Image Accuracy ⓘ **93.62%** Pixel Accuracy ⓘ **86.68%** *These values are the model's best performance evaluated against the test dataset*

Training Graphs

Image Accuracy
■ image_accuracy

Pixel Accuracy
■ pixel_accuracy

Dataset Split

Training Set	Validation Set	Testing Set
70%	20%	10%
66Images	19Images	9Images

Training Metrics
During training, it tracks mean average precision (mAP), precision, recall, and training loss. After training is done, track training time and single image inference time.

Process Tracking
Monitor dataset labeling and review completion.

Workflow Status
Provide an end-to-end workflow view, monitor pipeline stages from ingestion to deployment.

Annotation Quality
Assess annotation accuracy and consistency.

Reviewing Versions of Model Performance

Managing dataset versions and tracking model performance are critical for a transparent and well-documented workflows. Each model can be linked to a specific dataset version, maintaining consistency as the datasets evolve.

Detailed User Manual for Learning

User manual are provided to guide users through setup and the training process. Our team provides personalized onboarding and education sessions to ensure a smooth transition and optimal platform use. DaoAI World offers tutorial videos and blog posts that address common pitfalls.

EASE OF USE AND DATA MANAGEMENT

SIX STEP TO CREATE A TASK MODEL

1

Upload Image
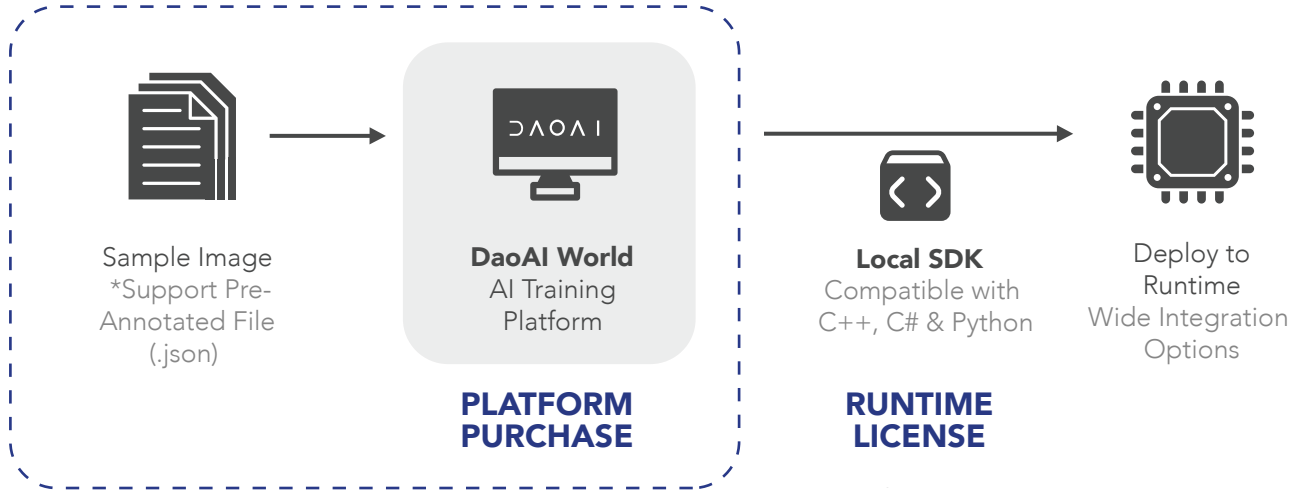DaoAI World supports users to upload single image or entire folders in png, jpg, jpeg, and bmp formats.

2

Annotate Image
Advanced labeling tools that enhance efficiency, supporting various annotation types for various detection tasks. AI-powered "Smart Labeling" accelerates and enhances annotation accuracy.

3

Generate Dataset Versions
Create structured versions of your dataset to track and compare changes over time. (Iterative improvements and ensures data consistency)

Pre-Processing
By resizing and recolouring the original image for a consistent analysis and data tracking.

Data Augmentation
By twitching and rescaling the limited amount of original image, AI train with new sets of "edited" data to expand learning.

4

Train A Model
Easily initiate the model training process. DaoAI World automates much of this step to simplify workflow for users. Enable users to view the model training status from real-time training chart.

Detection Modes
Refer to Page 3 for more info.

Fast Models
Accurate Models
Rotated Accurate Models
Refer to Page 4 for more info.

5

Deploy the Model
Deploy trained models seamlessly with DaoAI World. Ensuring quick integration into production environments.
Refer to Page 8 for more info.

6

Optimize Performance
Users can access confidence metrics and manage confidence parameters to rapidly adjust the inspection model.

■ USAGE DIAGRAM

6 STEPS

Sample Image
*Support Pre-
Annotated File
(.json)

DaoAI World
AI Training
Platform

**PLATFORM
PURCHASE**

Local SDK
Compatible with
C++, C# & Python

**RUNTIME
LICENSE**

Deploy to
Runtime
Wide Integration
Options

■ OPTIMIZATION AND SCALABILITY TAILORED TO YOUR NEEDS

	ENTERPRISE			INDUSTRIAL		
	Beginner	Regular	Pro	Beginner	Regular	Pro
GPU	NVIDIA RTX4080 16G x 4	NVIDIA RTX4090D 24G x 4	NVIDIA RTX4090D 24G x 8	NVIDIA RTX4060Ti	NVIDIA RTX4080	NVIDIA RTX4080 + NVIDIA RTX4060Ti
CPU	Intel Xeon Gold 6330 x 2			Intel Core I7-10700K		Intel Core I7-10700K
Storage	480GB 2.5in (SATA SSD) x 1 3.84TB 2.5in (SATA SSD) x 5			1TB SSD M.2		2TB SSD M.2
RAM	32GB DDR4 x 8			16GB DDR4 x 2		32GB DDR4 x 2

Multiple GPUs can enable real-time inference or simultaneous training of multiple models.

■ USE CASE

Keyboard Defect Detection
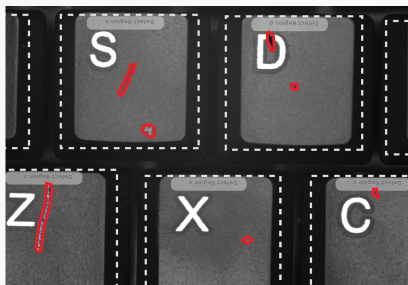
APPLICATION
Electronics

TRAINING MODEL
Unsupervised Defect Segmentation

Common keyboards are typically black and may develop various defects on the keycap surface, such as faint scratches, chipped paint on printed text, or even fingerprints. By leveraging an Unsupervised Defect Segmentation model, we successfully trained the system to identify all the defects without defect annotation.

Enhancing Track Link Inspection with Instance Segmentation

● **TOP**   ● **BOTTOM**
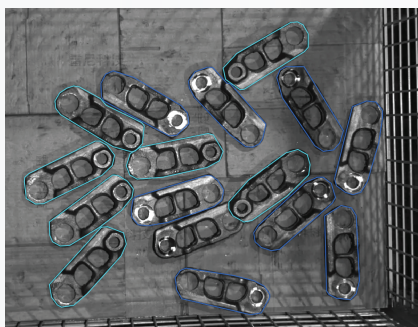
APPLICATION
Machinery Manufacturing

TRAINING MODEL
Instance Segmentation

The quality of track links directly affects the performance of tracked machinery, yet traditional inspection methods struggle to accurately identify subtle defects. Instance Segmentation, powered by AI, not only detects track links but also precisely segments their contours, ensuring reliable inspection without background interference. Regardless of lighting variations or surface wear, the model consistently identifies cracks, wear, and assembly errors, enhancing quality control accuracy. Additionally, the data collected by the system can be used to optimize material selection and design, extending the track links lifespan.

Fruit Appearance Inspection and Sorting
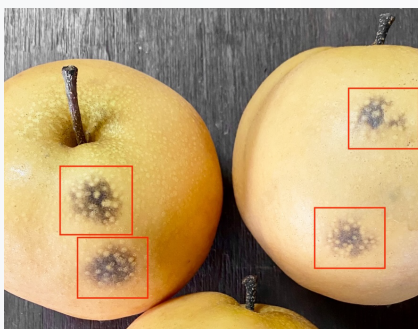
APPLICATION
Food & Agricultural

TRAINING MODEL
Object Detection

The model Object Detection model enables the detection of surface damage and quality grading for fruits and other agricultural products. Utilizing AI visual systems, it inspects food appearance for defects, confirms dimensions, and measures volume. Ideal for intelligent fruit quality inspection in agricultural production lines, it automates grading, helping farmers and processing companies select premium-quality fruit while identifying products that require additional processing. This improves both pro- duction efficiency and product quality. Additionally, the system can classify and identify acceptable products, ensuring compliance with market standards.

## AI-Powered Wheel Stud Detection for Precise Assembly
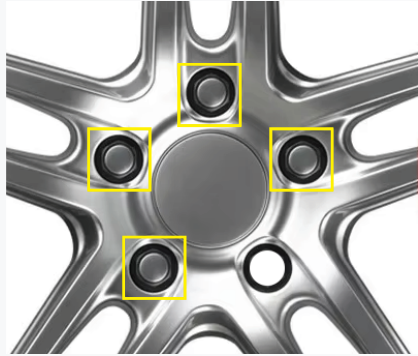
APPLICATION
Automotive Assembly Inspection

TRAINING MODEL
Presence Detection

Our AI-driven wheel stud detection system ensures accurate identification of missing bolts before lug nut installation. Unlike traditional vision systems, it adapts to varying wheel designs, reflective surfaces, and different stud placements—whether protruding or recessed. By learning from multiple angles and lighting conditions, it reliably verifies the correct number and positioning of studs, guaranteeing precise assembly.

Enhancing Package Traceability with AI-Based OCR
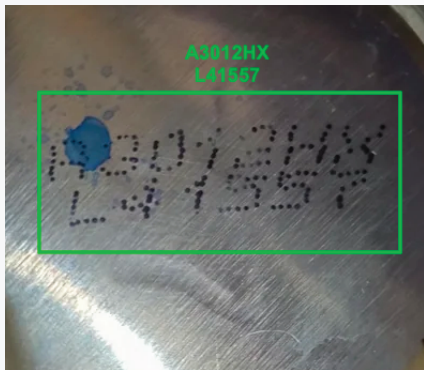
APPLICATION
Packaging Industry

TRAINING MODEL
OCR/Text Recognition

Manufacturers require robust systems to track and verify package traceability throughout the supply chain. However, challenges arise with low-contrast printed codes on labels or deformed, embossed characters on molded parts like bottle caps, which often contain critical date/lot information. Traditional OCR/OCV solutions demand extensive font training and still struggle with difficult-to-read codes. In contrast, AI-based OCR/OCV technology automatically deciphers poor-quality characters, enhancing traceability, ensuring compliance with food safety regulations, and streamlining recalls with minimal disruption to production.

## AI-Driven Tablet Inspection: Ensuring Quality and Minimizing Recall Risks

APPLICATION
Pharmaceutical & Medical

TRAINING MODEL
Classification

Tablets, a common form of oral medication, undergo visual inspection to ensure they meet quality standards. Any defects or foreign materials are removed to avoid contamination and prevent costly recalls. Manual inspection, prone to error, is often used due to visual complexity, but traditional machine vision isn't effective.

DaoAI world solves this by training on images of acceptable tablets, accurately detecting defects even if they're not in the training set. This ensures undamaged tablets reach consumers, protecting brand reputation and minimizing recall risks.

Dental Braces Defect Detection
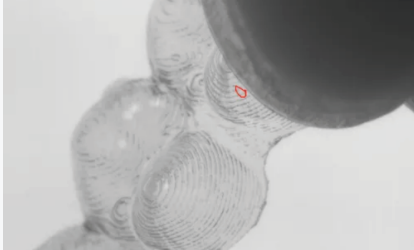
APPLICATION
Pharmaceutical &
Medical

TRAINING MODEL
Supervised Defect Segmentation

Using World-trained models to inspect dental braces quality. Even with transparent aligners, it can precisely detect defects such as wear, chips, or foreign objects, effectively ensuring product quality.

## Enhancing Precision in Automated Production with Visual AI

APPLICATION
Machinery Manufacturing

TRAINING MODEL
Positioning

In automated production, precise positioning of the latch is crucial. Use Visual AI to identify key points, ensuring accurate alignment even if the part rotates or deforms. This enhances assembly efficiency, reduces defects, and makes manufacturing more stable and efficient.

## Empowering Robots with Vision: Precision Detection for Robotic Automation
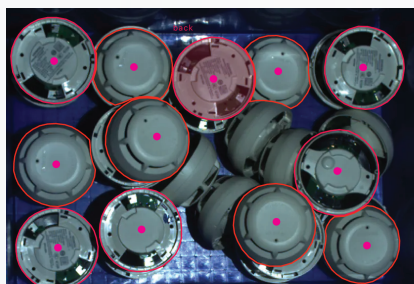
APPLICATION
Robotic Automation

TRAINING MODEL
Keypoint Detection

This technology acts as the "eyes" of the robot, enabling high-precision recognition of the front and back of each smoke detector while accurately locating its center point. This not only allows robots to complete picking or assembly tasks swiftly and accurately but is also widely applied in pose estimation, intelligent manufacturing, and other fields.

Rail Surface Defect Detection and Image Enhancement
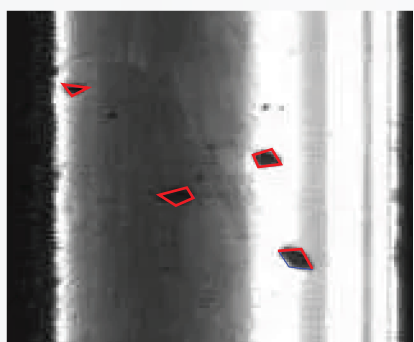
APPLICATION
Rail Defect Inspection

TRAINING MODEL
Unsupervised Defect Segmentation
Pixel Level Detection

The high reflectivity of railway tracks and varying lighting conditions complicate training and judgment. DaoAI World enhances data with histogram equalization and manual image adjustments. The Unsupervised Defect Segmentation model, trained on defect-free samples, detects cracks, scratches, foreign objects, and corrosion. This unsupervised approach improves detection efficiency and accuracy without requiring extensive labeled data.
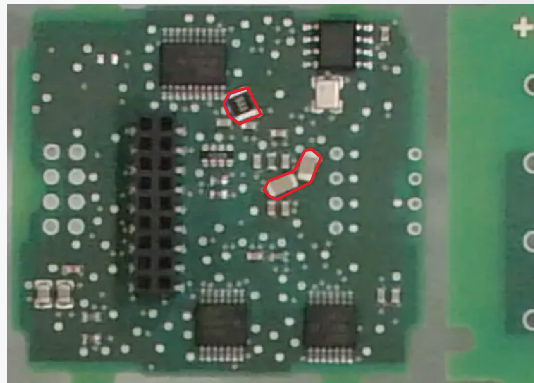
Detecting Unidentified Foreign Objects in EV Battery Assembly

APPLICATION
Automotive / EV Battery Inspection

TRAINING MODEL
Unsupervised Defect Segmentation
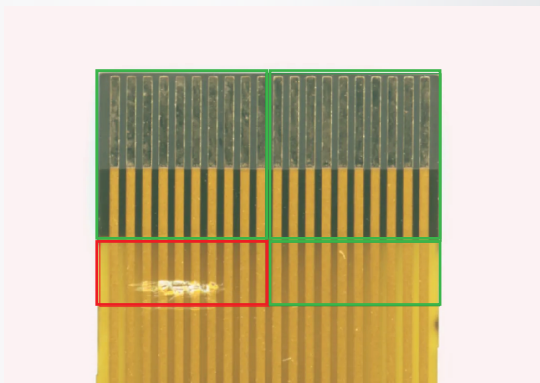Pixel Level Detection

AI-Powered PCB Defect Detection for Unknown Defect.

APPLICATION
Electronics/PCB Inspection

TRAINING MODEL
Unsupervised Defect Segmentation
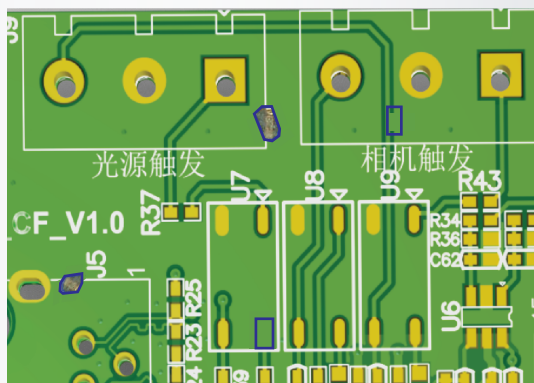Pixel Level Detection

FCP Defect Detection with Unsupervised Defect Segmentation

APPLICATION
Electronics/FCP inspection

TRAINING MODEL
Unsupervised Defect Segmentation
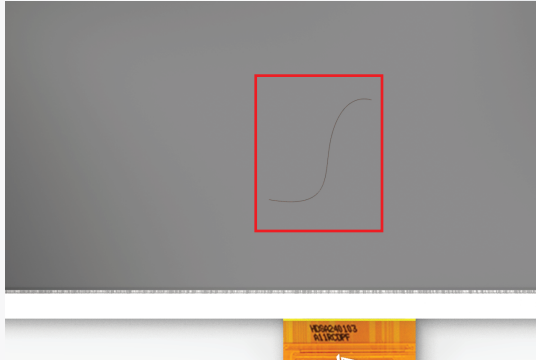Image Level Detection

Unsupervised Defect Detection for Chip

APPLICATION
Semiconductors Defect Inspection

TRAINING MODEL
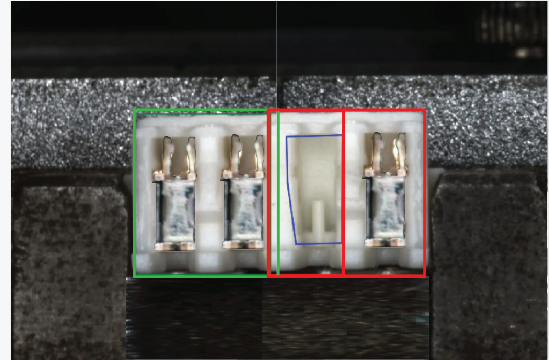Unsupervised Defect Segmentation
Pixel Level Detection

Enhancing Panel Defect Detection with Unsupervised Learning

APPLICATION
Panel Defect Inspection

TRAINING MODEL
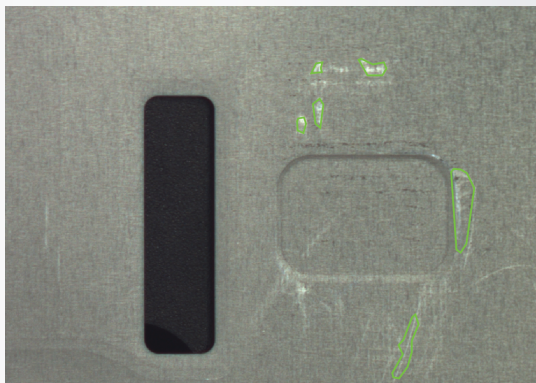Unsupervised Defect Segmentation
Pixel Level Detection

Efficient Electronic Connector Inspection

APPLICATION
Electronic/Connector Inspection

TRAINING MODEL
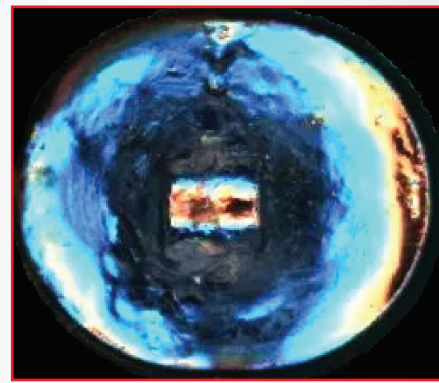Unsupervised Defect Segmentation
Pixel Level Detection

Scratch On Highly Reflective Surfaces

APPLICATION
Battery Holder Defect Inspection

TRAINING MODEL
Supervised Defect Segmentation

AI-Powered Solder Joint Inspection

APPLICATION
PCB Board Soldering Inspection

TRAINING MODEL
Classification

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