



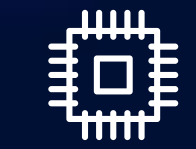
A Leading Edge AI Company

# ABOUT KNERON

Founded in 2015, Kneron Develops Unique Reconfigurable NPUs and High-Performance ISPs for Edge AI Applications

## Our Business

### Products



AI Chipset



Algorithm

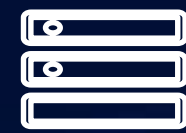


AI Software Platform

### Applications



Autonomous



Edge server



Security



AIoT

## Our Recognitions

**Gartner**

Tech Innovators in Edge AI

**CB INSIGHTS**

2020 AI 100

**EE Times**

Silicon 100 2021  
Top 10 AI chips 2020  
Silicon 60 2018



IEEE Darlington Best Paper Award 2021

**nature**

Publications on Nature

**NIST**

Highest Ranking in Light-Weight AI model

## Our Accomplishments



\$140 million funding from global VC



210+ employees, 20+ Ph.D., over 70% R&D

### GLOBAL R&D SITES



## Our Investors

**Horizons Ventures**  
维港投资

**FOXCONN**

**winbond**

**Alibaba Entrepreneurs Fund**  
阿里巴巴創業者基金

**QUALCOMM**  
VENTURES

**LITEON**

**Himax**

**中華開發資本國際**  
CDIB CAPITAL INTERNATIONAL

**SEQUOIA**

**DELTA**

**MXIC**  
旺宏電子

**ADATA**

# KNERON MANAGEMENT TEAM



**ALBERT LIU**  
Founder / CEO

Qualcomm, UCLA Phd, 30+  
International Patents  
70+ Papers in Major Journals



**Frank CHANG**  
Co-Founder

Former president of  
NCTU UCLA EE Wintek  
Chair



**HSIANG TSUN LI**  
Chief Scientist

AVP of Qualcomm, Spreadtrum,  
and Huawei



**JIMMY LAI**  
CFO

VP of SMIC, CFO of Daqo New  
Energy & China Online Education



**ROGER LIU**  
COO

COO/CTO of MilkyWay  
Silicon Technology

QUALCOMM®

SAMSUNG



SPREADTRUM

UCLA

vivo

HUAWEI

# KNERON AI CHIPSET STRENGTH



## Power Efficiency High Performance

- Powered by Battery
- Outstanding AI model support



## Scalable Design

- Compatible with mainstream AI Framework – TF/TF Lite/Pytorch/ONNX/Keras/Caffe
- Multiple device Cascading



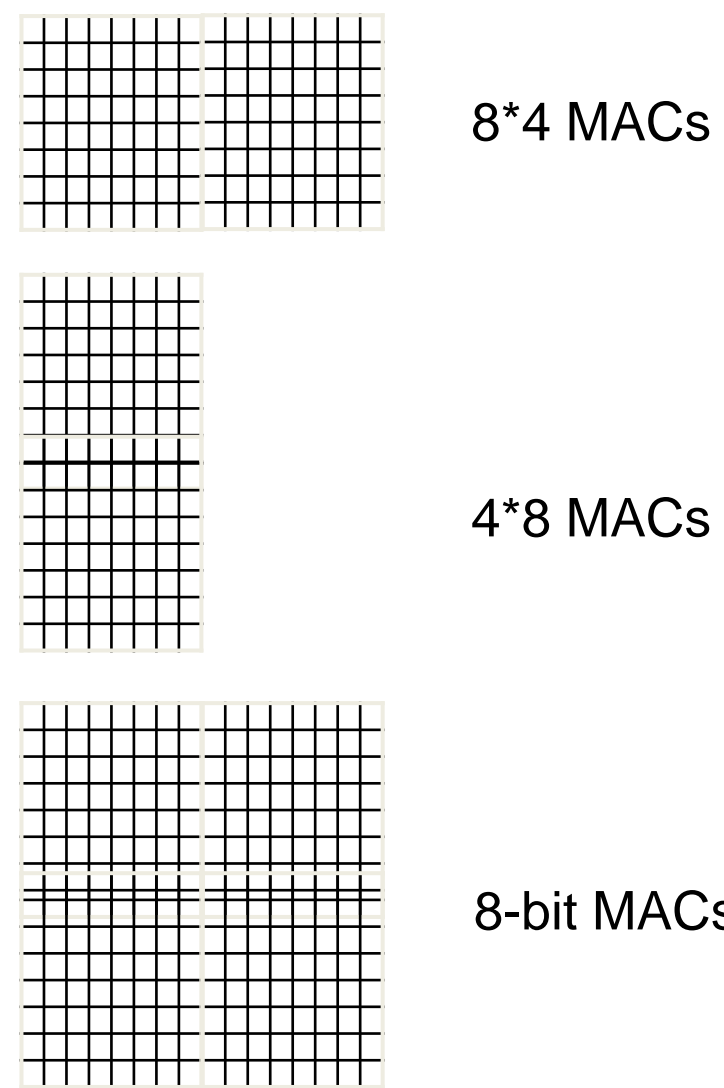
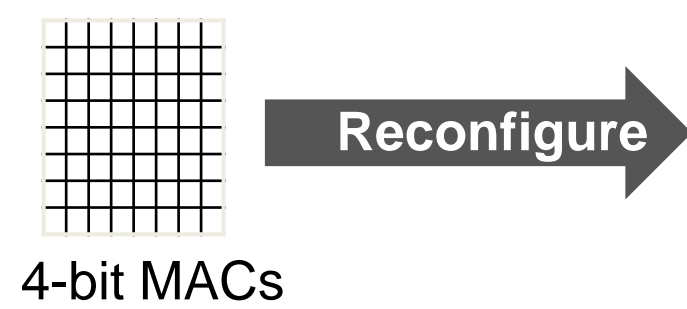
## High Quality

- AI ISP support in feature
- EIS support
- Dewarping support

# Kneron Core Technology – Higher MAC efficiency w/ higher fps

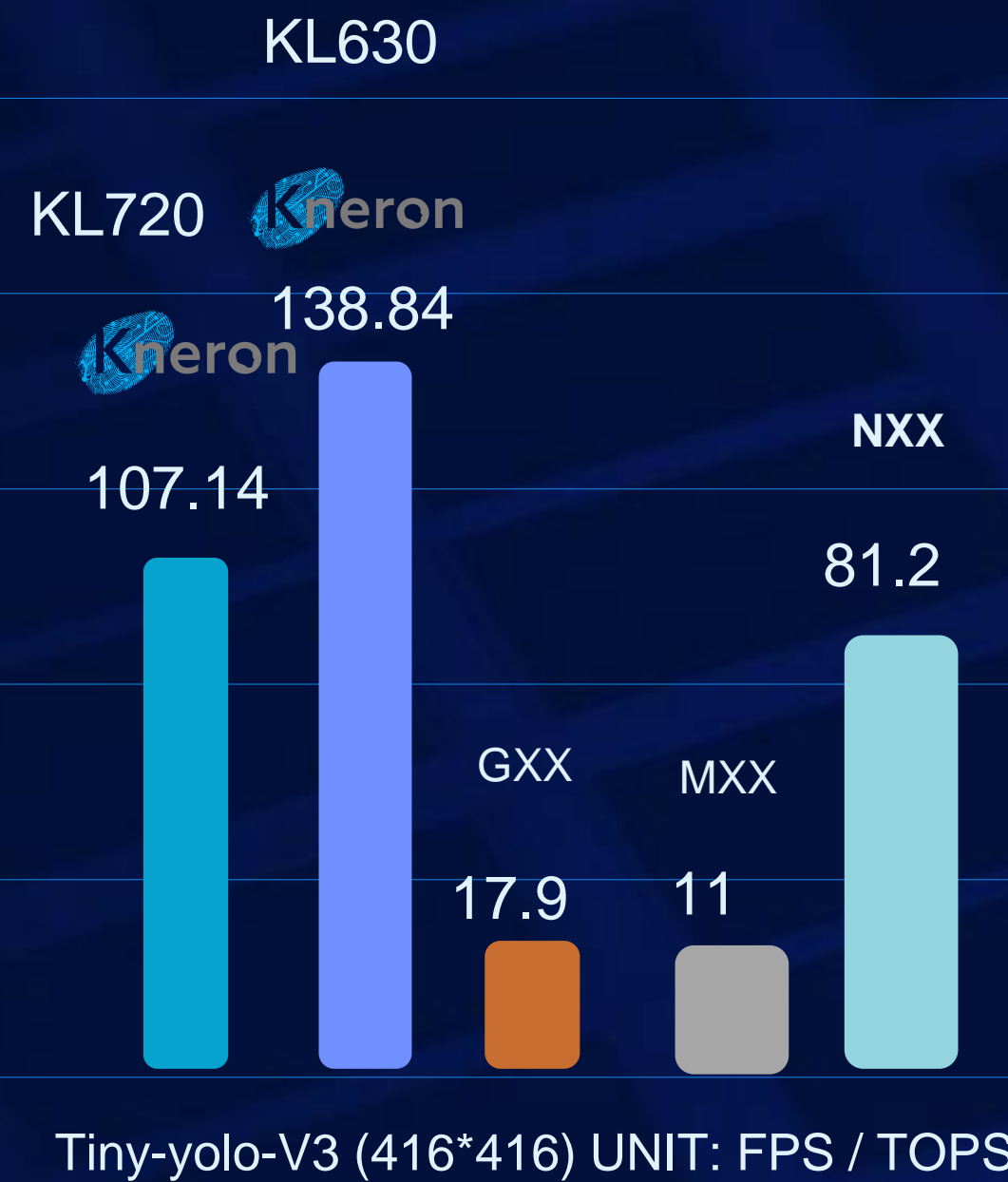
## Patented Reconfigurable NPU

Lego like MAC arrays to compute different AI model



Highly flexible architecture allows reconfiguration to run different AI models based on customers' need

## High Efficiency



Higher FPS performance under the same computing power

## Flexibility

Multiple AI Model in pipeline



CNN+CNN+.....

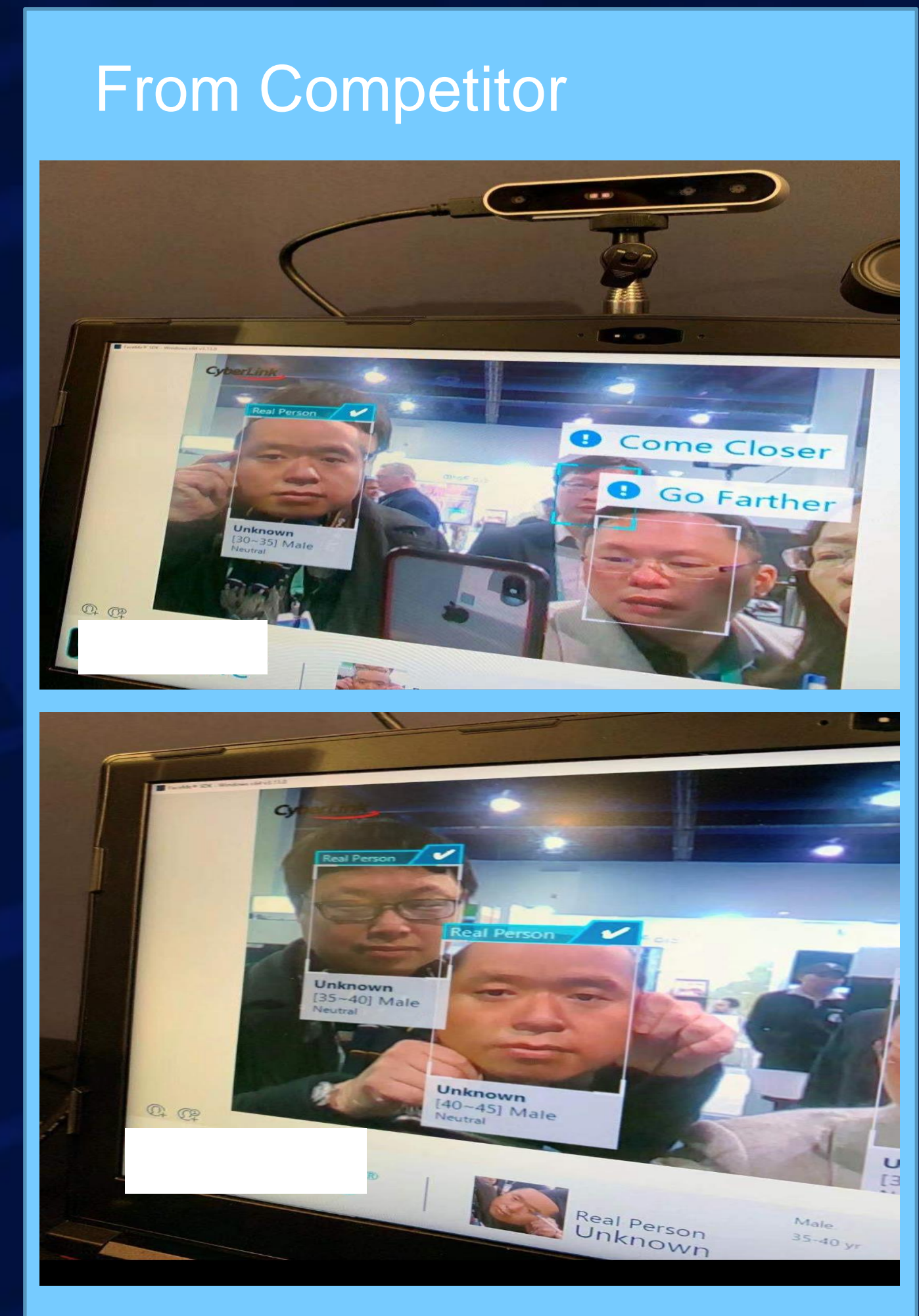
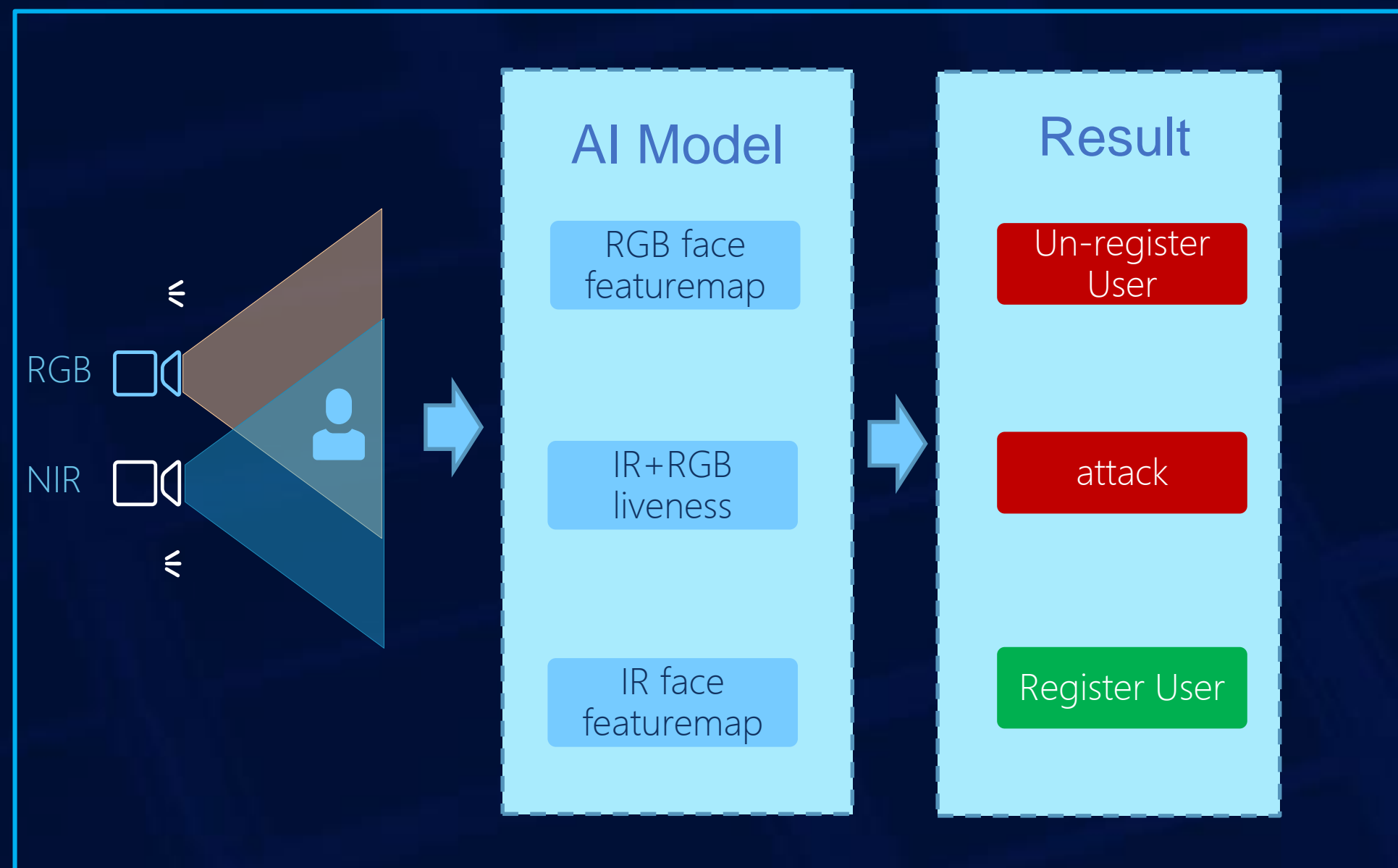
LSTM + CNN+.....

Transformer + CNN+.....

Multiple AI networks and applications on one

# USE CASE FOR MULTIPLE AI MODEL

AI model : e.g. Facial Recognition and Liveness



BE TE 国家金融IC卡安全检测中心  
National Financial IC Card Security Test Center  
银行卡检测中心  
Bank Card Test Center

报告编号: TFCR208SI1TP

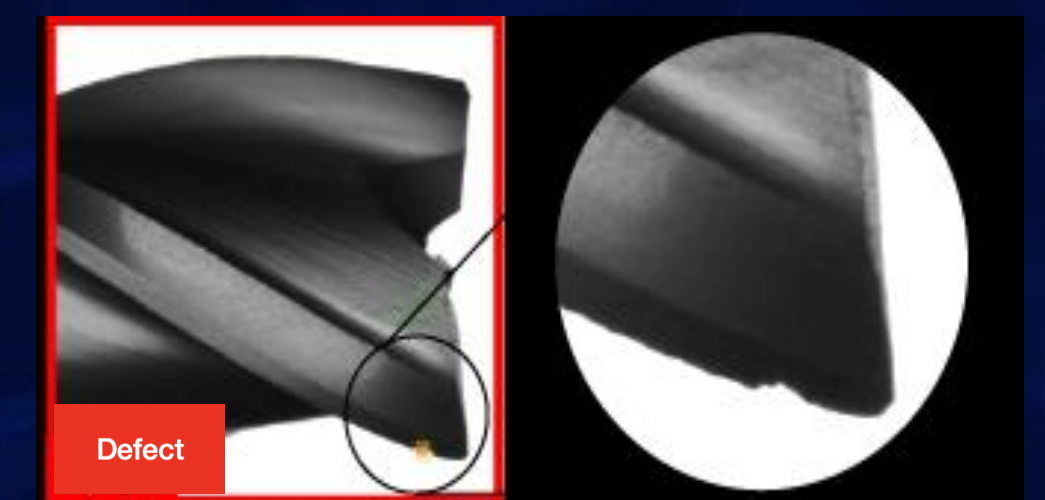
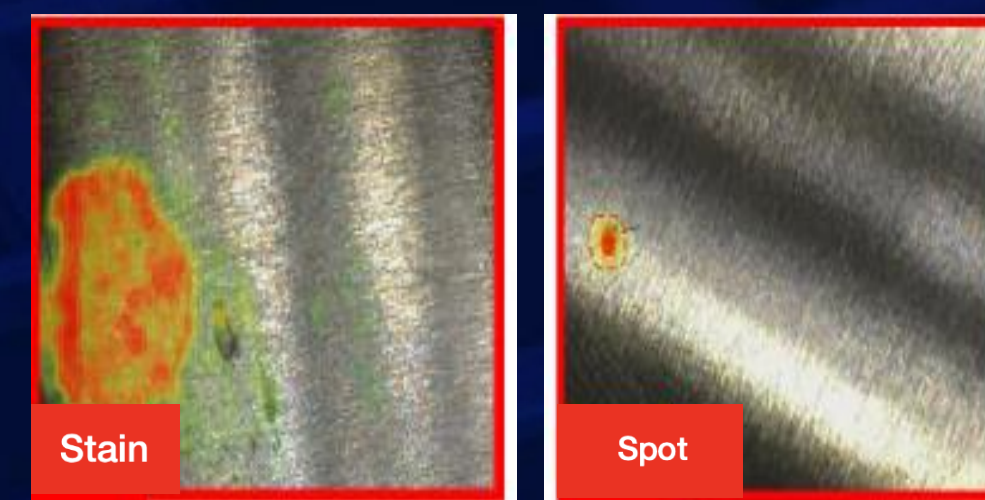
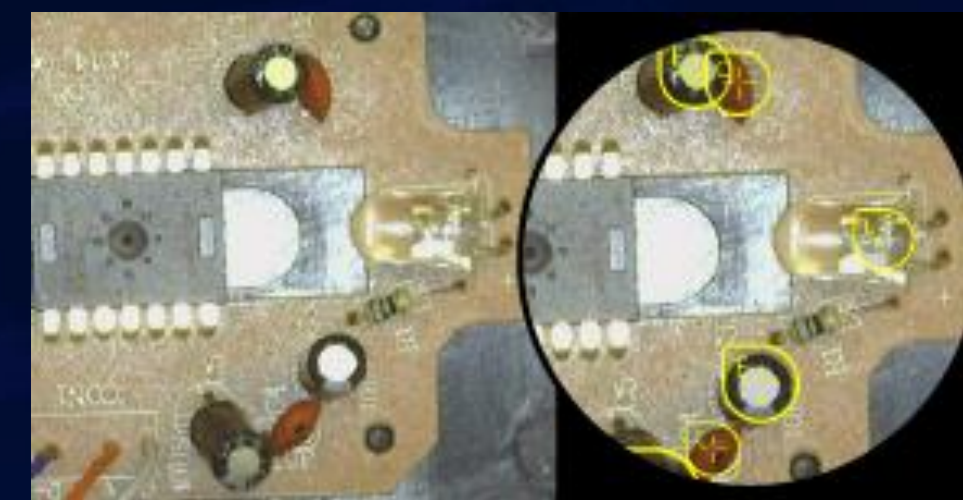
## 2.4 检测结果概况

检测项目	检测结果
错误接受率 (LDA FAR)	≤0.1%
错误拒绝率 (LPR FR)	≤1%
活体检测性能	<input type="checkbox"/> 基本级 <input checked="" type="checkbox"/> 增强级
人脸识别图像质量评估	通过
接口实现	未检测
激光安全检测	不适用

# FUNCTIONS OF AI IN MANUFACTURING

Train a CNN model with image data

Detect anomalies with localization and segmentation



Segmentation



Localization



Classifier



Detection

# APPLICATIONS OF AI IN MANUFACTURING

## 5 Typical AI Applications

### Manufacturing Inspection



- Quality control
- Improve yield rate
- Defect prediction

### Equipment Maintenance



- Maintain production
- Predict anomalies
- Respond in time

### Safety Alert



- Access control
- Safety alert
- Information security

### Supply Chain Management



- Improve supply chain
- Reduce waste
- Save cost

### Automated Communication



- Human-machine coordination
- Improve communication



# MANUFACTURING INSPECTION (I)

"Machine Vision" is the application of "Computer Vision" in industry and manufacturing. "Computer Vision" allows computers to extract information from images.

The use of machine vision in manufacturing inspection is called **Automatic Optical Inspection (AOI)**

## Installation Topology

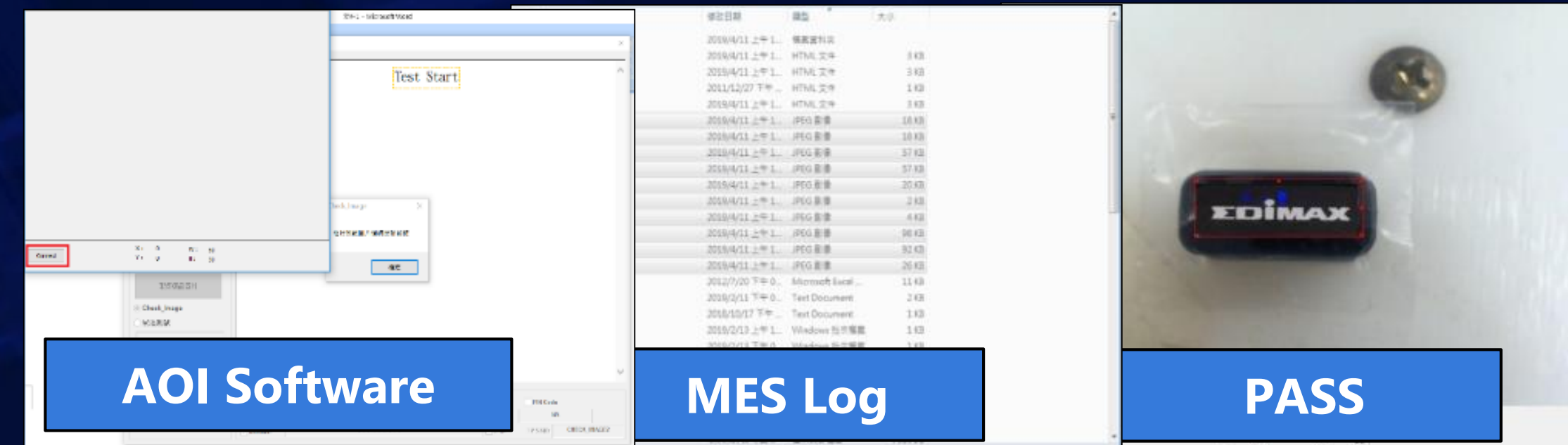
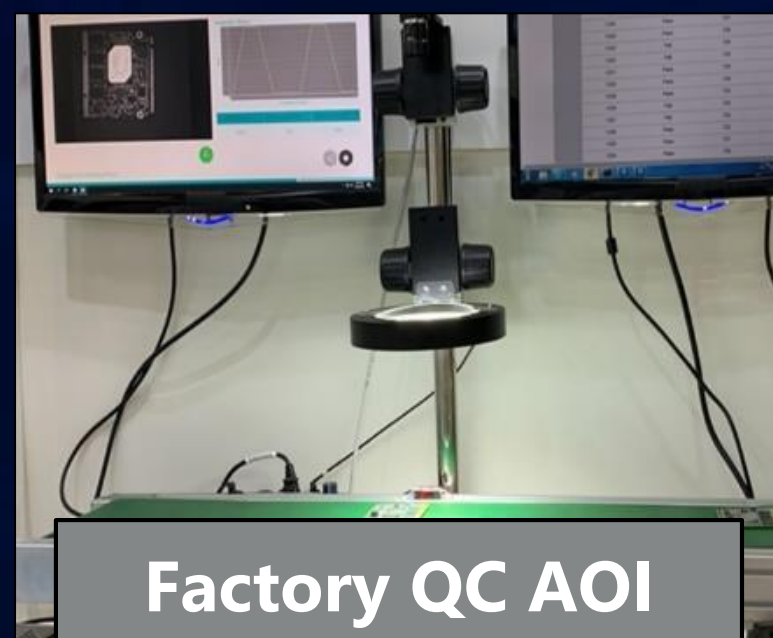
### AI Camera Module



AI Dongle

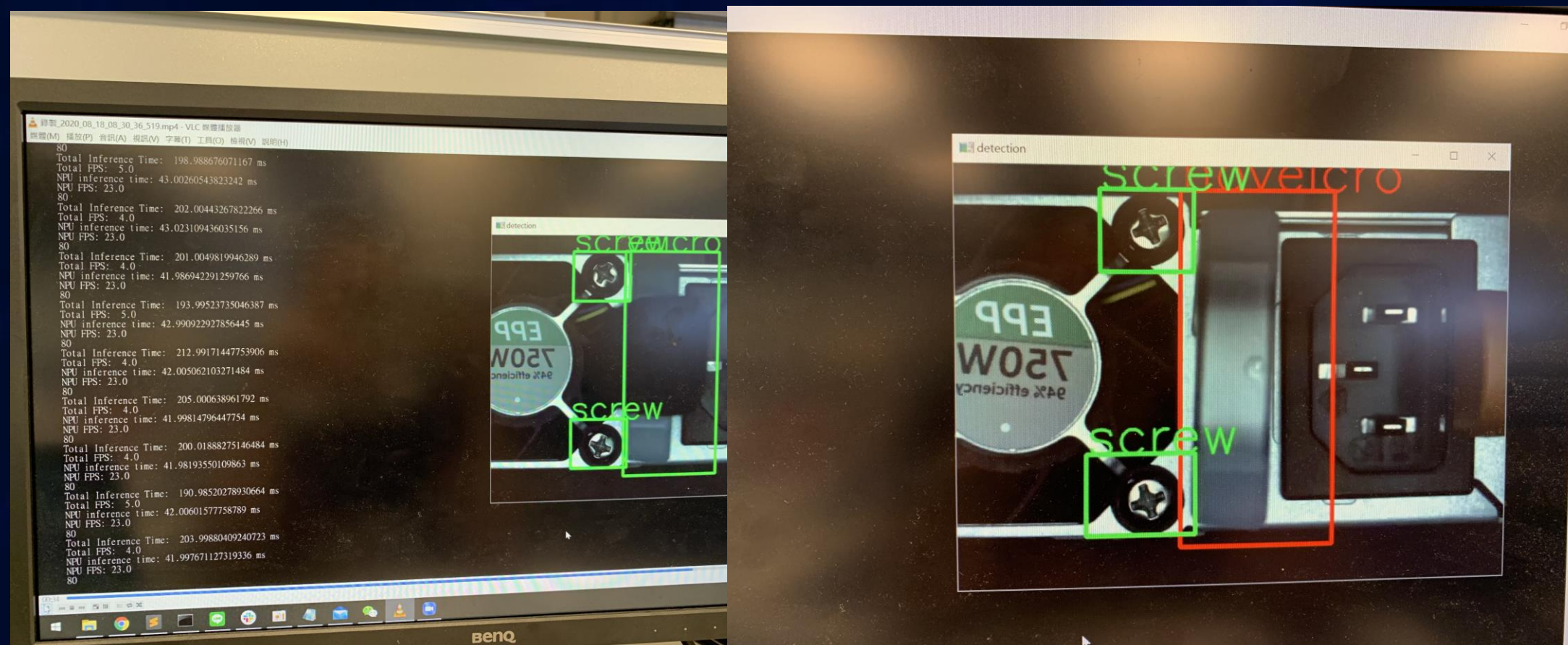


Factory Exist Equipment  
- Local Server Or Desktop



# MANUFACTURING INSPECTION(II)

## Screw detection



## AI 檢測連接器卡榫



- 專案硬體成本
- 1.Raspberry Pi 4 \$3xx/個
  - 2.USB攝像模組頭 \$5xx/個
  - 3.USB三色燈 \$65xx/個
  4. AI加速棒 \$18xx/個
- 總金額:1萬2有找



# MANUFACTURING INSPECTION(III)

瑕疵便辨便

使用說明：

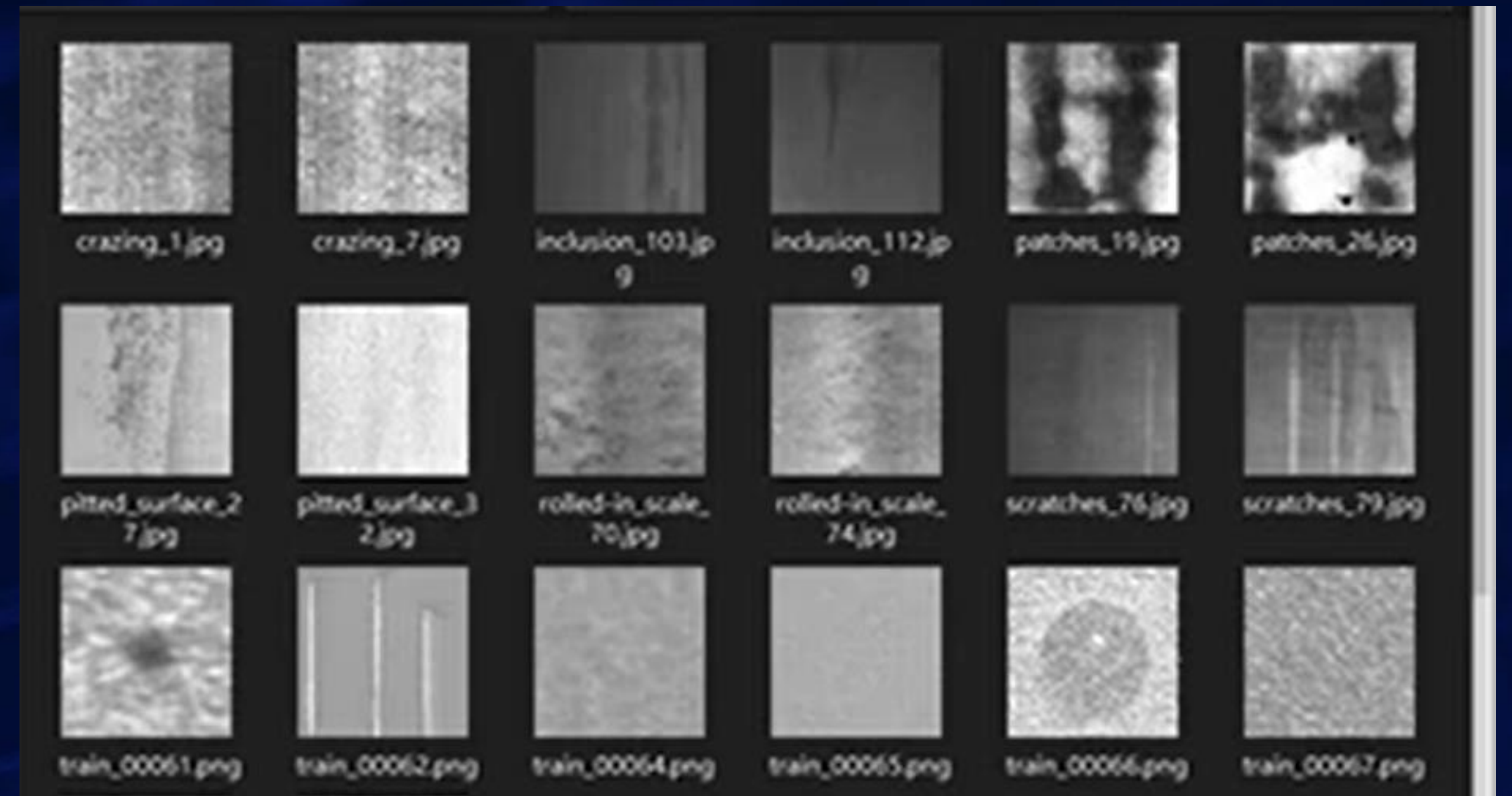
1. 點選SELECT，選擇待預測圖片所在資料夾
2. 點選OK，即可辨識圖片
3. 圖片測試結果將顯示在畫面右邊顯示欄
4. 點選download csv後，請至./host\_lib/python/output, 取用csv檔案，名稱同預測圖片所在資料夾之名稱

SELECT

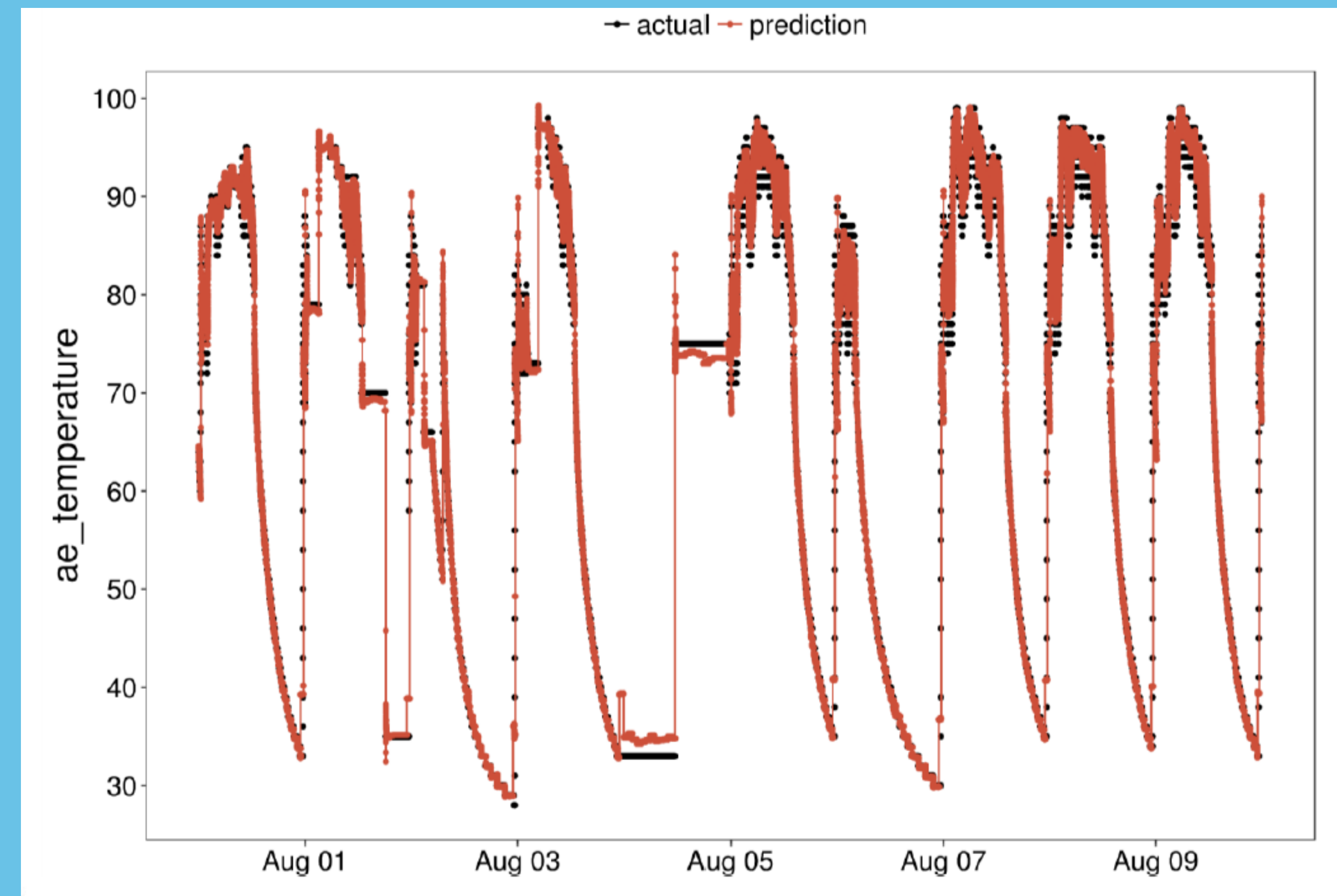
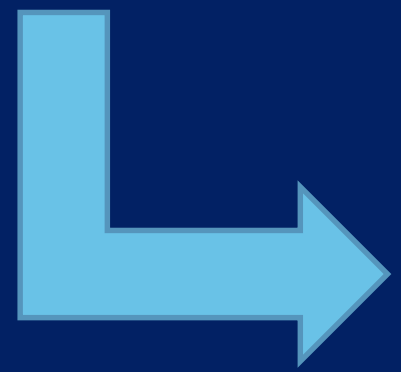
OK

測試請等待一段時間


crazing_1.jpg,	9
crazing_7.jpg,	9
inclusion_103.jpg,	8
inclusion_112.jpg,	8
patches_19.jpg,	7
patches_26.jpg,	7
pitted_surface_27.jpg,	6
pitted_surface_32.jpg,	6
rolled-in_scale_5.jpg,	5
rolled-in_scale_70.jpg,	5
scratches_76.jpg,	4
scratches_79.jpg,	4
train_00061.png,	3
train_00062.png,	2
train_00064.png,	0
train_00065.png,	0
train_00066.png,	1
train_00067.png,	0
train_00068.png,	0
train_00069.png,	3



# PREVENTATIVE MAINTENANCE




# Entrance – Tailgating Detection & People Recognition

	Description
Definition	<ul style="list-style-type: none"><li>● Integrate multiple camera and provide a high level access control application via people counting, body temperature and people recognition</li></ul>
Application	<ul style="list-style-type: none"><li>● Access control</li><li>● Public domain – Entrance</li></ul>
Highlight	<ul style="list-style-type: none"><li>● Analyze object and environment precisely</li></ul>
Scenario Demo	 A 3D architectural rendering of a modern entrance system. The scene shows a walkway leading through two sets of dark, vertical-slatted doors. On the left is a glass-walled security booth with a person inside. On the right is a decorative pillar with a textured facade. Above the entrance, several security cameras are mounted on a ceiling structure. Two circular icons are overlaid on the image: one on the left showing a head with a lightning bolt (representing temperature or health monitoring) and one on the right showing a person silhouette with a bounding box (representing people recognition). The background is a plain white wall.

# People Detection

	Description
Definition	●Detect People & identify object at once and then camera can filter non-defined motion and avoid false alarm
Application	●Industrial 禁制區
Highlight	●Analyze object and environment precisely
Scenario Demo	<p>3m</p>  <p>7m</p>  <p>20 M, Brightness variation</p>  <p>30M</p> 

# Safety - Limitation Area Detection

	Description
Definition	● Detect & identify object at once and then camera can filter non-defined motion and avoid false alarm
Application	● Industrial Restrict
Highlight	● Analyze object and environment precisely
Scenario Demo	

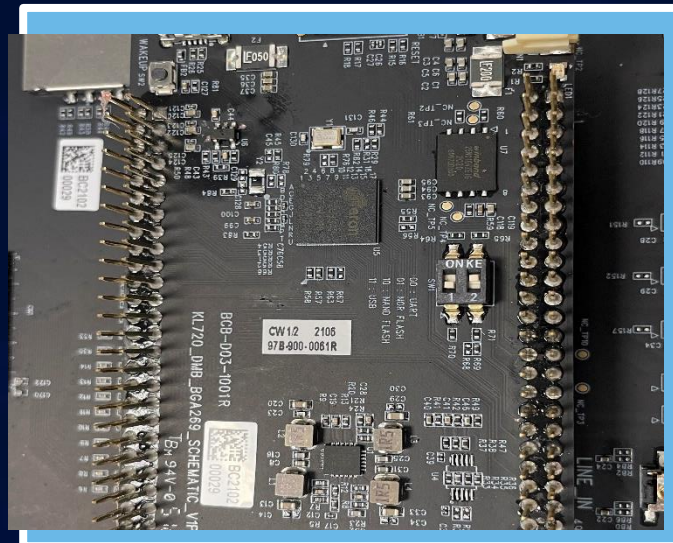
# **KNERON SOLUTION**

**HARDWARE | SOFTWARE**



# Hardware Solution

96 Board



88x56mm PCBA  
Evaluation Kit

Structure Light AI  
Module



Facial payment  
Smart Door Lock

M.2 Cards



Empower AI on  
existing devices  
mPCIe Interface

KL520 AI Dongle



Empower AI on  
existing devices  
USB Interface

KL720 AI Dongle



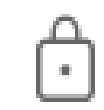
Empower AI on  
existing devices  
USB Interface

# Software Reference

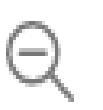
KNEO



Kneron Show Room



https://kneo.kneron.com/products/software#softwareCategory-5



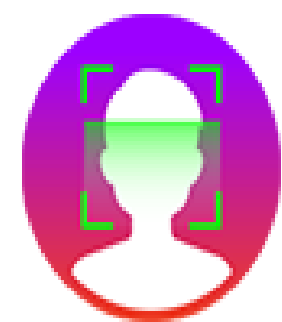
About

Software

Hardware



## Smart Factory



Facial recognition

Kneron, Inc.

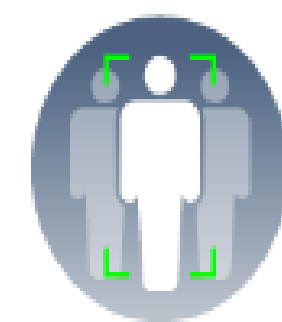
NT \$299



People detection

Kneron, Inc.

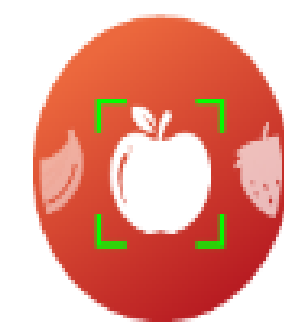
NT \$149



People detection in...

Kneron, Inc.

NT \$60



Object detection in...

Kneron, Inc.

NT \$60



KL720 ObjectDetect...

Kneron, Inc.

NT \$60



瑕疵便辨便

YZU\_HC

NT \$60



AI\_Connector connection...

至德科技有限公司

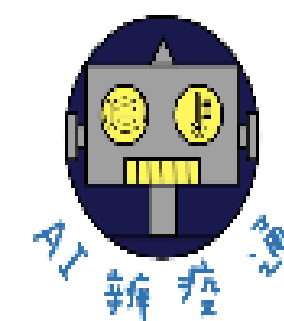
NT \$60



fire and smoke detection

RescueFire

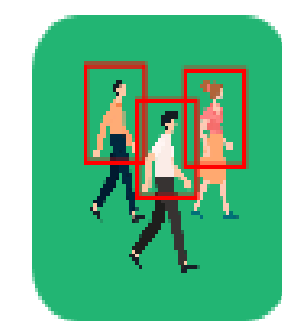
NT \$60



AI-Epidemic prevention...

AI辨疫通

Coming Soon



People

平常心

Coming Soon

# Support Resource

The screenshot shows the Kneron website's Document Center. The navigation bar includes links for SoC, Technology, Solutions, Support, News, About us, Contact us, and KNEO AI APP STORE. The main heading is "Document Center (kneron.com)". Below this, there is a "Developers" section with a paragraph explaining the page's purpose for partners. A "DEVELOPERS FORUMS" button is visible. The "Documentation center" section contains a table with columns for Document name, Version, and Latest modified. A "Need help?" section provides contact information for the support team.

Document name	Version	Latest modified
<a href="#">Kneron Documentations</a>		2020-07-02 <a href="#">Open link</a>
<a href="#">opencv 3.4.1</a>	3.4.1	2021-01-19 <a href="#">Download</a>

The screenshot shows the Kneron Show Room page. The navigation bar includes links for All, Object Detection, Face Recognition, License Plate Related, Regression, Liveness, Classification, and Audio. Three featured models are displayed with images and descriptions:

- CarDLPOCR**: Provided license plate detection and OCR. Input resolution recommend: 16:9 aspect ratio 720p and 1080p.
- ObjectDetection 4class**: Provided four classes detection for indoor scenario: Person, Bottle, Chair, Potted-plant. Input resolution recommend: 16:9 aspect ratio 720p and 1080p. Format supported YUV422/RGB565/RGBA. FOV: 120 degree. Camera height: 2.5 m.
- ObjectDetection 8Class**: Provided 8 classes detection: Person, Bicycle, Car, Motorcycle, Bus, Truck, Cat, Dog. Input resolution recommend: 640x360x3. Format supported YUV422/RGB565/RGBA. FOV: 120 degree. Camera height: 2.5 m.

The screenshot shows the Kneron Developer Forums page. The navigation bar includes links for Document Center, Categories, and Discussions. The main heading is "Kneron Developer Forums". Below this, there are several discussion categories:

- KL520 related discussion**: Any Kneron KL520 HW or SW issues, bugs, release notices, announcements etc....to be discussed here. 102 discussions, 427 comments. Most recent: 從0開始學習KL520 AI訓練 by Andy Hsieh on January 6.
- AI Model migration**: Any issues, bugs, discussions related to AI model migration to Kneron's SoC. 73 discussions, 401 comments. Most recent: Yolov7-tiny轉檔問題 by Timothy on January 31.
- KL720 related discussion**: Any Kneron KL720 HW or SW issues, bugs, release notices, announcements etc....to be discussed here. 79 discussions, 306 comments. Most recent: NCPU自定義Pre-process和Post-process的範例 by Maria Chen on 3:45PM.
- M5S and KLX\_5 related discussion**: issues for M5S and KLX\_5 chip can discuss here. 1 discussion, 0 comments. Most recent: SDK M5S 2.4.5中获取模型推理结果的问题 by jie.lin on September 2022.
- Innoserve area**: For Innoserve related topic and data. 31 discussions, 128 comments. Most recent: onnx轉成nef格式出現KeyError: 'images'的問題 by 蔡泊均 on November 2022.

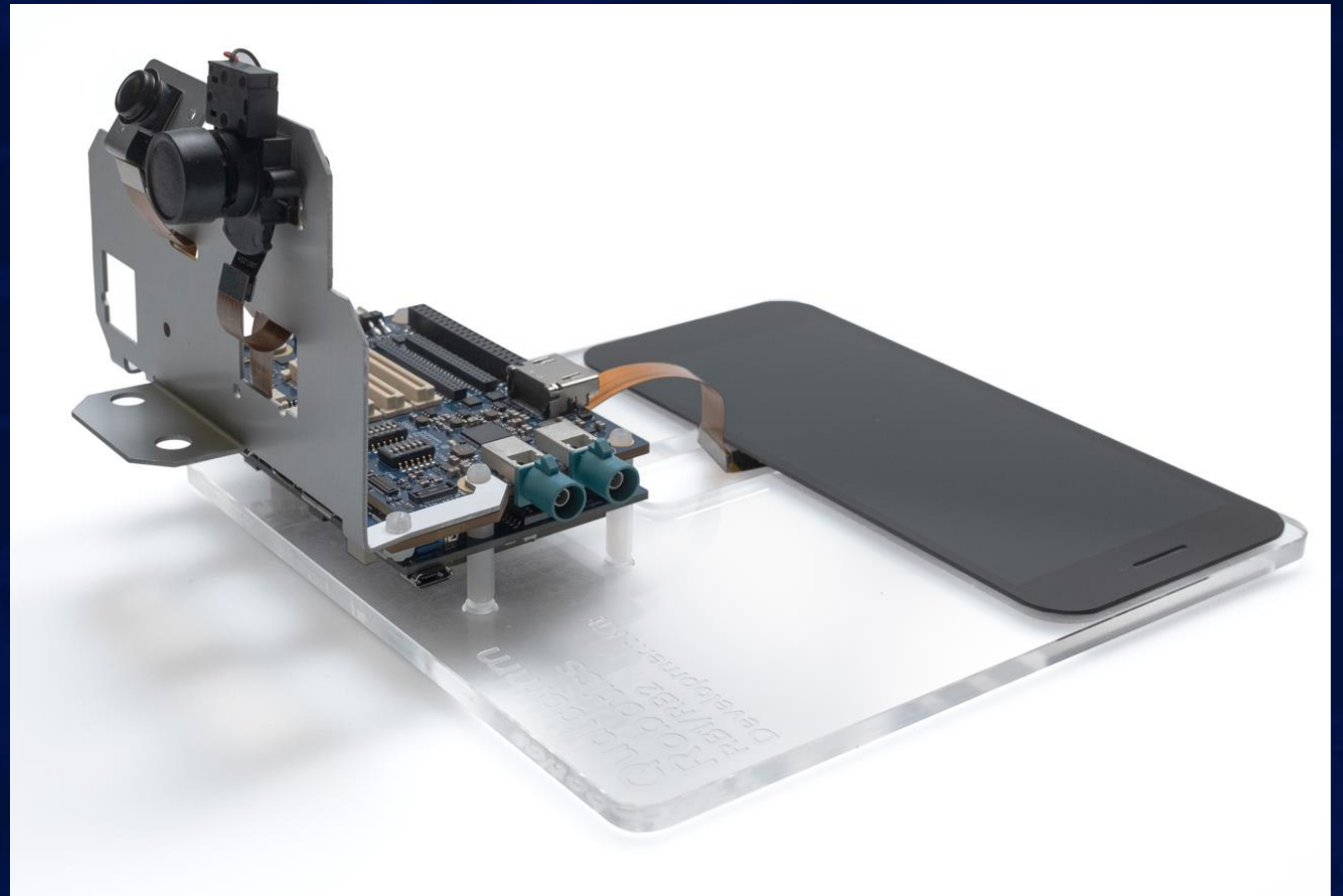
The screenshot shows the GitHub repository for Kneron/Model\_Zoo. The repository is public and has 45 commits. The main branch is selected. The repository contains several folders and files:

- classification: update resnet50 (2 years ago)
- detection: Delete .DS\_Store (2 years ago)
- mmclassification/regnet: add mmclassification regnet pretrain (10 months ago)
- mmclassification/yolox\_s: add mmdetection yolox\_s pretrain model and config (last year)
- mmclassification/rsn18\_freihand: update for mmpose (9 months ago)
- mmclassification/stdc\_1: add mmsegmentation stdc pretrain model and config (10 months ago)
- mmclassification/bytetrack: add mmtracking pretrained model (10 months ago)
- regression/litehmet: add litehmet (2 years ago)
- LICENSE: Initial commit (2 years ago)
- README.md: update resnet50 (2 years ago)

# Qualcomm® Robotics RB2 AI Platform

Powered by Qualcomm® QRB4210 SoC +Kneron KL720

Dream up and deploy a new generation of everyday robotics and IoT products for the masses without sacrificing features or performance.



# QRB4210 AI Market Fit



Powerful entry-tier chipset for a wide range of robotics and everyday IoT products

Uncategorized

# AI Chipsets Market 2022 Global Growth, Size, Opportunities, Trends, Revenue, Leading Company Analysis, Key Country Forecast to 2027

Posted on June 11, 2022 by vishwajit.d

The global AI Chipsets Market Size | 2022 Information, Communication & Technology Industry Global Analysis By Covid-19 Impact On, Size, Trends, Growth, Share, Business, Key Players, Merger, Statistics, Competitive

2027, from 8.14 Billion in 2019, at a **Compound Annual Growth Rate (CAGR) of 38.9% during the forecast period.**

**Request Sample Copy of the Report:**

<https://www.fortunebusinessinsights.com/enquiry-sample-pdf/104500>

**Major AI Chipsets Market Size companies covered in the market report include:**

Major players operating in the global AI Chipsets Market are NVIDIA Corporation (California, United States), Intel Corporation (California, United States), Xilinx, Inc. (California, United States), Samsung Electronics Co., Ltd. (Suwon, South Korea), **Micron Technology, Inc.** (Idaho, United States), **Kneron** (California, United States), **Alibaba Group Holding Limited** (Hangzhou, China), **Qualcomm Technologies, Inc.** (California, United States), International Business Machines Corporation (IBM) (New York, United States), Alphabet Inc. (Google LLC) (California, United States).

13:45 49% 4G

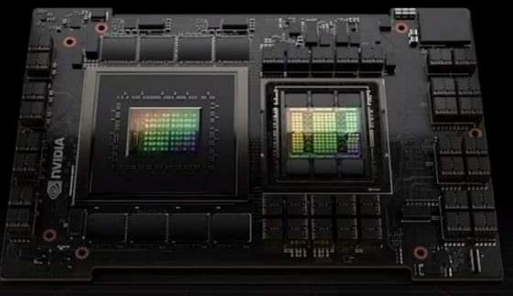
← kneron ×

全部 貼文 人物 社團 活動 相片 影片 粉

colocation, utilities etc).

Nvidia's sudden interest in becoming a service provider of its own is likely to make its partners slightly uncomfortable. The chair of the TIEA (Taiwan Internet and E-Commerce Association), which regroups some of the biggest names in the tech hardware industry, was lucid enough to declare yesterday that the company will "incur cooptation" with leading cloud service providers (CSP), and will likely accelerate the quest for an alternative to Nvidia, to establish an equilibrium.

All eyes are on AMD (with its Instinct MI300 GPU) and Intel but lurking in the shadows are a roster of challengers (Graphcore, Cerebras, **Kneron**, IBM and others) that will want a piece of a growing pie.



techradar.com

How to build your own ChatGPT alternative on the cheap? There's one way

讚 留言 分享

||| ○ <

# KNERON'S TECHNOLOGY EDGE (CON'T)

Independent Benchmarking Done by UC Berkeley Puts Kneron in Unique Company



Figure 9: Throughput comparison of different commercial edge processors for NN inference at the edge.

Published by UC Berkeley, A Survey of Quantization Methods for Efficient Neural Network Inference, Mar 2021

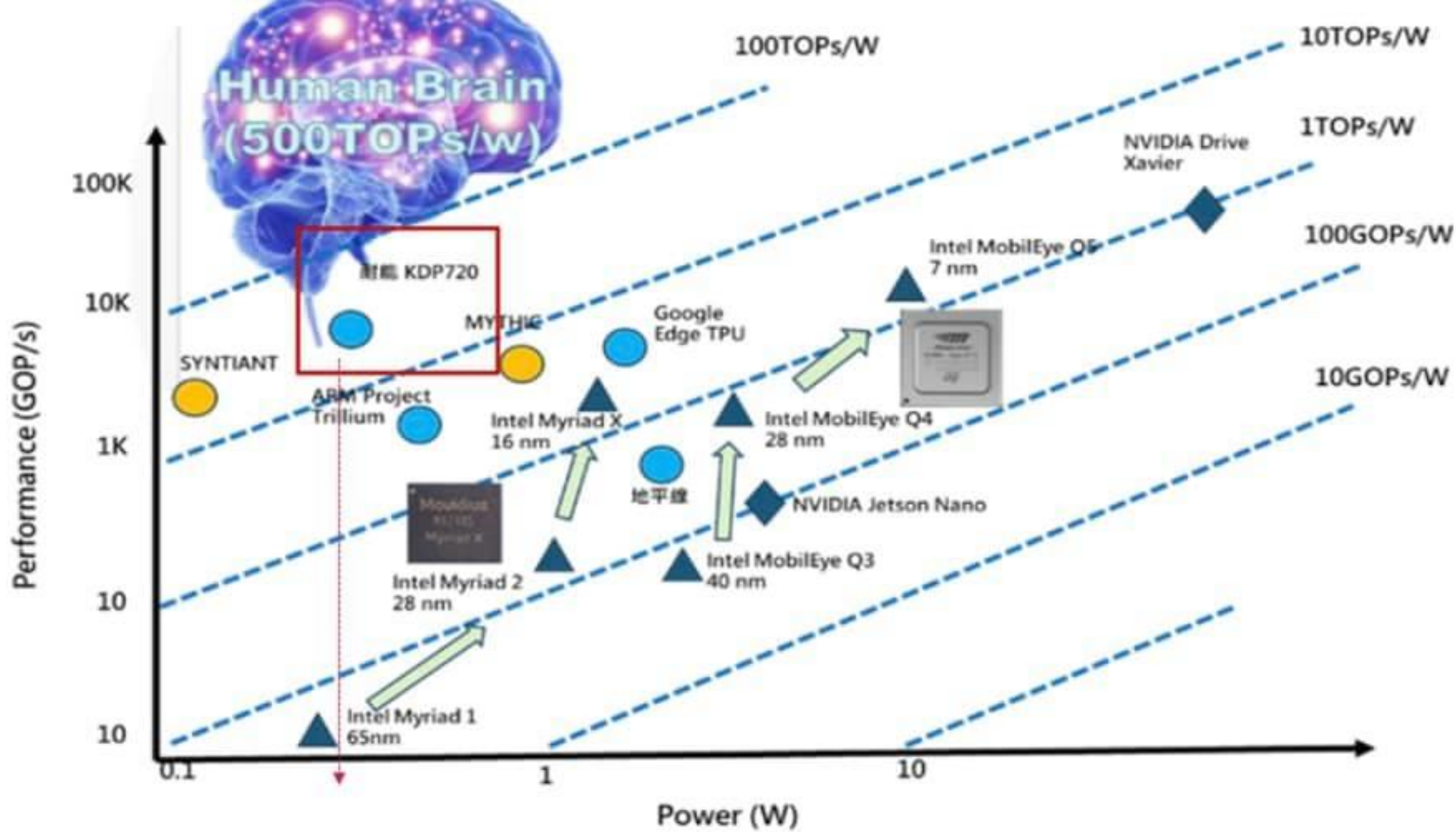


圖4 嵌入式AI平台往人腦效率發展

資料來源：工研院產科國際所





A Leading Edge AI Company