Mech-Mind Robotics

AI + 3D Vision Applications in Food and Beverage

We Help Integrators WIN
with best-in-class AI + 3D vision tools and services.

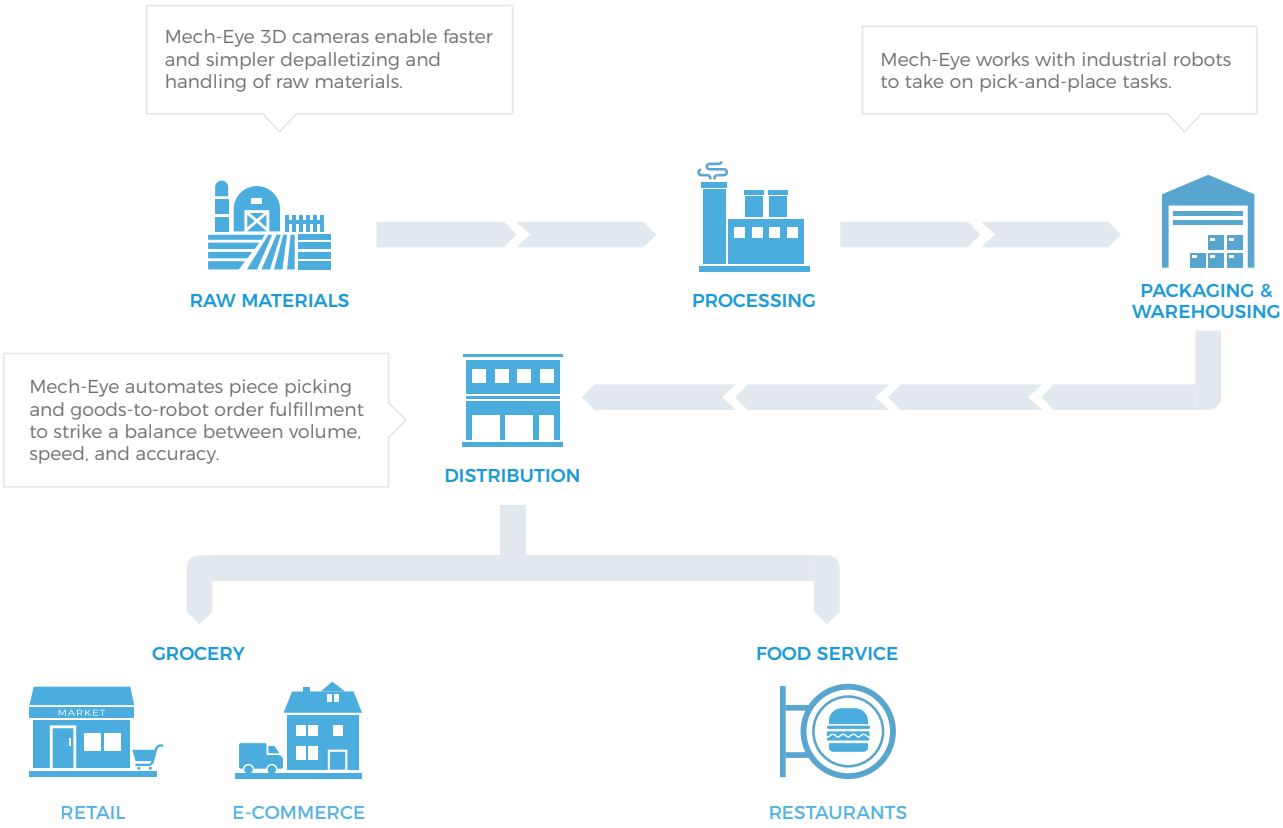
Advanced Techs | Proven | Versatile | Fast and Easy | No Black-Box | Industry-Ready | Open | Best Services

Mech-Mind – AI + 3D Vision Pioneer in Food and Beverage (F&B)

The F&B industry is under pressure to serve stricter consumer needs. From source to consumer, food and beverages are required to reach the market quickly while meeting strict hygiene standards. The entire supply chain involves many processes, making it uncertain and complex. 3D vision technologies have advanced robotic automation in food supply chain, making all processes more agile and resilient.

Mech-Mind Robotics, a global leader in AI and 3D vision, offers **proven, versatile, and easy-to-use industrial 3D sensors and software** to solve a variety of vision-guided robotic applications. We understand the importance of automation in meeting industry challenges, and our innovative AI and 3D vision tools deliver efficient, reliable performance to serve all clients' needs.

FOOD SUPPLY CHAIN



Mech-Mind AI + 3D Vision Solution

Vision-Guided Depalletizing

Vision-guided robots depalletize single-SKU pallets or pallets loaded with cases/sacks/totes of mixed weights and sizes.

Capabilities

- **Universal pallets and patterns**

  Works with typical pallets (e.g., 1.2 m × 1.2 m × 1.8 m).

  Manages tall pallets (as tall as 2.3 m).

  No need to stack cases/sacks/totes in a defined pattern.

- **Handle edge cases and unlimited SKUs**

  Handles wrinkled, unsealed, and damaged objects.

  Handles objects with different colors and highly reflective tape.

  Recognizes thousands of cases, bags and totes.

- **High-speed depalletizing**

  Industry-leading pick rates ensure higher output.

  The advanced multi-pick strategy allows accurate picking of multiple cases in one grasp.

- **Reliable unloading**

  Collision detection and path planning algorithms guarantee collision-free operation.

Recommended Cameras

- Mech-Eye DEEP

Point Clouds and Recognition Results

Tightly stacked cases

Deformable sacks

Case Study

Vision-Guided Depalletizing of Shrink-Wrapped Bottles

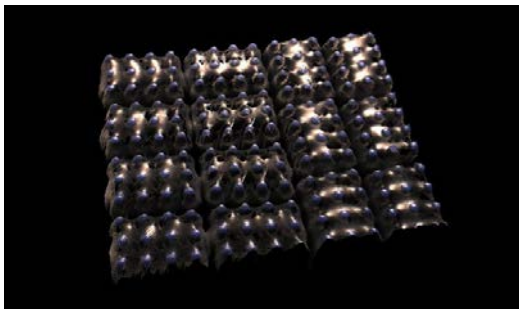
Large logistics company

The Challenge

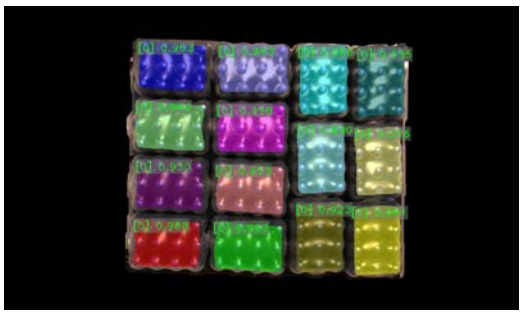
Uneven, transparent shrink-wrapped bottles are stacked in many different patterns, which poses a big challenge to imaging and recognition.

The Mech-Mind Solution

- Capture accurate point clouds of **uneven, tightly stacked** shrink-wrapped bottles.
- The image stitching algorithm enables the **complete point clouds** of the entire-layer bottles **in one shot**.
- **Multi-pick:** The vision system calculates the ideal pick points and the robot grasps a row of bottle cases in one go.
- Enable stable robotic depalletizing in compact spaces driven by collision detection and path planning algorithms.



Point cloud



Recognition result

The Result

- Successful recognition rate: ≥ **99.95%**.
- Adapt to **100+** types of bottles.

Case Study

Vision-Guided Sack Depalletizing

Large food factory

The Challenge

The grain sacks are tightly piled on the pallets. Their wrinkled and patterned surfaces make accurate recognition much difficult when robots are depalletizing these sacks.

The Mech-Mind Solution

- Mech-Eye DEEP, installed above the workstation, covers large pallets.
- Capture the point clouds of the whole layer with **only one exposure**.
- Accurately identify poses and positions of sacks with wrinkles and patterns.
- The system calculates the optimal pick point, allowing for accurate robotic operation.
- **Path planning** and **collision detection** algorithms allow for stable and collision-free depalletization.

Point cloud

Recognition result

The Result

- Successful recognition rate: **≥ 99.9%**.
- Accurate recognition and collision-free robotic operation ensure higher efficiency.

Case Study

Vision-Guided Case Depalletizing

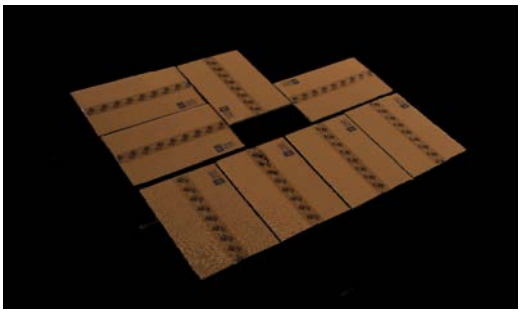
Large automation company

The Challenge

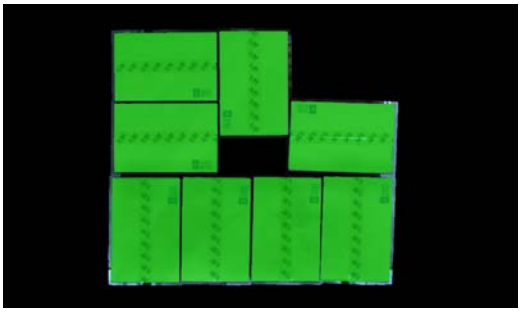
At the automation company, there are numerous food and beverage cases. The vision system needs to adapt to various cases in different sizes.

The Mech-Mind Solution

- Mech-Eye DEEP, installed above the workstation, covers large pallets.
- Create clear and detailed point clouds of **cases with patterns and tape**.
- Generate the pose and position information of the target objects.
- **Multi-pick:** The vision system calculates the ideal pick points and the robot grasps a row of cases in one go.



Point cloud



Recognition result

The Result

- Successful recognition rate: ≥ **99%**.
- Adapt to various case types.

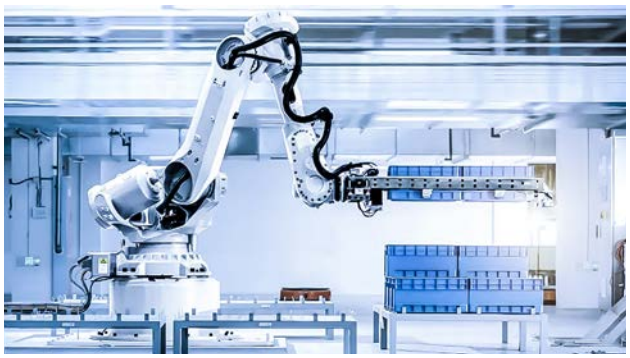
Case Study

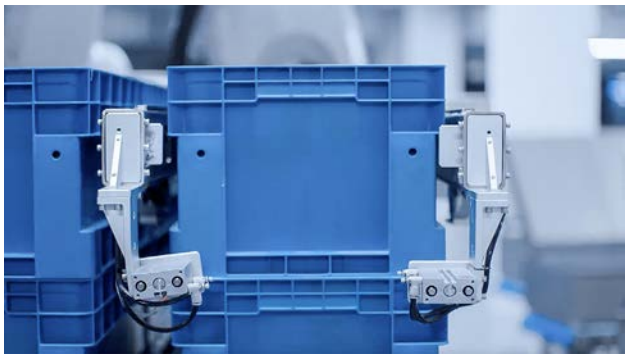
Vision-Guided Tote Depalletizing

Large food factory

The Challenge

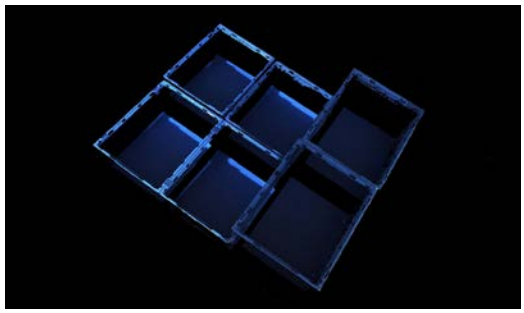
Robots are required to depalletize and palletize totes in a designated stacking pattern with higher accuracy and efficiency than manual operation.



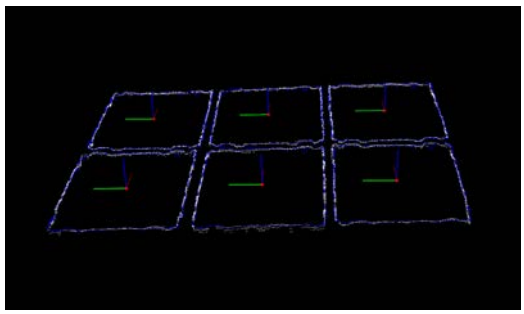


The Mech-Mind Solution

- Mech-Eye industrial 3D camera generates high-quality 3D point clouds of tightly stacked totes.
- The Mech-Eye industrial 3D camera, with a **large FOV**, handles both depalletizing and palletizing workstations.
- The vision system recognizes the poses and positions of totes, and then guides the robot to pick and place totes in designated areas.
- The vision system calculates the distance between totes to design the ideal **multi-pick** strategy, thus improving work efficiency.



Point cloud



Recognition result

The Result

- Cycle time (imaging + data processing): **< 0.5 s**.
- **24/7** stable operation.
- Doubled production capability than manual process.
- Production costs cut by **40%**.

Mech-Mind AI + 3D Vision Solution

Vision-Guided Piece Picking

Vision-guided robots pick random items up and place them at a defined place (e.g., on conveyors for scanning, sorting, etc.) accurately and quickly without damage.

Capabilities

- **Handle a vast range of items at high speeds**

  Sees dark, reflective and multi-colored items.

  Handles various materials, like cardboard and plastic-wrapped items.

  Distinguishes items randomly arranged or densely stacked.

- **Multi-suction cup end effector**

  Vision-guided robots decide how to best pick each item using the multi-suction cup end effector, ensuring accurate picking and gentle placing.

- **No pre-registration of new SKUs**

  No pre-registration of new SKUs meets the challenges of high-SKU counts and changing inventories.

- **Easy integration**

  Seamless integration with OCR system ensures high-speed order fulfillment.

Recommended Cameras

- Mech-Eye PRO

Point Clouds and Recognition Results

Multicolored groceries


Point cloud


Recognition result

Multicolored goods


Point cloud


Recognition result

Case Study

Vision-Guided Piece Picking

Leading food company

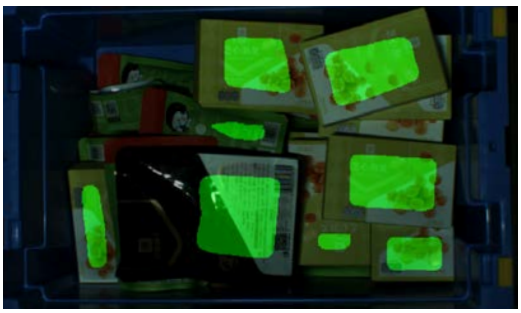
The Challenge

Vision-guided robots quickly pick items from mixed-SKU inventory bins and place them into order containers. The vision-enhanced robots are required to handle thousands of SKUs per day.

The Mech-Mind Solution

- The Mech-Eye industrial 3D camera generates high-quality point clouds of objects with various shapes (**boxes, bags, bottles, etc.**) and materials (**plastic, paper**, **etc.**).
- **No previous registration of new SKUs**. Quickly adapt to changing packaging.
- With the **multi-suction cup end effector**, the robot picks a wide range of SKUs with high accuracy, stability, and speed.
- With **advanced AI algorithms**, even some challenging items (e.g., objects near the bin walls or stacked in corners) are picked and placed accurately.
- Work with **the WMS, code scanner** and **pick-to-light (PTL) system** for efficient sorting.

Point cloud



Recognition result

The Result

- Doubled sorting efficiency.
- **24/7** stable operation.

Case Study

Vision-Guided Piece Picking

Large dairy company

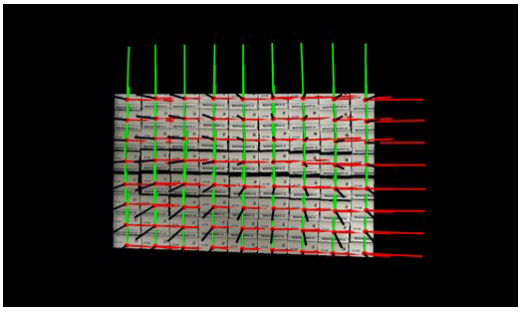
The Challenge

The vision system needs to differentiate the orientations of milk cartons for efficient detection in the further procedure.

The Mech-Mind Solution

- Mech-Eye PRO M, installed above the workstation, creates clear 3D data of **patterned** milk cartons.
- Count the objects in the tote to ensure the right number.
- Accurately recognize and **differentiate the orientations** of objects for greater efficiency in the next detection procedure.
- The vision system maps out the optimal multi-pick strategy, allowing the robot to **pick the maximum milk cartons in one go**.

Point cloud



Recognition result

The Result

- Recognition accuracy: **± 1 mm**.
- Successful recognition rate: **≥ 99.9%**.
- Adapt to various types of milk cartons.

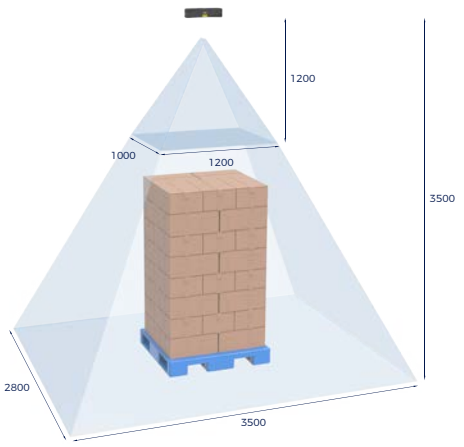
Mech-Eye Industrial 3D Cameras

Scan the QR code to access datasheets

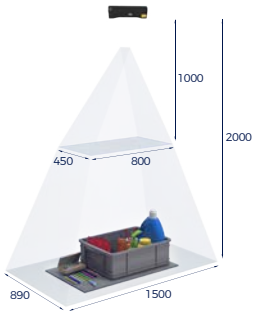
- Detailed and accurate 3D point clouds
- Ambient light resistance
- Short capture time
- IP65 water and dust resistance
- Rugged aluminum alloy housing
- MTBF (Mean Time Between Failures): ≥ 100,000 hours

Specification	DEEP 	PRO M 	PRO S 
Recommended working distance[1]	1200–3500 mm	1000–2000 mm	500–1000 mm
Near FOV	1200 × 1000 mm @ 1.2 m	800 × 450 mm @ 1.0 m	370 × 240 mm @ 0.5 m
Far FOV	3500 × 2800 mm @ 3.5 m	1500 × 890 mm @ 2.0 m	800 × 450 mm @ 1.0 m
Resolution	Depth map: 2048 × 1536 RGB: 2000 × 1500	1920 × 1200	1920 × 1200
Megapixels	/	2.3 MP	2.3 MP
Point repeatability Z (σ)[2]	1.0 mm @ 3.0 m	0.2 mm @ 2.0 m	0.05 mm @ 1.0 m
VDI/VDE accuracy[3]	3.0 mm @ 3.0 m	0.2 mm @ 2.0 m	0.1 mm @ 1.0 m
Typical capture time	0.5–0.9 s	0.3–0.6 s	0.3–0.6 s
Baseline	300 mm	270 mm	180 mm
Dimensions	366 × 77 × 92 mm	353 × 57 × 100 mm	265 × 57 × 100 mm
Weight	2.4 kg	1.9 kg	1.6 kg
Light source	Red laser (638 nm, Class 2)	Blue LED (459 nm, RG2)/White LED (RG2)	
Image sensor	Sony CMOS for high-end machine vision		
Operating temperature	-10–45°C	0–45°C	
Communication interface	Gigabit Ethernet		
Input	24V DC, 3.75 A		
Power supply	CE/FCC/VCCI/KC/ISED/NRTL		
IP rating	IP65		
Cooling	Passive		

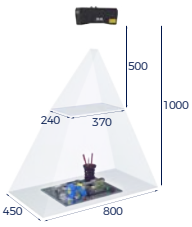
Mech-Eye DEEP



Mech-Eye PRO M



Mech-Eye PRO S



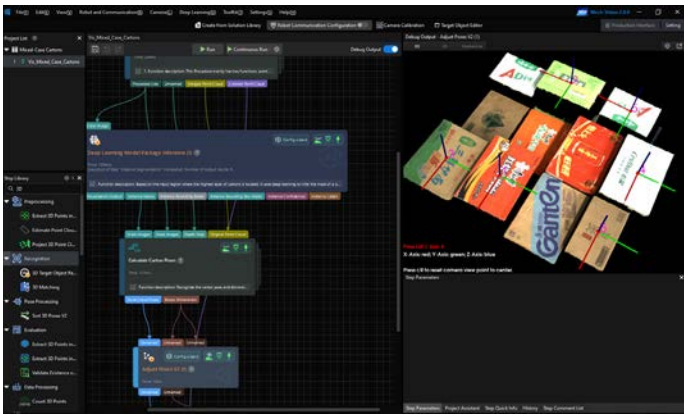
Field of view (mm)

[1] Multiple focal distances are available in a camera model. For further details, please scan the QR code to access camera datasheets.
[2] One standard deviation of 100 Z-value measurements of the same point. The measurement target was a ceramic plate.
[3] According to VDI/VDE 2634 Part II.

Mech-Vision

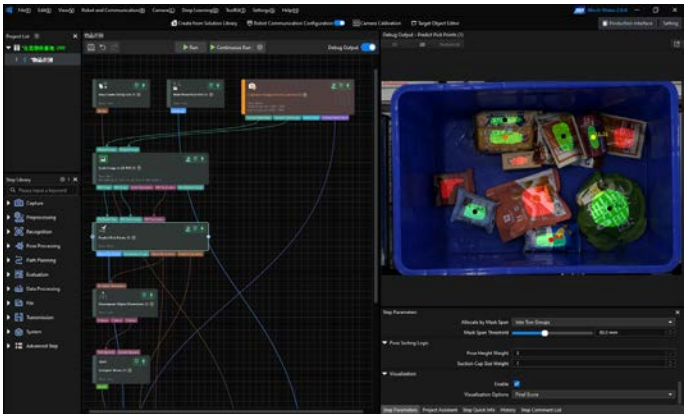
Machine Vision Software

Mech-Vision is an industry-leading machine vision software. It is designed to quickly build vision applications, whether simple or complex. With Mech-Vision, users can manage a wide range of vision tasks, including identification, localization, inspection & measurement, etc.



Build your vision applications efficiently

- Intuitive solution-oriented graphical user interface
- Drag-and-drop programming simplifies setup without writing a line of code
- Visualized configuration



Manage complex vision applications with extensive tools

- Powerful algorithms: 2D/3D matching, 2D/3D deep learning, 2D/2.5D measurement, etc.
- Integrated machine vision tools: matching model, pick point editor, automatic calibration, caliper, etc.
- The **3D Workpiece Recognition** tool delivers recognition results in 1 sec, enabling easier and faster deployment of various loading and handling applications

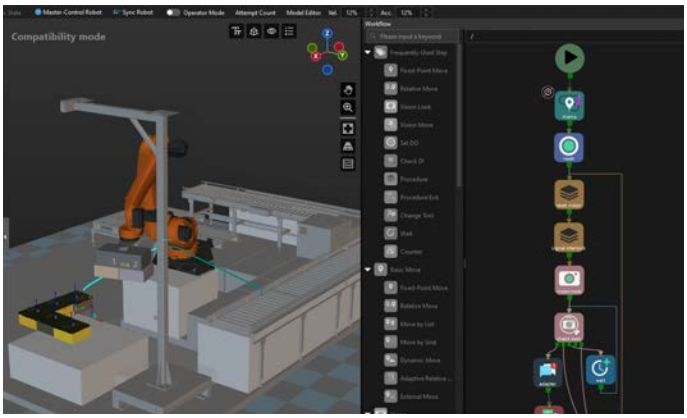
Develop vision applications easily and flexibly

- **Robust Solution Library:** get faster application deployment by adapting an existing project after simple modifications
- **Production Interface** for easy production status monitoring and data reporting
- Multiple languages: English, Japanese, Chinese, and Korean

Mech-Viz

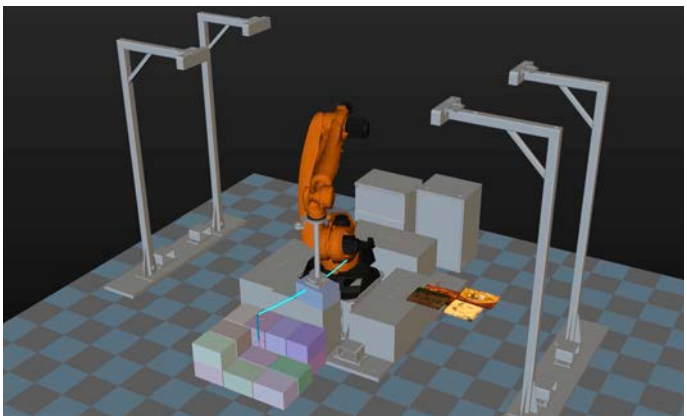
Robot Programming Software

Mech-Viz is a software product for efficiently implementing robotic applications without writing a line of code. Mech-Viz enables robots to manage demanding automation tasks with excellent stability, extraordinary flexibility, and outstanding consistency.



Intuitive Robot Programming

- Intuitive graphical user interface
- Code-free programming environment
- One-click simulation of robot path



Powerful Algorithms for Reliable Robotic Operation

- Motion planning and collision detection
- Multi-pick depalletizing algorithms
- Picking strategies: multiple pick points, rotational symmetry, etc.

ABB KUKA YASKAWA FANUC Kawasaki
NACHI DENSO UNIVERSAL ROBOTS STÄUBLI EFORT
GREE ROKAE ELITE ROBOTS PEITIAN ROBOTICS TM ROBOT
ESTUN ROBOTICS TURIN AUBO DOBOT QJAR
HAN'S ROBOT HD HYUNDAI ROBOTICS JAKA SIASUN DELTA

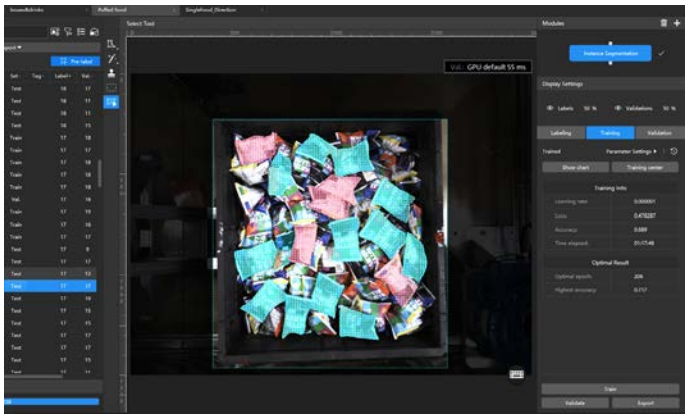
Flexible and Easy Implementation

- Support for almost all major-brand robots
- Streamlines configuration and redeployment with robot path reporting and tracking capabilities
- Multiple languages: English, Japanese, Chinese, and Korean

Mech-DLK

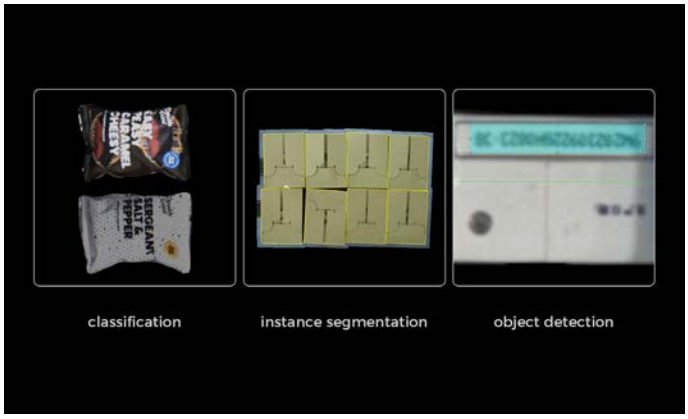
Deep Learning Software

Mech-DLK is a versatile deep learning software solving complex machine vision tasks. It enables users to rapidly train models and easily solve demanding vision applications, including overlapping object recognition and classification, complex defect detection, character reading, etc.



Train models efficiently without writing a line of code

- Intuitive code-free user interface
- Visualized model validation
- Advanced data augmentation: train models with smaller image sets
- **Finetune** function: leverage pre-trained models to expedite training, rather than train a model from scratch

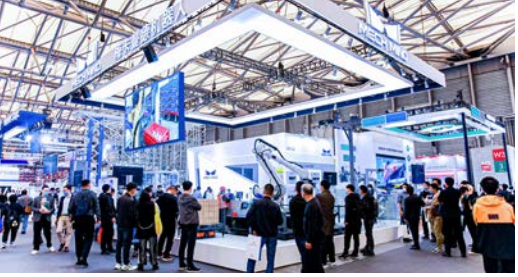


Manage complex machine vision tasks with speed and accuracy

- Manages complex vision applications with powerful algorithms such as object detection, classification, and instance segmentation
- **VFM labeling tool, smart labeling tool** and **pre-trained labeling tool** simplify the labeling process, saving time and effort

Integrate your vision tasks into your production environment easily

- Multi-language SDKs: C, C++, C#, and Python
- Easy integration with Mech-Vision for quick deployment



About Mech-Mind

Mech-Mind is an industry-leading company focusing on industrial 3D sensors and software suites for intelligent robotics.

By combining 3D vision with AI technology, Mech-Mind brings automation to the next level and empowers partners and system integrators to manage the most challenging automation tasks, including bin picking, depalletizing & palletizing, picking & placing, and more.

One of the Highest-Funded AI + Robotics Companies

Founded in 2016, Mech-Mind has closed its Series C+ with total funding of **> USD 200 million**. Backed by Intel and other global top investors, Mech-Mind has been one of the highest-funded AI + robotics companies all over the world.

World-Class Team with Deep Technical Knowledge

Mech-Mind assembles highly qualified experts with rich technical knowledge in **3D sensing**, **vision and robotics algorithms**, **robotics software**, **and intelligent robotic solutions**.

Create Success Together with Partners and Integrators

Excellent usability, approved quality, high flexibility, comprehensive service, and competitive price, that's what we stand for and how we help our customers and partners to exceed in their business. Our mature solutions empower system integrators and partners to solve the most demanding applications and bring automation to the next level.

10,000+ Cameras Deployed

Mech-Mind partnered with industry-leading companies and has deployed applications in **50+** regions. By delivering cutting-edge technology and reliable solutions, Mech-Mind has created visible ROI for global customers across diverse industries, including **automotive, metal and machining, logistics, home appliances, food and beverage, etc.**

10,000+ cameras
installed worldwide

> $200 million
total funding

50+
regions

Customers and Partners

Honeywell · LOTTE · DHL · Continental · Lenovo · DEMATIC · DAIKIN · arçelik · HIGHLY · GMCC · Midea · Haier · GREE · intel · SIEMENS · BOSCH · TOYOTA · NISSAN · BYD · NIO · GEELY · ABB · YASKAWA · KUKA · Kawasaki · FANUC · DENSO · NACHI · MITSUBISHI ELECTRIC · UNIVERSAL ROBOTS · DOBOT · FOXCONN · SDS · brose · WEICHAI · CAT · SKF · LiuGong · XCMG · ZOOMLION

Compatible with Major Robot Brands

ABB · KUKA · YASKAWA · FANUC · Kawasaki · NACHI · DENSO · UNIVERSAL ROBOTS · STÄUBLI · EFORT · MITSUBISHI ELECTRIC · GREE · ROKAE · a-z · TM ROBOT · TURIN · AUBO ROBOTICS · DELTA · QIAR · QKM · DOOSAN · EPSON · HAN'S ROBOT · ESTUN ROBOTICS · HD HYUNDAI ROBOTICS · COMAU · JAKA · SIASUN · DOBOT · ELITE ROBOTS · fruitcore robotics

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
Online community: community.mech-mind.com