如何善用工具協助AI數據分析以及產品化

無敵科技 & 樂達科技

BESTA 無敵

www.leda-creative.com

內容大綱

01 公司簡介

02 問題

03 解決方案

樂達創意科技股份有限公司

LEDA樂達科技是人工智慧技術公司，致力於光學設計、雲端服務、深度學習演算法開發及軟硬體整合等。我們提供操作簡易的人工智能開發平台，也提供自動化專案評估、整廠規劃、客製化的解決方案，協助超過50種以上產業的客戶順利轉型智能化、數位化、自動化，提供最專業的AI導入與數位轉型服務。

2015	2017	2019	2020	2021
成立	SBIR	中國深圳 分公司成立	AI平台成功 導入半導體業	成為 Google 合作夥伴

黃璽軒 **Rex**

現任：

樂達創意科技創辦人兼技術長

專長：

深度學習、機器視覺、工廠自動化

經歷：

國立交通大學機器工程學學士

國立台灣大學電信工程學碩士

鴻海科技雲運算事業群訊號模擬工程師

6+ 年電腦視覺實作經驗

5+ 年業內深度學習實作經驗

3+ 年產品與專案開發經驗於台灣中國越南知名製造產業

MV-6 OMNI
MIRTEC

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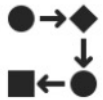
老闆的想法

ＡＩ可以解決一切的問題

風險 = 結果 + 不確定性
RISK

風險管理大師五步驟

解構風險	眼光放遠	結局回推	可逆與不可逆	分散風險



場域案例

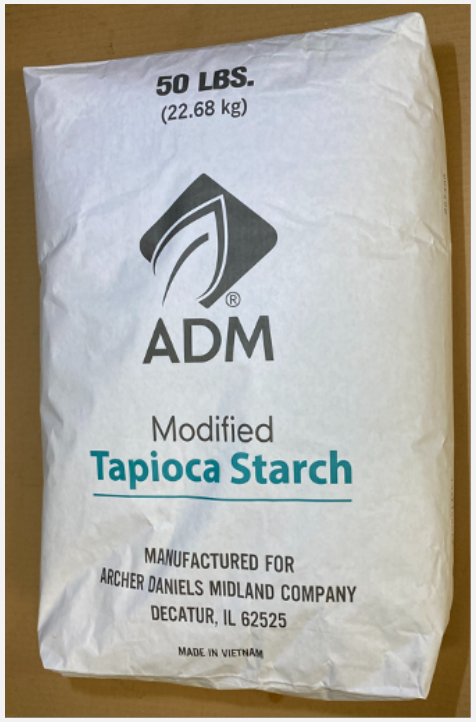
食品加工業包裝袋分類

實際場域影片

https://youtu.be/1LcUU2BkhyY

包裝袋分類

問題：如何使用取代人力分類包裝袋？



風險管理大師五步驟

解構風險	這是現場人員用手機拍的，會不會跟實際拍攝狀態不同？
眼光放遠	現場真正的使用情境是如何？
結局回推	想像驗收那天可能發生的狀況？
可逆與不可逆	總合以上思考，你要下的決策可逆嗎？成本高嗎？
分散風險	永遠要有備案！

解决方案

SeaDeep

A web-based, no-code platform

Connect

Easily ingest all plant data

Transform

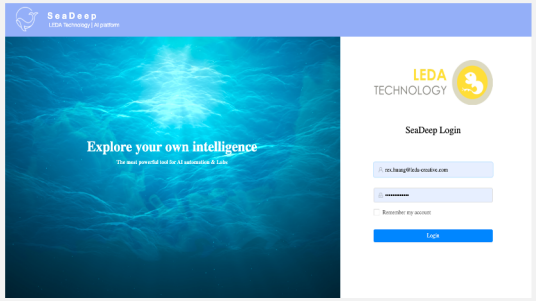
Automate data transformation

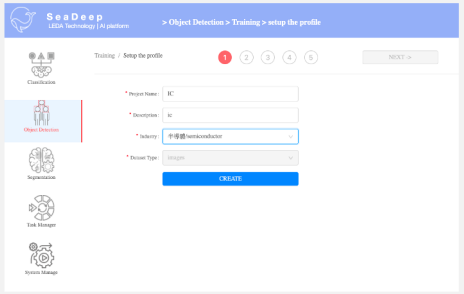
Analyze

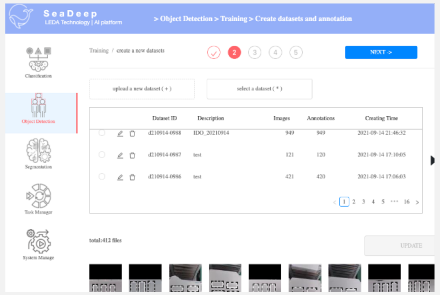
Analyze transformed data with built-in apps without coding

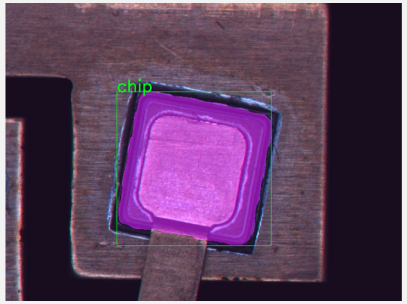
Deploy

Deploy solutions to edge devices by just one click.









AIoT

Integrated with SeaDeep AI training platform

Simplified Integration

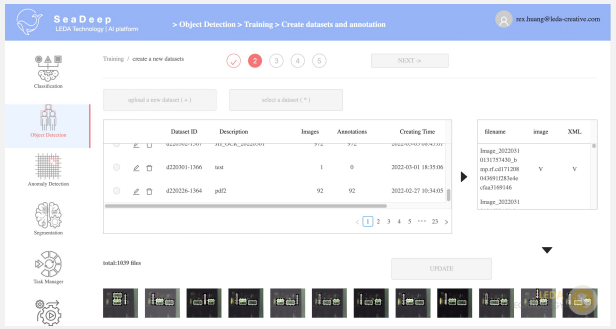
Neon smart cameras combine everything you need into all-in-one hardware solution.

Fast Deployment

Neon smart cameras support SeaDeep, LEDA's AI training platform so as to speed up the development process.

Data Health Check

Understand your data health helps you make informed decisions about how you process your data.



User Case

Contact Lens

Reports

SOLUTION BRIEF

AI Machine Vision
Automated Manufacturing Inspection

ADLINK and LEDA Technology Create AI-Enabled Contact Lens Inspection Solution

Automated inspection, optimized with the Intel® Distribution of OpenVINO™ toolkit, leads to faster, more accurate results

ADLINK Leading EDGE COMPUTING

LEDA TECHNOLOGY

"The ADLINK AI contact lens inspection solution, based on well-validated, cost-effective Intel® hardware and optimized with the Intel® Distribution of OpenVINO™ toolkit, offers contact lens manufacturers a reliable all-defect inspection solution with 95 percent accuracy."[2]

—Tim Juan, Senior Director, ADLINK Smart Factory Business Center

50X faster inspection[2]

OpenVINO

A clear advancement for machine vision

As demand for contact lenses grows, automating inspection processes is critical for manufacturers under pressure to increase throughput. Using ADLINK's AI machine vision system, optimized with the Intel® Distribution of OpenVINO™ toolkit, AI software partner LEDA Technology created easy-to-use contact lens inspection software that replaces human visual inspection. Using a smart inspection solution massively scales the number of lenses that can be inspected in a day.

The flexibility of the Intel Distribution of OpenVINO toolkit creates opportunities for software partners and manufacturers to develop tailored, smart solutions that solve unique customer challenges in the healthcare manufacturing industry.

Challenges: Bridging the gap between human and machine inspection

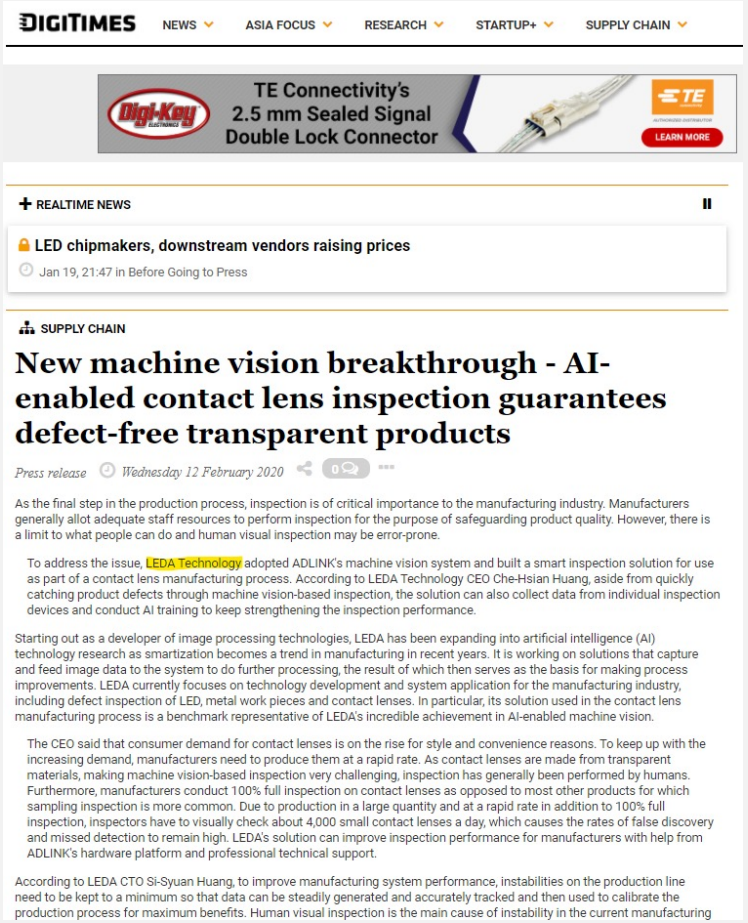
Inspecting contact lenses for manufacturing defects presents several unusual challenges. While most manufacturers can use a sample of products, contact lens manufacturers must inspect each individual lens. With 4,000 lenses inspected per day by each inspector,[1] human visual inspection creates a production bottleneck with high rates of false discovery and missed detection.

Due to the transparency of contact lens material, machine vision–based inspection has been very challenging for the industry. Conventional machine vision automated optical inspection (AOI) relies on fixed geometric algorithms to discover defects, but acquiring quality images from high-transparency objects resulted in unacceptable inspection performance. Manufacturers seeking machine vision solutions want a faster way to accumulate data and train new algorithms, which has historically been a time-consuming process with impacts that result in increased operating expenses.

Solution: 50x faster inspections[2] with 3x improved accuracy[3]

LEDA Technology adopted ADLINK's AI machine vision technology to build a smart inspection solution. In addition to more accurately identifying lenses with manufacturing defects, the solution also collects data from inspection devices to train AI and iterate on inspection performance gains and maintains inspection logs for customer reference. LEDA Technology provides a reliable multidefect-inspection solution, identifying defects including burrs, edges, particles, bubbles, scratches, and more.

LEDA Technology's AI contact lens inspection solution uses the well-validated EOS-i6000-M Series vision system, supporting a wide variety of deep learning applications. The system features a 9th Gen Intel® Core™ i7-9700E processor and four add-in accelerators based on Intel® Movidius™ Myriad™ X VPUs, optimized



DIGITIMES NEWS ASIA FOCUS RESEARCH STARTUP+ SUPPLY CHAIN

Digi-Key ELECTRONICS
TE Connectivity's 2.5 mm Sealed Signal Double Lock Connector
TE
LEARN MORE

+ REALTIME NEWS

LED chipmakers, downstream vendors raising prices

Jan 19, 21:47 in Before Going to Press

SUPPLY CHAIN

New machine vision breakthrough - AI-enabled contact lens inspection guarantees defect-free transparent products

Press release *Wednesday 12 February 2020*

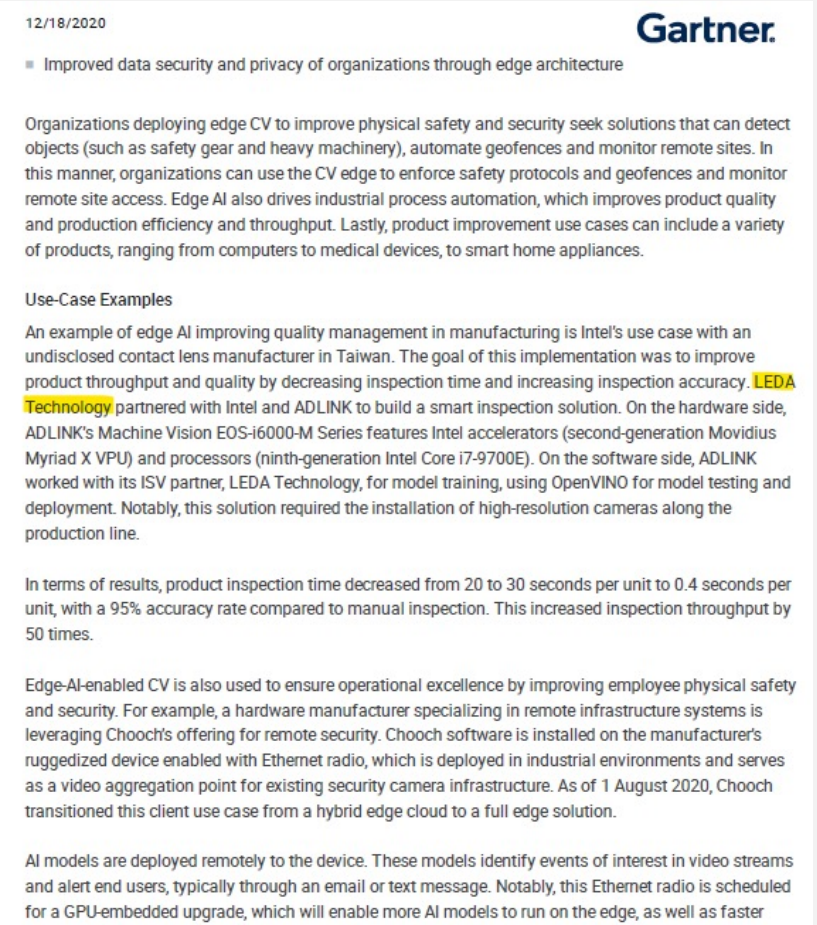
As the final step in the production process, inspection is of critical importance to the manufacturing industry. Manufacturers generally allot adequate staff resources to perform inspection for the purpose of safeguarding product quality. However, there is a limit to what people can do and human visual inspection may be error-prone.

To address the issue, LEDA Technology adopted ADLINK's machine vision system and built a smart inspection solution for use as part of a contact lens manufacturing process. According to LEDA Technology CEO Che-Hsian Huang, aside from quickly catching product defects through machine vision-based inspection, the solution can also collect data from individual inspection devices and conduct AI training to keep strengthening the inspection performance.

Starting out as a developer of image processing technologies, LEDA has been expanding into artificial intelligence (AI) technology research as smartization becomes a trend in manufacturing in recent years. It is working on solutions that capture and feed image data to the system to do further processing, the result of which then serves as the basis for making process improvements. LEDA currently focuses on technology development and system application for the manufacturing industry, including defect inspection of LED, metal work pieces and contact lenses. In particular, its solution used in the contact lens manufacturing process is a benchmark representative of LEDA's incredible achievement in AI-enabled machine vision.

The CEO said that consumer demand for contact lenses is on the rise for style and convenience reasons. To keep up with the increasing demand, manufacturers need to produce them at a rapid rate. As contact lenses are made from transparent materials, making machine vision-based inspection very challenging, inspection has generally been performed by humans. Furthermore, manufacturers conduct 100% full inspection on contact lenses as opposed to most other products for which sampling inspection is more common. Due to production in a large quantity and at a rapid rate in addition to 100% full inspection, inspectors have to visually check about 4,000 small contact lenses a day, which causes the rates of false discovery and missed detection to remain high. LEDA's solution can improve inspection performance for manufacturers with help from ADLINK's hardware platform and professional technical support.

According to LEDA CTO Si-Syuan Huang, to improve manufacturing system performance, instabilities on the production line need to be kept to a minimum so that data can be steadily generated and accurately tracked and then used to calibrate the production process for maximum benefits. Human visual inspection is the main cause of instability in the current manufacturing



12/18/2020

Gartner.

- Improved data security and privacy of organizations through edge architecture

Organizations deploying edge CV to improve physical safety and security seek solutions that can detect objects (such as safety gear and heavy machinery), automate geofences and monitor remote sites. In this manner, organizations can use the CV edge to enforce safety protocols and geofences and monitor remote site access. Edge AI also drives industrial process automation, which improves product quality and production efficiency and throughput. Lastly, product improvement use cases can include a variety of products, ranging from computers to medical devices, to smart home appliances.

Use-Case Examples

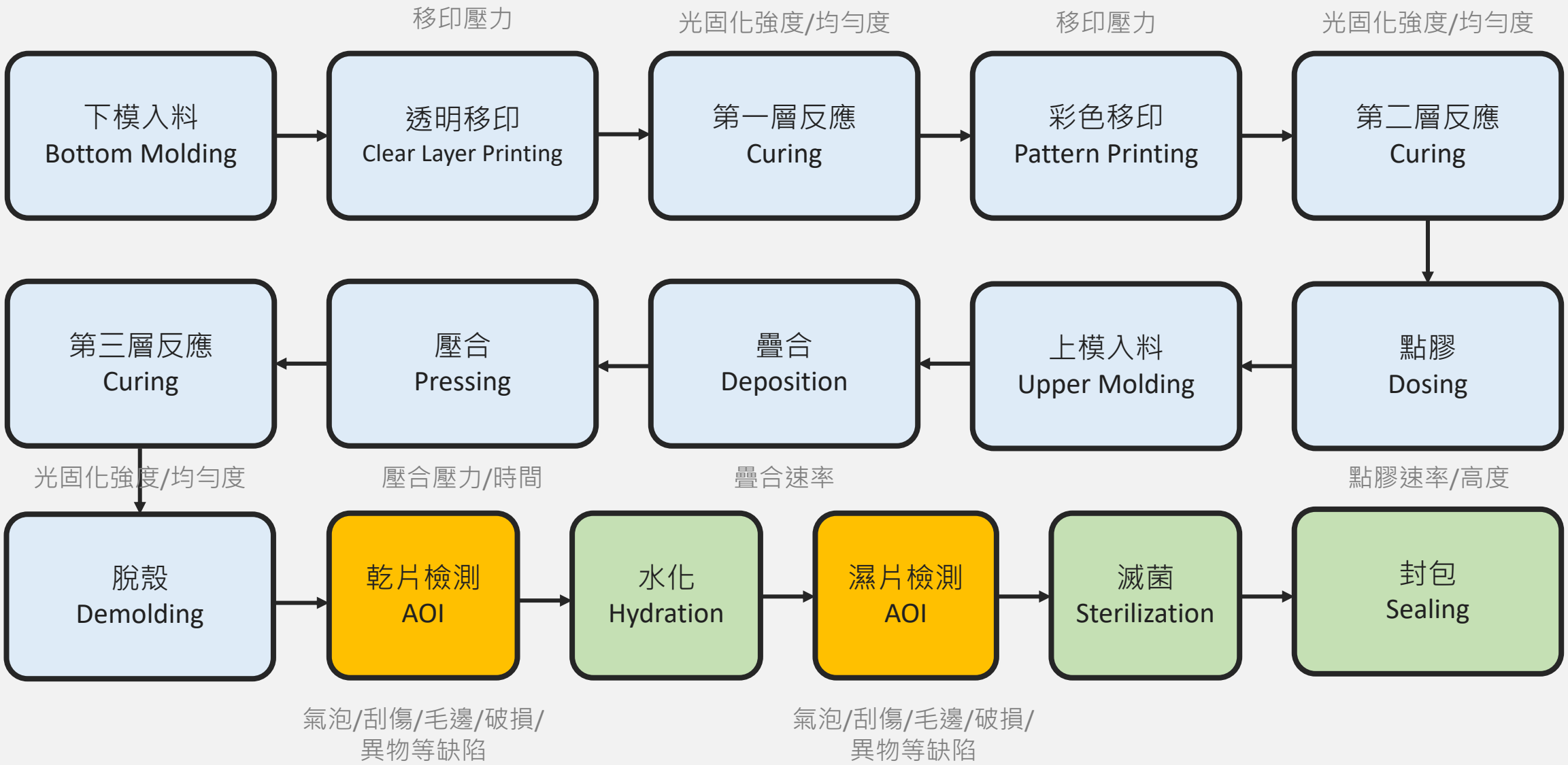
An example of edge AI improving quality management in manufacturing is Intel's use case with an undisclosed contact lens manufacturer in Taiwan. The goal of this implementation was to improve product throughput and quality by decreasing inspection time and increasing inspection accuracy. LEDA Technology partnered with Intel and ADLINK to build a smart inspection solution. On the hardware side, ADLINK's Machine Vision EOS-i6000-M Series features Intel accelerators (second-generation Movidius Myriad X VPU) and processors (ninth-generation Intel Core i7-9700E). On the software side, ADLINK worked with its ISV partner, LEDA Technology, for model training, using OpenVINO for model testing and deployment. Notably, this solution required the installation of high-resolution cameras along the production line.

In terms of results, product inspection time decreased from 20 to 30 seconds per unit to 0.4 seconds per unit, with a 95% accuracy rate compared to manual inspection. This increased inspection throughput by 50 times.

Edge-AI-enabled CV is also used to ensure operational excellence by improving employee physical safety and security. For example, a hardware manufacturer specializing in remote infrastructure systems is leveraging Chooch's offering for remote security. Chooch software is installed on the manufacturer's ruggedized device enabled with Ethernet radio, which is deployed in industrial environments and serves as a video aggregation point for existing security camera infrastructure. As of 1 August 2020, Chooch transitioned this client use case from a hybrid edge cloud to a full edge solution.

AI models are deployed remotely to the device. These models identify events of interest in video streams and alert end users, typically through an email or text message. Notably, this Ethernet radio is scheduled for a GPU-embedded upgrade, which will enable more AI models to run on the edge, as well as faster

Contact Lens Manufacturing Process



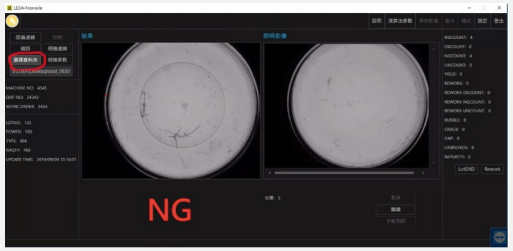
Progress

Stage1

Dry lens defect detection

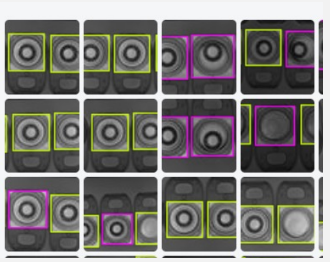
Stage2

Wet lens defect detection



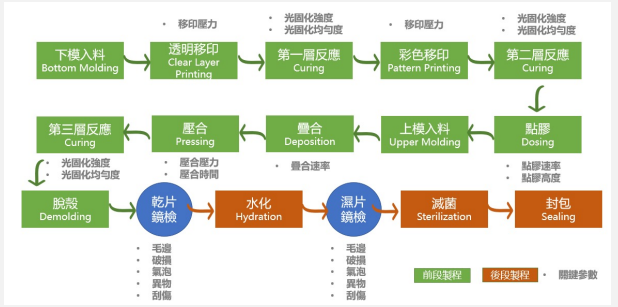
Stage3

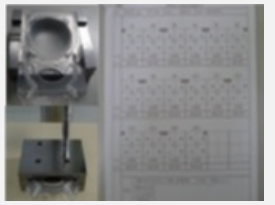
Lens lack check

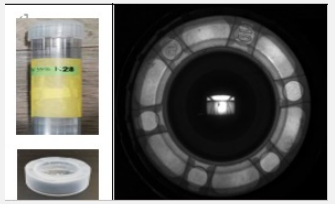


Stage4

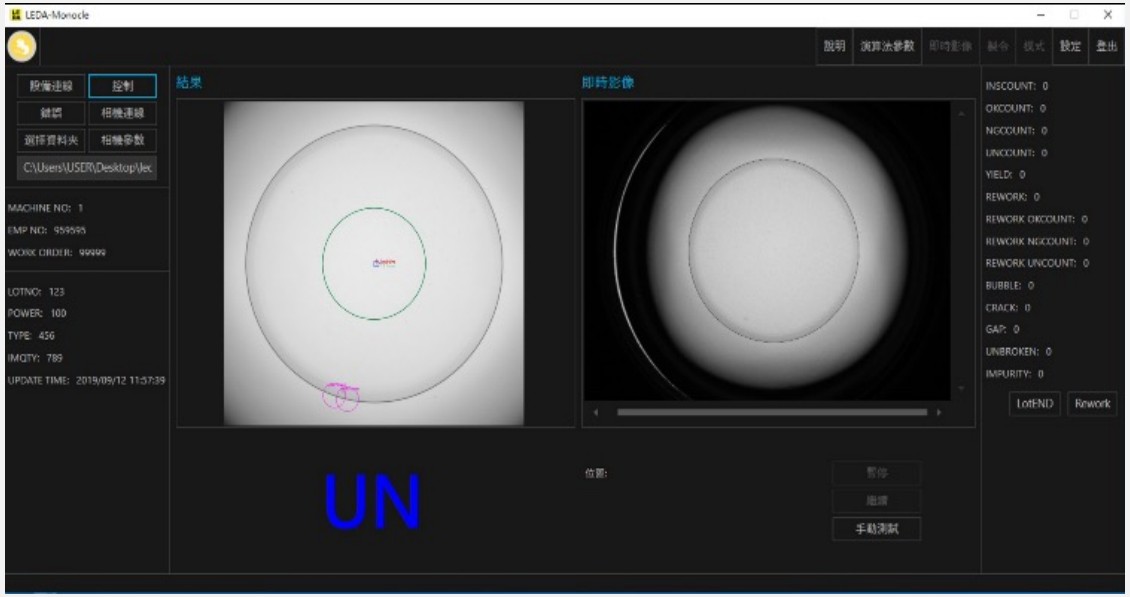
Structured data analysis







Contact Lens Defect Detection



SeaDeep
AI Training Platform

Object detection

Space
Data Middleware

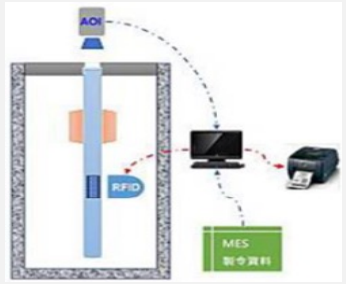
Connect with multiple sensors

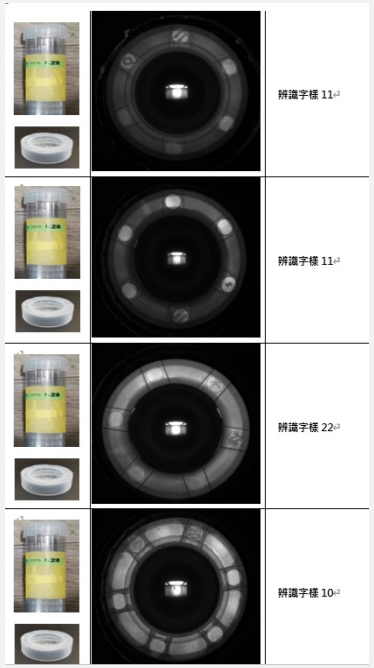
AIoT
Smart Devices

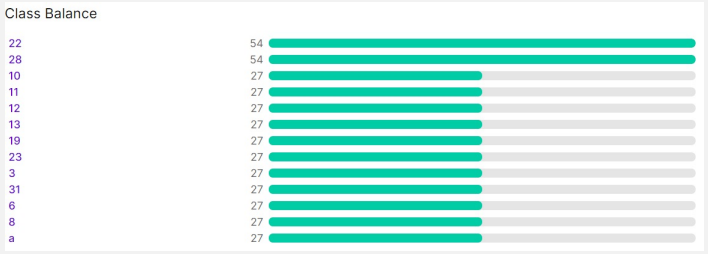
Smart camera

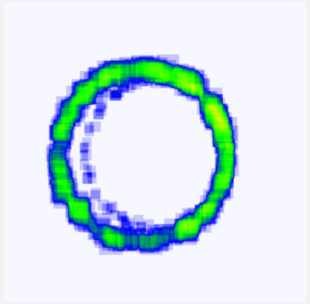
Contact Lens OCR

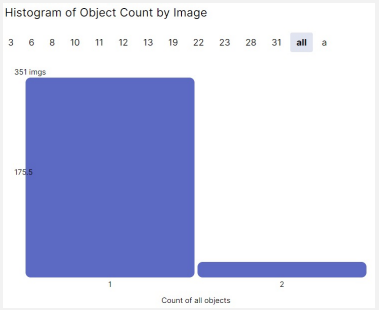
Collect → Organize → Label → Process → Train → Deploy

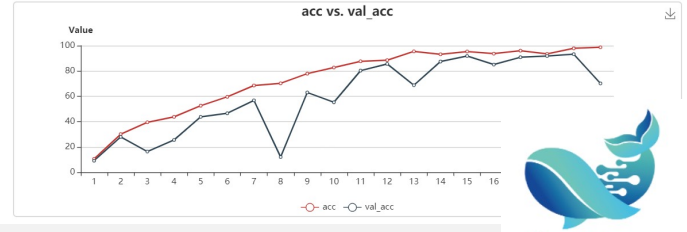








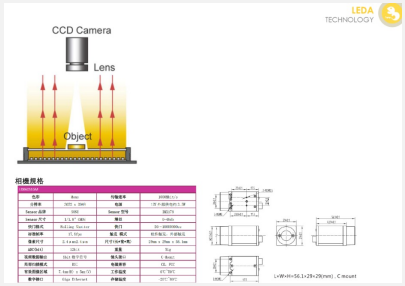


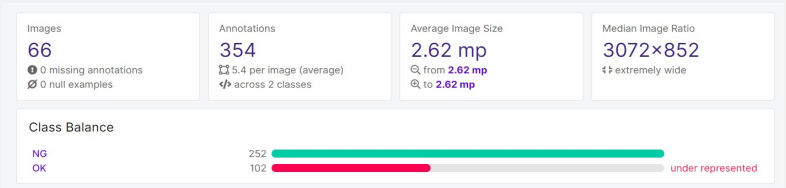


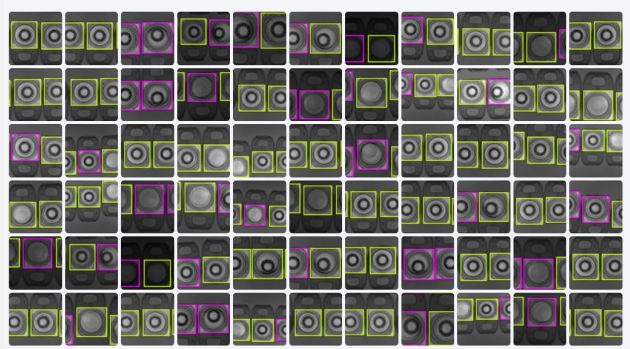
SeaDeep

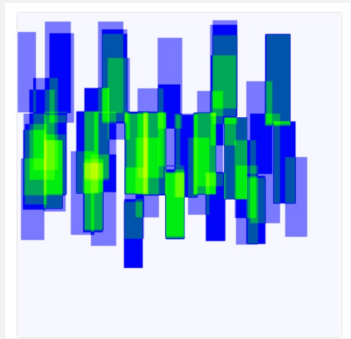
Contact Lens Lack Detection

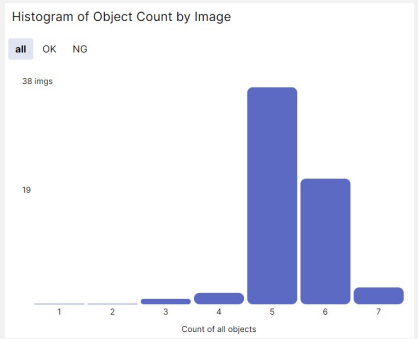
Collect — Organize — Label — Process — Train — Deploy





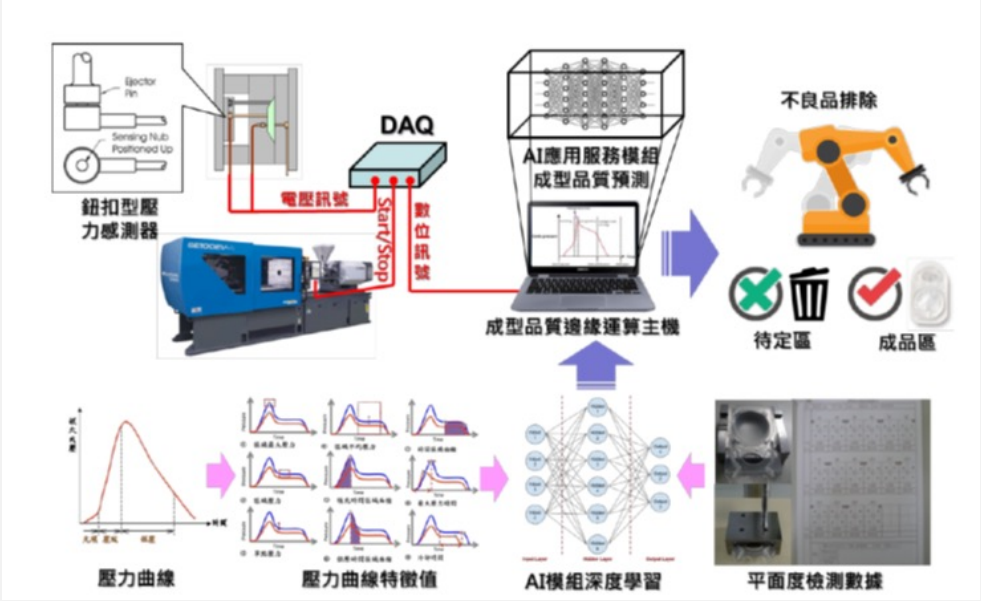






Contact Lens Structured Data Analysis

Collect → Organize → Label → Process → Train → Deploy



SeaDeep

Contact Lens AI Decision Making

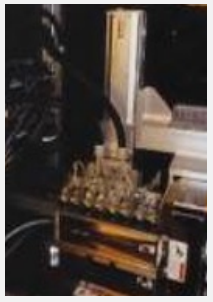
缺陷數量統計

預防保養

Focus Night & Day	O2 Optix	PureVision	Acuvue Oasys	Premi O	Avaira	Ultra	Pega Air	Acuvue Advance	Biofinity	Clariti	Definitive	Dailies Total 1	Acuvue TruEye	MyDay	Clariti 1 Day
Lotrafilcon A	Lotrafilcon B	Balafilcon A	Senofilcon A	Asmofilcon A	Enfilcon A	Samfilcon A	Formofilcon A	Galyfilcon A	Comfilcon A	Somofilcon A	Efrofilcon A	Delefilcon A	Narafilcon A	Stenfilcon A	Somofilcon A
24	33	36	38	40	46	46	46	47	48	56	74	33	46	54	56
1.4	1.0	1.1	0.7	1.1	0.5	0.7	0.6	0.4	0.8	0.5	0.35	0.7	0.6	0.4	0.5
140	110	99	103	129	100	95	70	60	128	60	60	140	100	80	60

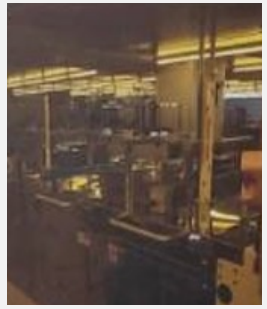
水膠材料調和比例

移印壓力



點膠速率

疊合對位行進速率



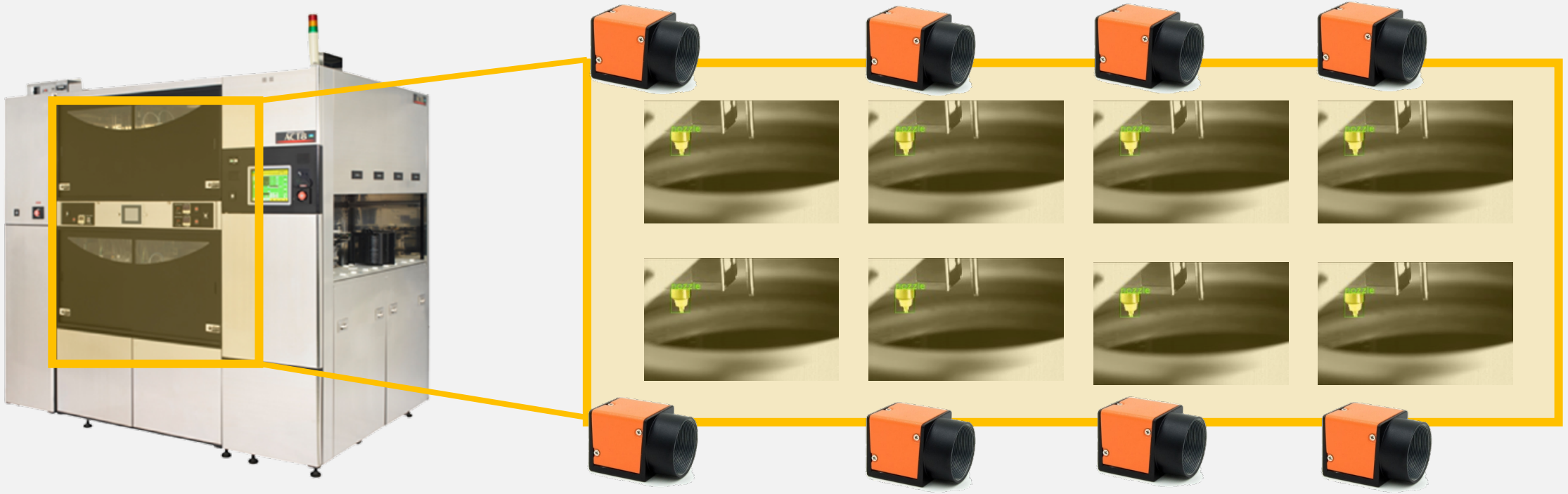
光固化均勻度

壓合壓力

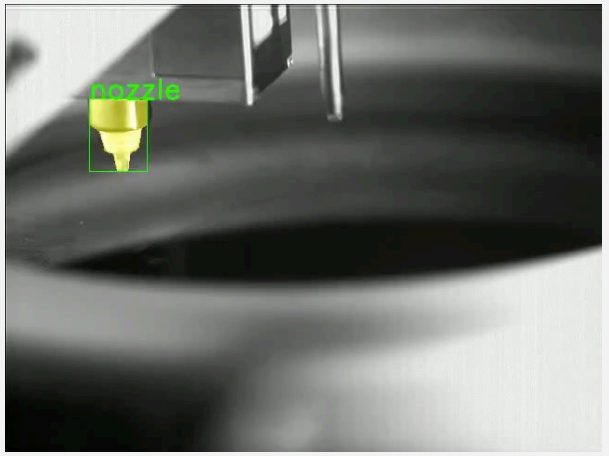
User Case

Semiconductor

Anomaly Detection



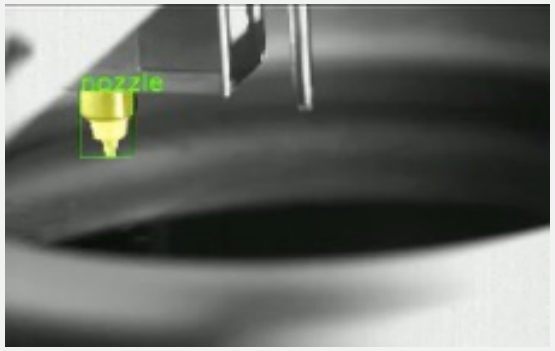
Anomaly Detection



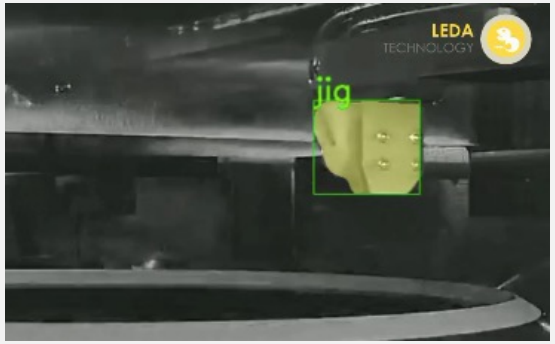
1. Find the nozzle
2. Detect the flow

1. AI Training Platform

Fab A



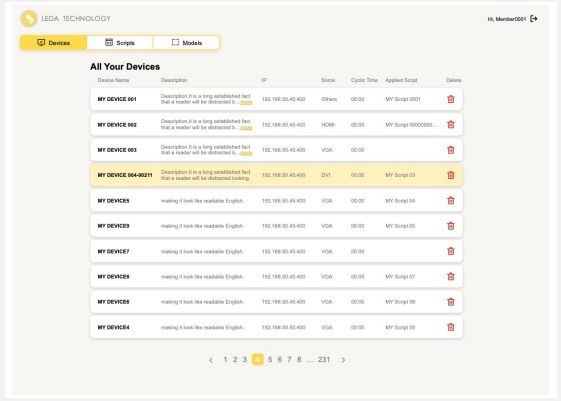
Fab B



Train Your Model Without Coding

2. Data Middleware

1 Click Deployment

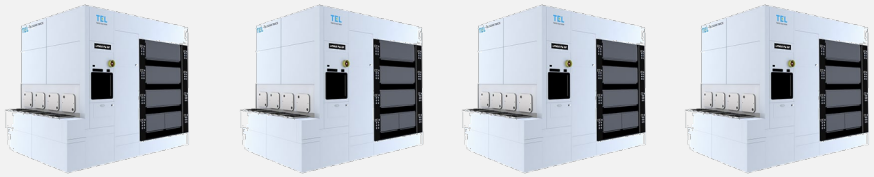


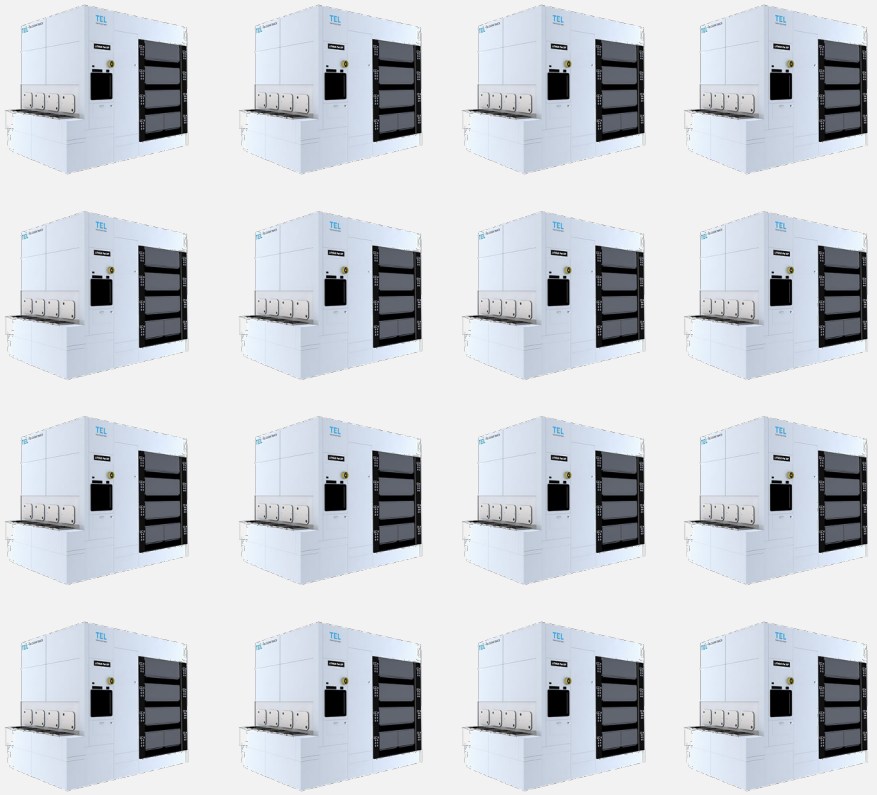
Deploy Your Model With 1 Click

3. AIoT

IoT with Smart Functions

Benefits





資料收集

AI訓練平台

SeaDeep

雲端

邊緣

data

data

data

data

邊緣裝置
(資料收集)

data

data

data

data

IoT

Video

Meters

Sensors

PLCs

模型部署

AI訓練平台

SeaDeep

雲端

邊緣

邊緣裝置
(預測)

Nvidia GPU
(x86)

Nvidia Jetson
(Arm-based)

Android Phone

Thank You

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